PUBLIC NOTICE
SHIRE OF SHARK BAY

Lot 304 Sunday Island Bay, Dirk Hartog Island
Proposed Local Development Plan

The Shire of Shark Bay has received a proposed Local Development Plan (LDP) for **Lot 304** Sunday Island Bay, Dirk Hartog Island.

Lot 304 is a privately owned parcel of land that is approximately 11.3 hectares in area and is located on the southeastern coast of Dirk Hartog Island, facing Sunday Island Bay.

Above: Location Plan showing Lot 304 Sunday Island Bay

The purpose of an LDP is to guide future development. An LDP is a mechanism used to co-ordinate and assist in achieving better built form outcomes by linking design to future development.

➢ CONSULTATION AND ADVERTISING

The Shire is advertising the LDP to provide government agencies, key stakeholders, local residents, the local community and general public with an opportunity to comment.

The proposal has been referred to the Department of Biodiversity, Conservation and Attractions, the Shark Bay World Heritage Advisory Committee, the Department of Water, Environment and Regulation, the Department of Health WA, the Department of Planning, Lands and Heritage, the Department of Primary Industries and Regional Development, Malgana Aboriginal Corporation, Tourism WA and other landowners on Dirk Hartog Island.

Public comments are requested to be lodged within 30 days (ie by 6 September 2025)
You can lodge a written submission to the Shire of Shark Bay, Chief Executive Officer, 65 Knight Terrace, Denham WA 6537 or email your submission to admin@sharkbay.wa.gov.au

The Local Development Plan will be assessed by an independent planning consultant engaged by the Shire, and a report on the LDP (including all submissions) will be referred to a future Council meeting for consideration.

Please be advised that submissions may be summarised in a future agenda report, and form part of a public agenda and minutes.

➢ GENERAL INFORMATION

A. Planning Context: Shire of Shark Bay Local Planning Scheme No 4 (the Scheme)

A Special Use zone applies to Lot 304 under the Scheme, that requires the preparation and submission of a Local Development Plan (LDP) before development can occur.

The Scheme states that the objective of this Special Use zone is to "*provide for ecotourism development*" and the Scheme also details the matters that the LDP has to address.

An LDP has been prepared on behalf of the landowners of Lot 304, and received by the Shire for assessment. The Shire has accepted the LDP for processing and advertising.

The fact that the LDP has been accepted for advertising, does not in itself, mean that it is supported by the Shire. A future report on the LDP will have to be considered by Council, along with the issues raised in any submissions.

B. Summary of Local Development Plan

The LDP consists of a plan showing the building envelopes and supporting text.

The LDP proposes:

- Eight (8) building envelopes, with all buildings to be accommodated within the building envelopes, unless otherwise approved by Council;
- Each building envelope measures 2,250m^2, and may accommodate up to four (4) visitor accommodation units plus staff accommodation, resulting in a maximum of 32 visitor accommodation units (plus staff accommodation units);

- Each building envelope will accommodate all ancillary development including water tanks for drinking water, servicing infrastructure (including effluent disposal areas) and ancillary outbuildings (sheds);

- Parking and fire fighting water tanks would be located outside the building envelopes;

- A maximum of 100 persons (visitors and staff) is proposed to be accommodated within the LDP area;

- Tracks for vehicular access are proposed along the rear, front and both sides of the lot with designated access points to each building envelope; and

- A maximum building height of 4.85 metres is proposed, measured from the finished floor level to the roof ridge line of each accommodation unit.

C. Supporting Documents

The supporting documentation that has been provided to accompany the LDP includes the following:

1. A Management Plan relating to matters including visitor access, servicing, maintenance, waste water, rubbish and effluent disposal;

2. Design Guidelines which detail built form, construction type and materials as well as standards for ancillary structures, paths and vegetation;

3. An Environmental Report which provides information in regard to servicing including water, power and effluent disposal. This report also provides a visual impact assessment, a biosecurity implementation plan and an indicative building envelope plan;

4. A report on Coastal Processes which details coastal setbacks and finished floor levels for the accommodation units;

5. Flora Reports;

6. A Site and Soil Evaluation; and

7. A Bushfire Management Plan (BMP) and Bushfire Emergency Plan.

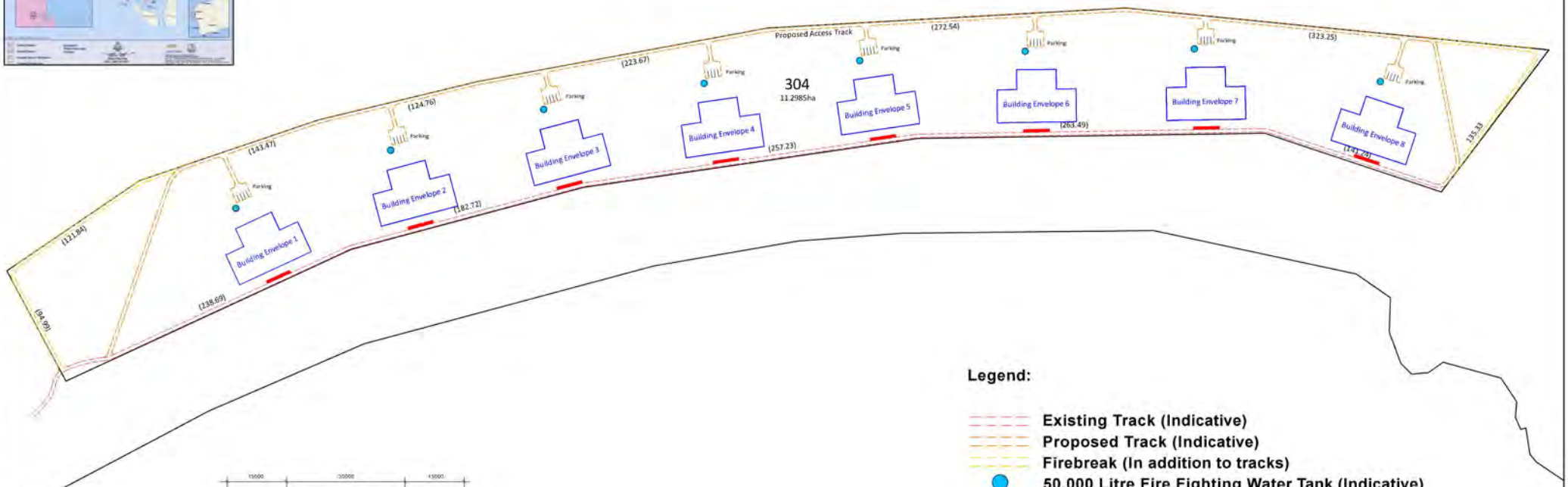
All reports, plans and documents relating to the LDP are available on the Shires website and are generally too large to email.

- **GENERAL QUERIES**

If you have any queries, please do not hesitate to contact Amanda Butterworth on 9382 3000. Amanda is the planning consultant who will be assessing the Local Development Plan, and providing advice on the LDP to the Shire of Shark Bay.

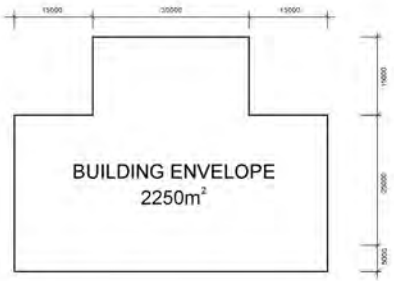
Dale Chapman
Chief Executive Officer
8 August 2025

ATTACHMENT 1
LOCAL DEVELOPMENT PLAN
ADVERTISING COPY



Legend:

- Existing Track (Indicative)
- Proposed Track (Indicative)
- Firebreak (In addition to tracks)
- 50,000 Litre Fire Fighting Water Tank (Indicative)
- Vehicle Parking
- Passing Lanes



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Endorsement Table: This Local Development Plan has been approved by the Shire of Shark Bay Council at its Ordinary Meeting held on..... in accordance with Clause 52(1) of the Planning and Development (Local Planning Schemes) Regulations 2015

Chief Executive Officer..... **Date**.....

LOCAL DEVELOPMENT PLAN

Lot 304 on DP 50257, Dirk Hartog Island

50 0 50 100 200 300m

Source of Information

Site boundaries: Harley Dykstra
Projection: MGA94

NOTE

All areas and dimensions are subject to survey, engineering and detailed design and may change without notice.

Project Lot 304 on DP 50257, Dirk Hartog Island | Scale 1:3000 @ A3 | Date: February 2025

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Local Development Plan

Lot 304 Dirk Hartog Island (Sunday Island Bay)

1.0 Statutory Requirements

This Local Development Plan (LDP) has been prepared in accordance with Schedule 2 Part 6 of the deemed provisions of the Planning and Development (Local Planning Schemes) Regulations 2015.

Lot 304 Sunday Island Bay is zoned Special Use No 14 (SU14) under the Shire of Shark Bay Local Planning Scheme No 4. Under Schedule B of the Scheme specific conditions apply to the Local Development Plan and the ensuing development of Lot 304.

2.0 Objectives

Condition 1 of SU 14 states that the objective of SU 14 is to 'provide for eco-tourism development' with specific conditions applying to any proposed development on the site which shall address and demonstrate compliance with the objective of the zone.

The objectives of this Local Development Plan are to:

a) Facilitate a co-ordinated eco-tourism development upon the site via future approval of development applications.

b) Ensure that the proposed use and/or development will have a low impact on the natural environment, not compromise the high conservation values and have regard for the need to protect the ecological values and special attributes of the island.

c) Mitigate bushfire threat for the future development upon the site through mitigation measures in accordance with the State Government's Guidelines for Planning in Bushfire Prone Areas.

d) Include a Management Plan as a supporting document to address future management of the site pursuant to approval of development applications.

e) Demonstrate that the proposed development will be of a high architectural quality via detailed Design Guidelines which will be sympathetic to the site.

f) Respect Coastal setbacks and monitor inundation risk, erosion risk, beach access and dune management.

g) Include an Environmental Report as a supporting document that demonstrates that the LDP and any proposed use and or development will have a low impact on the natural environment.

3.0 Land Uses

Permissible Land Uses are controlled by Scheme No 4 which, for the Special Use zone Clause 21 of the Scheme, refers to Schedule B of the Scheme which under Condition 7 for SU14 requires that "Any development or Local Development Plan shall demonstrate alignment with the objective of the zone" which for SU14 is guided by Condition 1 which states that its objective is to 'provide for eco-tourism development'.

While SU14 has no Permissible Land Uses, it's Discretionary Uses for the delivery of the objective of the zone include Camping ground, Caravan Park, Holiday accommodation and, most relevant for the zone objective, tourism development.

4.0 Building Envelopes

4.1 Lot 304 enjoys an expansive aspect to Sunday Island Bay, which the LDP capitalises on by locating the proposed eco-tourism development to be contained within eight (8) building envelopes. In determining a proposal outside a building envelope, consideration will be given to responsive design that minimises impact on the environmental and visual landscape character of the location.

4.2 All ancillary development including water tanks, vehicle parking, servicing infrastructure and ancillary outbuildings are to be sited having regard for the following:

- Minimising removal of remnant vegetation.
- Soil suitability/capability for effluent disposal
- Bushfire management.
- Coastal hazard risks.
- Any other practical considerations such as topography.
- Outbuildings are only to be constructed to the rear of any building envelope so as not to obstruct the coastal aspect or views from the accommodations and to minimise visual impact as viewed from Sunday Island Bay.
- A development application may trigger the requirement to establish the depth to water below that building envelope as a condition of development
- Effluent disposal is to be contained within building envelopes

5.0 Building Design, Height, Built Form, Visual

* Detailed design guidelines to control colours, materials, built form, scale to achieve a development sympathetic to the natural character of the island are attached. Through its supporting Design Guidelines document, the LDP will provide guidance on design elements to ensure a high architectural quality, but low scale development outcome is achieved.

All buildings and outbuildings will be low scale and sympathetic to the location taking into account the undulating topography, physical characteristics and unique character of surrounding area consistent with the Scheme objectives and design guidelines. Any future development is to have regard to and address the Design Guidelines.

* A visual impact assessment may be required as a condition of development when development applications are submitted to Council to demonstrate that any development will not negatively impact on World Heritage values or detract from the scenic quality of the land.

* The Minimum finished floor level of any building must not be less than 4.2 AHD (Australian Height Datum)

* Maximum building height is 4.85m measured from the finished ground floor level.

* Buildings raised more than 1.0m above the minimum floor level must demonstrate that the bulk and scale of the building takes into account topography, natural landscape and coastal amenity of the location.

* Buildings to be constructed above ground using eco anchors, pylons or similar methods

6.0 Siting & Setbacks

The linear nature of Lot 304 allows that eight building envelopes can be distanced from each other. The LDP allows four accommodation units and staff accommodation within each envelope, providing for thirty-two accommodation units in accordance with the limit of thirty-three applied to Lot 304 when it was created as a freehold title. Sited in locations which respect the topography whereby all future accommodations will enjoy views of Sunday Island Bay and will be backed with predominantly higher topography, thereby minimising visual impact from the future development. Each of the building envelopes is based on an 11m setback line running parallel from the southern boundary of Lot 304 in accordance with bushfire management requirements.

Coastal setbacks are to comply with relevant State Planning Policy in conjunction with the annexed Damara WA Pty Ltd technical reports.

7.0 Environmental, Vegetation

7.1 No introduced non-native species shall be planted on Lot 304.

7.2 Revegetation shall not occur in conflict with the recommendations of any Bushfire Management Plan approved by the local government.

7.3 Management and visitors shall be guided by the Dirk Hartog Biosecurity Implementation Plan 2015.

7.3.1.1 Any development proposed must embrace low impact on the natural environment, not compromise the high conservation values of the World Heritage Area of the location and have regard to protect the ecological values and special attributes of the island

7.3.1.2 An environmental report and Flora Significance report is attached as a base for future development applications that includes information on building envelopes, visitor numbers and vegetation and biosecurity measures..

8.0 Bushfire Management

8.1 The subject site is located within a designated bushfire prone area under the Western Australian State Map of Bush Fire Prone Areas (DFES).

*Any development applications (DA) for habitable buildings shall be accompanied by a Bushfire Management Plan addressing the requirements under State Planning Policy 3.7 Bushfires 2024 and associated Planning for Bushfire Guidelines

*Any application for development of habitable buildings shall demonstrate compliance in accordance with State Planning Policy 3.7 Bushfires and Planning for Bushfire Guidelines 2024.

8.2 An onsite manager shall be responsible for the implementation and management of any Bushfire Management Plan and EEP and/or BAL Assessment approved by the local government.

8.3 Vegetation (existing or proposed) in Asset Protection Zones within Lot 304's building envelopes shall be managed and maintained as 'low threat vegetation' in accordance with any Bushfire Management Plan and/or BAL Assessment approved by the local government.

*Vegetation management within APZ areas must be minimised and in line with the Planning for Bushfire Guidelines November 2024 to ensure any development will have a low impact on the environment and not negatively impact on World Heritage values or detract from the scenic quality of the land

9.0 Service Infrastructure

9.1 Development application(s) is to address effluent disposal in accordance with the Government Sewerage Policy 2019 and having regard to the Site and Soil Assessment Evaluation for Lot 304 Sunday Island Bay.

9.2 Development application(s) shall demonstrate servicing of building envelopes and development thereon with water supply (potable 10,000L and firefighting 50,000L tanks) and electricity, to the satisfaction of the local government.

9.3 Wind turbines are permitted at the discretion of the local government.

9.4 The use of renewable energy sources and wastewater reuse is encouraged where feasible.

9.5 Service areas including any outbuildings should be located behind the accommodation units out of view from Sunday Island Bay..

9.6 All trafficable areas including vehicle parking are to be maintained in their unformed state. Limestone grounds, shell grit or other approved materials may be used to form a natural base for such traffic.

9.7 A maximum of one (1) pedestrian path from each building envelope is permitted between the area from the lot and the beach and such path/s shall be constructed and maintained in accordance with the conditions of approval.

10.0 Management

A management plan is attached as required as a condition of development approval that addresses visitor access, servicing, maintenance, waste disposal, effluent disposal, service areas, rubbish management and the transport of construction material.

A Foreshore Management Plan may be required and referred to DBCA for endorsement as a condition of development when development applications are submitted to Council for approval.

11.0 Construction

11.1 Temporary Sea containers and structures associated with construction may be in place for a maximum period of 12 months, or longer period approved by the local government, and thereafter removed from the island at the developer(s)/landowner(s) cost.

11.2 Construction access over the National Park strip between the site and foreshore shall only be by using raised ramps at locations approved by DBCA in order that vegetation will not be compromised.

12.0 Staging

Development within any of the eight building envelopes may be undertaken by stages, with any stage proposed beyond a first stage dependent upon that stage being approved, constructed and operationally meeting the objectives of the Special Use zone and the conditions of SU 14 .

13.0 Advice Notes

13.1 Regarding the building envelopes, Lot 304 is subject to covenants to the benefit of the Minister for Lands and should be referred to by development proponents. Amongst other things the covenants provide details in relation to:

- The number of visitor accommodation units that may be built or placed on the land and the floor area of each 'visitor accommodation unit'; and
- The 'staff accommodation' and the ratio of staff to guests and floor area per staff personnel being housed.

13.2 Regarding Bushfire Management, Lot 304 is in a designated bushfire prone area. Visitors will be advised of the increased risks associated with bushfire when visiting Lot 304.

The Local Development Plan is an application for the approval of building envelopes within Lot 304 and the provision of supporting guideline documents for future development applications within the Lot 304 envelopes as required by SU14 Condition 3(i) to (vi) of Local Planning Scheme No 4.
THE SUBMISSION IS NOT AN APPLICATION FOR DEVELOPMENT

Local Development Plan

Lot 304 Sunday Island Bay
Dirk Hartog Island
February 2025

DHIDevelopment Pty Ltd
PO Box 107 NORTH FREMANTLE 6159

Local Development Plan & Conditions

Local Development Plan Application

Supporting Documentation

A Management Plan

B Design Guidelines

C Appendices to A & B

D Environmental Report

Appendices to D

a. Damara Coastal Process Reports

b. Flora Report

c. Flora Significance Report

d. Consolidated Flora List

e. Site & Soil Evaluation

f. DBCA Correspondence

g. Bushfire Management Plan

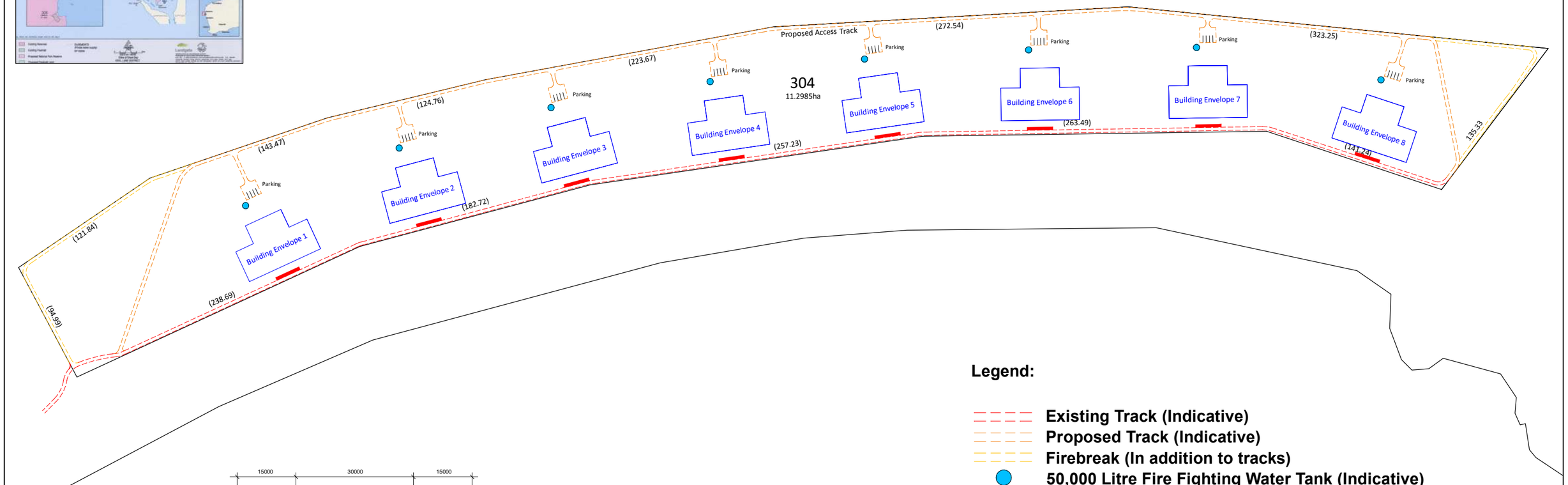
h. Bushfire Emergency Plan

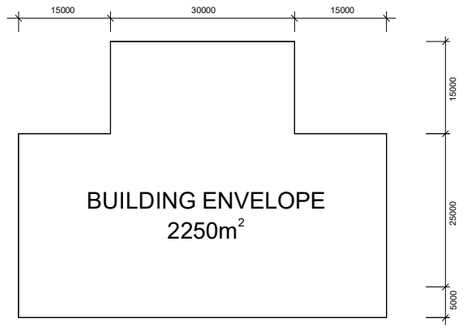
The Local Development Plan provides for eight building envelopes, tracks ,firebreaks, parking locations and fire fighting water tanks.
The conditions provide guideline parameters within which development applications can be submitted
THE SUBMISSION IS NOT AN APPLICATION FOR DEVELOPMENT

Local Development Plan Conditions & Plan

Lot 304 Sunday Island Bay
Dirk Hartog Island
February 2025

DHIDevelopment Pty Ltd
PO Box 107 NORTH FREMANTLE 6159





Scale 1:1000

Legend:

- **Existing Track (Indicative)**
- **Proposed Track (Indicative)**
- **Firebreak (In addition to tracks)**
- **50,000 Litre Fire Fighting Water Tank (Indicative)**
- **Vehicle Parking**
- **Passing Lanes**

Endorsement Table: This Local Development Plan has been approved by the Shire of Shark Bay Council at its Ordinary Meeting held on..... in accordance with Clause 52(1) of the Planning and Development (Local Planning Schemes) Regulations 2015

Chief Executive Officer..... Date.....

LOCAL DEVELOPMENT PLAN

Lot 304 on DP 50257, Dirk Hartog Island

50 0 50 100 200 300m

Source of Information

Site boundaries: Harley Dykstra
Projection: MGA94

NOTE

All areas and dimensions are subject to survey, engineering and detailed design and may change without notice.

Project Lot 304 on DP 50257, Dirk Hartog Island I Scale 1:3000 @ A3 I Date: February 2025

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Local Development Plan

Lot 304 Dirk Hartog Island (Sunday Island Bay)

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Lot 304 Sunday Island Bay is zoned Special Use No 14 (SU14) under the Shire of Shark Bay Local Planning Scheme No 4. Under Schedule B of the Scheme specific conditions apply to the Local Development Plan and the ensuing development of Lot 304.

2.0 Objectives

Condition 1 of SU 14 states that the objective of SU 14 is to 'provide for eco-tourism development' with specific conditions applying to any proposed development on the site which shall address and demonstrate compliance with the objective of the zone.

The objectives of this Local Development Plan are to:

a) Facilitate a co-ordinated eco-tourism development upon the site via future approval of development applications.

b) Mitigate bushfire threat for the future development upon the site through mitigation measures in accordance with the State Government's Guidelines for Planning in Bushfire Prone Areas.

c) Include a Management Plan as a supporting document to address future management of the site pursuant to approval of development applications.

d) Demonstrate that the proposed development will be of a high architectural quality via detailed Design Guidelines which will be sympathetic to the site.

e) Respect Coastal setbacks and monitor inundation risk, erosion risk, beach access and dune management.

f) Include an Environmental Report as a supporting document that demonstrates that the LDP and any proposed use and or development will have a low impact on the natural environment.

3.0 Land Uses

Permissible Land Uses are controlled by Scheme No 4 which, for the Special Use zone Clause 21 of the Scheme, refers to Schedule B of the Scheme which under Condition 7 for SU14 requires that "Any development or Local Development Plan shall demonstrate alignment with the objective of the zone" which for SU14 is guided by Condition 1 which states that its objective is to 'provide for eco-tourism development'.

While SU14 has no Permissible Land Uses, it's Discretionary Uses for the delivery of the objective of the zone include Camping ground, Caravan Park, Holiday accommodation and, most relevant for the zone objective, tourism development.

4.0 Building Envelopes

4.1 Lot 304 enjoys an expansive aspect to Sunday Island Bay, which the LDP capitalises on by locating the proposed eco-tourism development to be contained within eight (8) building envelopes. In determining a proposal outside a building envelope, consideration will be given to responsive design that minimises impact on the environmental and visual landscape character of the location.

4.2 All ancillary development including water tanks, vehicle parking, servicing infrastructure and ancillary outbuildings are to be sited having regard for the following:

- Minimising removal of remnant vegetation.
- Soil suitability/capability for effluent disposal
- Bushfire management.
- Coastal hazard risks (refer to Coastal Risk Management Plan Notes).
- Any other practical considerations such as topography.
- Outbuildings are only to be constructed to the rear of any building envelope so as not to obstruct the coastal aspect or views from the accommodations and to minimise visual impact as viewed from Sunday Island Bay.
- A development application may trigger the requirement to establish the depth to water below that building envelope as a condition of development
- Effluent disposal is to be contained within building envelopes

5.0 Building Design, Height, Built Form, Visual

* Detailed design guidelines to control colours, materials, built form, scale to achieve a development sympathetic to the natural character of the island are attached. Through its supporting Design Guidelines document, the LDP will provide guidance on design elements to ensure a high architectural quality, but low scale development outcome is achieved.

All buildings and outbuildings will be low scale and sympathetic to the location taking into account the undulating topography, physical characteristics and unique character of surrounding area consistent with the Scheme objectives and design guidelines. Any future development is to have regard to and address the Design Guidelines.

* A visual impact assessment may be required as a condition of development when development applications are submitted to Council to demonstrate that any development will not negatively impact on World Heritage values or detract from the scenic quality of the land.

* The Minimum finished floor level of any building must not be less than 4.2 AHD (Australian Height Datum)

* Maximum building height is 4.85m measured from the upper surface of the floor to the roof ridge line

* Buildings raised more than 1.0m above the minimum floor level must demonstrate that the bulk and scale of the building takes into account topography, natural landscape and coastal amenity of the location.

* Buildings to be constructed above ground using eco anchors, pylons or similar methods

6.0 Siting & Setbacks

The linear nature of Lot 304 allows that eight building envelopes can be distanced from each other. The LDP allows four accommodation units and staff accommodation within each envelope, providing for thirty-two accommodation units in accordance with the limit of thirty-three applied to Lot 304 when it was created as a freehold title. Sited in locations which respect the topography whereby all future accommodations will enjoy views of Sunday Island Bay and will be backed with predominantly higher topography, thereby minimising visual impact from the future development. Each of the building envelopes is based on an 11m setback line running parallel from the southern boundary of Lot 304 in accordance with bushfire management requirements.

Coastal setbacks are to comply with relevant State Planning Policy

7.0 Environmental, Vegetation

7.1 No introduced non-native species shall be planted on Lot 304.

7.2 Revegetation shall not occur in conflict with the recommendations of any Bushfire Management Plan approved by the local government.

7.3 Management and visitors shall be guided by the Dirk Hartog Biosecurity Implementation Plan 2015.

7.3.1.1 Any development proposed must embrace low impact on the natural environment, not compromise the high conservation values of the World Heritage Area of the location and have regard to protect the ecological values and special attributes of the island

7.3.1.2 An environmental report and Flora Significance report is attached as a base for future development applications that includes information on building envelopes, visitor numbers and vegetation and biosecurity measures..

8.0 Bushfire Management

8.1 The subject site is located within a designated bushfire prone area under the Western Australian State Map of Bush Fire Prone Areas (DFES).

*Any development applications (DA) for habitable buildings shall be accompanied by a Bushfire Management Plan addressing the requirements under State Planning Policy 3.7 Bushfires 2024 and associated Planning for Bushfire Guidelines

*Any application for development of habitable buildings shall demonstrate compliance in accordance with State Planning Policy 3.7 Bushfires and Planning for Bushfire Guidelines 2024.

8.2 An onsite manager shall be responsible for the implementation and management of any Bushfire Management Plan and EEP and/or BAL Assessment approved by the local government.

8.3 Vegetation (existing or proposed) in Asset Protection Zones within Lot 304's building envelopes shall be managed and maintained as 'low threat vegetation' in accordance with any Bushfire Management Plan and/or BAL Assessment approved by the local government.

*Vegetation management within APZ areas must be minimised and in line with the Planning for Bushfire Guidelines November 2024 to ensure any development will have a low impact on the environment and not negatively impact on World Heritage values or detract from the scenic quality of the land

9.0 Service Infrastructure

9.1 Development application(s) is to address effluent disposal in accordance with the Government Sewerage Policy 2019 and having regard to the Site and Soil Assessment Evaluation for Lot 304 Sunday Island Bay.

9.2 Development application(s) shall demonstrate servicing of building envelopes and development thereon with water supply (potable 10,000L and firefighting 50,000L tanks) and electricity, to the satisfaction of the local government.

9.3 Wind turbines are permitted at the discretion of the local government.

9.4 The use of renewable energy sources and wastewater reuse is encouraged where feasible.

9.5 Service areas including any outbuildings should be located behind the accommodation units out of view from Sunday Island Bay..

9.6 All trafficable areas including vehicle parking are to be maintained in their unformed state. Limestone grounds, shell grit or other approved materials may be used to form a natural base for such traffic.

9.7 One access path over the area between the lot and the beach front can be applied for from each development envelope when development planning commences and application for development is commenced for any stage.

10.0 Management

A management plan is attached as required as a condition of development approval that addresses visitor access, servicing, maintenance, waste disposal, effluent disposal, service areas, rubbish management and the transport of construction material.

A Foreshore Management Plan may be required and referred to DBCA for endorsement as a condition of development when development applications are submitted to Council for approval.

11.0 Construction

11.1 Temporary Sea containers and structures associated with construction may be in place for a maximum period of 12 months, or longer period approved by the local government, and thereafter removed from the island at the developer(s)/landowner(s) cost.

11.2 Construction access over the National Park strip between the site and foreshore shall only be by using raised ramps at locations approved by DBCA in order that vegetation will not be compromised.

12.0 Staging

Development within any of the eight building envelopes may be undertaken by stages, with any stage proposed beyond a first stage dependent upon that stage being approved, constructed and operationally meeting the objectives of the Special Use zone and the conditions of SU 14 .

13.0 Advice Notes

13.1 Regarding the building envelopes, Lot 304 is subject to covenants to the benefit of the Minister for Lands and should be referred to by development proponents. Amongst other things the covenants provide details in relation to:

- The number of visitor accommodation units that may be built or placed on the land and the floor area of each 'visitor accommodation unit'; and
- The 'staff accommodation' and the ratio of staff to guests and floor area per staff personnel being housed.

13.2 Regarding Bushfire Management, Lot 304 is in a designated bushfire prone area. Visitors will be advised of the increased risks associated with bushfire when visiting Lot 304.

Objective of the LDP is to:•
Provide a plan which shall guide the development of accommodation units on Lot 304 meeting the 'objective of the zone' establishing a unique tourist destination located within the Shark Bay World Heritage Property and Dirk Hartog Island National Park.•
Provide for development opportunities that will achieve beneficial economic, environmental and community outcomes that enhances the management and welfare of the Shark Bay World Heritage Property.•
Provide Design Guidelines that ensure that any development is of a high architectural quality designed to be low scale and sympathetic to the location taking account of topography, physical characteristics and the unique character of the surrounding area.•
Ensure compliance with all relevant State Planning Policies. •
Ensure any development has a low impact on the natural environment, not compromising the high conservation values and having regard for the need to protect the ecological values and special attributes of Dirk Hartog Island.•
Provide evidence that a BMP for the site can comply with and meet the conditions of SPP 3.7 Bushfire 2024
THE SUBMISSION IS NOT AN APPLICATION FOR DEVELOPMENT

Local Development Plan

Application

Lot 304, Sunday Island Bay
Dirk Hartog Island
February 2025

DHI Development Pty Ltd
PO Box 107 NORTH FREMANTLE

"DHI will be a world leading nature-based adventure tourism destination rich in heritage, cultural, terrestrial, aquatic and social experiences, a place where adventurous travellers immerse in a unique, sustainable wilderness environment that engulfs their heart, soul and mind, inspiring appreciation and conservation among current and future generations."

(Dirk Hartog Island Recreation and Tourism Opportunities Analysis, DBCA July 2023)

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Supporting Reports

A MANAGEMENT PLAN

B DESIGN GUIDELINES

C APPENDICES

D ENVIRONMENTAL REPORT

Appendices

- Damara Coastal Process Reports
- Flora Reports
- Site & Soil Evaluation
- Bushfire Management Plan
- Bushfire Emergency Plan

1. INTRODUCTION

1.1 History of Dirk Hartog Island

Dirk Hartog Island is an island located off the Gascoyne coast of Western Australia situated within the Shark Bay World Heritage Area. The island is about 80 kilometres long north to south and between 3- and 15-kilometres wide east to west. It covers an area of approximately 630 square kilometres. It is Western Australia's largest and most western island and is approximately 850 kilometres north of Perth, the capital of Western Australia.

The island was discovered by Dutch Captain Dirk Hartog on 25 October 1616 in the Dutch East India ship Eendracht en route from Cape Town to Batavia.

In 1869, Francis Louis von Bibra was initially granted a lease on a portion of the island and established a sheep station. Leases for additional areas were granted subsequently. In the 1800's the first homestead was located near or on what would become Lot 304, the subject of this Local Development Plan, and was subsequently dismantled and relocated to Lot 62 on the island's eastern coast, the second location for the homestead.

Acquired by the Withnell brothers from Messrs Moore and Meade in 1907, the island was regarded as an ideal place for a sheep station as there was no danger of rabbit invasion and minimal fencing was required. In 1909 it was carrying a flock of about 12,000 sheep and intended to increase the flock on the island to 25,000. By 1919 the pastoral lease was put up for auction by the owner James Nicholas who also owned other mainland stations.

In 1969 Perth's Lord Mayor Sir Thomas Wardle purchased the island to run it as a sheep station and later retired there. The island returned to government ownership in 2009 and became part of Dirk Hartog Island National Park, with the exception of four parcels of land, being:

- Lot 62, a freehold Title comprising 40.6755ha of land on the eastern coast of the island which accommodates the homestead which has been augmented by accommodation buildings. The homestead and accommodations are now run as an eco-tourism resort which is managed and maintained by Wardle's grandson, Kieran Wardle.
- Lot 303, a freehold Title comprising 17.3507ha of land which follows the eastern coast to the immediate north-west of Lot 62.
- Lot 304, a freehold Title comprising 11.2985ha of land on the south-eastern coast facing south across "Sunday Island Bay". Lot 304 is the subject of this Local Development Plan submitted for DHI Development Pty Ltd, the majority owner of the land (84%) on behalf of DHID and other minor owners (16%) since 2021; and
- Lot 305, a freehold Title comprising 4.5953ha of land overlooking the south-western corner of Sunday Island Bay, facing north-east across Sunday Island Bay, the owner being the Clough family.

The remainder of the island comprises:

- Lot 350, a Crown Land Title for a Reserve vested under Statute comprising "about 62,926ha" of land which is managed by the State's Department of Biodiversity, Conservation and Attractions (DBCA); and
- Lot 351, a site of "about 5ha" of land surrounded by Lot 350 on a rocky headland at the most northerly point of Dirk Hartog Island National Park, which is arguably the most historically significant site in Australia. Lot 351 is the site of Cape Inscription Lighthouse and Lighthouse keepers' quarters which was vested in the Shire but ultimately returned to the Department of Biodiversity, Conservation and Attractions when the Shire realised it was too costly to maintain.

The total area of the Island is therefore approximately 63,000 hectares.

1.2 Shire of Shark Bay Local Planning Scheme No. 4

The Shire's operative Local Planning Scheme No.4, which was gazetted on 1 October 2018, zones Lots 62, 303, 304 and 305 "Special Use", the requirements of which are prescribed in Schedule B of the Scheme. Properties zoned Special Use under the Scheme are allocated a number and the four freehold titled lots above have been allocated Special Use "SU14".

Schedule B prescribes that the objective of this zone is to provide for eco-tourism development, that subdivision of the above lots is not permitted and that a Local Development Plan with supporting Management Plan, Environmental Report and Design Guidelines, each of which are required prior to the application for development of any of the above four lots, is required: and Bushfire management in accordance with State Planning Policy.

Lots 62, 303 and 305 have been developed and only Lot 304, the subject of this LDP, is now submitted to the Shire for Council's approval, whereupon applications for the development of short-term accommodation units, which, over time, can be considered for approval when plans for any development are submitted to Council for development approval.

It is important to clarify that the Shire has advised that they will not consider any application for any development approval until such time as the Council approves a Local Development Plan for the lot.

1.3 History of the Local Development Plan for Lot 304

The Local Development Plan (LDP) is an application for the approval of eight building envelopes within Lot 304 and the provision of supporting guideline documents for future development applications within the Lot 304 building envelopes, within which applications for development approval (DA) can be submitted and approved by Council.

A previous LDP application by another consultant was submitted to the Shire in 2020 and was refused on several of Schedule B Scheme Conditions for Special Use SU14, including fundamental misunderstanding of Lot 304's undulating topography, the threat of bushfire attack and the means by which the bushfire threat can be mitigated. A new SPP3.7 -Bushfire- and Guidelines was introduced by DPLH in 2024 providing clarity to items above.

Correspondence from the Shire's town planning adviser, Liz Bushby, in 2020, has resulted in a new LDP:

> *"I would encourage you to look at the site with a FRESH PERSPECTIVE (rather than re-present the same LDP with additional information) as the Shire is clearly looking for a new plan which is why they have decided it should be in the form of a new LDP."*

A preliminary FRESH PERSPECTIVE submission was provided to the Shire and to Amanda Butterworth from Allerding & Associates in February 2024. The Shire provided Allerdings' responses and suggested amendments in May 2024. Responses to Allerdings' advice have been addressed within this LDP Report (Refer Appendix 22) including the appointment of a Level 3 Bushfire practitioner who completed his BMP in December 2024. (Refer ER Appendix I)

During an online meeting with Liz Bushby and the Shires CEO Dale Chapman in May 2024 (DHID Geoff Wardle and Marc Loftus plus Tim Brady Heyscape) advice was provided that neither Liz Bushby nor Dale Chapman knew of any impediment to the approval of any submitted LDP for Lot 304.

Liz Bushby separately advised that the Shire had concerns with two items:

1. that the BMP was prepared by a Level 2 bushfire consultant; and
2. possible vegetation management to comply with a BMP.

In line with this advice comprehensive information on these two items has been included within the LDP and accompanying reports. Rohan Carboon from Bushfire Safety Consulting, a Level 3 bushfire practitioner, was engaged to completely review bushfire management for the site and to prepare a BMP that complies with SPP3.7 (2024) and the Guidelines.

In November 2024 the State Government released revised versions of both **State Planning Policy 3.7 – Bushfire** and **Planning for Bushfire Guidelines for the implementation of State Planning Policy 3.7 Bushfire.** The BMP prepared by Bushfire Safety Consulting complies with these new and active planning documents.

This LDP application is based on a comprehensive understanding of the site's opportunities and constraints, which are addressed in the LDP layout, the management plan, the environmental report and the design guidelines. Engagement with the Shire and its external planning consultants has ensured that this LDP application addresses the Scheme Conditions for SU14 as follows in Section 3 of this submission.

1.4 Summary of the 2024 Local Development Plan (LDP) Application

The Local Development Plan will facilitate development in accordance with the objective of the SU14 zone under the Shire of Shark Bay Local Planning Scheme No. 4.

The LDP provisions are established to provide guidance to the Shire when development applications are submitted.

The underlying aim for the LDP is to provide opportunities for the provision of accommodation units for the development of ecotourism upon lot 304 within nominated building envelopes with low or no impact upon the natural environment and with no compromise to the high conservation values whilst having regard for the need to protect the ecological values and special attributes of the island.

Objective of LDP is to:

- provide a plan which shall guide the development of accommodation units on Lot 304 meeting the 'objective of the zone' establishing a unique tourist destination located within the Shark Bay World Heritage Property and Dirk Hartog Island National Park.
- provide for development opportunities that will achieve beneficial economic, environmental and community outcomes that enhances the management and welfare of the Shark Bay World Heritage Property.
- Provide a Management Plan establishing management strategies and actions for managing the site following development application approvals by the Shire.
- provide Design Guidelines that ensure that any development is of a high architectural quality designed to be low scale and sympathetic to the location taking account of topography, physical characteristics and the unique character of the surrounding area.
- Provide an Environmental Report in regard to the lot and its immediate surroundings.
- ensure compliance with all relevant State Planning Policies.
- ensure any development has a low impact on the natural environment, not compromising the high conservation values and having regard for the need to protect the ecological values and special attributes of Dirk Hartog Island.
- Provide evidence that a BMP for the site can comply with and meet the conditions of SPP 3.7 Bushfire 2024

The proposed LDP for Lot 304 Sunday Island Bay and the subsequent development within the proposed building envelopes can satisfy the primary Scheme Condition for SU14, being "The objective of this zone is to provide for eco-tourism development". The Scheme defines "ecotourism" as follows:

> *'Ecotourism means ecologically sustainable tourism with a primary focus on experiencing natural areas that fosters environmentally and cultural understanding, appreciation and conservation'*

The remoteness of Dirk Hartog Island and the limited means of accessing the island attracts a range of visitors interested in the opportunity of experiencing an environmental and cultural understanding and appreciation of the isolation of the location and the conservation values associated with the Shark Bay World Heritage listing and Dirk Hartog Island National Park.

The proposed LDP comprises eight building envelopes, each of which would be capable of accommodating from one to four 90m^2 short term accommodation units, staff accommodation and other required

infrastructure without affecting the area of asset protection zones which are based upon the requirements for a 'refuge': the location of the refuge, the slope of land and the vegetation according to location.

The terminology of *"Accommodation Unit"* emanates from the Covenants registered on the Certificate of Title for Lot 304 in 2009 and is therefore maintained throughout this report. The Covenants contain an area-based mathematical formula which limits any future development to thirty-three accommodation units.

There is a limit on the number of visitors and staff, to a maximum of 100 (including staff), on Lot 304 at any given time, which is validated by Section 5 of the Bushfire Management Plan (see Supporting Report D ER Appendix I) which proposes the maximum of 100 occupants to conform with Bushfire Protection Criteria Element 5 (Vulnerable Tourism Land Uses). Management of visitor and staff numbers on site will be controlled by a computer booking system maintained by the onsite manager.

1.4.1 Building Envelopes/APZ

The proposed LDP includes eight building envelopes which have a cumulative footprint of approximately 1.84 hectares. This comprises approximately 16% of Lot 304 and 0.0029% of Dirk Hartog Island.

The location of the building envelopes proposed within Lot 304 are based on key factors as follows:

- on site survey and assessment.
- the protection of significant flora and fauna.
- the mitigation of coastal hazards.
- the provision of onsite effluent disposal.
- risk management.
- existing site conditions.
- topography.
- scale.
- physical characteristics and unique character of the surrounding area.
- bushfire management requirements.
- minimising vegetation management.
- coastal setbacks.
- landscape impacts.
- access tracks and paths (existing and proposed).
- the protection of the unique landscape character of Dirk Hartog Island; and
- the minimisation of visual impact from the two ocean passages to the south-east of Sunday Island Bay (refer to the images under Condition 11 on page 27, Appendix 21, ER figure 7).

In conformity with conditions included within SPP 3.7 Bushfire and Planning for Bushfire Guidelines November 2024 any buildings constructed are required to have an Asset Protection Zone surrounding those buildings. The intent of this LDP is to minimise vegetation management requirements in conformity with the objectives of SPP 3.7.

A refuge/shelter within each building envelope will be staffed with personnel who are qualified in bushfire management.

Within each of the building envelopes the shelters will act as refuges for each and every occupant of their accommodations (including staff) in the event of a bushfire threat. The dimensions of the APZ in each group of accommodation units are calculated from each shelter in accordance with the bushfire guidelines. Each of the accommodation units is located within their APZ. (see Supporting Report D ER Appendix I Bushfire Management Plan)

1.4.2 Topography

The proposed building envelopes were located, following onsite surveys, with respect to Lot 304's undulating topography, aiming as much as possible to mitigate the physical and visual impacts of any proposed short term accommodation development, with management of the site's vegetation only

necessitated for asset protection, delivering a smaller total development footprint which will respect the need for conservation and sustainability of the site's environment and its landscape.

1.4.3 Future Development

Pursuant to Council's approval of the proposed LDP, future development applications for short term accommodation units within Lot 304's building envelopes will provide visitors with a unique eco-experience related to the site's isolation, the natural areas of the island and the Shark Bay World Heritage values for which the area was listed - referring specifically to coastal scenery of Dirk Hartog Island.

Details regarding any proposed accommodation units would be provided in compliance with LPS No 4 when development applications are submitted, **the Shire having advised in 2020 that they would NOT consider any 'development application' until an LDP is approved**.

It would be proposed that a combined staff accommodation/shelter/visitor services unit would be located in each building envelope and built to "refuge" standard, allowing staff and occupants of the accommodation units within the same envelope to take shelter and safety, as a last resort, in the event of a bushfire emergency.

Having a refuge within each building envelope (which increases visitor safety) substantially reduces the amount of vegetation management required in accordance with the LDP's Bushfire Management Plan complying with State Planning Policy 3.7 – Bushfire, which includes in its Policy Objectives:

- *Avoid the bushfire risk in the first instance, but where unavoidable, manage and/or mitigate the risk to people, property and infrastructure, to ensure the risks are acceptable and appropriate to the land use and the location*
- *Improve the bushfire resilience of communities through the provision of community infrastructure, for use by emergency services and the community in the event of a bushfire*
- *Ensure development is resilient to increasingly severe and more frequent bushfires compounded by climate change*
- *Prioritise the retention of native vegetation for biodiversity conservation, environmental protection and landscape amenity*

The staging of the development within the building envelopes will, over time, allow continual review of vegetation management.

1.4.4 Design Guidelines

The Design Guidelines (Supporting Report B) have been established to deliver accommodation units of high architectural quality with low scale development sympathetic to the location taking account of topography, physical characteristics and unique character of the surrounding area: providing a peaceful location for visitors to appreciate and embrace the environmental assets of this remote location within a World Heritage property. Visitors will have the opportunity to interact with the landscape and wildlife including reintroduced endangered species and other fauna, birds and unique flora while exploring the attractions of the surrounding Marine Park.

The Design Guidelines have been formulated with designer Robin Adair to provide parameters to ensure a development of high architectural quality can be achieved that is sympathetic to its location within the Shark Bay World Heritage Property on Dirk Hartog Island. The parameters allow for future designers/architects to develop visitor accommodation that will sit within the topography without dominating the visual landscape.

The LDP provides a framework to guide the Shire when it considers subsequent development proposals within any of the Lot 304 building envelopes, which are intended to:

- *guide future development proposals allowing for accommodation facilities that meet the Objective of Special Use zone SU14 (refer to Condition 1 on page 13); and*

- *achieve beneficial environmental and community outcomes that enhance the management and welfare of the Shark Bay World Heritage Property with minimal impact to the environment and landscape while providing unique ecotourism opportunities and experiences.*

Upon the Shire's approval of the proposed LDP, applications to the Shire for development approval of short term accommodation units to be built within the approved Lot 304 building envelopes would be prepared: providing the opportunity for visitors to stay at Sunday Island Bay in accommodation that respects the surrounding natural environment, giving visitors a unique ecotourism opportunity to embrace the land, the sea and the sky on World Heritage listed Dirk Hartog Island, thereby meeting the objective of the Special Use SU14 zone.

The proposed building envelopes are located to take account of Lot 304's undulating topography while mitigating as much as possible the physical and visual impacts of any development with necessary areas of vegetation management minimised as much as possible, delivering smaller total site footprints and, in turn, responsible development, conservation and sustainability of the site, its environment, and its landscape. (refer to Supporting Report D, Environmental Report).

By including the nominated staff accommodation unit as a refuge in each envelope and the refuges built to required standards provides better protection and safety for visitors : this substantially reduces the amount of vegetation management that may be required for the alternative of a single remote refuge which, in an emergency would need to be accessed by an open path between each building envelope(refer to Supporting Report D,ER Appendix I Bushfire Management).

Our Design Guidelines (Supporting Report B) will provide an aesthetic from which our visitors will appreciate and embrace the environmental assets of the remote location within a World Heritage property.

Visitors will have the opportunity to interact with the landscape and wildlife including reintroduced endangered species and other fauna, birds and unique flora while exploring the attractions of the surrounding Marine Park.

This LDP submission, supported by its Management Plan, Environmental Report, Design Guidelines and Appendices, each of which are required prior to future applications for development, as required by the Scheme Conditions for Special Use SU14; augmented by the Bushfire Management Plan (Supporting Report D, ER Appendix I), required by the Shire's Scheme in response to Condition 3(iv) of SU14, provides all of the required information.
The LDP submission demonstrates that any proposed development upon Lot 304 can meet the objective of the zone and comply with SPP 3.7 Bushfire (November 2024) to provide for eco-tourism development.
The Shire's approval of the proposed LDP is a precursor to detailed planning for development applications within the LDP's building envelopes within Lot 304 which could then commence providing for development on the site.

Notwithstanding, development applications were submitted and approved by the Shire and assessed by both the State and Federal Environmental agencies - prior to Local Planning Scheme No 4 being adopted - who advised:

"Although the (earlier) proposal raises several environmental issues the EPA objectives for the preliminary environmental factors can be met through the satisfactory implementation of this public advice and through other statutory decision-making processes".

As a result, the EPA considers that "*the likely environmental impacts of the proposal are not so significant as to warrant formal assessment".*

Despite there being no record of previous bushfires on the island, Lot 304 is located in a bushfire prone area declared by DFES and must be compliant with SPP 3.7 – Bushfire (November 2024).

It is important to understand/point out that the LDP is NOT a development application.

Several of the Schedule B conditions for the Shire's Special Use 14 requires the proponent to address architectural design by providing general design guidelines for future accommodation units.

CONTEXT

- Dirk Hartog Island has an area of approximately 63,000 hectares.
- Lot 304 has an area of only 11.2985 hectares.
- Lot 304 comprises 0.018% of the area of the island
- The proposed building envelopes are capable of accommodating from one to four short term accommodation units with the maximum number limited by covenant referred to earlier: each accommodation unit is allowed a maximum enclosed accommodation area of 90m^2 plus outdoor verandas. The width of each envelope is approximately 60 metres to provide for accommodation units plus ancillary infrastructure within each envelope. The envelopes will also provide for a 3m wide defendable space abutting the extremities of short-term accommodation units and ancillary structures in accordance with a Bushfire Management Plan which, at the Shires request, augments the LDP.
- In accordance with the Shire's Scheme, the definition of "building envelope" includes areas for onsite effluent disposal. This will be accommodated in each envelope.
- Each envelope will have an area of approximately 0.23ha with the total of all eight envelopes adding up to approximately 1.84ha representing close to sixteen percent of Lot 304 and 0.0029% of the island, minimising the possible area of vegetation management required to meet regulatory requirements while allowing for large areas of the site to remain undeveloped.
- A landscape vegetation plan will be developed for the site and each asset protection zones at the DA stage (BMP) following approval of the LDP
- Furthermore, in the context of the scale of the World Heritage Property (2,200,905ha), the approximate 1.84ha area of building envelopes proposed will have minimal impact to World Heritage, Dirk Hartog Island and its landscape. (see ER)
- Providing short term accommodation units allowing visitors to appreciate the unique location while limiting the total number of visitors and staff on site to no more than 100 in line with the appended Bushfire Management Plan and DFES guidelines (potentially an average of sixteen visitors plus staff could occupy an envelope if four accommodation units were included within an envelope but there can be no more than 100 visitors and staff in total on the site).

3. THE PROPOSAL FOR LOT 304 SUNDAY ISLAND BAY

First and foremost, this proposal seeks the Shire's approval for the Local Development Plan proposing eight building envelopes in consideration of undulating topography, management of possible environmental impacts both physically and visually, bushfire protection requirements in accordance with a Bushfire Management Plan and the inclusion of conditions for any future proposed development.

IT IS IMPORTANT AT THIS POINT TO EMPHASISE THAT THE APPROVAL AND REFERRAL AGENCIES MUST UNDERSTAND THAT THE LDP IS NOT AN APPLICATION FOR DEVELOPMENT APPROVAL.

The LDP proposes eight building envelopes representing approximately sixteen percent of the lot. Separate building envelopes with a refuge located within each envelope substantially reduces the amount of vegetation management that could be required in complying with a BMP in accordance with SPP3.7 providing greater safety for visitors.

This meets one of the main aims, emphasised by the Shire in response to an earlier submission and included within the objectives of SPP 3.7 Bushfire November 2024, to limit any vegetation management to the minimum required leaving large areas in their natural state: staging allows continual review.

Lot 304 is one of the freehold lots on Dirk Hartog Island created in October 2009, when the majority of the island was returned to Government ownership by way of a Crown Title as a "Reserve vested under statute" with the primary interest holder being the Conservation Commission of Western Australia.

The Crown Title includes the following Limitations, Interests, Encumbrances and Notifications:

1. L055597 TAKING ORDER: The designated purpose of the interest taken for an easement is private water supply as to the portion shown "z" on Deposited Plan 50258 only registered 28/8/2009.
2. L120937 EASEMENT BURDEN: For to draw and convey water purposes. See Deposited Plan 50258, registered 29/10/2009.
3. L120939 CLASS A RESERVE 50325: For the purpose of National Park, registered 29/10/2009.
4. L122282 VESTED: Pursuant to Section 7 of the Conservation and Land Management Act 1984, registered 30/10/2009.

Lot 304 comprises only 11.2985ha of freehold land on the south-eastern coast of the island, facing southeast across Sunday Island Bay and is surrounded by the National Park's Crown Title. While Lot 304 enjoys a wonderful vista of the Bay, it does not bound the Bay 's shoreline, with its southern boundary set back from the shoreline by a strip of National Park land.

Coastal consultants Damara WA Pty Ltd advice was included in the previous 2019 LDP and Damara's report on the coastal setbacks (SU14 Condition 3(iii) was deemed "Achieved" in the Shire's report to Council and was validated by Damara in December 2021 and updated in 2023 and 2024. (Damara Report -refer ER Appendix B)

Damara WA's Principal Coastal Engineer Dr Matt Eliot provided the following advice in 2023:

> *To the extent that we are aware, we consider the Sunday Island Bay CRMP dated 16 December 2021, supported by previous reporting, should remain relevant for use. In particular, the adaptive management framework is considered suitable for any coastal change likely to have occurred in the subsequent period.*
>
> *Setbacks will apply relative to the original baseline positions. Prior to on-ground development, management triggers should be checked and any appropriate modifications to development conditions should be applied subsequently. It is understood that management triggers have not presently been reached, and the 'present layout' outlined in Sunday Island Bay CRMP (dated 16 December 2021) remains valid.*

The vegetation in the coastal setback, mainly referred to as 'groundcover' in SPP 3.7 Guidelines-2024 (being in the main less than 0.5m in height), rises from the shoreline by less than 3m AHD at the western end of Lot 304's southern boundary and close to the middle of Lot 304's southern boundary.

The LDP proposes eight building envelopes representing approximately sixteen percent of Lot 304 and less than 0.0030% of Dirk Hartog Island: the maximum number of short-term accommodation units allowed on Lot 304 is limited by covenant (Appendix 18). Each envelope is designed to accommodate from one to four short term accommodation units within the area of an asset protection zone of a building envelope required for a 'refuge'.

The staff accommodation/shelter/visitor services unit in each building envelope would be proposed to be built to refuge standard, whereby occupants of any units in the envelopes would have a minimal distance to traverse in the case of a bushfire. Having a refuge within each building envelope (as against one remote refuge) reduces the amount of vegetation management that could be required in complying with a BMP while still meeting State Planning Policy (SPP) 3.7 and providing increased visitor safety.

This in turn meets one of the main aims, emphasised by the Shire and included within the objectives of SPP 3.7 Bushfire, to limit any vegetation management to the minimum required and prioritising the retention of native vegetation for biodiversity conservation, environmental protection and landscape amenity leaving large areas in their natural state. The staging of any short-term accommodation development within the building envelopes allows continual review of vegetation management.

Any future development proposal to establish short term accommodation units located within building envelopes upon the Lot would provide a unique eco experience related to its isolation and the natural areas of the island location including the World Heritage values for which the area was listed - demonstrating compliance with the 'objective of the zone'.

The Shark Bay World Heritage listing specifically refers to the coastal scenery of Dirk Hartog Island.

Under Part 6 of the Shire's Scheme, ecotourism is defined as:

> "Means ecologically sustainable tourism with a primary focus on experiencing natural areas that fosters environmentally and cultural understanding, appreciation and conservation."

Pursuant to the Shire's approval of the proposed LDP, the design and construction of any proposed short term accommodation units would be based upon and mindful of:

- Responding to ecotourism needs providing accommodation options allowing a unique experience for visitors to the site, Dirk Hartog Island and the World Heritage Property.
- Ensuring development provides for high architectural quality that results in a low scale that is sympathetic to the location taking into account topography, physical characteristics and unique character of the surrounding area. (see DG's)
- Including appropriate architectural design. (see DG's)
- Meeting the Shire's expectations and the objectives of SPP 3.7 Bushfire, November 2024 in regard to vegetation management prioritising the retention of native vegetation for biodiversity conservation, environmental protection and landscape amenity. (see ER Appendix I)
- Ensuring the development has a low impact on the natural environment and will not compromise the high conservation values whilst protecting the ecological values and special attributes of Dirk Hartog Island. (see ER)
- Ensuring biosecurity measures mitigate the risks of feral incursions and disease impacts to the island. (see ER)
- Achieving agreement with the Department of Biodiversity, Conservation and Attractions (DBCA) for access over the strip of National Park land separating Lot 304 from the ocean foreshore from each building envelope.
- Ensuring vehicle and pedestrian access within Lot 304 impacts upon the site in the least possible way. In this regard the vehicular access to Lot 304 is in compliance with the BMP entering the site from the west and continuing eastward along the southern boundary of the site. (see MP)

- The LDP proposes that this track is augmented by a loop whereby the track can provide vehicular access to enable vehicle parking behind the future accommodation units. (see LDP Plan)
- Addressing coastal hazards through compliance with the recommendations provided by coastal risk management consultants Damara WA Pty Ltd, who have provided updated advice in respect of coastal erosion management and inundation risk management, recommending that any accommodation units within the proposed building envelopes have a minimum finished floor level of +4.2m as required by the Shire's Scheme; (refer ER Appendix B Damara Report)
- Addressing potential bushfire threat through compliance with an approved Bushfire Management Plan prepared by Bushfire Safety Consulting, taking account of responsive building design allowed for within the Design Guidelines and the BMP, with proactive onsite accommodation management measures to ensure that visitor safety will be a priority in the development's design. (refer to ER, Appendix I Bushfire Management).

3.1 Supporting Reports

This proposed LDP submission is supported by accompanying reports which address the requirements of the conditions applicable to the development through the conditions applicable to Special Use SU14 under Schedule 3 of the Shire's TPS No.4, with SU14 applicable to Lots 62, 303, 304 & 305 Dirk Hartog Island. Our response to the conditions as they apply to Lot 304 are addressed in Section 5 of this submission and are supported by the appended supporting reports.

Key issues addressed are mitigating impacts to the environment, landscape and the ecology of the site and its surrounds whilst providing opportunities for ecotourism experiences through the provision of accommodation options supported by ongoing responsible onsite management.

The supporting reports comprise:

- A Management Plan
- B Design Guidelines
- C Appendices
- D Environmental Report
    - Damara Coastal Process Reports
    - Flora Reports
    - Site & Soil Evaluation
    - Bushfire Management Plan
    - Bushfire Emergency Plan

Bayley Environmental Services' Environmental Report (Supporting Report D) demonstrates that any proposed development of Lot 304 would pose a low risk to World Heritage values in line with:

- The site's relatively small site area of 11.2985ha, being **approx. 0.018% of Dirk Hartog Island's total area** of **63,000ha** and 0.0015% of the land content of the World Heritage Property of 748,306ha.
- The site's remote location, including remoteness from specific World Heritage listed values.
- The maximum of accommodation units permitted by covenant across eight building envelopes with a possible collective footprint of 1.84ha (being **approx. 0.0030%of Dirk Hartog Island's total area of 63,000ha**).
- Restricted accommodation unit numbers in accordance with the Covenant on Lot 304's Certificate of Title.
- Restricted occupancy numbers, including visitors and staff, (maximum of 100 at any time in accordance with the Bushfire Management Plan (potentially averaging sixteen visitors plus staff per envelope caped at a total of 100 staff and visitors)).
- Onsite management accommodated within each cluster of units.
- Biosecurity undertakings.
- Undertakings to treat the site with care to minimise impacts to the site and surrounding National Park and World Heritage property.

- Occupant safety with any development within each building envelope having a staff accommodation unit built to refuge standards, minimising APZ vegetation management requirements and providing for increased visitor safety.

4. LOT 304 LDP RESPONSE TO SCHEDULE B CONDITIONS FOR SU14

CONDITION 1) **The objective of this zone is to provide for eco-tourism development.**

LDP RESPONSE Under PART 6 of the Shire's Scheme Text, Division 1 - General definitions used in Scheme, ***ecotourism*** means "ecologically sustainable tourism with a primary focus on experiencing natural areas that fosters environmentally and cultural understanding, appreciation and conservation."

The Shire's Scheme text does NOT define the meaning of ***eco-tourism development,*** nor does it define the meaning of ***development***, although it defines the use ***tourism development*** – a D (discretionary) use in Special Use SU14 – as "a building or a group of buildings forming a complex, other than a bed and breakfast, a caravan park or holiday accommodation, used to provide:

(a) short-term accommodation for visitors.
(b) onsite facilities for the use of visitors; and
(c) facilities for the management of the development.

While Ecotourism Australia advise that there is no definition of what "eco-tourism development" means, our response to this Condition is that the attraction of Dirk Hartog Island for visitors is its unique history having been discovered by Dirk Hartog in 1616, its remoteness, its exceptional areas of natural beauty, its quietness and the opportunity for visitors to "get away from it all" to appreciate the conservation of the landscape, its vegetation and rare features such as the island's cliffs and blowholes. Furthermore, the island's inclusion within the Shark Bay World Heritage property and its inclusion as Dirk Hartog Island National Park by the Western Australian Government has enhanced its eco-tourism attraction.

Development within Lot 304 is first and foremost governed by Covenants (Appendix 18) which were imposed on the Certificate of Title for Lot 304 in 2009, with Covenant 1 (a) confirming that "the Land may only be used for the purpose of low impact ecotourism, which includes the provision of **Visitor Accommodation Units and Staff Accommodation**".

Covenant 3 (c) states that ***"ecotourism" means ecologically sustainable tourism with a primary focus on experiencing natural areas that fosters environmental and cultural understanding, appreciation and conservation"***

Covenant 3 (e) states that ***"low impact" means low impact on the environment having regard to the number of tourists visiting the Land and the facilities and other services provided for their use".***

In July 2023 the Department of Biodiversity, Conservation and Attraction (DBCA) sought tenders from consultants for a study "to improve and diversify visitor experiences whilst protecting Dirk Hartog Island's unique natural and cultural values" and to "identify the opportunities available".

On page 2 of this report we have brought to attention the study's vision based on stakeholder views and feedback, which is repeated in this response to Condition 1 as follows:

"DHI will be a world leading nature-based adventure tourism destination rich in heritage, cultural, terrestrial, aquatic and social experiences, a place where adventurous travellers immerse in a unique, sustainable wilderness environment that engulfs their heart, soul and mind, inspiring appreciation and conservation among current and future generations."
(Dirk Hartog Island Recreation and Tourism Opportunities Analysis July 2023)

With expansive views to the south over Sunday Island Bay and its inner and outer passages, any short stay accommodation proposed to be developed on Lot 304 would be a compelling attraction to visitors seeking to experience an ecologically sustainable environment.

The objective of the zone being to provide for **eco-tourism development** does not necessarily refer to physical construction of built facilities but rather includes providing opportunities **to develop eco-tourism products and experiences** that meet and conform with the criteria of eco-tourism.

Eco-tourism is the business of providing holidays and related services which are not harmful to the environment of the area.

Eco-tourists include all nature-based forms of tourism in which the main motivation of the visitors/tourists is the observation and appreciation of nature as well as the traditional cultures prevailing in natural areas.

The development of accommodation units at Sunday Island Bay (*tourism development*) would offer the opportunity for visitors/tourists to appreciate and embrace the natural land and marine areas of Sunday Island Bay, Dirk Hartog Island and the Shark Bay World Heritage Property '*meeting the objective of the zone'*.

As noted on the previous page, any development of Lot 304 must not only comply with both the Covenants on the land and the conditions prescribed for Special Use Zone SU14, but also with conditions of a Bushfire Management Plan which limits the number of visitors and staff permitted on site at any one time to 100.

CONDITION 2) **No subdivision of lots shall be permitted.**

LDP RESPONSE Subdivision of Lot 304 is not proposed. The LDP proposes eight building envelopes within which one to four short term accommodation units can be accommodated, with the maximum number of units in total restricted in accordance with covenant 1(b) on the Certificate of Title for Lot 304.

CONDITION 3) **Prior to the commencement of development of any of the four lots a Local Development Plan shall be prepared in accordance with Part 6 of the *Planning and Development (Local Planning Schemes) Regulations 2015* and address the following:**

LDP RESPONSE Lot 304 is one of the four freehold lots on Dirk Hartog Island which are zoned Special Use under the Shire's Scheme and have been allocated the identifier "**SU14**". Development within Lot 304 is to be guided by these conditions for SU14.

Condition 3 specifically requires the preparation of a Local Development Plan for any of the four lots within SU14 *(prior to any application to Council for development approvals),* which must also respond positively to specific sub-conditions of Condition 3 as follow:

CONDITION 3 (i) **A Management Plan that addresses visitor access, servicing, maintenance, waste disposal, effluent disposal, service areas, rubbish management and the transport of construction materials:**

LDP RESPONSE Management Plan for Lot 304 is included in this LDP report as Supporting Report A. The Management Plan comprehensively addresses each Item included in SU14 Condition 3(i), namely:

- Visitor access
- Servicing
- Maintenance
- Waste disposal
- Effluent disposal
- Service areas
- Rubbish management
- Transport of construction materials

The Management Plan has been prepared to provide parameters, strategies and guidance within which future development applications for Lot 304 addressing management proposed to minimise impacts whilst still encouraging eco-tourism development, appreciation and activities can be assessed.

The Management Plan provides information and guidelines regarding future management of the site following approval of the LDP, and any application then submitted for development.

The Management Plan does not form part of a Development Application – which on Shire of Shark Bay advice cannot be proposed until the LDP has been accepted.

Future built accommodation would be proposed to be developed in stages -spread between eight proposed building envelopes - managed in a sustainable way.

Staging allows for continuous review of impacts and the ability to mitigate issues that may arise following development and to compartmentalize development. Any future first stage application for development would not be proposed to exceed the number of accommodation units, as approved in an earlier submission with subsequent development applications subject to ongoing review.

The total number of staff and visitors permitted on the 11.2985ha site at any time is restricted to a total of 100, in compliance with a BMP (refer ER Appendix I).

The Management Plan proposes strategies and management actions that demonstrate that, with onsite management, impacts can be mitigated and the objective of the zone – to provide for eco-tourism development – can be met.

The aim for the Management Plan for Lot 304 is to establish management strategies for future ecotourism development related to SU14 addressing items contained within condition 3(i) plus other relevant management factors and proposing actions to be undertaken by management.

CONDITION 3(ii) **The proposed development is to be of a high architectural quality and be designed to be low scale and sympathetic to the location taking into account topography, physical characteristics and unique character of the surrounding area:**

LDP RESPONSE Design Guidelines are included in this LDP report as Supporting Report B to ensure that any development within each of the proposed building envelopes, which would follow the approval of this LDP, will consider topography, physical characteristics and unique character of the surrounding area.

There are no specific definitions to what “high architectural quality” means.: design guidelines attached have set parameters allowing for “high architectural quality” design

of short-term accommodation units (submitted within any future development application) demonstrating that mandatory compliance would allow development to achieve a high architectural quality whilst maintaining the requirement to be low scale and sympathetic to the location with a common theme between each building envelope.

The design concept is to not only touch the earth lightly but for any development to recede into the landscape, so that the physical presence becomes camouflaged into the background and surroundings. Design guidelines have been established following an architectural brief. Any development proposed for building envelopes must comply with the design guidelines with each cluster being complementary with a common theme.

Any proposed short term accommodation units will be required to conform with the appended Design Guidelines to be proportionally low scale, low bulk and tied to the landscape, with small footprints and construction methods to minimize impact to the ground while adopting common and complementary accommodation units between all clusters.

CONDITION 3 (iii) Coastal setbacks in accordance with relevant state planning policy:

LDP RESPONSE A report on coastal processes was obtained from respected Western Australian coastal engineering consultancy Damara WA Pty Ltd in 2014. This report addressed potential coastal hazards, including projected sea level rise, and provided information and recommendation that address the management of hazards and impacts from coastal processes including erosion risk and inundation management. (see ER Appendix B)

Sunday Island Bay is a relatively stable coast and the Damara report acknowledged that the site effectively avoids coastal hazards to 2070.

The adopted strategy is to *Avoid* present day erosion hazard to buildings and undertake *Managed Retreat* following sustained coastal recession. *Protect* will not be pursued at this location.

Adopted coastal management strategy is focused on beach access and dune management, with a longer-term consideration of *Managed Retreat* for development

Likelihood of dune instability can be reduced if north-south aligned access paths are avoided, number of access paths are minimised (no more than eight), and revegetation of any destabilised areas is undertaken. These measure may delay the triggering of managed retreat of buildings.

In December 2019 Damara WA provided an updated report in support of the earlier Local Development Plan prepared by planning consultants Taylor Burrell Barnett which was considered by Council in August 2020. This Condition 3 (iii) was deemed “Achieved” in the Shire’s planning consultant’s report to Council.

In December 2021, coastal engineers Damara WA provided a further report which provided recommendations in regard to:

(a) Erosion risk management:

(b) Monitoring and management of dunes and beach access:

(c) Implementation of managed retreat; and

(d) Inundation risk management

In 2023 and 2024 Damara WA confirmed that their 2021 advice remained relevant. (see ER Appendix B)

These recommendations have been incorporated into this Local Development Plan.

CONDITION 3 (iv) Bushfire management in accordance with relevant state planning policy

LDP RESPONSE **The Bushfire Management Plan (BMP) and Bushfire Emergency Plan (BEP) prepared by Bushfire Safety Consulting responds to this condition by assessing the LDP Application against the State Planning Policy 3.7 Bushfire (SPP 3.7) and the associated Planning for Bushfire Guidelines (2024)**

The BMP and BEP have been developed consistent with:

a) the aims and provisions of this Scheme (including any planning codes that are read, with or without modifications, into this Scheme) and any other local planning scheme operating within the Scheme area.

(b) the requirements of orderly and proper planning including any proposed local planning scheme or amendment to this Scheme that has been advertised under the Planning and Development (Local Planning Schemes) Regulations 2015 or any other proposed planning instrument that the local government is seriously considering adopting or approving; and

(c) any approved State planning policy.

Large fires have occurred in the Shire area and will in the future. A large fire on Dirk Hartog is highly unlikely due to the low number of potential ignition sources, the narrow arrangement of flammable vegetation broken up by sand dunes systems and the surrounding coastal environments, beaches and ocean where fires will extinguish. However, the BMP plan recognises that a fire could start and threaten the development, so a thorough assessment has been undertaken and appropriate planning undertaken to ensure risks are managed to acceptable levels.

At commencement it was considered appropriate to undertake a Bushfire Hazard Level assessment according to methodology in Appendix A of the Guidelines to provide a landscape perspective on the ability of a bushfire to impact and run through the site.

The assessment of a 2km radius around the site determined that the site is not exposed to extreme bushfire hazard levels. The classified vegetation is Class C Shrubland and is considered a moderate hazard only.

The methodology used to assess the site is outlined in the Planning for Bushfire Guidelines (Sept. 2024) in Appendix A, Section A.2. The purpose of the Bushfire Hazard Level (BHL) assessment is to provide a broad brush understanding of the potential intensity of a bushfire in the landscape near the site. The methodology is outlined in clause A.2.4 in Appendix A of the Planning for Bushfire Guidelines (2024). The pre-development site and all vegetation classes within 2 kilometres was assessed including slopes where contour data was available and measured on-site where accessible.

Within the assessment area, over 50% of the total area is ocean or inlet vegetation dominated by succulent samphire plants and mangroves. Of the remaining vegetated land, the landscape is covered in Class C shrubland and low shrubland vegetation only. The vegetation is wind pruned and rarely exceeds 1 metre in height.

The bushfire hazard level assessment confirmed the site is exposed to a moderate hazard level from the north and west, but has minimal exposure to long fire runs from the east and south

A detailed Bushfire Attack Level Contour map assessment was undertaken, within a 150 m radius of the site; a pre and post development vegetation classification map has been developed, a detailed assessment of effective slopes and a series of detailed BAL Contour maps were then prepared.

A number of plants were measured using a measuring tape on-site and captured in several representative photos within the BMP. Most of the vegetation averaged less than 0.3 metres in height with the occasional shrub reaching 1 metre in height. It is a very open and wind

exposed site, many shrubs showed obvious signs of wind pruning as they were dying on the southern wind exposed side of the plant.

An effective slope assessment undertaken at the site includes two distinct methods.

Firstly, a landscape scale bushfire impacting the site from surrounding areas was modelled with 47 separate transects and cross-sections. This detailed effective slope analysis within the assessment area determined that no effective slopes exceed 10 degrees, however there is a range of effective upslope and downslope fire runs towards the site from all directions around the site.

This surrounding landscape effective slope analysis was undertaken in order to provide clarity around where on-site shelter buildings could and could not be sited within the lot and achieve a radiant heat flux less than 10kW/m² with a 1200K flame temperature and FDI of 100. The FDI of 100 was selected as this represents the fire weather trigger whereby the site will be pre-emptively evacuated ahead of any days above FDI or FBI 100 (ie. Catastrophic Fire Danger Rating).

This assessment of a landscape scale bushfire run towards the site also provides an understanding of site constraints and input limitations on where an on-site shelter could be sited when the layout of the final development is confirmed at Development Application stage.

The second effective slope analysis was undertaken on each indicative building cluster location and focussed both on the analysis to determine the on-site shelter exposures from fire runs in the general east and west directions and also what the effective slope was for each accommodation unit.

In total there were 14 effective slope outcomes from the total fire runs assessed surrounding the development site and surrounding each cluster. This analysis will be repeated to support the final site layout at Development Application stage.

A method 2 BAL Assessment was undertaken to determine the predicted radiant heat flux impacting the proposed staff accommodation and on-site shelter buildings

A method 1 BAL Assessment was undertaken to determine the BAL contours impacting the proposed accommodation units. The design and siting of the Asset Protection Zone was specifically assessed to ensure it is contained within the lot boundary and achieves BAL-29 and lower for all buildings; this is achieved as all proposed buildings are exposed to BAL-29 and lower.

The bushfire exposure for accommodation units can achieve full compliance with the Guidelines because there is sufficient space on the development lot to contain an Asset Protection Zone so that all buildings achieve BAL-29 and lower.

Access to the site is limited as is evacuation off the island, the site is isolated so there does need to be a thorough examination of the site and propose development appropriately to ensure there is an element of self-resilience and people can shelter from life threatening radiant heat if a fire was to ever move across the island and impact the site.

By constructing an approved on-site shelter according to minimum standards, people can shelter from a bushfire as a last resort option and co-ordinate with emergency services for evacuation off the island if needed.

The BMP has been developed to confirm to and to provide confidence for the Shire to approve the submitted LDP knowing that visitors would not be left in a vulnerable position in the event of a bushfire.

The BMP complies with SPP 3.7 Bushfire 2024 and has been prepared directly in accordance with Planning for Bushfire Guidelines 2024.

The BMP considered more than 100 short and long fire run scenarios, which are included within the report, in assessing bushfire risks in the future when development was completed.

The Shire can be confident in the Level 3 Bushfire Practitioners BMP that provides details that ensures multiple scenarios have been addressed and that the options proposed in the event of bushfire are the best options for visitors and staff leaving no one in a vulnerable position without last resort direct onsite shelters and staff able to assist immediately at all times.

Despite there being no record of previous bushfires on the island, Lot 304 is located in a bushfire prone area and must be compliant with SPP 3.7 – Bushfire (November 2024).

DFES includes Dirk Hartog Island within its broad State map of bushfire prone areas. Within the island this includes large areas of sand dunes with no vegetation and an area at Cape Inscription that has similar vegetation to Sunday Island Bay, but which has been excluded from the map.

State Planning Policy (SPP 3.7 – Bushfire) and Planning for Bushfire Guidelines (For the implementation of SPP 3.7 Bushfire) were released recently in November 2024. The Guidelines define 'Bushfire Hazard' as ***"a fuel complex, defined by amount, type condition, arrangement, and location, that determines the degree of hazard".***

The Guidelines also define 'Hazard separation' as ***"separation of a development or subject site from vegetation classified under AS 3959 to assist in preventing the spread of bushfire to buildings. Hazard separation is usually in addition to an Asset Protection Zone, and includes hard surfaces, including roads and footpaths, waterways and public open space that has vegetation as low threat, in accordance AS 3959: Construction of buildings in bushfire-prone areas."***

Bushfire Safety Consultants have prepared a Bushfire Management Plan (BMP) which complies with State Planning Policy (SPP) 3.7 Bushfire and Planning for Bushfire Guidelines November 2024 in consideration of vegetation management and refuge requirements and the necessity to ensure that visitors will be protected in the event of a fire or emergency event.

Related Condition 5 of SU14 states as follows:

'The local government will have due regard to coastal setbacks and bushfire management in accordance with relevant state planning policies and Clause 67, Schedule 2, Part 9 of the Planning and Development (Local Planning Schemes) Regulations 2015'.

There is only limited documentation available regarding the fire history of Dirk Hartog Island. Given its island status and the influence of salt laden air on the vegetation, events of naturally occurring fire are limited. As a result, wildfires on DHI are highly unlikely due to the saline nature of the vegetation, lack of ignition sources, limited vegetation south of the site, prevailing winds and lack of appropriate fire weather.

No fires/wildfires have been recorded in the past one hundred and fifty years.

The axis of the island follows a north-south direction and this with the influence of salt laden shrubs, generally of low flammability, and the dominant prevailing wind being south westerly limits the ability of any fire to continuously burn. Shrub land vegetation communities are common on the island however the risk of ignition from lightning is low and the ability for the vegetation to carry and sustain fire is limited. To spread in this type, weather thresholds, particularly normal wind speed and relative humidity need to be exceeded. A fire deliberately started (upon Agriculture Dept advice in 1995), north of Sandy Point in January, failed to spread beyond 500 square metres due to the heavy salt

content in the vegetation even though smoke from the fire was observed as far away as Denham. (*G Wardle observation)* There is no evidence of any regular historical anthropogenic burning on DHI.

A 2012 Bushfire Management report prepared for DBCA by consultants Strategen quoted:

"*Information suggests that the accumulation of large, continuous swards of spinifex grassland on DHI is unlikely and the resultant probability of wildfire, based on the fire history of the island, is very low".*

A check on the Landgate Pro Firewatch web site confirms that there have been no recorded bushfires on DHI.

Vegetation on DHI does not consist of large, continuous spinifex grassland swards like much of the Gascoyne arid interior but instead contains a combination of spinifex and low open shrubland components. Onsite observation, reported by Strategen in 2012 concluded that the vegetation near Lot 304 did not show any signs of spinifex being present; however, a mixture of continuous and discontinuous low shrubland was noted when the vegetation assessment was undertaken for the BMP.

Planning for future short-term accommodation cannot proceed until an LDP identifying building envelopes is approved. When an LDP is approved for the site future development for short term accommodation units can be prepared for lodgement as a development application.

Although a BMP would normally be prepared for a development application when building design and the location of buildings was established the Shire of Shark Bay specifically requested that a BMP be prepared and submitted with the LDP to confirm that a BMP can be developed that is compliant with SPP3.7 and the Planning for Bushfire Guidelines, updates to both having been released recently in November 2024.

Design Guidelines set the standards for accommodation unit construction, including that all proposed units are to be built to the appropriate dwelling construction standards, and including appropriate cyclone and bushfire refuge standards.

All materials would be proposed to be sourced to achieve appropriate fire ratings available as provided by Fire crunch and similar products. Fire Crunch contains no formaldehyde, no asbestos and no toxic chemicals, NO VOC and most important no steel corrosive magnesium chloride. Fire Crunch is 100% fire resistant. It will not burn in a fire! Fire Crunch has been tested for – FIRE SEPARATION WALL AND BOUNDARY WALL: FRL: 60/60/60 * 90/90/90 * 120/120/120 with steel frame construction and in timber frame construction.

In view of the extended width of Lot 304, the nomination of a refuge and onsite management within each envelope has been proposed in the BMP as a more acceptable solution as it ensures that:

1. Each building envelope includes accommodation for staff who are immediately available in the case of any emergency.
2. Visitors would not be put into vulnerable positions having to traverse up to 500m or longer to a sole refuge if only one was located on the entire site and with which they may not be familiar.
3. Visitors would have immediate on-site support from staff members trained to react to and support visitors in the event of a fire or other emergency event and again would not have to move to a separately located refuge on the property (possibly up to a kilometre) which they may not be familiar with.

4 Vegetation management is directly related to a 'refuge' and the slope of the land: any proposed vegetation management would be limited to APZs around the refuge and accommodation units located within building envelopes, significantly reducing such management requirements if a remote refuge was to be accessed via an open pathway, whilst still meeting SPP3.7 Bushfire and Planning for Bushfire Guidelines November 2024 protecting visitors in line with State Government recommendations; a landscape vegetation plan would be prepared for the site and each building envelope and its asset protection zone. Each asset protection zone would be carefully managed to ensure compliance with SPP3.7 and a BMP

5 In all cases the use of a 'refuge' is the last alternative in the event of a fire emergency event (refer BEP ER Appendix I). Closing of accommodation units and evacuation to a safe location prior to emergency status is the preferred avenue in the case of a bushfire threat or any forecast fire event.

6 The management of visitors' safety during severe events including cyclone and fire is paramount. Management would prioritise early evacuation of visitors in these cases, to be determined in consultation with the Department of Fire and Emergency Services, the Department of Biodiversity and Attractions, the Shire of Shark Bay, and in accordance with the approved BMP and BEP.

CONDITION 3 (v) **An environmental report that demonstrates that the Local Development Plan and proposed use and/or development will have a low impact on the natural environment, not compromise the high conservation values and have regard for the need to protect the ecological values and special attributes of the island. The report should include information on building envelopes, visitor numbers, a vegetation assessment and how biosecurity measures to mitigate the risks of feral incursions and disease impacts to the National Park will be achieved.**

LDP RESPONSE The Environmental Report authored by Phil Bayley of Bayley Environmental Services (Supporting Report D) has been prepared in response to Condition 3(v) of the Local Planning Scheme to document the environmental characteristics of Lot 304 and its surroundings, describe the LDP and intended future developments, examine the potential environmental impacts and set out management measures to avoid or ameliorate those impacts.

The report addresses the requirements included in Condition 3(v), including minimising the impacts of building envelopes, management of visitor numbers, protection of vegetation and biosecurity management, as well as other potential impacts of the development.

The Environmental Report shows that the development will have a minimal impact on the environmental values of Dirk Hartog Island, and little to no impact outside of the approved development area.

Specifically, the report aims to address:

- Protection of the conservation values of the Shark Bay World Heritage Property and Dirk Hartog Island National Park.
- Demonstration that ecological values and special attributes of the island can be protected.
- Biosecurity measures to mitigate feral incursions and disease impacts to the Dirk Hartog National Park; and
- Demonstration that the proposed development will have low impacts in terms of development footprint, visitor numbers, disturbance to vegetation and fauna, solid and liquid waste disposal, traffic, bushfire hazard and visibility.

The report addresses each of the mandatary information requirements which are summarised as follows:

Building envelopes

The eight building envelopes proposed have been located with regard to adequate setback from the coast in accordance with Damara WA's recommendations,

Due to the undulating topography across Lot 304, the proposed short term accommodation units within each building envelope would be required to be constructed above ground using ground anchors, pylons or similar methods to facilitate a common floor level, as is required for each accommodation unit to have safe egress from each unit to the envelope's refuge in the case of a fire event.

Visitor numbers

The Bushfire Management Plan for Lot 304 imposes a maximum of 100 occupants (comprising visitors, management and staff) onsite at any given time. Given the remote nature of the island, and Sunday Island Bay in particular, it is highly unlikely that this maximum would ever be reached but will be monitored by the development's management using a computer booking system.

Vegetation assessment

The vegetation within Lot 304 has been inspected onsite by Ecosystem Solutions and I Lantzke, and addressed in Bushfire Safety Consulting's Bushfire Management Plan, which identifies there is no evidence of threatened and priority flora (nor fauna), no evidence of contaminated sites and no Cockatoo breeding sites nor roost sites. (refer to Appendices C, D and Supporting Report D ER).

An application for a clearing permit in 2020 received a detailed response from DWER. (Appendix 19)

The vegetation within Lot 304 and adjoining areas of the National Park is classified as 'Class C – Shrubland'. Each cluster of accommodation units requires an Asset Protection Zone (APZ) separating any proposed Refuge unit from classified vegetation by managing the APZ as proposed within the BMP prepared by Bushfire Safety Consulting in line with SPP 3.7 November 2024.

This level of vegetation management can be achieved in line with the sparseness of the onsite vegetation and its, in the main classification, within the Planning for Bushfire Guidelines, as 'groundcover under 0.5m in height, both on and surrounding building envelopes without undue impact in line with envelope separation distances. A landscape vegetation plan would be prepared for the site and each building envelope and its asset protection zone.

The BMP refers to the Planning for Bushfire Guidelines November 2024 in regard to vegetation management:

- fine fuels (dead vegetation less than 6mm wide) is to be removed to comply with the Guidelines
- Groundcovers under 10cm can be retained within the asset protection zone with no restrictions on location
- Groundcovers greater than 10cm but under 50cm can be retained as long as they are not within 2 metres of a structure or 3 metres from any window or doors.
- Shrubs greater than 50cm and under 5 metres can be retained within the APZ as long as they are not within 3 metres of buildings and are planted in clumps of $5m^2$ or less, separated from each other and any exposed window or door by 10 metres

Biosecurity measures to mitigate the risks of feral incursions and disease impacts to the National Park

The risk of feral incursions and disease impacts is addressed in the Environment Report (Supporting Report D). Biosecurity measures are addressed through all visitors, staff, contractors and builders being provided with pre-information sheets on biosecurity matters and will be inducted and instructed on arrival as to their importance.

In summary, the Environmental report demonstrates that the proposed use and any proposed development on Lot 304 will have a low impact on the natural environment and would not compromise identified high conservation values while having regard to protecting ecological values and special attributes of the island.

Context

In the context of an island of approximate 63,000ha, Lot 304's small area of approximately 11ha demonstrates that any proposed development of Lot 304 would pose a low risk to World Heritage values as evidenced below:

- The relatively small site area of only 11.2985ha comprises less than 0.018% of Dirk Hartog Island's total area of approximately 63,000ha.
- The site's location in Sunday Island Bay at the southern end of the island is remote from specific Dirk Hartog Island World Heritage listed values.
- The Local Development Plan proposes only eight building envelopes with a collective footprint of only approximately 1.84ha (being around 030% of Dirk Hartog Island's total area of 63,000ha);
- The maximum number of accommodation units permitted within Lot 304 is restricted, in accordance with Covenant 1(b) on Lot 304's Certificate of Title. The average number of 90m^2 accommodation units allowed by covenant per building envelope is approximately four, with the preferred layout options being from one to four per envelope depending on locational preference.
- The maximum occupancy (visitors and staff) numbers on Lot 304 at any given time is restricted to 100 in accordance with the Lot 304's Bushfire Management Plan, potentially allowing up to 16 occupants plus staff per building envelope, but not exceeding 100 in total.
- Onsite management, accommodated within each building envelope, ensures that occupants adhere to the environmental requirements of the proposed LDP, including biosecurity undertakings and undertakings to treat the site with care to minimise impacts to the site and surrounding National Park and World Heritage property.
- Occupant safety within each building envelope is enhanced through each building envelope having the staff accommodation unit built to refuge standards, minimising APZ (Asset Protection Zone) management to meet any BMP (Bushfire Management Plan) vegetation management requirements.
- Any future development proposal to establish short term accommodation units located within building envelopes upon the Lot would provide opportunities for visitors to stay on Dirk Hartog Island and to be accommodated at Sunday Island Bay enabling a unique eco experience related to its isolation and the natural areas of the island location including the World Heritage Values for which the area was listed - demonstrating compliance with the 'objective of the zone'. The SBWH listing specifically refers to the coastal scenery of Dirk Hartog Island; and

Following approval of this proposed LDP, planning for any development upon the Lot would be required to be mindful of the following:

- responding to ecotourism needs providing self-contained short term accommodation options allowing a unique experience for visitors to the site, Dirk Hartog Island and the World Heritage Property.
- adopting appropriate architectural design with minimal impact on the land and landscape, with each cluster to be complementary to each other cluster.
- negotiating agreement with DBCA for access over the strip of National Park land separating Lot 304 from the ocean foreshore with minimal impact on the land and landscape with careful design.
- ensuring vehicle and pedestrian access around the lot has minimal impact on the land and landscape.
- addressing coastal Hazards through compliance with recommendations provided by independent consultants Damara Pty Ltd including responsive building design and proactive management measures.
- addressing bushfire risks through compliance with any approved BMP prepared by Bushfire Safety Consulting taking account of responsive building design allowed for within the Design Guidelines and proactive management measures to ensure visitor safety would be a number one priority in design with each cluster of units in any building envelope being complementary to those in other building envelopes; and
- landscape vegetation plans as indicated within the BMP would be prepared for the site and each building envelope and asset protection zones to ensure any required vegetation management was undertaken in careful compliance with the plan and Planning for Bushfire Guidelines. Landscape plans would comply with the Shire's bushfire notices and the objectives included within SPP 3.7 Bushfire November 2024 prioritising the retention of native vegetation for biodiversity conservation, environmental protection and landscape amenity,

THE SUPPORTING ENVIRONMENTAL REPORT D INCLUDES RECOMMENDATIONS TO MINIMISE IMPACTS

CONDITION 3 (vi) **Detailed design guidelines to control colours, materials, built form, scale, and achieve a development sympathetic to the natural character of the island may be required by the Local Government.**

LDP RESPONSE The objectives for establishing Design Guidelines are to provide parameters to be addressed in designing any future accommodation development proposal for lot 304 to ensure it meets the conditions of SU 14 3(ii) achieving high architectural quality, whilst being low scale, factoring in all of the attributes of the surrounding area.

Design guidelines allow broad scope for architectural quality with designs to be proportionally scaled and sympathetic to the location whilst considering topography, physical characteristics, and unique character of the surrounding area.

Addressing coastal processes and fire protection for visitors and staff is an important element when considering all aspects for design and any future development application.

The objective is to achieve architectural quality with proportionally scaled development relative to the topography and landscape while maintaining the isolation and natural setting of the Sunday Island Bay location - reflecting upon the island's pastoral history and ongoing environmental reconstruction without compromising Shark Bay World Heritage or Dirk Hartog Island National Park values.

The built form must

Take its inspiration from the landscape, which should be symbolised in both colour and texture.

Maintain a light footprint on its immediate environment by appearing to float above its building line

Reflect the surroundings it sits upon, through its chosen materials,

Appear to become partially invisible to the human eye from a distance

The appended Design Guidelines (Supporting Report B) will ensure the design of any short-term accommodation units conform with the guidelines to deliver a development sympathetic to the natural character of the island.

Pursuant to the Shire's approval of this Local Development Plan, it is expected that the Shire will accept Development Applications for short term accommodation units, whether individual or in groups within an envelope, which will have been submitted by management of Lot 304 based on the Guidelines.

The design and development of accommodation units within each building envelope will be complementary with a common theme throughout the site.

Central to the design is the ability to reduce construction waste by incorporating standard sized building materials, prefabrication and lightweight footing systems that are removeable and recyclable, allowing site adaptability and minimal- if any- excavation. The inclusion of high-level roof, wall and floor insulation allows significant savings of up to fifty percent on heating and cooling costs.

CONDITION 4 **Any staged development is to address the requirements indicated in Condition 3 above.**

LDP RESPONSE Development cannot be proposed until the Local Development Plan has been approved, since only an approved LDP can confirm the location of building envelopes within Lot 304.

The LDP proposes that development would be staged so that, in response to management strategies and environmental factors, which can be examined, staging where necessary, can be addressed and reviewed.

The appended Design Guidelines (Supporting Report B) set the standards for development. Accommodation units will be required to comply with the design guidelines and probably would be constructed at any stage of the development and must comply with the design guidelines. Fast lightweight construction methods would be encouraged for the units to ensure that construction, at any time, would cause limited on-site activity or operational interference with completed stages.

Staging demonstrates compliance with SU14 by providing for review and assessment at any stage addressing:

a. Assessment of environmental factors relative to development.
b. Assessment of the low impact construction methods proposed to minimise any impact to the site.
c. Confirmation that prefabricated kits allow fast construction without undue interference with ongoing operations at any time.
d. Assessment of construction waste produced at site.
e. Compliance with the Bushfire Management Plan.
f. Protection for future visitors.

g. Assessment of any impacts to the site due to visitor access and solutions if required.
h. Reviewing power and water services to ensure they are workable and appropriate for stages of development.
i. Assessment of adequacy of maintenance services.
j. Ensuring design guidelines are achieving a coordinated and matching development.
k. Confirmation that the design layout would meet operational requirements as planned, including a review of the indicative tracks required for access and movement to and around the building envelopes as shown indicatively on the LDP.
l. Confirmation that waste disposal and rubbish management meet operational requirements as proposed.
m. Ensuring effluent disposal systems meet the requirements of the government sewerage policy.
n. Reviewing the management and transport of construction material; and
o. Reviewing monitoring results.

CONDITION 5 **The local government will have due regard to coastal setbacks and bushfire management in accordance with relevant state planning policies and Clause 67, Schedule 2, Part 9 of the Planning and Development (Local Planning Schemes) Regulations 2015.**

LDP RESPONSE Our response in respect of coastal setbacks and their conformity with State Planning Policy is provided in our response to Condition 3 (iii)

CONDITION 6 **Notwithstanding Condition 3, the local government may consider development in the absence of a Local Development Plan as provided for under Clause 56(2), Schedule 2, Part 6, of the Planning and Development (Local Planning Schemes) Regulations 2015.**

LDP RESPONSE Noted, but it is unlikely that this will be entertained and, as such, the Shire's assessment of the 2020 LDP deemed this Condition "Not Assessed". As such we would expect the same response from the Shire's planner for this LDP submission.

CONDITION 7 **Any development or Local Development Plan shall demonstrate alignment with the objective of the zone.**

LDP RESPONSE Condition 1 confirms that **the objective of Special Use 'SU14' is to provide for eco-tourism development**, applicable to the four freehold Titles on Dirk Hartog Island, being Lots 62, 303, 304 & 305. Lot 304 remains the only undeveloped freehold property on Dirk Hartog Island, Lots 62 and 303 being occupied by the established DHI Eco Lodge on the eastern coast of the island and Lot 305, occupied by accommodation units and shed, is located on the western side of Sunday Island Bay, with Lots 305 and 304 visible to each other across the bay, the former lot being close to the southern end of the island.

While the Eco Lodge is primarily accessed by boat/barge from Denham or Shelter Bay on the mainland or via light plane from Denham airport to an airstrip proximate to the lodge, Lot 304 is located in a relatively isolated corner of the island best accessed by boat/barge from Shelter Bay on the mainland to the south of the island.

As such, any proposed development on Lot 304 (pursuant to Shire approval of this LDP submission) will be isolated - an epitome of eco-tourism.

Alignment with the objective of the zone - 'to provide for ecotourism development' - can be demonstrated via:

- Approval of an LDP with proposed building envelopes located to take account of the topography including physical and visual impacts allowing for management planning and ecotourism products and opportunities to be proposed and any areas of regulatory vegetation management related to a BMP to be minimised.
- Limiting the number of envelopes with development to be located within those envelopes minimises building footprints, and in turn, responsible development, conservation and sustainability of the site, its environment, and its landscape.
- Including a nominated accommodation unit as a refuge in each envelope built to required standards substantially reduces the amount of vegetation management required to access a single remote refuge accessed by an open path and increases visitor safety.
- The area of the eight building envelopes is approximately 1.84ha, being around sixteen percent of the Lot and 0.0026% of the island, minimising physical impacts by minimising the area of vegetation management required to meet regulatory requirements, while allowing for large areas of the site (almost 70%) to remain undeveloped.
- Minimal impact to the land and the landscape through envelope selection demonstrates low scale when compared to the total area of Lot 304 (11.2985ha), the island (63,000ha) and the World Heritage Property (2,200,905ha) whilst still allowing for eco-tourism development.
- Providing short term accommodation units - as part of a tourist development - allowing visitors to appreciate the unique location while limiting the total number of visitors and staff on site to no more than 100 at any one time (potentially an average of 16 visitors and plus staff per envelope) in line with BMP restrictions and DFES guidelines for tourism sites. A computer booking system operated by the onsite manager ensures numbers of visitors and staff cannot exceed 100.
- The maximum number of short-term accommodation units permitted within Lot 304 is limited, due to a restrictive covenant on Lot 304's Certificate of Title, with the enclosed area of each accommodation unit not to exceed 90 square metres, which also limits the use of the land to low impact ecotourism demonstrating compliance with 'the objective of the zone'. Lot 304 represents approximately 0.018% of the total island. Within any of the eight approx. 2,300m^2 building envelopes up to four accommodation units are capable of being included based upon the asset protection zone (APZ) established from the location of each building envelope's staff/refuge/visitor services' unit location (augmented by open decks, staff quarters and storage).
- The project Design Guidelines (Supporting Report B) for the development of any proposed future accommodation unit within a building envelope will ensure a limited footprint within each of the building envelopes. The future accommodation units are expected to be secured with eco-anchors or similar solutions, thereby minimising development impact, protecting the ecosystem and the ecological values and special attributes of the location.
- With the exception of the proposed building envelopes, the majority of Lot 304 would not be disturbed other than for essential infrastructure, including tracks providing vehicular access to any proposed short term accommodation units, pathways and other essential services.

- The project Design Guidelines will ensure that clusters in all envelopes must be complementary following a common theme. Future proposed short term accommodation units are designed to be proportionally visually low profile and physically low impact using construction methods including eco anchors with minimal or no levelling, digging or dust creation for foundations demonstrating limited site impact and conservation of the landscape and ecosystems on site whilst still providing for planned ecotourism development.
- The Design Guidelines for any future proposed short term accommodation units and their layout within envelopes are to be complementary to fit within the character of the National Park, being of modest but proportional scale, low profile and unobtrusive, aligned with the natural landscape to achieve the design philosophy of "treading lightly on the land", as expected for an ecotourism development.
- As the Shire's Scheme requires the proposed development to be of a high architectural quality, any proposed future accommodation units built to refuge standard are to reference the Design Guidelines - encouraging unique visual eco-experiences for visitors on site and the opportunity of expanding those experiences to other locations on the island -demonstrating conformity in line with the objectives of the zone.
- The Design Guidelines for any future proposed short term accommodation unit provide a scope for an eco-tourism development that embraces the landscape. The use of colours aligned with the World Heritage Advisory Committee colour palette for Dirk Hartog Island demonstrates compliance with World Heritage Advisory Committee requirements. Extensive glazing would demonstrate compliance with 'objectives', giving visitors the opportunity of a visual eco-experience with uninterrupted views over Sunday Island Bay.
- The proposed inclusion of renewable solar energy and new era small wind turbines coupled with battery storage demonstrates a commitment to sustainable eco-tourism using nature's free resources, with no necessity for mechanical back up or fuel storage allowing for planned eco-tourism development meeting the objectives of the zone.
- Onsite staff accommodated within each building envelope provides increased security and safety for visitors if an emergency situation should arise in regard to bushfire, cyclone or other event.
- Onsite management would provide:
    - information on biosecurity, access, and the values of the Shark Bay World Heritage property (SBWHP) including the Dirk Hartog Island National Park (DHINP) and adjacent marine park, which will demonstrate and contribute to the eco-experience for visitors. This allows for interpretation, education and appreciation by visitors, demonstrating the importance to conserve the environment to sustain the future wellbeing of the area, with locals and visitors provided with long term and continuous opportunities for ongoing eco-experiences and eco-tourism development.
    - information for visitors to inform and demonstrate the importance of an appreciation of the high conservation values of the area and to support protection and conservation of the DHINP and surrounding marine park. The provision of information demonstrates a way that management can provide interpretation and education to visitors whilst encouraging and outlining strategies to protect the environment; and
    - visitors with environmental and cultural awareness and respect for Dirk Hartog Island, with positive eco-experiences, which meets the objective for the zone, which is "to provide for eco-tourism development".

Additionally, any future development's sustainability would be evidenced through its minimal impact on the ecosystems and landscape, both physically and visually, through the management of each stage of the development, including restricting any access tracks and paths together with building techniques and design guidelines, demonstrating compliance with the conditions of SU14.

Agreement established with the traditional owners of the land – Malgana – with employment opportunities and information signage to be erected.

The Malgana name for Dirk Hartog Island is *Wirruwana.*

CONDITION 8 **Any development or Local Development Plan shall be referred to the Department of Biodiversity, Conservation and Attractions (Parks and Wildlife Services), the Shark Bay World Heritage Advisory committee and the Department of Planning Lands and Heritage for comment prior to determination.**

LDP RESPONSE The requirement to refer the proposed LDP to the above agencies is understood, our understanding being that the referrals will be conducted by the Shire.

CONDITION 9 **Any design guidelines that form part of a Local Development Plan approved by the Local Government shall be enforced as if the requirements form part of the Scheme.**

LDP RESPONSE It is our expectation that the Shire will refer to our Design Guidelines when considering development applications for short term accommodation units pursuant to the Shire's approval of this LDP.

CONDITION 10 **A Foreshore Management Plan may be required and referred to the Department of Biodiversity, Conservation and Attractions (Parks and Wildlife Services) for endorsement where a physical foreshore exists between the site and the coast as a condition of development.**

LDP RESPONSE In reviewing an earlier submission for approval of seven accommodation units, each proposed on its own building envelope, the Western Australian EPA proposed that any Foreshore Management Plan (FMP) should be considered as an **access plan.**

Any approval or non-approval of a foreshore management/access plan is not enforceable or controllable by the Shire, whose consideration of development on Lot 304 cannot include any foreshore management/access plan over the area of land between the site and the ocean as neither the Shire nor the owner of the freehold have any enforceable rights over this land which forms part of the Dirk Hartog Island National Park (DHINP). As such, the Shire may only make recommendations.

While it is acknowledged that an FMP **may** be required, until the LDP and its proposed building envelopes are approved it is not possible to complete more than a draft FMP since the location of any proposed accesses over the DHINP cannot be plotted. (see LDP Appendix 20, LDP Condition10.0)

In correspondence in March 2020 from DBCA Land Use Planning coordinator Nick Detchon to the Shire's planning consultant Liz Bushby,

DBCA advised that
"it supports the development by the proponent of suitable access paths to allow pedestrian access between Lot 304 and the beach and to prevent development of informal walk tracks and associated disturbance to the DHINP." **(Refer Appendix 2)**

DBCA's correspondence confirmed that

"it is the responsibility of the proponent to develop a plan for pedestrian paths that are appropriate for the development proposed and to demonstrate that potential impacts to the DHINP from pedestrian access will be adequately managed."

DBCA further advised that

"Without final details of the development proposal (e.g. number of units, their location, staging of construction of units, occupation numbers and expected usage patterns) DBCA cannot provide detailed advice regarding pedestrian pathway design, numbers or locations."

Until the LDP locating Building Envelopes is approved it is not possible to provide the essential information requested by DBCA.

As such, the proponent cannot commit to an FMP providing details of the proposed foreshore access paths and their management until the LDP and its proposed building envelopes is approved by the Shire, which will facilitate the lodgement and approval of formal development applications for the Lot 304 accommodation units. Condition 10 includes a trigger for submission of a FMAP

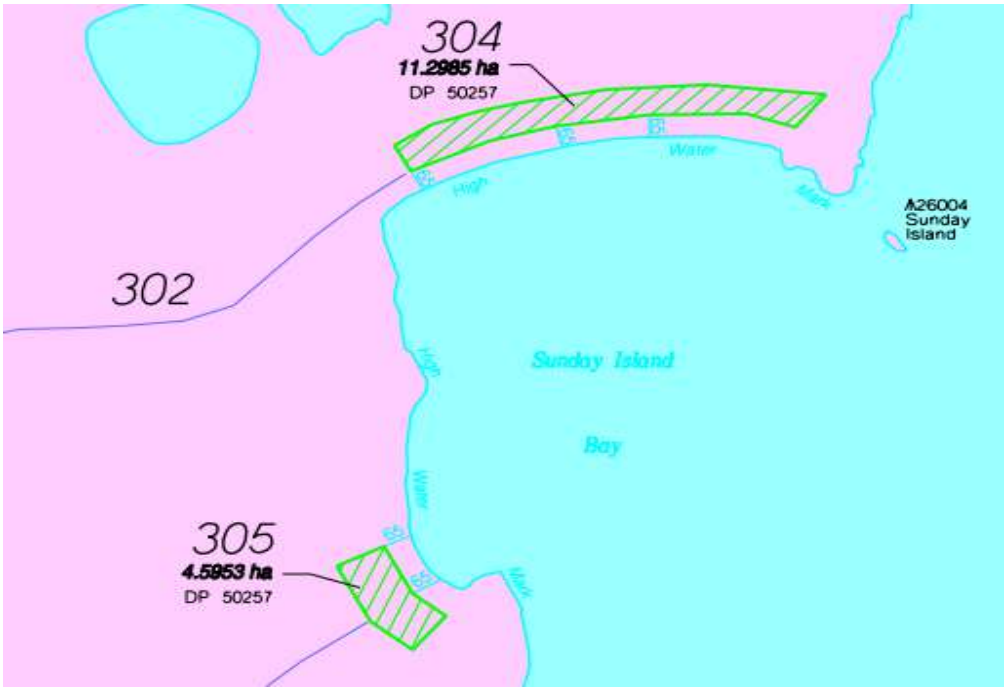
CONDITION 11 **A Visual Impact Assessment may be required to demonstrate that any development will not negatively impact on World heritage values or detract from the scenic quality of the land.**

LDP RESPONSE This condition states that a Visual Impact Assessment **may** be required to demonstrate that any development will not negatively impact on World Heritage values or detract from the scenic qualities of the land. (refer Appendix 21, LDP Condition 5 and ER Figure 2 & 7)).

It is not possible to proceed with any proposed short term accommodation planning until an LDP including proposed building envelopes is approved. Any future proposed chalet located within any building envelopes will be positioned on the site to blend seamlessly into the background with a small footprint, low proportional profile and Shark Bay World Heritage Advisory Committee colour choices to achieve maximum blending with the terrain and in turn minimising visual impact and effectively camouflaging the physical presence in their surroundings.

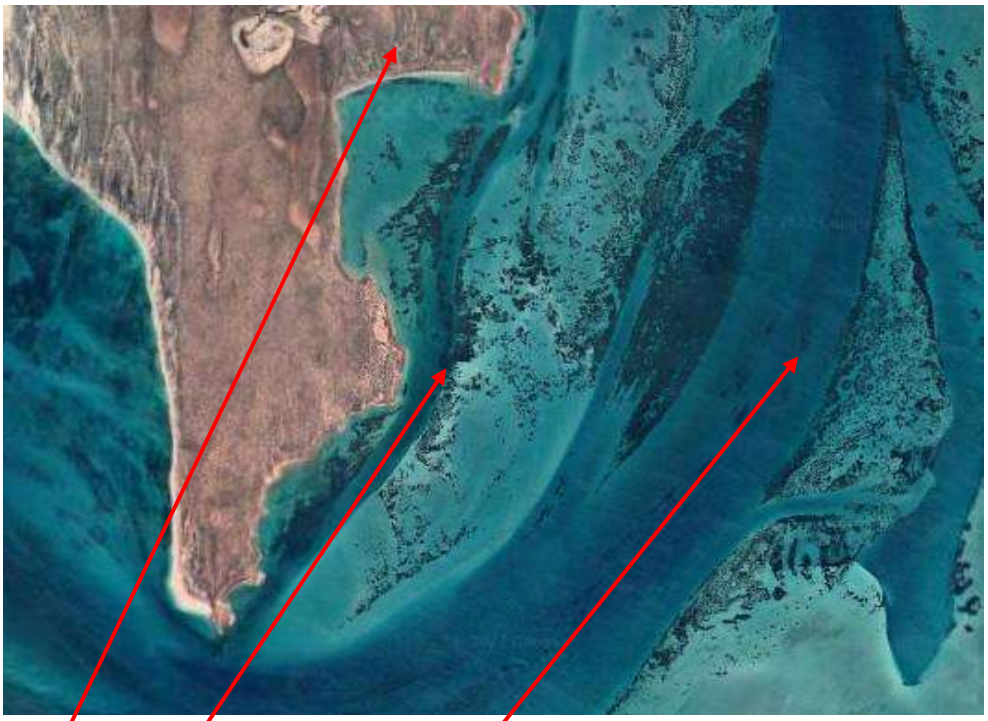
The location of the Sunday Island Bay site within an enclosed bay facing southeast and more than thirty kilometres from the local township of Denham provides minimum opportunity for visual impact to the general community. The scale of any proposal would be insignificant compared to the area of Sunday Island Bay, Dirk Hartog Island and the Shark Bay World Heritage area.

The map below confirms that the only land-based vision of the proposed development on Lot 304 will be from Lot 305 and vice versa.



Plan 1: Freehold Locations, Sunday Island Bay

Viewed from the sea, any proposed development on Lot 304 is also limited, as boats passing Sunday Island Bay need to navigate one of the two ocean passages on the aerial photograph below, depending upon vessel size and tidal conditions:



(Photo 1 - Passages)

Vessels and small boats passing the bay travelling in a southerly direction would always be at a distance of approximately 2.5 kilometres from the site which would, due to the passages and direction of travel, make the site impossible to observe until the vessel was at least 2 kilometres past the site and then only by looking backwards

in a northerly direction, which is highly unlikely. (see additional visual detail Appendix 21 and ER)

This makes any chance of sighting of any accommodation unit on Lot 304 almost impossible, demonstrating minimal visual impact as is the case with Lot 305 on the opposite side of the bay, as evidenced by photographs of Lot 304 from Sunday Island Bay below:

Vessels and small boats passing the bay travelling in a northerly direction will sight the bay initially from about 4 kilometres depending upon the passage followed, again at a distance making it almost impossible to identify any built structure within Lot 304.

The frequency of vessels passing in either direction is minimal and limited to in the main privately owned fishing vessels coming from Denham or Steep Point and/or commercial and/or charter vessels coming from Denham or from Perth. Due to the strong southerly winds experienced during the summer period from October to March there is less boat movement in Shark Bay and particularly near Sunday Island Bay due to its distance from Denham and relative to the ocean conditions.

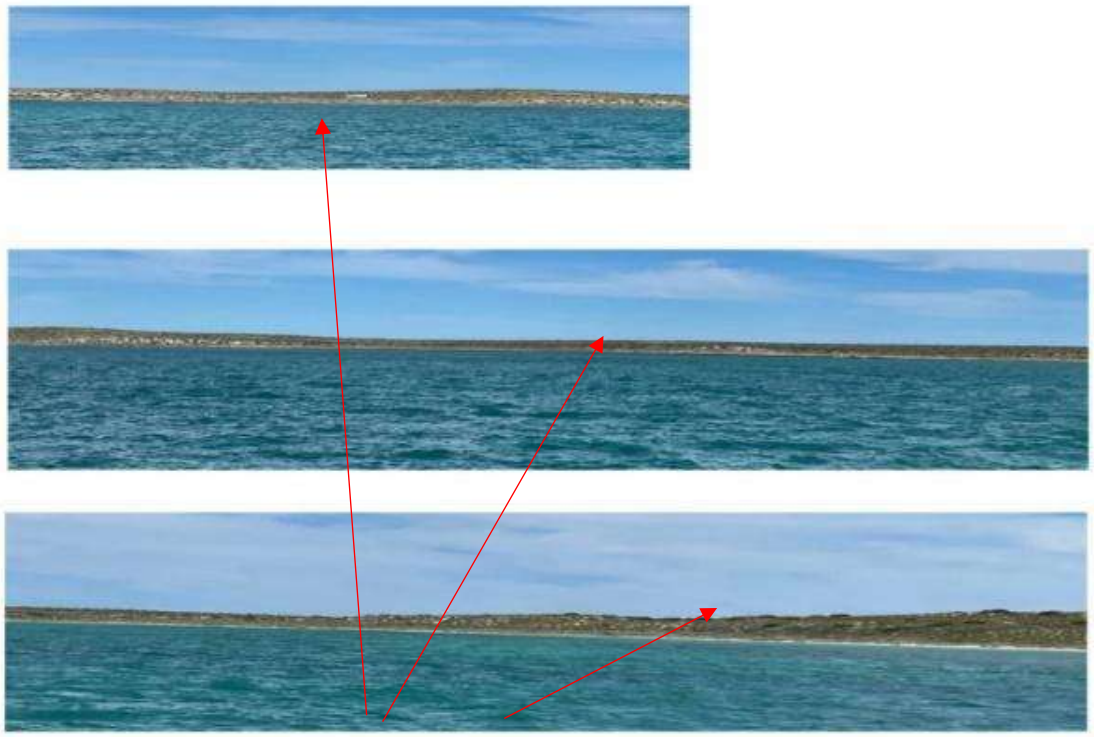


Photo 2: Visual aspects of Lot 305 and 304

Lot 304 is not viewable from the main Dirk Hartog Island track as it approaches the site from the north. Therefore, the proposed development would not present any visual impact for vehicles travelling this route. The site is viewable from private freehold Lot 305 as is 305 visible from Lot 304.

The Design Guidelines (Supporting Report B) require the sympathetic treatment of the land by applying low impact building methods whereby any proposed short term accommodation units will be founded above ground using eco anchors, pylons or similar methods to mitigate the undulation of the site while facilitating a horizontal base for the chalets in any of the proposed building envelopes as well as minimising clearing of the natural vegetation.

The low impact of future proposed chalets will be emphasised by:

- A requirement of the Design Guidelines that the colours from the Dirk Hartog Palette shall be used.
- Demonstrated compliance with the SBWHAC submission minimizing visual impact from near or far.
- Minimum physical reshaping of the land via levelling and filling, if any, through the use of adjustable steel footings secured by eco anchors; and
- Vegetation management in accordance with regulatory requirements, guided by a landscape vegetation plan for the site and each building envelope and its asset protection zone with eco-tourism short term accommodation units sensitively located to impinge in the least possible way upon the existing natural landscape within designated envelopes.

CONDITION 12 **In relation to the land use "Motor vehicle, boats or caravan sales" only hire of motor vehicles, boats or caravans may be considered by the local government.**

LDP RESPONSE Given that the attraction of accommodation is fundamental to the development proposed, the sale of motor vehicles, boats or caravans is not envisaged for Lot 304 and is seemingly a land use more relevant to the mainland. The possible hiring of motor vehicles, boats or caravans may be considered subject to the Shire's consideration.

5. TOURISM DEVELOPMENT OPPORTUNITIES IDENTIFIED

5.1 TOURISM OPPORTUNITIES

Generally, ecotourism has been defined as "responsible travel to natural areas that conserve the environment, sustains the well-being of the local people, and involves interpretation and education" and is tourism which is conducted responsibly. Eco-tourism helps preserve and foster respect for some of the most beautiful environments on Earth: it encourages travellers to help protect the environment and contribute to local communities on a much deeper level than the tourists just passing through - building environmental and cultural awareness and respect. Eco-tourism should provide positive experiences for both visitors and hosts and generate benefits towards conservation for both local people and private industry.

As early as 1988 the Shark Bay Regional Plan identified Dirk Hartog Island as a site for tourist development through the increased use of beaches and adjacent marine areas. In 1997 the review of the 1988 report confirmed this, stating that the natural attractions of Shark Bay relate primarily to the marine environment and the recreational opportunities, one of those attractions being Dirk Hartog Island.

The Shark Bay World Heritage Property was listed in 1991, and a Strategic Plan 2008-2020 was prepared by the West Australian Department of Environment and Conservation.

5.2 PREVIOUS REPORTS IDENTIFYING DEVELOPMENT OPPORTUNITIES ON DIRK HARTOG ISLAND

Dirk Hartog Island and Lot 304 Sunday Island Bay have been identified and referred to in numerous Government reports acknowledging and recommending the development of tourism and ecotourism accommodation facilities as follows:

- **The Shark Bay Region Plan adopted in June 1988** states: *'the main tourist potential for Dirk Hartog Island appears to lie in increased uses of beaches and adjacent marine areas."*
- **The Shark Bay Regional Review Draft 1997** states: *"the natural attractions of Shark Bay relate primarily to the marine environment and the recreational opportunities it provides; Dirk Hartog Island is one of those attractions."*
- **The Tourism Planning Taskforce report 2006** states:
  - *"The key principle identified is that a sustainable tourism industry, with its many inherent benefits, requires tourism development to be undertaken for tourism purposes".*
  - *"it is acknowledged that tourism projects have broad multiplier benefits, particularly in regional areas"*
  - *"'the primary issues identified as impeding sustainable tourism development relate to the coordination of development approval".*
  - *"The difficulties of initiation of regional tourism projects often relates to the isolated nature of the development site and lack of basic infrastructure".*
- **The Shark Bay Terrestrial Reserves and Proposed Reserve Additions Draft Management Plan 2007** and the Dirk Hartog Island National Park Interim Management Guidelines for Necessary Operations identifies **Lot 304** *as "highly modified". In this area there will be high level recreation, education and interpretation and group activities specifically catered for".*
- **The 2014 Shark Bay Local Tourism Planning Strategy** identifies the need for further development of ecotourism activities on Dirk Hartog Island and the 2014 Ningaloo-Shark Bay Landscape Final Experience Development Strategy stated that *"Dirk Hartog Island is identified as having the **potential for new eco accommodation development".***

- **The Shark Bay Terrestrial Reserves and Proposed Reserves Additions No 75 2012 states;** *"the freehold homestead and proposed adjacent lot and the proposed* ***Sunday Island Bay freehold lots*** *have a highly modified setting. In these areas there will be high level recreation, education and interpretation and group activities specifically catered for".*
- **The Shark Bay Local Tourism Planning Strategy 2014** identifies; *"**the need for further development of ecotourism activities on Dirk Hartog Island''** plus **''the need for easier access to Dirk Hartog Island''** plus "**the opportunity of marketing Dirk Hartog Island as an aspirational attraction''**.*
- **The Ningaloo- Shark Bay Landscape Final Experience Development Strategy 2014** states: ''*Dirk Hartog Island is identified as having the potential of new eco accommodation development''.*
- **The Gascoyne Regional Tourism Strategy 2014** states: **"***strategic action identified to develop eco-tourism ventures and* ***provide improved access to Dirk Hartog Island****" plus "Identified the need to explore and* ***investigate the potential to develop new product experiences on Dirk Hartog"****.*
- **The Gascoyne Regional Planning and Infrastructure Framework 2015** identifies: **"***tourism nodes and minor tourism nodes on Dirk Hartog Island National Park"*
- **The Gascoyne Coast Sub-Regional Strategy Part A Strategic Planning 2018** notes**:** *"Dirk Hartog Island is recognised as a minor tourism node providing overnight accommodation'' and "at Dirk Hartog Island both Sunday Island Bay and the Homestead are recognised as sites for tourism development''*
- **The Shark Bay Destination 2018** report states that: "*Dirk Hartog Island offers natural environment, scenery, landscape, and beaches and identified* ***further opportunities for the development of ecotourism activities on Dirk Hartog Island***" and that: *"the following locations provide opportunities of overnight tourism and recreation accommodation…**Dirk Hartog Island**"*
- **The State Planning Strategy 2050** (published 2021) states: **"**one of the Government's State Tourism Development Priorities include ecotourism initiatives" and "an increase in tourism infrastructure to exploit the State's unique opportunities is important for the future diversification of the economy, especially regionally" and that: "There is a need for a substantial increase in short stay accommodation in strategic regional areas and a need to identify eco-tourism sites and have them developed."

5.3 CURRENT ANALYSIS ON RECREATION & TOURISM OPPORTUNITIES

In January 2023 the Department of Biodiversity, Conservation and Attractions called for submissions to prepare a "Dirk Hartog Island Recreation and Tourism Opportunities Analysis" to identify issues and challenges and provide recommendations to improve visitor experiences whilst managing the island's natural and cultural values. The chosen consultant for the analysis is Marketrade (Peter Backshall), who conducted interviews with over 35 people (stakeholders) from 20 organisations.

In July 2023 DBCA distributed Marketrade's analysis to stakeholders and invited comments on the report by November 2023. The following extracts from the analysis are pertinent to this LDP submission.

PREAMBLE

"There is a groundswell of interest in Dirk Hartog Island (Wirruwana) due to the 400-year celebration of Dirk Hartog's landing on the island in 1616, strong visitation to WA's coastal tourism destinations and World Heritage Areas in particular, and the island's ecological restoration project. Drivers of future growth in visitation to Dirk Hartog Island include development of ecotourism accommodation on freehold land, additional recreation and tourism infrastructure within the National Park, tour operators offering a wider range of experiences appealing to a wider audience, and a wider range of options to access the Island. Balance is required in maintaining an ecologically sustainable environment as visitation grows."

EXECUTIVE SUMMARY

"Dirk Hartog Island has potential to be a world-leading eco-tourism destination as outlined in the island's vision based on stakeholder views and feedback. DHI will be a world leading nature-based adventure tourism destination rich in heritage, cultural, terrestrial, aquatic and social experiences, a place where adventurous travellers immerse in a unique, sustainable wilderness environment that engulfs their heart, soul and mind, inspiring appreciation and conservation among current and future generations."

DIRK HARTOG ISLAND

"In 1616, Dutch captain Dirk Hartog and crew were the first Europeans to land on Western Australia. The heritage site at Cape Inscription, where a pewter plate was affixed to record the landing, is also home to an historic lighthouse and keeper's quarters. Cape Inscription is registered on the national heritage list.

The 1616 Project is an ecological restoration project that offers visitors the opportunity to experience fauna and flora rehabilitation.

The 1616 Ecological Restoration Project aims to restore the ecological condition of DHI to pre-European discovery and the subsequent settlement by miners, fishers and pastoralists. The 1616 Project has involved the removal of feral animals before the translocation of native fauna (many of which are listed as threatened) while also undertaking weed control of selected priority weeds. The 1616 Project is expected to continue until 2030."

TOURISM

"Tourism on DHI is expected to evolve from a small scale, nature-based camping, self-guided focus to a larger realm that includes eco-accommodation. The challenge is to expand the infrastructure and facilities on DHI sufficiently to activate opportunity for visitors to more effectively experience and appreciate its uniqueness, without destroying its distinctive qualities, values and appeal."

TOURISM TRENDS

"Globally, niche tourism experiences are displacing mass tourism and over-tourism in particular. Tourists are seeking new opportunities that are ecologically sustainable, socially equitable and personally attractive on a health, wellness and spiritual level."

ATTRACTIONS

"Commencing in 2023, a Shark Bay tour operator is planning to run 4WD buses on DHI to provide guided tours to sites including those listed above. The 13-22 seat buses will be stationed on DHI during the visitor season and could potentially offer shuttle services to fly-in visitors, for example, staying at the Lodge (or future eco-accommodation on freehold lots)."

ISLAND TOURISM

"Visitation to DHI is expected to grow at 3-6%p.a. in the coming years due to:

- *Increase in tours bringing visitors to DHI via fast-boat and to a lesser extent plane.*
- *Increase in DHI promotion appealing to visitor interest in wellness, nature & adventure.*
- *Potential new accommodation bringing new services, tours & improved choices for visitors.*
- *Continued strong interest in Ningaloo bringing visitors to marine experiences on DHI, and*

- *Improved intra-regional flight services & better linkages with WA's iconic tourism areas. Four visitation (demand) scenarios are presented below based on variations in DHI accommodation development and overnight capacity. DHI visitor levels could grow from 7,800 in 2024 to 17,500 by 2031 depending on:*

  1) No new accommodation. Low visitor growth at 3% p.a.

  2) No new accommodation. Moderate visitor growth at 5% p.a.

  3) One-off increase in accommodation (e.g. Sunday Island Bay). Moderate growth at 5% p.a."

VISITOR EXPERIENCES

"There is strong growth potential for fast-boat tours from Denham to Homestead Lodge/ Sunday Island Bay; offering heritage, 1616 Project, culture, scenery, marine activities & catering; day trip & overnight tours; utilising 4WD buses-vehicles stationed on DHI.

6. CONSULTATION

Contact and email correspondence has been undertaken with: Jim Sharp (DEC); Brett Fitzgerald (DBCA); Nicholas Detchon (DBCA); Allison Donovan (DBCA); Steve Nicholson (DBCA Manager Shark Bay); Richard Trinh (DFES); Ron de Blank (DFES); Nigel Sercombe (DBCA); Paul Anderson (then CEO of Shire of Shark Bay); Cr Cheryl Cowell (then Shire President); Liz Bushby (Shire's Consultant Planner); Phil Scott (Preston Consulting Environmental) and then Chair of the Shark Bay World Heritage Advisory Committee); Dr Matt Elliott (Principal Coastal Engineer, Damara WA Pty Ltd); Landy Jones (DWER; NRMO Planning Advice); Amanda Butterworth (Shire's Independent Planning Consultant).

Key references are as follows:

- **Shire of Shark Bay** by letter and advice dated October 1, 2020, stated:
  - *A new Local Development plan should be prepared in consultation with relevant government agencies who have lodged submissions to ensure that their concerns are comprehensively addressed.*
  - *Any new Local Development plan should include a section outlining the consultation undertaken by the applicant.*
  - *It is recommended that the applicant consider clustering of development to minimise the building footprint on natural vegetation and allow an eco-tourism development within a natural setting.*

- **DBCA Manager Shark Bay**
  - **TBB wrote to Steve Nicholson on** 15 October 2019 as follows:
    "Hi Steve thanks for the phone discussion in relation to Lot 304.
    A Local Development Plan typically includes a map of the relevant land area and in this case we would propose to illustrate development envelopes and contain a set of development provisions for future development applications to have regard to (in addition to the local planning scheme and other relevant documents). Please note, a local development plan does not constitute a development application, which would be lodged with the Shire for works and use of the land. And, for reference, a local development plan would be advertised by the local government when it is formally lodged with the Shire of Shark Bay for their assessment and determination. I am interested in annotating on the LDP, potential access points between the coastline of the bay and lot 304."
  - **Steve Nicholson District Manager Gascoyne** was contacted several times from April 2021 and provided with the above copy text from the Shire of Shark Bay.
  - **Nigel Sercombe, Regional Manager Midwest** responded on 27 August 2021 stating:
    "For DBCA to support a development proposal for Lot 304 (or components of a proposal, such as a LDP or FAMP) sufficient detail of the proposed development should be provided to enable assessment of potential impacts to the Dirk Hartog National Park (DHINP), Shark Bay Marine Park and values of the Shark Bay World Heritage Area. Development proposals and supporting documents should clearly demonstrate how impacts will be mitigated and managed in the long term."

IT SHOULD BE NOTED THAT THE LDP IS NOT A SUBMISSION FOR DEVELOPMENT APPROVAL.

- **World Heritage Committee**
  - **Cheryl Cowell the Executive Officer for the SBWHAC** was contacted on April 7,2021 and provided with the information required by the Shire. As Cheryl was also President of the Shire of Shark Bay, she was already fully aware of the Shire's request in regard to consultation.

- **Cheryl Cowell responded on 7 April** advising:
  " As you are aware I am the Executive Officer for the SBWHAC and Phil Scott is the current Chair of the Committee. Therefore, please address your correspondence regarding consultation and the request for a Local Development Plan for Lot 304 to Phil (pscott@prestonconsulting.com.au) with a copy emailed.

  A number of email exchanges followed:
  - **Phil Scott** advised on 25 June 2021:
    "I can confirm that the drafts (LDP drafts) have now been distributed to the Committee with a request for general comments. They did not go out before the last meeting as the Committee members would not have had time to look at them prior to the meeting".
  - **Phil Scott** advised on 10 August 2021:
    "I have received some input from the Committee. I will need to confirm a date for next meeting with Cheryl."

  NUMEROUS FURTHER EMAILS TO PHIL SCOTT WERE NOT REPLIED

- **DWER**
  - **Landy Jones from DWER** was contacted numerous times from April 2021 and provided with the text above from the Shire of Shark Bay.
  - Landy Jones responded on 13 May 2021 stating:
    "The Department of Water and Environmental Regulation will not be varying the recommendations from the original application. If the Shire has requested, you to provide additional information to support your application and address the Departments recommendations, responses need to be directed through the Shire. The Department is unable to comment on proposals that are currently under assessment by the Shire of Shark Bay."

  - Following further emails Landy Jones advised on 18 June 2021:
    Please note that further communication on this matter will not be entered into until such time that this occurs through formal referral of a Development Application by the Shire of Shark Bay."

AGAIN, IT SHOULD BE NOTED THAT THE LDP IS NOT A SUBMISSION FOR DEVELOPMENT APPROVAL

Plan 2: Sunday Island Bay Location

The Management Plan has been prepared to provide parameters and guidance within which future development applications within Lot 304 can be assessed addressing management proposed to minimise impacts whilst still encouraging eco-tourism development, appreciation and activities. The Management Plan provides information and guidelines regarding future management of the site following approval of the LDP, and any application then submitted for development.
THE SUBMISSION IS NOT AN APPLICATION FOR DEVELOPMENT

Local Development Plan Management Plan Supporting Report A

Lot 304, Sunday Island Bay
Dirk Hartog Island
February 2025

DHI Development Pty Ltd
PO Box 107 NORTH FREMANTLE WA 6159

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1.0. INTRODUCTION

The purpose of the Local Development Plan (LDP) prepared for Lot 304 is to provide a strategic plan for coordinated development of the lot, and to provide the Shire with a document to guide future decision making at the subsequent development application stages.

The Management Plan is a supporting document for a Local Development Plan (LDP) submitted on behalf of Dirk Hartog Island Development Pty Ltd (DHID), for Lot 304 located at Sunday Island Bay, Dirk Hartog Island as required by-

Shark Bay LPS No 4 SU 14 condition 3(i).

'A Management Plan that addresses visitor access, servicing, maintenance, waste disposal, effluent disposal, service areas, rubbish management and the transport of construction material'.

The Management Plan has been prepared to provide parameters and guidance within which future development applications for Lot 304 addressing management proposed to minimise impacts whilst still encouraging eco-tourism development, appreciation and activities can be assessed.
The Management Plan provides information and guidelines regarding future management of the site following approval of the LDP, and any application then submitted for development.

The Management Plan does not form part of a Development Application – which on Shire of Shark Bay advice cannot be proposed until the LDP has been accepted.

Future built accommodation would be proposed to be developed in stages -spread between eight proposed building envelopes - managed in a sustainable way.

Staging allows for continuous review of impacts and the ability to mitigate issues that may arise following development. Any future first stage application for development would not be proposed to exceed the number of accommodation units, as approved in an earlier submission with subsequent development applications subject to ongoing review.

The total number of staff and visitors permitted on the 11.2985ha site at any time is restricted to a total of 100, in compliance with a BMP (refer ER Appendix I).

1.1 Scope

The Management Plan has been prepared in response to Condition 3(i) of the Local Planning Scheme No 4 to address management and any development of the site providing strategies and management actions for each of the items included within condition 3(i) and other relevant factors related there to.

1.2 Objective

The primary objective of the Management Plan for Lot 304 is to address each of the items specified in LPS SU14 condition 3(i)- above- providing information on and undertakings regarding their ongoing management: and addressing other relevant management factors.

1.3 Aim

The aim for the Management Plan for Lot 304 is to establish management strategies for future ecotourism development related to SU14 addressing items contained within condition 3(i) plus other relevant management factors and proposing actions to be undertaken by management.

Limiting/minimising impacts to the landscape and vegetation of the site and its location is a high priority aim in managing any development - and as provided for in the objectives of SPP 3.7 Bushfires November 2024 -is a priority factor of this plan.

1.4 Challenges

The careful location of building envelopes to allow accommodation units to be built with the least impact to the land and the visual landscape was completed following many site assessment visits.
Any future development of Lot 304 would include land and vegetation management to allow for built structures, infrastructure and bushfire requirements to provide safety for visitors - in compliance with SPP 3.7 Bushfire -November 2024 and "Planning for Bushfires Guidelines".
Planned landscaping is one ingredient in managing the land in a sustainable way to address and limit/minimise impacts from development and to provide security for visitors and staff, in case of emergency situations, whilst still allowing for development in a natural setting.

SPP 3.7 November 2024 "Planning for Bushfires Guidelines" provides detailed information regarding site vegetation management. (see pages 32 onward)

Meeting challenges through careful and responsible management of the environment of the site guided by consultant reports and landscape vegetation plans while addressing the specific items that are included within 3(i) is provided for within this plan.

1.5 Consultants

Consultants have provided technical reports in support of the LDP and this Management Plan:

- BMP & BEP – "Bushfire Safety Consulting" (refer ER Appendix I)
- Flora Significance Assessment – "Ecosystem Solutions" (refer ER Appendix D)
- Site and Soil Evaluation – "Land Assessment Pty Ltd (refer ER Appendix F)
- Coastal Processes - "Damara Pty Ltd "(refer ER Appendix B)
- Environmental Report (ER) – "Bayley Environmental" (Supporting Report D)

1.6 Covenants

Lot 304 is subject to both restrictive covenants to the benefit of the Minister for Land in Western Australia and a positive covenant registered upon the title for the transport of water following a registered easement. (Appendix 18)
The covenants are not applicable to the Shire of Shark Bay LPS No 4 (including Lot 304's Special Use 14 zoning) and are not included or referred to in LPS No 4 or SU14.

The covenants have been addressed and complied with in the LDP submitted.

1.7 Zoning

The lot was zoned within the Shire of Shark Bay LPS No 4 in 2018 as a Special Use Zone (SU14).
Condition 1 of SU 14 states that.

"*The objective of the zone is to provide for eco-tourism development*" ***(not defined in LPS No 4)***

1.8 DHI Development Pty Ltd (DHID)

The Management Plan for Lot 304 has been prepared by DHI Development Pty Ltd (DHID) in consultation with Loftus Co business management advisers in compliance with SU 14; it includes management strategies and actions proposed for the construction and ongoing operations following approval of development applications submitted and approved by Council subsequent to the approval of this LDP.

DHID would manage and be responsible for appointing all management and staff to be employed to manage and maintain the site and its operations following approval of the proposed LDP and any future development application.

DHID will prepare, submit, and manage all proposed development applications submitted and future development in compliance with Design Guidelines, SU14, LDP conditions and covenants, BMP and BEP - for Council approval.

2.0. GENERAL INFORMATION

Additional information is provided and should be referred to within appendix 8

2.1 Land

The Shark Bay World Heritage Property (SBWHP)has a total area of approx. **2,200,905ha**. (Map 1 page 2)

Dirk Hartog Island (DHINP) has a land area of approximately **63,000ha**. (approx. 2.9% of SBWHP) (Map 2 page 50)

Lot 304 located at Sunday Island Bay on Dirk Hartog Island is a freehold site of **11. 2985ha** (approx. .0005% of SBWHP) with a southern boundary facing Sunday Island Bay exceeding one kilometre. (Plan 1 page 52)

The site is located within the Shark Bay World Heritage Property requiring special consideration for management when addressing the environment and possible impacts resulting from development.

The outstanding universal values of Dirk Hartog Island and the possible threats and responses to those values are attached. (see Appendices 9 and 10).

Proposed onsite management of the land within the lot and any future agreed accessways across the national park land are factors in managing and protecting the integrity of the location's environment, its ecosystems, the landscapes of the site, and safety for visitors in addition to managing ecotourism opportunities meeting the *'objective of the zone'*.

In line with staged development, each building envelope will be proposed to – in addition to visitor accommodation – also provide accommodation for staff (incorporating a Refuge) and visitor services providing immediate onsite management of visitors, in the case of fire and/or emergency incidents, as development proceeds.

An Agreement with '*the Malgana'* who jointly manage Dirk Hartog Island with the Department of Biodiversity, Conservation and Attractions (DBCA) provides for the erection of signage on the site following the completion of any future development. A 2021 DWER report (refer appendix 19) regarding vegetation management noted that there were no mapped Aboriginal Sites of Significance located within ten kilometres of Lot 304: this was also confirmed in a Malgana Heritage Survey of Dirk Hartog Island prepared in 2007 following an onsite visit to Lot 304 and other locations on the island.

The LDP and supporting documents, proposing building envelopes, are to allow the submission to be approved by Council so that the next stage of preparing development proposals to be located within building envelopes can be commenced and then submitted to Council.

Advice Received from Shire of Shark Bay.

The Shire advised in 2019.
"A thorough Local Development Plan will essentially pave the way for future development applications, and the subsequent development application process should then be relatively straightforward".

Following a submission in 2020 the Shire advised in October 2020 that.
"It is recommended that the applicant consider clustering of development to minimise the building footprint on natural vegetation and allow an eco-tourism development within a natural setting."
'Council would only consider development applications once Council had approved a Local Development Plan for Lot 304.'

The Shire town planning consultant Liz Bushby advised DHID's then consultant Town Planner in September/October 2020.
"I would encourage you to look at the site with a fresh perspective *(rather than re-present the same LDP with additional information) as the Shire is clearly looking for a new plan which is why they have decided it should be in the form of a new LDP"*
"One clear concise document that supersedes all others would be the best option for Council to consider in the form of a newly submitted Local Development Plan"

Independent Town Planning Consultants Allerdings reviewed a preliminary new '***fresh perspective*** 'submission to Council in 2024 and provided recommendations to be addressed before final submission to Council. (Refer Appendix 22)

The new **'fresh perspective'** *LDP('one clear concise document')* for lot 304 proposes only eight building envelopes for future staged short term accommodation clusters with a staff accommodation/refuge/visitor services/store unit onsite within each envelope - acknowledging the Shire and their town planning advisers' letter and advice resulting in:

- Significantly reducing building footprints
- Leaving extensive areas of the lot in its natural state
- Limiting vegetation management to APZ areas at each building envelope (refer BMP ER appendix I)
- Providing for onsite resident staff in each building envelope
- Providing last resort Refuge in each building envelope

Only following the approval of the proposed LDP submitted by Town Planning consultants on behalf of DHID, providing for endorsement of building envelopes, can a development proposal (DA) be prepared and submitted to Council for consideration.

2.2 Ecotourism

Additional supporting general information is provided and should be referred to in Appendix 7 and 8.

Ecotourism has been described as a business providing holidays and related services which are not harmful to the environment of the area:

Eco-tourism development **(not defined in LPS No 4**) does not necessarily refer only to physical construction of built facilities but can also include providing/developing opportunities for eco-tourism products that meet and conform with the criteria of eco-tourism which can include built accommodation.

The development of short-term accommodation units (term used in the LDP and reports for any proposed accommodation before any DA is proposed) within Lot 304 will form a by-product of/ to or for ecotourism.

In modern day tourism and in particular ecotourism the trend has shifted from seeing to experiencing and any future proposed careful development and management of Lot 304 at Sunday Island Bay would provide the opportunity for visitors to be accommodated at Sunday Island Bay on Dirk Hartog Island within the Shark Bay World Heritage Property embracing a unique ecotourism experience within the confines of the World Heritage listed island and its surrounding ocean.

Built facilities at Lot 304, providing accommodation, would provide a base for visitors to appreciate and discover/embrace ecotourism experiences found in the Shark Bay World Heritage Property, Dirk Hartog Island National Park, and the Shark Bay Marine Park.

In compliance with a BMP the total visitor and staff numbers permitted on-site are limited to one hundred distributed over eight building envelopes with management and staff also located within each building envelope ensuring visitors would be managed effectively at all times whilst educating and guiding them on the importance of retaining the outstanding wilderness and natural values of the location, Dirk Hartog Island National Park and the SBWHP. (refer Appendix 8,9,10)

Any future development proposal (DA) would be proposed to provide for staged development of short-term accommodation units in clusters - *as recommended by the Shire of Shark Bay in their letter dated 1 October 2020* - to be located within proposed building envelopes with a staff accommodation unit/visitor services/store within each envelope also nominated as a 'refuge'.

The BMP (refer ER Appendix I) provides for four ninety square metre accommodation units plus staff accommodation/refuge/visitor services/store unit within each building envelope.

Potentially if all four accommodation units in an envelope were constructed and fully booked and three staff were also accommodated on site then the 'refuge' would provide for the maximum of 19 persons to be accommodated therein and managed by the onsite staff, but the total number of visitors and staff onsite cannot exceed 100.

Visitor and staff numbers on site would be managed through a computer booking program administered by the onsite manager to ensure the permitted numbers on site are not exceeded.

Future development of one to four ninety square metre short term accommodation units, each with two bedrooms (accommodating up to four visitors) plus staff accommodation/refuge/visitor services/store unit for one to three could see from one to sixteen visitors plus staff (3) located at a building envelope *- but the maximum number of visitors and staff permitted on site would be limited to 100 in conformity with a BMP.*

Each cluster of accommodation units will have common facilities for power, water and effluent disposal with onsite staff and management provided for within each envelope.

The staff accommodation/refuge/store/visitor services unit would provide for visitor services in each building envelope. Each accommodation unit would be self-contained for visitors to appreciate a visual environmental experience from their unit relative to the land, the sea and the sky.

Any development proposal must address the environment and propose strategies to eliminate, mitigate or reduce impact to the site and World Heritage Values.

2.3 Effective Site/Visitor Management

Effective management of the 'site' will be achieved with

- An onsite manager and staff accommodated within each cluster and through their compliance with this plan, the Environmental Report and BMP
- the actions and directions of management and staff,
- the use of signage and temporary fencing
- the response of management and staff to ongoing information gathered from monitoring points located on the site.

Areas of the site not used for short term accommodation units and other associated infrastructure within the building envelopes and land not included within the envelopes not required for essential infrastructure will be managed by the proposed manager; substantial areas remaining undeveloped and in compliance with an approved BMP.

Up to three staff would be proposed to be accommodated within each building envelope when visitors are present in all accommodation units within a cluster. Initial development for staff within a building envelope would be proposed to accommodate the site manager.

Effective management of 'visitors' would be achieved through.

- visitor induction upon arrival,
- Confirmation that at least one visitor in a group was fluent or understanding of English to assess possible issues and then to resolve them (multi-lingual information pamphlets)
- provision of information in regard to access
- Provision of information in regard to bushfire emergency procedure
- ongoing monitoring and responses,
- clear signage,
- temporary fencing
- onsite manager and staff directions.

Visitors to the site will be required to comply with covenants to the land that restrict the accommodation for visitors to 'short term accommodation' whereby no visitor can stay at a visitor accommodation unit for longer than three months.

The site manager or a designated staff member would meet visitors on arrival and direct them to their accommodation following induction to the site. Induction on arrival ensures visitors are familiarised with protocols on the site and surrounding National Park and aware of the site's inclusion within the States bushfire map.

Visitors will not be permitted to be accommodated on site if there were no fire and emergency trained staff resident at the visitor's accommodation building envelope.

A computer booking system administered by the manager would ensure that visitor and staff numbers are managed to ensure that no more than 100 persons in total were onsite in compliance with an approved BMP.

3.0. MANAGEMENT OBJECTIVES - SU14 3(i)

- Addressing each of the items listed within SU14 3(i)
  -visitor access,
  -servicing,
  -maintenance,
  -waste disposal,
  -effluent disposal,
  -service areas,

-rubbish management and the
-transport of construction materials.

- Managing all aspects of any development application
- Managing the site to minimise any impacts to the land and landscape of Sunday Island Bay, the Dirk Hartog Island National Park, and Shark Bay World Heritage property.
- Ensuring outstanding universal values identified in the WH listing and DBCA's interim management guidelines for Dirk Hartog Island (Appendix 10) are treated with respect and not impacted upon.
- Inducting future staff and visitors on arrival to ensure they are fully aware of the environmental objectives, requirements, and access protocols.
- Ensuring that visitors comply with the covenants to the land, relevant LDP conditions and SU14 zoning that no visitor is permitted to be accommodated at a unit for more than three months at one time.
- Managing visitors on the site to minimise any impacts to the site and surrounding area including between the site and the foreshore.
- Providing and managing information to visitors to ensure that their visit is beneficial, rewarding, and educational with minimal/no impact upon the site, World Heritage values and National Park.
- Identifying management responsibilities for managing the site to minimise impacts.
- Managing visitor activities on site
- Managing compliance with Dirk Hartog Island Biosecurity Implementation Plan 2014-15 requirements.
- Managing the implementation of any Bushfire Management Plan (BMP) and Bushfire Emergency Plan (BEP) (refer ER Appendix I)
- Managing visitors following the implementation of any BMP and BEP
- Managing vegetation on the lot and within each APZ using a landscape vegetation plan for each building envelope and asset protection zone to comply with any approved BMP or other regulatory requirement to minimise impacts as provided for in Planning for Bushfires Guidelines November 2024 version for the implementation of SPP 3.7.
- Managing ongoing monitoring of established monitoring locations.

3.1. Visitor Access-SU14 3(i)

Visitor entry and access to the site and short-term accommodation units would be controlled and managed by a resident manager/caretaker, who, with other trained staff (including a nominated leader in each envelope) located within each envelope, would be responsible for the management of visitors on site and within each envelope ensuring that accommodation units, tracks and paths were:

a. Accessed only via formalised tracks/paths to minimise disturbance and any impact of visitors outside of building envelopes.
b. Only occupied for short stay use and subject to entry controls.
c. Not occupied by any person(s) for more than three months (excluding staff required for management and operations)
d. Available as short-term accommodation
e. Continually monitored for visitor impacts related to access.
f. Continually monitored regarding weeds and other non-indigenous species

Formal onsite management of visitor access to Lot 304 to minimise impacts demonstrates an ability to maintain the integrity of the site and its ecosystems so that long term benefits of ecotourism are not compromised, and possible environmental, physical, and visual impacts are addressed, resolved, and/or mitigated where necessary.

3.1.i Vehicles

Visitors would access the site by vehicle from the main island track that leads to Lot 304 entering the site in its most south westerly corner and then accessing short-term accommodation units within one of the building envelopes via signed tracks. (refer LDP Submission Plan)

Any internal tracks included within future development applications will be a shared space for vehicles and pedestrians with vehicle travel speeds restricted. There will be no vehicle access over the National Park strip of land between Lot 304 and the foreshore for vehicles both before and after any development was completed.

Possible access over the National Park strip between the lot and the ocean via raised platforms, during construction, is subject to approval by DBCA when a DA has been prepared. (refer Plan 1)

It would be proposed that two vehicles would be permitted at each accommodation unit with parking located behind/beyond any accommodation units developed (BMP compliant) with specific details to be addressed and submitted within a DA. Vehicle parking is provided for within the BMP and would be located to the rear and out of sight to ensure physical and visual aspects are not compromised with no/minimal impact.

Vehicles will be managed within the lot to ensure that the outstanding wilderness and natural values of Dirk Hartog Island are not impacted upon by visitor activities or vehicle movements.

Vehicle movement would be in the main coming to and leaving the lot to return from and to visit other localities on the island or coming from or returning to the mainland.

Trailers for boats will not be allowed for on the site. There is no option or allowance for boat trailer parking, launching or retrieval of boats as the site is separated from the foreshore by a strip of National Park land which abuts the Marine Park- both of which are managed jointly by DBCA and the Malgana.

It would be anticipated that the predominant movement of visitors within the lot will be on foot and mandatory on foot to the foreshore via the main access in the southwest corner of the lot or future agreed walkways (subject to future DBCA approval).

As with visitor's vehicles any staff vehicles would be housed to the rear of the building envelope beyond sight. Specific details for parking would be provided within a DA when submitted following approval of the LDP.

3.1.ii Tracks

A strategic track mainly following the boundary of the lot exists and will be maintained as a firebreak in accordance with Shire of Shark Bay firebreak requirements.

It is proposed that tracks for vehicles and pedestrians on Lot 304 will be aligned, maintained, and managed as unformed access routes in conformity with the BMP provided by "Bushfire Safety Consulting" to maintain the integrity and to manage and protect the ecological values of the site. (refer BMP within ER Appendix I)

The Local Development Plan includes tracks and proposed tracks which primarily are located on the boundaries of Lot 304 serving as firebreaks and strategic firebreaks. The main existing track enters Lot 304 at its south-western corner and follows the southern boundary circumnavigating the lot before heading southwest again as shown on the LDP plan. The track provides rear access to each building envelope.

Any proposed tracks and access paths shown on the LDP plan will be designed to minimise visual and physical impacts to the site through sensitive location related to the prevailing winds, topography and

visual aspects demonstrating attention proposed to minimising impacts. Passing bays will be strategically located within the southern extent of APZ's for building envelopes providing additional separation from vegetation in the event of fire. Additional passing bays will be located on the northern boundary at each envelope access. Generally, tracks are not visible from the ocean apart from restricted views of some thirty metres of track in the southeast corner of the lot and then only from some points close to the shoreline.

In line with the undulating topography, these tracks will be planned/established/maintained to respect the terrain and vegetation, as with the existing southern boundary track.(priority given to the retention of native vegetation for biodiversity conservation, environmental protection and landscape amenity an objective of SPP 3.7) The establishment of joint walkways/tracks stops possible effects of trampling from uncontrolled access and would be a more ephemeral impact since these areas would regrow if left untraversed.

Staged development will allow tracks and paths to be reviewed and ongoing management and control procedures to be considered prior to commencing any stage of any proposed development. In line with this management, it is maintained that development would achieve its ecological aim of being a sustainable ecotourism destination.

With only eight building envelopes proposed in the LDP and restricted total visitor and staff numbers (100) only a maximum of ten visitors and two staff could potentially occupy a building envelope with four accommodation units if all envelopes were developed and occupied. The maximum number of staff and visitors permitted on site is however limited to a total of 100 as provided for in the BMP which can result in no persons occupying some building envelope accommodation if all were constructed and visitor and staff numbers were at one hundred.

The total number of visitors and staff will be managed and controlled by a computer-based booking system administered by the manager which would not allow the total number of accommodated visitors and staff on site to exceed one hundred irrespective of accommodation that may be available.

In line with this it is not anticipated that visitors to the site would present any visitor management control issues beyond track and access protocols to ensure there is no random movement beyond authorized tracks to minimise possible impacts and to maintain the integrity of the site.

3.1.ii.a. Tracks and Paths Crossing National Park

Future agreement for proposed temporary access over the National Park between the site and the foreshore for vehicles during the construction stage (Appendix 2) has been documented- in principal - and subject to final approval from DBCA following the submission of a development application (DA); all such access must be via raised structures demonstrating management control avoiding any possible impact to vegetation on the National Park: all such structures would be proposed to be removed following the completion of development.

Future agreement for pedestrian access over the National Park between lot 304 and the foreshore is subject to DBCA approval following the submission of a development application as confirmed in an email from Nick Detchon, Land Use Planning Coordinator, Midwest, DBCA – which stated. (refer Appendix 2)

"DBCA supports the development by the proponent of suitable access paths to allow pedestrian access between Lot 304 and the beach and to prevent development of informal walk tracks and associated disturbance to the DHINP."

As total visitor and staff numbers permitted upon lot 304 is limited to one hundred in compliance with a BMP it is concluded that the maximum number of visitors and staff located within each building

envelope could not exceed twelve if all units were available. If nineteen visitors and staff were located within five envelope clusters then the remaining three envelopes could not be occupied. Total numbers would be regulated and controlled through a computer booking system administered by the site manager and staff. If there were less visitors located within an envelope cluster, then more clusters could be occupied.

In compliance with the Shire of Shark Bay advice that any application for development will not be considered until an LDP is approved it is not possible to propose any tracks crossing the National Park strip until the LDP locating building envelopes is approved.

3.1.ii.b. Track Design

Tracks and paths for vehicles and pedestrian access within Lot 304 will be aligned. All tracks, including passing bays, and access paths will be designed to minimise possible impacts to the site: specific details of tracks and paths would form part of any proposed future development application (DA) which cannot be commenced until an LDP identifying the location of building envelopes has been approved: tracks may be surfaced with shell grit, limestone grounds or other non-flammable approved materials.

3.1.iii Other Associated Matters

3.1.iii.a. Planning for Bushfires Guidelines November 2024 -shelter access

Section B.5 of the Bushfire Guidelines covers Vulnerable Land Uses and B.5.2.3 covers On-site Shelters stating:

*"It should be emphasised that on site shelter is not a stand-alone contingency and, in most instances, early evacuation of visitors and employees should be the first consideration and will form the basis of a successful bushfire emergency plan. Where **on site shelter** is contemplated the shelter should be provided with sufficient space for the maximum number of employees and visitors that could be on site at any given time and **should be within easy walking distance** from the development, with a designated and sign posted footpath. The ABCB Design and Construction of Community Bushfire Refuges Handbook (2014) recommends 0.75m2 per person, however it is recommended that a minimum of 1.0m2 per person be considered."*

In line with DPLH bushfire guidelines related to tourism operations and any approved BMP for Lot 304 the total number of staff and visitors permitted on site at any one time will be limited to one hundred. Any shelter is provided as a last resort with early evacuation as provided for in the BMP and BEP the first option in all situations. As described above any on site shelter should be within easy walking distance from development.

3.1.iii.b Staged development

Staged development allows ongoing management and control procedures of visitors and vehicles to be reviewed prior to referral or commencing any development.

The beach frontage to the bay from lot 304 is more than one kilometre in length and capable of accommodating all visitors (limited by BMP to a total of one hundred visitors and staff over all building envelopes) accessing accommodation units without undue pressure upon the beach or Lot 304 when following access protocols.

3.1.iii.c. Department of Biosecurity Conservation and Attractions Information-Access

In line with a letter from DBCA (previously DEC) (refer Appendix 2) dated 2011 it would be proposed to seek approval from DBCA for unformed track access for pedestrians from Lot 304 to the foreshore over the National Park for pedestrian access, from each building envelope, when development plans were prepared at the DA stage.

Any access track approved by DBCA would take account of site conditions and be aligned to limit possibilities of impacts: such tracks being located upon the National Park are not subject to a development application to Council or approval from Council.

The LDP is not dependent upon any approval for such tracks as access is available from the south-western end of Lot 304 via a formal track. (refer Plan 1)

The area between the lot and the beach foreshore has limited low 'ground cover' less than 0.5m in height (refer Table 9 Planning for Bushfire Guidelines – November 2024) interspersed with areas of sand and wind-blown seaweed from the ocean providing minimal requirements for any works to establish walkways when approved. (see ER)

DBCA email dated 3 March 2020 states:
"DBCA supports the development by the proponent of suitable access paths to allow pedestrian access between Lot 304 and the beach and to prevent development of informal walk tracks and associated disturbance to the DHINP."(Appendix 2)

3.1.iii.d Private Vessels

DHID has no control over vessels entering or leaving Sunday Island Bay however the DHIBIP 2014-15 document would be made available to visitors regarding private vessels entering the bay for access to lot 304. (see DHIBIP Report Attached)

3.1.iii.e Visitor Activities & Facilities

Upon accessing the island visitors will have the opportunity to observe/experience flora and fauna in its natural state including reintroduced endangered species of fauna and could become associated with the environmental protection and conservation of the island through interaction with DBCA initiatives and on-site projects proposed by the site manager when accessing the site.

Visitors would have a range of activities that they can experience, view, participate in and appreciate in support of the conservation and sustainability of the special attributes of the island promoted and managed by a resident manager/caretaker when accessing the site. The opportunity for hiking, photo safari, observation of astronomical phenomena in the night sky, boating and boating tours, scuba, snorkelling and swimming are but some.
Each accommodation unit is provided for independent self-catering: kitchen facilities, bbq and substantial undercover areas provided for visitor comfort: the staff accommodation/refuge will include a visitor lounge area.

3.1.iii.f Access Management Strategy:

- Minimise the number of tracks on the site.
- Track design to minimise visual and physical impacts to the site through sensitive location related to the prevailing winds, topography, visual aspects and monitoring to minimise vegetation management requirements.
- Vehicles and visitor movement on the site would be managed by the resident manager/staff and restricted to shared tracks included in the LDP and future DA.
- Management control would include closure and redirecting tracks, clear signage and temporary fencing.
- Continual monitoring of the site and comparing photographic and observed impacts allows ongoing management decisions to be implemented regarding the impact of vehicle and visitor access implications to the environmental assets of the site and surrounding National Park.
- Staged development allows for continual review.

3.1.iv.g Management Actions on Visitor Access

Management Action	Responsibility	Timing
Control of visitor and vehicle movement on Lot 304	Manager & Staff	At all Times
Close tracks, provide clear signage and temporary fencing when required	Manager & Staff	At all Times
Monitor site using real observations and photographic comparisons to assess impacts	Manager & Staff	At all Times
No unauthorised tracks to be developed	Manager & Staff	At all Times
Ensure track designs are maintained	Manager & Staff	At all Times
Management of visitor impacts beyond building envelopes	Manager & Staff	At All Times
Continually review track locations	Manager & Staff	At All Times

3.2. Servicing – SU14 3(i)

At the development application stage (DA) additional to details included in this plan, specific details regarding the provision of renewable energy for power, ATU units or similar approved solution for effluent disposal would be provided (refer Appendix 6). In the main rainwater and water carted to the site would be provided for potable application. Water carted to the site from the mainland and existing ground water that can be pumped to the site from two wells for shower and toilets can be provided for non-potable application. (refer ER)

Each short-term accommodation cluster within approved building envelopes will include an integrated multiple use staff shelter unit/store facility/visitor services area to accommodate staff, renewable energy infrastructure and for other servicing requirements.
It is not proposed to store fuel on site; if fuel was to be brought to the site it would be appropriately bunded and its location would be in compliance with the site BMP. Chemicals required for maintenance and servicing of accommodation units would be stored within the multi-use store in appropriate enclosures.

Any laundry and cleaning requirements will be undertaken and managed by the resident cluster manager and/or staff trained in fire and emergency events located within each building envelope minimising the need for additional separate support infrastructure and in turn limiting impacts to the site.

An enclosed area will be provided out of sight behind any accommodation proposed, to allow for assembly of waste and rubbish prior to its removal by visitors (specific details to be included within any DA submitted following approval of the LDP) and or staff.

3.2. i Water

There are no bores on DHI: shallow ground water wells located within limestone depressions have provided water for more than thirty thousand sheep and goats at various locations on DHI over more than 100 years.

Water would be sourced from three separate areas.

- Potable water would be captured within each cluster from roof run off.
- Potable water would also be carted to the site from the mainland if, and when required.
- Non-Potable water would be carted to the site or drawn from existing wells on the Island and piped along a registered easement for the ‘carriage of water’.

Water will be stored within separate tanks for potable, non-potable, and firefighting (see BMP) at appropriate locations on the site to be included within a DA and managed by the manager and staff.

Dirk Hartog Island is not located within a water-controlled area. There are no wetlands occurring on the lot.

3.2.i. a Potable Water

It is proposed that rainwater captured from each proposed accommodation unit roof will provide potable water additional to that transported from the mainland as and when required ensuring that there is adequate potable water always available. All water captured and transported to the site would be stored on site in appropriate water storage tanks with no runoff to ground.

The average rainfall for Denham, the closest recorded weather station, is around two hundred millimetres per annum: Historically Dirk Hartog Island rainfall has substantially exceeded that figure. (One hundred years of rainfall records from original pastoral station. G Wardle) Given this rainfall it has been calculated that using the roof area of clusters that rainfall could at a minimum account for more than eighteen thousand litres annually for each accommodation unit. (refer ER)

Providing for an average per person usage of 2.5 litres daily for drinking water there is more than adequate annual water that could be stored using any accommodation unit catchment (90m2 roof area x 200mm average rainfall= 18,000lt/annum or up to 72,000lt per cluster of four units plus catchment from ancillary buildings).While the calculation of catchment has been used for demonstration purposes water transported to the site will be a primary source ensuring adequate potable water is always available irrespective of the ratio referenced. 32,000 Lt or larger capacity tanks would be proposed to be provided in each building envelope for potable water with a final decision on size confirmed at the DA stage. (see ER)

Cyclonic rainfall in summer can significantly increase the annual rainfall figure.

The average water usage per person has been drawn from Government websites:
(Healthdirect.gov.au states that as a general rule males need 2.6litres of fluids every day and females need 2.1 litres of fluids each day. The Australian guidelines say the definition of fluids includes 'plain water, milk and other drinks.'
Eat for Health.gov.au provides a table for fluid consumption and states 2.6 litres of fluids per day for men and 2.1 litres of fluids per day for women which also includes plain water, milk and other drinks.)

3.2.i. b Non-Potable Water

Based on the depth of the existing wells on the east coast of Dirk Hartog Island the ground water lies between eight meters and sixteen meters below proposed building envelopes identified on Lot 304.Dirk Hartog Island does not fall within a declared area for water control.

A positive covenant on the site provides an easement that follows the main island track to existing wells for drawing and transporting water to Lot 304. It is proposed that non-potable water requirements would be carted to the site from the mainland or sourced from existing wells on the island via the documented and registered water easement.

If water was to be sourced from the island it would be sourced from Two Wells which has been accessed for more than one hundred years for stock watering during the islands pastoral history and has proved to be reliable and more than sufficient for that original purpose used daily for more than one thousand sheep and unknown numbers of goats that watered from this well. (G Wardle observation 1970-2007)

Using average water usage by sheep and goats in this climate the source would equate to more than

15,000 litres per day - more than adequate to meet water requirements for Sunday Island Bay: based upon average usage of 250lts per household of up to 4 per day (excluding gardens). (i.e. 250ltx4 units=1000lt x 8 envelopes=8000lt) if occupied every day of the year. Staff would potentially add an additional 190 Lts per day or up to 1600lt - still well within the well capacity. This usage figure could be reduced further with new water saving devices including hot water return and water protocols. Thirty-two thousand litre capacity water tanks (or larger) would be proposed to be provided in each building envelope for non-potable water: a final decision on tank size/capacity and number to be confirmed at the DA stage following the approval of the LDP.

In more than one hundred years as an operating sheep station the water drawn at Two Wells has been a reliable source of water and there are no known issues that would prevent this continuing.
In the unlikely event of loss or reduced supply of water from Two Wells water would be carted directly to the site from the mainland or drawn from the well located at West Wells connected by the same water easement and thus would provide no impediment to the ongoing operation of any development.

Tests of the water from Two Wells mirror those for West Wells currently used for more than thirty years for tourist operations at Lot 62 on the island confirming its suitability for use within any proposed development. (refer Appendix 1) Irrespective of the possibility of sourcing water from Two Wells water carted to the site from the mainland or drawn from West Wells is a viable and practical option for water supply.

3.2.i.c Water Treatment

All accommodation water would be proposed to be treated via in line filters with an ionic ultraviolet steriliser.

3.2.i. d Water Easement

A documented water easement, that allows for the transport of water follows the existing Dirk Hartog Island main track south from 'west wells 'and 'two wells' branching at the Sunday Island Bay turn off and then following a sub track to Lot 304.
The delivery of non-potable water when accessed on the island would be via a pipeline from the existing wells located at 'two wells' or 'west wells': a solar pump would provide the source of power, and the pipeline would be connected to water tanks located within building envelopes on the site and in accordance with a BMP.

3.2.i. e Water for Fire Management

It is proposed water for Fire Management would be sourced from existing wells on the island via the documented and registered water easement and/or directly from the ocean, (with DBCA approval, as current for Lot 305). Separate water storage tanks for fire use would be located as indicated within the BMP and maintained and managed by the site manager and staff.

Additional to the 50,000Lt water tanks included in the BMP it would be proposed that additional tanks would also be provided within each building envelope for immediate and additional building envelope bushfire protection; to be confirmed at the DA stage following approval of the LDP.

3.2.i. f Water Strategy:

- Provision of gutters on all buildings to allow maximum capture of rainfall with no runoff onsite.
- Provision of water storage tanks within each building envelope for potable, non-potable and for firefighting water.
- Installation of pipeline from Two Wells or West Wells for transport of non-potable water to the site.
- Provision of water tanks for firefighting as indicated in the BMP.

3.2.i. g Management Actions - Water

Management Actions	Responsibility	Timing
Maintenance of gutters for water capture facilities	Manager & Staff	Ongoing
Maintenance of water storage facilities	Manager & Staff	Ongoing
Maintenance of water pipelines	Manager & Staff	Ongoing
Maintenance of firefighting facilities	Manager & Staff	Ongoing

3.2. ii Power

In line with eco-tourism recommendations all power will be sourced from renewable energy sources including solar and wind combined with battery storage.

Each short-term accommodation cluster within a building envelope would be independent for the provision of renewable power: the onsite manager and staff would be responsible for managing and maintaining all the elements/infrastructure of renewable energy systems within each envelope. (Appendix 3,4)

Power would be independently provided through:

3.2. ii. a Solar Power

- solar panels located upon the roof of accommodation units or other approved location. (Appendix 3)

3.2. ii. b Wind Power

- new generation small vertical and non-vertical wind turbines appropriately placed upon or alongside accommodation units (Appendix 4):
- battery storage and operational power components located within a store unit located appropriately within each building envelope managed and maintained by the onsite manager.

Specific details regarding the provision of power to any accommodation clusters will be included within any future development application (DA) proposed for the site which cannot be commenced until the LDP with eight building envelopes is approved confirming areas for proposed development.

As development progressed building envelopes could be connected and cross gridded for power sharing in the event of a system failure or overload at any one envelope location.

Generic information on proposed power options is included in Appendix 3 & 4.

Lighting

Design guidelines designate that all lighting is to be directed downwards towards the ground and that no light is to be directed towards the ocean or over the site in any direction that could affect marine animals and nocturnal and breeding animals. Management will be responsible to ensure this was complied with and adhered to.

3.2. ii. a Power Strategy:

- Provision of solar and wind power options for each building envelope
- Provision of small new generation vertical and non-vertical wind turbines
- Provision of multipurpose room for solar infrastructure and battery storage.

3.2. ii. b Management Actions on Power

Management Action	Responsibility	Timing
Maintain all Solar Renewable Energy Infrastructure	Manager & Staff	Ongoing
Maintain Wind Turbine Infrastructure	Manager & Staff	Ongoing

Maintain all elements of battery infrastructure for renewable energy storage	Manager & Staff	Ongoing
Ensure any lighting is directed downwards	Manager & Staff	Ongoing

Laundry
The Manager and staff will be responsible for managing laundry requirements for any linen provided to accommodation units.
Cleaning
The Manager and staff will be responsible for managing cleaning and maintaining each accommodation unit.
Staffing
Staffing numbers will be directly related to accommodation units completed and visitor occupation thereof. There will be a minimum of one to three staff members resident in each building envelope when visitors are accommodated depending on bookings.

3.3. Maintenance SU14 3(i)

Resident manager/caretaker will be responsible for managing and maintaining all elements of any finished built development plus the land, vegetation, tracks, paths, firebreaks, and accommodation units.

Maintenance to each unit and its services will be managed and undertaken by the caretaker/manager/staff or sourced through contractors where appropriate.

Tracks and paths will be managed and maintained by the manager and staff with vegetation managed to meet any approved BMP or regulatory requirement for the site in the most sensitive way to limit visual and physical impacts – guided by a landscape vegetation plan. The landscape vegetation management plan would be proposed to be prepared for each building envelope and asset protection zone, as development proceeded, to maintain vegetation in compliance with a BMP guided by Planning for Bushfires Guidelines November 2024 version Section B.2.2 – Designing an Asset Protection Zone and B.2.3 – Management of an Asset Protection Zone which states:

"An APZ should provide the greatest level of vegetation management ***within three metres*** *of a habitable building to ensure adequate unobstructed defendable space for emergency services to operate*. ***The area should contain minimal vegetation and be free of combustible materials and obstructions.***
Within the remainder of the APZ, planting and vegetation can increase as you move farther away from the building. (see ER Appendix I BMP)

Sand, limestone grounds, shell grit or other non-combustible approved material included in a three-metre defendable area will surround accommodation units as provided for in a BMP and would be managed and maintained by the manager and staff.

In addition to regular maintenance of each APZ further bushfire protection can be provided by:

- *Ensuring gutters are free from vegetation*
- *Installing gutter guards*
- *Regular cleaning of underfloor spaces, or enclosing them to prevent gaps*
- *Trimming and removing dead plants or leaf litter and seaweed*
- *Pruning any climbing vegetation*
- *Removing vegetation in close proximity to water tanks*
- *Following the requirements of the Shire of Shark Bay local government firebreak notice*

3.3. i Maintenance Strategy:

- Manage all facets of ongoing maintenance of the land and all built structures.

- Undertake regular maintenance checks of all units including gutters to ensure no accumulation of flammable or blocking debris.
- Maintain all tracks on site to allow vehicle access and to avoid environmental issues.
- Maintain firebreaks included in any BMP to provide for visitor, staff and site safety.
- Maintain any additional fire prevention areas as provided for in any BMP.
- Maintain any ATU units as provided for in manufacturers specifications.
- Maintain all power infrastructure to manufacturers specifications.
- Manage water from buildings to ensure it is captured and retained within building envelopes.
- Ensure landscape vegetation plans are prepared and complied with.
- Continually inspect asset protection zones and maintain them to Guideline requirements.
- Manage any pipelines used for supplying water to the site to ensure there is no breakdown or leakage.

3.3.ii Management Action on Maintenance

Management Action	Responsibility	Timing
Manage all facets of ongoing maintenance of the land, vegetation and all built structures.	Manager, staff, contractors	Ongoing
Undertake regular maintenance checks of all units including gutters to ensure no accumulation of flammable debris.	Manager, staff, contractors	Ongoing
Maintain all tracks on site to allow easy vehicle access and to avoid environmental issues.	Manager, staff, contractors	Ongoing
Maintain firebreaks included in any BMP to provide for visitor, staff and site safety.	Manager, staff, contractors	Ongoing
Maintain any additional fire prevention areas as provided for in any BMP.	Manager & Staff	Ongoing
Maintain any ATU units as provided for in manufacturers specifications	Manager, staff, contractors	Ongoing
Maintain all power infrastructure to manufacturers specifications	Manager & Staff	Ongoing
Manage water from buildings to ensure it is captured and retained within building envelopes.	Manager & Staff	Ongoing
Ensure landscape vegetation plans are complied with.	Manager & Staff	Ongoing
Continually inspect asset protection zones and remove any flammable debris accumulations	Manager & Staff	Ongoing
Manage any pipelines used for supplying water to the site to ensure there is no breakdown or leakage.	Manager & Staff	Ongoing

3.4 Waste Disposal/Rubbish Management SU14 3(i)

Visitors will be required to remove their waste and rubbish when they depart lot 304.

Waste generated by staff will be managed, assembled and returned to Denham regularly as required. Food waste generated by staff will be treated using approved bio digestion equipment. (Appendix 5)

As accommodation units are confined to building envelopes with resident management and staff also located within the envelope this will ensure concise and practical management of waste and rubbish within each envelope.

The composition of waste from accommodation establishments such as any proposed development for SIB, is similar to household waste as described in WALGA information briefs.

Due to-

- the remoteness of DHI
- The limited capacity for vehicles to hold extensive quantities of food and other waste
- The limited stay time on site expected
- The requirement to take rubbish and waste with you when departing

-this practically reduces the quantity and volume of waste that may need to be addressed.

WALGA produce a waste calculation tool which provides for realistic estimates of possible waste and rubbish produced by visitors and staff. Draft staff waste estimates per envelope are included (Appendix 5) based upon the assumption of a two-bedroom staff accommodation unit in compliance with WALGA information.
When the LDP is approved and plans for development are proposed a detailed plan addressing waste management would be completed with a DA when submitted.

3.4. i Aim

Any proposed development will aim to be low-waste, encouraging the principles of reuse whilst also addressing removal, recycling, composting, and bio-digestion processes (Appendix 5) where appropriate.

- Removal of all rubbish/waste back to the mainland by visitors is the mandatory objective preventing waste production/accumulation and then managing waste that remains for whatever reason by implementing waste management protocols.
- To minimise the environmental impact of waste generation and disposal
- Rubbish, and waste generated by visitors to Lot 304 would be required to be removed from the island by those visitors when they depart:
- incentives and disincentives for removing or leaving rubbish would be considered at the development application stage following approval of the LDP.
- Reduce waste handling, disposal volumes and costs
- Protect visitor health and safety
- Provide a safe working environment
- Rubbish and waste generated by staff and management would be based upon the removal of the waste and rubbish back to the mainland on a regular basis as required and treatment via bio digestion and other approved processes. (Appendix 5)

3.4. ii Objective

- Removal of waste and rubbish from Lot 304.
- Ensure visitors advised and aware before arrival that they must remove their waste and rubbish at the completion of their visit.
- The removal of waste by visitors
- Prevent waste.
- Minimize waste.
- Reduce waste handling and disposal volumes.
- Protect visitor health and safety.
- Minimize environmental impact of waste.
- Provide for bio-digestion and/or composting processes where appropriate. (Appendix 9)
- Include recycling in accordance with State initiatives where appropriate.
- Provide a standard for waste segregation.
- Encourage commitment from staff, contractors and visitors to actively participate in waste avoidance, waste reduction and recycling
- Establish a monitoring system for performance.
- Provide a safe working environment.
- Ensure commitment from staff, contractors, and visitors.
- Provide user friendly signage.
- Offcuts or waste generated during construction are to be removed from the site.
- The onsite resident manager and staff to be responsible for ensuring that visitors comply with all requirements of any future waste management and manage it accordingly.
- Consider incentives and disincentives to visitors for removal or management of rubbish and waste.

3.4.iii Environmental Sensitivity

Dirk Hartog Island is a location of environmental sensitivity: it is proposed that all waste generated by visitors to Lot 304 will be removed by those visitors, when they depart, to maintain the environment of the location and to support the ecological sustainability of the development. This is in conformity with worldwide standard eco-tourism practices and encouraged protocols for eco tourists visiting remote locations.

DBCA require that all rubbish and waste brought to Dirk Hartog Island by visitors using DBCA camping sites must be removed from the island by them when returning to the mainland on departure from the island.

The control and management of rubbish and waste is important to sustainably managing and maintaining the environment of the location and limiting possible impacts both physically and visually.

An enclosed storage area for rubbish and waste will be located, screened from sight, behind each accommodation unit for assembly prior to removal by visitors. Final location of each enclosed storage area will be confirmed at the DA stage submission following approval of the LDP.

3.4. iv Fuel

It is proposed that there will be no storage of fuel or hazardous chemicals on the site: if fuel storage was to be provided for in the future it would be appropriately located and bunded in compliance with the BMP. Standard chemicals for cleaning will be stored in suitable cabinets within the multipurpose storage unit located within each building envelope.

3.4. v Waste Strategy:

- Create as little waste as possible by not producing it to begin with
- Ensure visitors are aware of the necessity to limit waste creation when planning their visit
- All waste produced by visitors to the site must be removed by those visitors on their departure from the site.
- Ensure visitors are aware before arriving onsite that they must remove any rubbish or waste from their visit when they depart.
- Provide an area in each building envelope behind accommodation where visitors can store, sort and assemble any of their waste and rubbish before they return it to the mainland.
- Staff waste and rubbish to be sorted and assembled within each envelope to the rear of their accommodation and returned to the mainland for disposal on a regular basis. Allow for reuse of items that can be reused, sold or donated to others where appropriate.
- Provide bio digestion options for waste and rubbish generated by staff and visitors on site.

3.4.vi Management Actions on Waste

Management Actions	Responsibility	Timing
All waste produced by visitors to the site must be removed by those visitors	Manager, Staff, Visitors	Ongoing
Ensure visitors are aware before arriving onsite that they must remove any rubbish	Manager	Ongoing
Induct visitors on arrival confirming waste and rubbish protocols	Manager & Staff	Ongoing
Provide an area in each building envelope where visitors can store and assemble any waste prior to them removing it on departure	Manager	Ongoing
Staff waste and rubbish to be assembled and returned to the mainland on a regular basis.	Manager & Staff	Ongoing
Provide bio digestion options for waste and rubbish generated on site.	Manager	Ongoing
Develop spill strategies for waste	Manager	Ongoing
Develop workplace health and safety strategies for prevention of injury	Manager	Ongoing
Design and implement on going education and training of staff in regard to waste management	Manager	Ongoing

Regularly review recycling opportunities	Manager	Ongoing
Identify and implement waste segregation practices	Manager	Ongoing
Formally review waste management practices annually	Manager	Ongoing
Manage waste assessment	Manager	Ongoing
Design and implement waste avoidance and minimisation policy	Manager	Ongoing
Provide waste storage and assembly areas for each accommodation unit	Manager	Ongoing
Provide signage both internally and externally of accommodation units providing clear instructions in regard to waste and rubbish	Manager	Ongoing

3.5 Effluent Disposal SU14 3(i)

Effluent will be treated using either an approved Aerobic Treatment Unit or Composting toilet option. (refer Appendix 6, ER Appendix F))

In addressing effluent disposal, the Management Plan takes note of the Shire of Shark Bay LPS No 4 Part 6 which states: 'BUILDING ENVELOPE' means the area of land within which all buildings and effluent disposal facilities on a lot must be contained'. In line with this requirement the proposed building envelopes are larger than the actual area required for the accommodation units.

*(*The Government Sewage Policy comments within Table 4: *"general site features for onsite sewage disposal" and the sub section "Location of land application area within building envelopes" advises that*

"Local government may approve the location of land application areas outside building envelopes where proposed location meets requirements outlined" of Table 4.)

Lot 304 is internally draining with no surface runoff. This is the result of low annual rainfall, a high annual pan evaporation rate, and a surface cover of highly permeable sand. There are no watercourses or wetlands, and the land is not within a Public Drinking Water Supply Area.

3.5. i Aim

To ensure that effluent disposal meets the Government Sewerage Policy with no effect on the environment of the site and its surroundings.

3.5. ii Objective

To ensure that whatever effluent disposal system was proposed it was a system that provided for the least impact to the environment of the site and its surroundings.

3.5.iii Site and Soil Evaluation

A separate Site and Soil Evaluation report prepared by Land Assessments Pty Ltd (updated July 2023 taking account of Shire comments on 2020 submission -External Consultants Appendices) in accordance with the Government Sewerage Policy demonstrates the capability of Lot 304 to accommodate on-site effluent disposal with the use of secondary treatment systems (ATU). It confirms that the land contained within Lot 304 has a capability rating for the maximum number of visitors and staff permitted on site (100).

The Evaluation report confirms that in line with the location of proposed building envelopes and in combination with marine and BMP setback, the use of a secondary treatment system with nutrient

retention capability significantly reduces any risk of on-site effluent disposal endangering public health or the environment.

The Site and Soil Evaluation Report was prepared on the basis that eight building envelopes with a maximum of five accommodation units capable of accommodating four visitors would result in the expected hydraulic load (total wastewater volume) of 2,800L per day. (4x140 =560 x 5 = 2800L) per envelope.
Applying four accommodation units with four visitors plus accommodation for three staff members results in a total wastewater volume of 2,660 L per day (19x140=2660 L) per envelope capped with a total of 100 visitors and staff permitted on site. (The result with four accommodation units plus staff is consistent)

The Site and Soil Evaluation report noted that the maximum number of visitors and staff permitted on site is one hundred and there are covenants on the title limiting the number of accommodation units permitted on the site. (refer ER Appendix F)

The Health Department's *Supplement to Regulation 29 and Schedule 9 of the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974 advise that a combined flow of 140 L/person/day is required to be used in calculating water usage for ecotourism facilities.*

Based on the maximum permitted occupancy (100) the Evaluation Report concluded that the cumulative daily wastewater volume across the site is 14,000L per day (140L/day X 100 = 14,000 L/day inclusive of visitors and staff) spread across eight proposed envelopes. (average 1750L/day/envelope) when all envelopes were developed, and the total number permitted on site were in fact on site. The evaluation report further concluded that the site had the capability to meet all the requirements of the Government Sewerage Policy if all 100 persons were accommodated on the site.

3.5. iv ATU

Effluent will be treated by an approved ATU or composting option, and grey water disposed of. (refer Appendix 6)

EPA advice *notes provided to DHID in 2015 state that "it was considered that if ATU's or similar option (composting) were used consistent with their advice then it would be unlikely to have a significant impact on the environmental factors of inland waters environmental quality."*

It would be proposed that each visitor accommodation cluster (including staff accommodated) located within a building envelope and included within any future development application (DA) would be connected to an ATU unit in each envelope or an appropriate composting option, approved by the Shire of Shark Bay, complying with recommendations of the EPA advice notes and in turn minimising impact to the site.

A final decision on effluent management systems would be made following approval of the LDP when a development application could then be prepared and finalised for submission.

If, as provided for in a BMP, four accommodation units are included within each envelope with a capacity of four visitors (sixteen in total) plus up to three staff then the total number of litres of wastewater would be 2660lt per day(19x140=2660) in that envelope. The Fuji Clean CV-7000 / CV-10000 units proposed meet the Health Department standards and have sufficient capacity to meet the hydraulic load. Irrespective of the number of accommodation units on the site the total number of persons permitted on site is limited to one hundred. (see ER)

The infiltrative area required for this within each envelope with four accommodation units for four visitors plus three staff members is five hundred and thirty-two square metres which is provided for within the building envelopes which each has an area of approx. two thousand three hundred square metres. (140Lx19 persons=2660 Lx.2=532m2). The Evaluation report concluded that the capability of Lot 304 to accommodate on site effluent disposal (for five units per envelope) had been demonstrated by:

- *'All of the eight proposed building envelopes were able to meet the Government Sewerage Policy's general site requirements for sewage sensitive areas as outlined in Table 1 of the report. (subject to the use of secondary treatment systems')*

A computerised booking system administered by the manager will ensure that no persons including staff beyond one hundred could be present on site.

In sewage Sensitive Areas the Government Sewerage Policy requires the discharge of a sewage system to be at least 1.5m above the highest groundwater level. The likely depth of installation of a leach drain (to dispose of primary or secondary treated wastewater) is about 0.6m from the surface. Therefore, if there is a total depth of about 2.1 m of free draining (non-saturated) soil at the wettest time of year, then there is sufficient clearance; information on the specific depth to groundwater beyond that is not required or mandated by regulation but has been provided for within the LDP conditions.

The Evaluation report concluded that all potential effluent disposal areas associated with the proposed building envelopes are located within deep calcareous sand dunes at positions in the landscape where surface elevations are between eight and sixteen metres AHD well above any possible restrictive layer at 1.7 m AHD.

In addressing the depth to water, the Site and Soil Evaluation report concluded that if groundwater (or evidence of its seasonal occurrence) was not encountered by 1.5m depth (the depth excavated) from the surface at the lowest point on the site, it would also not be encountered at 2.1m. On-site effluent disposal would therefore be in accordance with the requirements of the Government Sewerage Policy since all envelopes are located above four metres AHD. (refer ER Appendix F)

The Government Sewerage Policy Explanatory Notes under Clause 5.3 – Information to Support Planning Proposals states:
If a site and soil evaluation is prepared in accordance with the policy provisions of Schedule 1 at the appropriate planning stage, it will be sufficient to submit with the planning application. It is not the intent of the policy to require geotechnical investigations as per AS 1726: 2017 Geotechnical site investigations

The Site and Soil Evaluation Report confirmed that each of the eight building envelopes proposed were situated above seven metres AHD and hence at a significant elevation above any underlying Tamala limestone and commented that "groundwater, or evidence of any long-term persistence of a perched water-table, was not encountered within any of the observed sites included in the report. This also included site 2 at the lowest portion of Lot 304 (topographic unit D within the report) which is not an area proposed for infiltration**.** (refer ER Appendix F)

3.5. v Aerobic Treatment Unit's – Composting Option

It would be proposed that accommodation clusters within building envelopes would be serviced by either an ATU unit approved by the Shire of Shark Bay or a new era composting option in compliance with the government sewerage policy and recommendations provided by the EPA. The onsite manager and staff would be responsible to ensure that all ATU /Composting units were operating and maintained in accordance with' suppliers' specifications. A decision on what system to install would be made at the DA stage submission. (refer Appendix 6)

Treatment of effluent by ATU/Composting units approved by the Shire of Shark Bay and in compliance with the Governments Sewerage Plan demonstrates that this facet of development would provide for minimum impact on the natural environment - not compromising the conservation and ecological values or special attributes of the island*:* meeting EPA recommendations.

3.5.vi Government Sewerage Policy

Whilst it is not a requirement of the Government Sewerage Policy that any Evaluation report should include a measurement of the depth to groundwater below building envelopes both physical and anecdotal evidence based upon excavations during the Site and Soil evaluation visit and other existing wells located around the island (including two wells from which water could be drawn for Lot 304) and their actual depth to water demonstrates that the depth to groundwater below each proposed building envelope would be more than 6 metres.(refer ER Appendix F)

In sewerage sensitive areas the Government Sewerage Policy requires the discharge point of a sewerage system to be at least one and a half metres above the highest groundwater level and where a nutrient retentive secondary treatment system is used this should be 0.6m. All potential effluent disposal areas located within proposed building envelopes are located within deep calcareous sand dunes at positions in the landscape where surface elevations are between six and eighteen metres AHD. The Government Sewage Policy does not specifically address setbacks from the marine environment.

At the lowest point within the lot (not proposed for effluent disposal) there would still be adequate depth: Any ATU units would be located well above 4m AHD. The proposed depth of installation of a leach drains or sub surface drip system (to dispose of either primary or secondary treated wastewater) is approx. six hundred millimetres from the surface. This would leave a total depth of about five metres of free draining (non-saturated) soil at the wettest time of the year which is acceptable clearance as guided by the Government Sewerage Policy: in all building envelopes this distance is substantially greater. Composting options do not require depth information.
When an LDP is approved by the Shire of Shark Bay confirming the location of building envelopes upon which application for development (DA) could be prepared the physical confirmation of the depth to groundwater could be established if ATU's were proposed*: **'there is however convincing physical, anecdotal and historical evidence available that the depth is more than eight to twelve metres below proposed envelopes on Lot 304'.*** Depth to groundwater has limited relevance for composting options.
The Government Sewerage Policy Explanatory Notes under Clause 5.3 – Information to Support Planning Proposals states:
If a site and soil evaluation is prepared in accordance with the policy provisions of Schedule 1 at the appropriate planning stage, it will be sufficient to submit with the planning application. It is not the intent of the policy to require geotechnical investigations as per AS 1726: 2017 Geotechnical site investigations

The LDP Conditions attached includes a condition trigger-4.2- relative to establishing the depth to water at the DA stage following approval of the LDP and the submission of a DA.

Environmental Protection Authority Comments
In the advice notes accompanying an EPA determination on a 2015 submission for a proposed stage one development of seven accommodation units it was stated:

> ***'The EPA** does not support the installation of septic systems and instead **recommends that Aerobic Treatment Units (or similar) are installed for on-site effluent disposal.'***
>
> ***'The EPA considers that the proposal, if implemented consistent with this public advice, is not likely to have significant impact on the environmental factors of inland waters environmental quality'.***

In compliance with this advice, it is proposed that effluent disposal would be via the use of an ATU, or composting unit approved by the Shire of Shark Bay and in compliance with the Government Sewerage Policy: accommodation units within each building envelope would be connected to appropriately sized ATU's or composting option.

3.5.vii Effluent Strategy:

- Ensure ATU/Composting units are installed and operating according to manufacturer specifications.
- Continue monitoring of site and associated sites to establish any changing environmental conditions that may be occurring due to the operation of ATU's.

3.5. viii Management Actions on Effluent

Management Actions	Responsibility	Timing
Ensure ATU/Composting units are installed and operating according to manufacturer specifications.	Manager	Ongoing
Continue monitoring of site and associated sites to establish any changing environmental conditions that may be occurring due to the operation of ATU's.	Manager	Ongoing

3.6 Service Areas SU14 3(i)

It would be proposed that each accommodation cluster will include an integrated multi-use store unit for the provision of services including solar infrastructure. It is proposed that an enclosed area located behind accommodation units will allow for storage of waste etc as required before removal by visitors and by staff.

The location of any proposed separate on-site bio digestion area – if required- would be included within a development application submission (DA) following approval of the LDP.
New era bio digestion machines allow for their inclusion within the proposed multipurpose store if approved. (Appendix 5)
The manager is responsible for managing any service areas proposed.

3.6. i Service Strategy:

- Proposed multi-use store within each accommodation cluster
- contain solar infrastructure within store with separate location for solar batteries.
- areas provided for storage of items required for servicing any development including chemicals required for cleaning and other purposes appropriately stored.
- separate enclosed area behind accommodation for assembly of rubbish and waste prior to its removal by visitors and/or staff
- onsite storage of fuel is not proposed.

3.6. ii Management Action on Service Areas

Management Actions	Responsibility	Timing
Maintain multi-use store within each accommodation cluster	Manager & Staff	Ongoing
Maintain solar infrastructure within store	Manager & Staff	Ongoing
Maintain areas provided for storage of items required for servicing any development within store.	Manager & Staff	Ongoing
Maintain separate enclosed area behind accommodation for assembly of rubbish and waste prior to its removal by visitors	Manager & Staff	Ongoing

3.7 Transport of Construction Materials, Fuels & Chemicals SU14 3(i)

It is proposed that construction materials or completed prefabricated accommodation units would be delivered to Sunday Island Bay from Perth, Geraldton or Denham: management of the protocols regarding transport of the materials/units has been included within the Environmental Report section regarding biosecurity (refer ER)

To limit unnecessary waste being transported to the site it will be a requirement that where practicable any additional packing would be removed prior to transport to Dirk Hartog Island. Once unloaded the materials would be moved onto lot 304 via the formalised official track into the western corner of the lot or via future agreed DBCA temporary access points crossing the national park.

The standard required for the transport of construction materials to the site include:

- No mud or soil, plant material and/or fauna are present in any form or quantity after inspection of building materials and tools and equipment.
- Sand and aggregate to be free of plant material and/or fauna.
- Building materials, tools, and equipment to be inspected and cleaned/treated by owners prior to arrival at any barge transfer point.
- It would be proposed that accommodation units would be pre-manufactured in a kit form for easy and quick assembly or prefabricated for transport to site - it is not anticipated that there would be any substantial offcuts or waste generated during construction.
- Construction waste not used on site would be returned to Denham registered tip.

It would not be proposed to store fuel on the site.

3.7. i Transport Strategy:

- monitor and check all activities related to the transport to and the construction of accommodation units on the lot.
- Ensure all biosecurity protocols and recommendations are addressed.

3.7. ii Management Action on Transport of Construction Materials

Management Actions	Responsibility	Timing
monitor and check all activities related to the transport to and the construction of accommodation units on the lot.	Manager & Staff	Ongoing
Continually monitor biosecurity to ensure compliance with the DHIBIP 2015	Manager & Staff	Ongoing

4.0. MANAGEMENT

4.1 Project Manager

It is proposed that a Project Manager (DHID) and staff with training in fire and emergency processes will manage all aspects of any proposed and approved development/ construction on the site and would:

- be responsible for managing construction stages from commencement to handover ensuring any possible/real impacts were identified, addressed, and resolved.
- be responsible for induction of all construction personnel.
- monitor the progress of construction providing on going photo monitoring to assess and manage possible impacts during construction.
- ensure impacts related to construction were resolved immediately.
- ensure that development approvals were complied with.
- ensure biosecurity and waste management protocols were adhered to.
- ensure all environmental recommendations in the environmental report are followed.

It is proposed that the project manager will be accommodated in temporary accommodation on site or at the main homestead when any project was being developed/constructed.

Strategy * Appoint Project Manager

4.2 Onsite Resident Manager & Staff

It is proposed that when any short-term accommodation development was completed on site, and ready for occupation by visitors, a manager and required staff trained in fire and emergency processes would be retained to manage the accommodation, the site and the surrounds.
It would be proposed that one to three staff fully trained in fire and emergency procedures will be, depending upon visitor occupation, located and accommodated within each envelope.

It would be proposed:

- that a resident onsite manager together with any caretaker and staff trained in fire and emergency procedures would manage all aspects of the day-to-day operations from the time and when any units were occupied by visitors.
- that any accommodation units erected within any of the building envelopes and occupied by visitors would be operated and managed by an onsite manager as short-term occupancy for low impact ecotourism activities related to the number of visitors on site (limited by BMP to 100) in accordance with the covenants to the land and the length of stay restrictions included in those covenants.
- Visitor accommodation would only be permitted to be occupied when a resident manager, caretaker or staff members fully qualified in fire and other emergency procedures was resident at a building envelope occupied by visitors.
- As any development would propose to be staged each accommodation cluster/building envelope is to be treated as an independent entity with the 'envelope' onsite accommodated manager/caretaker/staff directly responsible for visitors located at that cluster in the event of an emergency such as a bushfire.
- Manager, caretaker, and staff would propose to be accommodated to the rear of visitor accommodation - operating reception from this location.

Strategy

- Appoint Onsite Manager and Staff trained in fire and emergency procedures.

4.3 General Management Duties

The duties of management and staff includes but would not be limited to.

- Reception and induction of visitors and staff.
- Provision of information regarding any BMP and EEP
- Provision of information regarding DHI and SBWH values
- Provision of information on and management of biosecurity requirements
- Provision of information on and management of waste and rubbish protocols
- Provision of information on local tour opportunities
- Information on accessing DHINP.
- Control and management of tracks and paths on site.
- Control and management of vehicles entering the site.
- Control and management of visitors on the site.
- Management of biosecurity protocols

- Management of vegetation as required by any BMP approved guided by a landscape vegetation plan for each APZ and Building Envelope.
- Management and maintenance of vegetation in line with a BMP Landscape vegetation plan
- Management of Lot 304 supported by ongoing monitoring from multiple established survey points.

Strategy

- Establish and confirm general management duties.

4.4 Management Responsibilities

The manager and staff will be responsible to manage ongoing strategies for monitoring and any remedial action requirements including: -

- managing the maintenance and repair of units, utilities, services, and other improvements that may be required.
- Operating maintenance facilities multipurpose store located within each building envelope.
- managing and keeping any proposed facilities and improvements on the lot clean, tidy, well maintained and in good working order.
- Maintaining and managing any proposed access paths, tracks, fences, firebreaks and any required vegetation management guided by a landscape vegetation plan.
- providing services required for any proposed unit's occupation by visitors.
- providing onsite security for any proposed units
- Providing onsite inductions to proposed future visitors upon arrival detailing; -
    i. areas where visitors may move.
    ii. information regarding accessing the beach at SIB and the national park.
    iii. visitor information upon biosecurity matters
    iv. information on waste management protocols.
    v. Information on the unique qualities of Dirk Hartog Island
    vi. Information on BMP and BEP
- being fully trained in fire and emergency and evacuation procedures.
- ensuring all staff are trained in fire and emergency procedures including operation and implementation of any BMP and BEP
- responsibility for implementing any approved BMP & BEP
- responsibility to maintain any vegetation management requirements included within a BMP guided by a landscape vegetation plan.
- responsibility for managing any visitor impacts both inside and outside the building envelopes and any future approved access paths between the site and the foreshore to be agreed with DBCA.
- responsibility for managing weed control in cooperation with DBCA as part of biosecurity management.
- responsibility for ongoing monitoring and remedial actions regarding coastal processes as provided for in Damara coastal processes report.
- responsibility for employing staff.
- provision of temporary fencing if required to manage access and any other facets requiring such controls.
- Ensuring appropriate signage is in place where required.
- Ensuring visitors remove their waste and rubbish when departing the site.
- Ensuring staff waste and rubbish is returned to the mainland regularly and/or dealt with by bio digestion processes.
- Managing biosecurity and compliance with the DHIBIP
- Providing management of vehicle movement within the site

Strategy:

- Confirm and Implement Management responsibilities.

4.5 Emergency Response-Refuge-Management

The site is almost eleven hundred metres in length and to adequately manage and ensure safety of visitors and to manage accommodation units within building envelopes it would be proposed that each building envelope will include a staff accommodation/shelter/visitor services unit designated as a "nominated refuge" with the appropriate asset protection zone and bushfire construction standard for fire and other emergencies with accommodation for one to three staff members depending upon visitor occupation.

The staff accommodation/Refuge/Visitor services unit will be located within each building envelope from where each cluster of short-term accommodation units would be managed by fully trained fire and emergency staff members allowing immediate on-site management response in the event of fire or other emergencies that may occur.

Having a 'nominated refuge' within each envelope together with staff members resident in each envelope to manage visitors substantially reduces the risk to visitors from a possible fire or emergency event as could be the case if all visitors had to move up to eleven hundred metres to a separate refuge - if there was only one refuge located on the site- with which they may not be familiar.

Additionally

- having a refuge in each cluster/building envelope substantially reduces the requirements for vegetation management that would be required for any path joining an accommodation unit to a single refuge
- having a refuge in each cluster/building envelope ensures staging of development does not leave a refuge isolated from accommodation units as development progresses

The provision of trained staff within building envelopes that include accommodation units allows immediate response and management direction to visitors and removes the necessity for moving to a separately located 'REFUGE' with which visitors may not be familiar. (see BEP Supporting Report B)

Vegetation management required for only one remotely located refuge would be contrary to the advice received from Council in 2020- to minimise vegetation management requirements- and could put visitors lives at a greater risk with up to eleven hundred metres to be traversed rather than a refuge in each building envelope.

The use of a 'refuge' for visitor safety is always the last option for management.

Closure of short-term accommodation and evacuation from Lot 304 Dirk Hartog Island on the notification/forecast of hazardous fire conditions by a responsible authority or category cyclone warnings prior to any emergency is the preferred management option. (see Supporting Report D ER-BMP & BEEP Appendix I)

4.5. i DBCA Information

Every day during the fire season the Bureau of Meteorology (BOM) forecasts an outlook of the fire danger index by considering elements of the predicted weather including temperature, relative humidity, wind speed and dryness of vegetation. State fire agencies, in consultation with the Bureau, then consider a range of other factors relating to that area to set the Fire Danger Rating. Factors include

the length of time the fire index has been elevated, the extent of fire already in the landscape, fuel and dryness and the likelihood of weather events such as lightning. (Appendix 15,16)

Fire Danger Ratings are communicated to the wider community through weather forecasts, newspapers, radio, TV and on websites. (see BMP and BEP)

DBCA provides the following information relative to National Parks and Recreation Sites in regard to closure of their locations due to Fire Danger Ratings. (Appendix 14)

- *Park closures are likely to be an uncommon occurrence, however each bushfire season is different.*
- *Closures to DBCA sites on Dirk Hartog Island will apply according to the fire danger rating for the designated BOM weather forecast district.*
- *A list of closed parks will be provided on the DBCA website and through the general and social media during the day before the forecast Very High to Catastrophic Fire Danger Day*
- *Closure duration is based on the daily forecast period which is reviewed at the beginning and end of each day and will be confirmed in information releases*
- *Those persons already in bushfire prone areas should leave the night before or early in the morning to avoid the risk*
- ***On days of Catastrophic Fire Danger Rating all parks and reserves managed by DBCA identified as significant bushfire risk will be closed.*** Management of Lot 304 will conform with DBCA assessment and arrange for visitors to leave lot 304 and return to the mainland if safe to do so. (Appendix 14)
- *On days of **Extreme / Severe / Very High** days & Other Bans the majority of parks should remain open. However, there are exceptions where parks will be closed including: where an area is identified as high bushfire risk, where response capacity is limited or reduced and on any day with a Total Fire Ban.* Management of Lot 304 will conform with DBCA assessment and arrange for visitors to leave lot 304 and return to the mainland if safe to do so

DBCA will be closing parks in high-risk areas on days of Catastrophic fire danger rating and some parks on Extreme, Severe and Very High as well as during Total Fire Bans from time to time

Management of Lot 304 will conform with DBCA assessments and its own BMP trigger point and arrange for visitors to leave lot 304 and return to the mainland if safe to do so.

In normal circumstances the DBCA website in regard to Dirk Hartog Island National Park proposes that visitors should assemble at the Cape Ransonet barge assembly/departure location the night before departure to be close by when barge operations commence each morning and to avoid possible interaction with reintroduced nocturnal species whilst traversing tracks in the darkness.

In the case of a fire emergency, staff responsible for visitors located at their cluster at Sunday Island Bay – IF SAFE TO DO SO- would separately lead their cluster of visitors to the assembly/departure point at Cape Ransonet for transport back to the mainland or comply with its BMP.

4.5.ii BMP Strategy:

- Ensure management and staff are fully trained in fire and emergency services and fully aware of the BMP and BEP
- Onsite accommodation for staff
- Onsite staff when visitors occupying accommodation.
- Onsite refuge in each envelope

4.5.iii Management Actions in Response to DBA Advice on National Park Closure

Management Actions	Responsibility	Timing
Monitor information from DBCA in regard to National Park closures	Manager	October to March
Inform visitors of possible closure of National Park	Manager and staff	October to March
Guide visitors to island exit assembly area for evacuation to mainland if safe	Manager and Staff	October to March

4.6 Vegetation

Lot 304 is 11.2985ha in area and is vegetated with coastal shrubland.

- The total area of proposed building envelopes within the lot is approximately 1.84ha allowing for sewerage dispersion
- The area proposed to have accommodation units constructed within the building envelopes is approximately .056ha per envelope and .448ha over the eight envelopes
- Generally, each of the proposed building envelopes are level
- A building accommodation covenant registered on the title of the Lot allows a maximum accommodation construction size of ninety square metres for visitor's accommodation.

Short term accommodation units and staff accommodation -including a refuge- located within each building envelope is considered more practical for management than having a single, remotely located refuge for the whole development because:

- It is safer with visitors having a shorter distance to travel to refuge
- It enables immediate management of visitors in each cluster by staff who are familiar with those visitors
- Allows refuges to be developed alongside accommodation in stages as against one large remote refuge.

And it removes the need for.

- more extensive areas of vegetation management associated with the heat flux requirements when accessing an open path to a separately located refuge (possibly up to 500 metres or more).
- Visitors to walk more than 500m in emergency conditions to reach a central refuge, with which they may be unfamiliar
- Providing a single large building sized to accommodate up to 100 people, which would create considerable vegetation and visual impacts including a wide asset protection zone
- Staff to coordinate visitor movements from eight separate locations

In 2021an application for a clearing permit within lot 304 was assessed and approved by the Department of Water and Environmental Regulation for an application area of 0.038ha; a substantial report was attached to the approval. (Appendix 19)
The LDP is not submitted for approval of any development or for any application/proposal for any vegetation management which cannot be proposed until an LDP for the lot has been approved and a DA prepared.

Each cluster is proposed to be constructed above ground using eco anchors or similar applications further minimising vegetation management required.

The vegetation within lot 304 is classified as part of the Edel system which covers approximately 20,000 ha of Dirk Hartog Island. Most of the vegetation within and surrounding lot 304 is less than 0.5m in

height which according to the November 2024 guidelines is regarded as 'groundcover' with only groundcover exceeding 0.5m regarded as shrubs

Tracks circumnavigating the lot are already in existence in line with Shire bushfire requirements. Additional tracks in conformity with a BMP and the LDP providing for rear access to proposed building envelopes plus parking would add approximately .21ha of vegetation required to be managed.

Vegetation management is an important factor for Management and staff in strategically managing the site and any development thereon.

The BMP requires that an Asset Protection Zone (APZ) surrounding all habitable buildings be established to the requirement of the Planning for Bushfires Guidelines November 2024 version. Section B.2.Siting and Design B.2.1, B.2.2 and B.2.3, B.2.4

B.2.1 DESIGNING AN ASSET PROTECTION ZONE

According to the November 2024 Planning for Bushfire Guidelines **an APZ should not be seen as an area entirely cleared of vegetation, but as a strategically designed space that considers how existing and future mature vegetation, and combustible and non-combustible features interact with and affect the building's resilience to bushfire.**

An APZ should provide the greatest level of vegetation management within at least three metres of a habitable building, to ensure adequate unobstructed defendable space for emergency services to operate. This area should contain minimal vegetation and be free of combustible materials and obstructions. **Within the remainder of the APZ, planting of vegetation can increase as you move farther away from the building.**

The placement of plants within an APZ is a key design technique. Separation of garden beds with areas of low fuel or non-combustible material will break up fuel continuity and reduce the likelihood of vegetation within an APZ supporting a bushfire. It is important to consider the plant density and final structure and form of plants in their mature state.

Strategic landscaping measures can be applied, such as replacing weeds with low flammability vegetation to create horizontal and vertical separations between the retained vegetation.

Mulches used within the APZ should be non-combustible. The use of stone, gravel, shells, rock and crushed mineral earth is encouraged. Very fine or light mulch (such as shredded pine bark, pine needles, or poplar woodchips) less than five millimetres in diameter should be avoided. It is recommended that wood mulch is used in garden beds or areas where the moisture level is higher by regular irrigation, and these areas are separated with non-combustible elements, such as pathways and open spaces.

Incorporation of landscaping features, such as masonry feature walls, can provide habitable buildings with barriers to wind, radiant heat and embers. These features can include noise walls or wind breaks. Use of Appendix F of AS 3959 for bushfire resistant timber selection or the use of non-combustible fencing materials such as iron, brick, limestone, metal post and wire is encouraged within an APZ.

Planning for Bushfire Guidelines November 2024 version Asset Protection Zone (APZ) technical requirements

Fences within the APZ	Should be constructed from non-combustible materials (for example, iron, brick, limestone, metal post and

	wire, or bushfire-resisting timber referenced in Appendix F of AS 3959).
Fine fuel load (combustible, dead vegetation matter less than 6 mm in thickness)	• Should be managed and removed on a regular basis to be maintained as low threat vegetation • Should be maintained at less than two tonnes per hectare (on average) • Mulches should be non-combustible such as stone, gravel, shells, rock or crushed mineral earth or wood mulch more than five millimetres in thickness.

Shrub* and scrub* (0.5 m to 6 m in height). Shrub and scrub more than 6 m in height are to be treated as trees.	• Should not be located under trees or within three metres of buildings • Should not be planted in clumps more than five square metres in area Clumps should be separated from each other and any exposed window or door by at least 10 metres.
Ground cover*(less than 0.5 m in height. Ground cover more than 0.5 m in height is to be treated as shrub)	• **Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load'** above Can be located within two metres of a structure but three metres from windows or doors if more than 100 mm in height.
Defendable space	**Within three metres of each wall** or supporting post of a habitable building; the area is kept free from vegetation **but can include ground cover**, grass and non- combustible mulches as prescribed above.
Liquid petroleum gas cylinders	• Should be located on the side of a building farthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building • The pressure relief valve should point away from the house • No flammable material within six metres from the front of the valve Must sit on a firm, level and non-combustible base and be secured to a solid structure.

It would be proposed that land not included in building envelopes, used for accommodation or other land not used for any associated services/infrastructure will remain undeveloped managed by the resident manager in compliance with any approved BMP and to minimise impact to those areas by visitors.

The ER includes measures to comply with the DHIBIP 2015 to ensure that the integrity of DBCA's *Return to 1616* project is not compromised through the introduction of weeds, or feral or domesticated animals

4.6. i Vegetation Strategy:

- Manage vegetation carefully and sensitively in compliance with any approved BMP or other regulatory requirement guided by a landscape vegetation plan for the site and building envelopes.
- Manage weed control in cooperation with DBCA

4.6.ii Management Actions for Vegetation

Management Actions	Responsibility	Timing
Manage Landscape Vegetation Plan for APZ's	Manager	Ongoing
Ensure Vegetation in APZ's complies with Guidelines	Manager	Ongoing
No unauthorised loss or degradation of vegetation within or outside lot 304	Manager/staff	Ongoing
No uncontained refuse within the lot 304 or in the surrounding area	Manager/staff	Ongoing
Maintain the amenity of the area and the health of the surrounding environment by minimising indirect impacts such as dust from building activities	Manager/staff	Ongoing
Protect vegetation and any fauna habitats by ensuring no unauthorised clearing or earthworks	Manager/staff	Ongoing
Prevent sediment from lot 304 entering the ground and surface water environment	Manager/staff	Ongoing
Ensure all vehicles, plant and equipment entering lot 304 are free from dirt and plant material	Manager/staff	Ongoing
Consult with DBCA to develop and implement control procedures if any new weed outbreaks occur in lot 304	Manager/staff	ongoing

4.7 Biosecurity

Biosecurity measures are outlined in the supporting environmental report. Biosecurity measures proposed take account of the mitigations referred to in SU14 and includes measures to be undertaken by the resident manager/staff to prevent the risks of feral incursions and disease impacts by complying with the Dirk Hartog Island Biosecurity Implementation Plan (DHIBIP 2014-15-Attached) and following the protocols listed within the environmental report. DBCA produced a brochure providing information on biosecurity that will be provided to all visitors. (Appendix 11)

Effective management regarding the possible introduction and spread of plant and animal diseases is demonstrated by the resident manager/caretaker following the protocols listed in managing lot 304 included within the environmental report and DHIBIP 2014-15 supported by ongoing monitoring.

Vegetation Management-Biosecurity. Management actions linked with biosecurity of the site to prevent/reduce the introduction and/or spread of weed species and feral incursions within the lot and surrounding vegetation when development approvals are in place are detailed in the ER and include:

- The introduction and management of weed hygiene for vehicles and plant and equipment - adopting the DHIBIP 2014-15 to ensure any contractor and later visitors to the lot are aware of the requirements and have complied with DBCA notifications regarding vehicles brought on to DHI.
- Restricting access to the lot to initially approved staff and contractors only and later visitors.
- Education of staff, contractors, and later visitors to raise awareness of weed species in the vicinity of the site and how they can impact environmental values if they are transported to DHI and the site.
- In cooperation with DBCA implement appropriate eradication procedures in the event of a weed outbreak or infestation of unwanted species
- Erection of signage warning contractors, staff, and later visitors of the necessity to comply with the DHIBIP 2014-15.
- Provision of relevant weed fact sheets to staff, contractors, and later visitors so they are aware of the weeds that need to be watched for and eliminated.

- Continually consult with DBCA to develop, manage, and implement appropriate control procedures if new weed outbreaks occur on the site.
- Ensure that all contractors, staff, and later visitors are aware of the lot boundaries and areas which they may traverse or occupy when visiting the lot.
- Ensure there is no disturbance to vegetation beyond the approved development areas.
- Report any NIS to DBCA

4.7.i Biosecurity Strategy:

- Ensure biosecurity protocols are followed and adhered to
- Ensure DHIBIP is complied with
- Ensure visitors fully aware of biosecurity requirements.

4.7.ii Summary of Weed Management actions, Responsibilities and timing.

Management Actions	Responsibility	Timing
Ensure visitors are aware that all vehicles and equipment is to be washed down prior to arrival at Lot 304	Manager and Staff	At all Times
Ensure visitors are aware that all vehicles and equipment entering Lot 304 must be free from dirt and plant materials	Manager and Staff	At all Times
Carry out periodic inspection of visitor vehicles to ensure compliance with weed hygiene measures	Manager and Staff	At all Times
Erect signage advising visitors of biosecurity protocols	Manager and Staff	At all Times
Provide copies of relevant weed factsheets to staff and visitors on site	Manager and Staff	At all Times
Work cooperatively with DBCA to implement biosecurity measures	Manager and Staff	At all Times
Continually monitor for biosecurity breaches	Manager and Staff	At all Times

4.8 Visitor Numbers

It would be proposed that each short-term accommodation unit will provide accommodation for up to four visitors whilst the maximum number of accommodated visitors and staff permitted on site would be limited to one hundred. (a maximum number of accommodation units is provided for in covenants and a maximum of one hundred visitors and staff across eight building envelopes would be permitted on Lot 304 as provided for in any BMP).
A computerized booking system will be implemented to ensure that visitor and staff numbers located at Lot 304 cannot exceed 100.

If three accommodation units were located within a building envelope, then up to twelve visitors plus one to three staff (15) could be accommodated. If five other envelopes had the same (ie-5x15=75+15=90) then the accommodation on the other envelopes could only accommodate a maximum of ten visitors and staff. Less visitors proportionally accommodated in each building envelope allows other envelopes to be occupied by visitors.

Strategy:

- Continually monitor visitor and staff numbers to ensure compliance with any approved BMP.

4.9 Foreshore Access

Until an LDP is approved locating building envelopes it is not possible to locate any visitor access paths over the National Park strip on the LDP plan or within the lot. In general, however the following protocols would be followed in addressing management of the foreshore area. A draft Foreshore Access Management plan is attached. (Appendix 20)

Key environmental factors in managing the foreshore area:

- Maintaining the quality of land and soils so that the environmental values, both ecological and social, are protected. (uncontrolled access to the foreshore area has the potential to degrade vegetation leading to erosion)

- Ensuring that impacts to amenity are reduced as low as reasonably practicable. (unregulated disposal of rubbish within the foreshore area has the potential to impact on the amenity of the area)

Key management targets in regard to foreshore area between Lot 304 and the ocean:

- No erosion within the foreshore area between Lot 304 and the ocean
- No uncontained refuse within the area between Lot 304 and the ocean or in the surrounding environment
- Protecting the amenity and surrounding environment by limiting disturbance where possible and by progressive revegetating any disturbed areas.

The manager and staff would be responsible for managing any agreed accesses (to be detailed and agreed with DBCA at the time of any DA application) crossing the National Park to ensure there is no erosion, no loss or degradation of vegetation and no waste or refuse left within the accesses and surrounds - and that any impacts to amenity on the foreshore are eliminated or reduced to as low as reasonably practicable.

It would be proposed that a final foreshore access plan will be developed and completed in cooperation with DBCA (as requested via email from DBCA) as part of and included with any proposed future development application (DA) and would be managed by the resident manager and staff (Environmental Report).

Until an LDP is approved the location of access points from proposed building envelopes cannot be established to enable details requested by DBCA to be finalised. The area of land between Lot 304 and the foreshore does not fall within the Shire of Shark Bay LPS No 4 and as such the Shire has no influence/control upon any agreement with DBCA regarding access over this land.

There will be no general vehicle access over the National Park strip between Lot 304 and the foreshore for visitors or staff.

Access over the National Park strip during construction via raised structures has been documented in a letter dated March 16,2011(refer Appendix 2) and is subject to the submission of a formal development application and DBCA approval.

4.9. i Foreshore Strategy:

- Ensure foreshore access protocols discussed and agreed with DBCA.
- Prepare and finalise Foreshore Access Plan
- Establish a monitoring program.

4.9. ii Proposed Management Monitoring Program Re Foreshore

Indicator	Parameter	Monitoring Method	Frequency	Location
No erosional features within the foreshore area between Lot 304 and the ocean	Erosion	Site Inspection	Annually during peak visitor period	Within the foreshore area between Lot 304 and the ocean
No loss of vegetation within the foreshore area due to visitor activities	Vegetation	Site Inspection	Bi-annually	Within the foreshore area between Lot 304 and the ocean
Area between Lot 304 and the ocean is free of rubbish	Littering	Site Inspection	Weekly	Within the foreshore area between Lot 304 and the ocean

The following chart addresses management actions regarding the most likely avenues that may cause

environmental impact to the area between Lot 304 and the ocean.

Proposed Management Actions Re Foreshore

Risk & Key Impacts	Management Actions	Priority	Timing
Uncontrolled access to the foreshore area south of Lot 304 has the potential to degrade vegetation leading to erosion.	• Provide formalised pedestrian access paths to the beach. • If required undertake revegetation of areas disturbed by visitor activities • Install signage and fencing to ensure access to the foreshore is via designated access tracks agreed with DBCA. • Induct all visitors to Lot 304 of the necessity to follow only authorised and signed access routes to the beachfront. • Provide educational material in each visitor accommodation unit providing clear details and maps showing access routes from the accommodation to the beachfront.	High Medium High Medium Medium	Ongoing Ongoing Ongoing Ongoing Ongoing
Unregulated disposal of rubbish within the foreshore area has the potential to impact on the amenity of the area	• Induct all visitors to Lot 304 of the necessity to follow waste disposal protocols including removal by visitors. • Provide educational material in each accommodation unit outlining waste disposal protocols including. -all rubbish brought on site by visitors must be removed by visitors when they depart -no rubbish is to be dumped or left on the foreshore area between Lot 304 and the ocean * Install signage at each agreed accessway to the beachfront informing visitors of rubbish disposal protocols	Medium Medium Medium	Ongoing Ongoing Ongoing
Establish guidelines determining species, plantings and landscaping of any degraded areas	• Establish species list approved for revegetation where required • Prepare a landscape vegetation plan	Medium	Ongoing

Proposed Ongoing Management Review and Revision of Monitoring Results for Foreshore

Indicator	Action	Responsibility	Timing
Erosion within the foreshore area adjacent to Lot 304	• Investigate Cause • Implement appropriate control to reduce or rectify impact which could include. a. Restricting access to areas that are impacted. b. Changing the access route and install fencing in consultation with DBCA. c. Undertaking rehabilitation of eroded areas in consultation with DBCA d. Continue annual monitoring. e. Revise and update risk assessment and management actions where applicable	Manager	Immediate
Loss of terrestrial vegetation within the foreshore area due to impacts from visitor activities	• Investigate Cause • Implement appropriate control to reduce or rectify impact which could include. a. Restricting access to areas that are impacted. b. Changing the access route and install fencing in consultation with DBCA. c. Undertaking rehabilitation of eroded areas in consultation with DBCA • Continue annual monitoring. • Revise and update risk assessment and management actions where applicable	Manager	Immediate
Rubbish observed in foreshore area	• Investigate Cause • Clean-up and correctly dispose of rubbish.	Manager	Immediate

between Lot 304 and the ocean	• Review procedures for waste disposal. • Revise and update risk assessment and management actions where applicable		

5.0. OTHER RELATED MANAGEMENT MATTERS

5.1 Coastal Processes Management

The site of Lot 304 is an area identified in the Damara Report as subject to coastal hazards in the 100-year timeframe. The potential future movement of the shoreline and the risk posed by extreme events necessitates the requirement for coastal adaption and risk mitigation planning.

The potential vulnerability of the coastline needs to be considered for any coastal development; the proposal for building envelopes to be located landward of the AHD 4.7 m contour and the building line approx. 11 meters from the front boundary of lot 304 provides security for development within the one-hundred-year forecasts.

Coastal processes long term management pathway as recommended in Damara report is to avoid erosion and inundation risk until not viable and then moving into a managed retreat phase. Damara confirmed in April 2024 that their reports, which were accepted by the Shire in 2020, were current and in accordance with government policy. (refer ER re Damara Reports)

SPP 2.6 outlines a hierarchy of risk adaption and mitigation options, where options that allow for a wide range of future strategies are considered more favourably. The options provided in this hierarchy are generally:

- Avoid – avoid new development within the area impacted by the coastal hazard
- Retreat – the relocation or removal of assets within an area identified as likely to be subject to intolerable risk of damage from coastal hazards
- Accommodation – measures which suitably address the identified risks
- Protect – used to preserve the foreshore reserve, public access and public safety, property and infrastructure

A key element of adaption planning is the response to potentially increasing risks of coastal movement. The accommodation clusters proposed for lot 304 have been located more than one hundred metres from the high tide mark – an area located at an AHD level above five metres. The Damara report refers to the possibility of the ocean level reaching existing four metre AHD level within one hundred years: this is regarded as a generally tolerable risk.

The Damara CHRMAP report prepared in compliance with SPP 2.6 recommends that the long-term pathway for development is to avoid erosion and inundation risk until not viable, then moving into managed retreat phase before the ocean levels forecast are achieved.

The Damara Report identifies that erosion risk management is to be focused on beach access and dune management until retreat is required to be implemented

The recommendations of this report will be followed and monitored by management and addressed at the DA level when appropriate as an ongoing requirement for managing the site.

Strategy:
*****Monitor Coastal Processes as proposed in Damara reports.

5.2 Fire Risk Management

This section should be read in conjunction with appendices 12-17 and Supporting Reports D ER -BMP & BEP Appendix I

Fire safety assessment is critical, to the successful operations of a remotely located ecotourism operations, for protection of "vulnerable" visitors who may visit the site.

Lot 304 is located within a bushfire prone area designated by the Fire and Emergency Services Commissioner. Fire warning areas are broken down into districts. (Appendix 15)

The Shire of Shark Bay issue a general bushfire notice in regard to firebreaks each year (appendix 13) and have only issued ONE TOTAL FIRE BAN since June 2022. (Appendix 16)

The Shire of Shark Bay requested that a BMP be prepared and lodged with the LDP submission to confirm that a BMP for the site could be completed that would comply with SPP3.7 and the Guidelines.

"Bushfire Safety Consulting" prepared a BMP that meets State Planning Policy 3.7(SPP 3.7) Bushfire November 2024 in line with Planning for Bushfire Guidelines November 2024.

Significant research has been undertaken regarding fire safety including details for 'refuge, fire resistant paints and fire-resistant construction materials to provide for a safe environment in the event of a fire emergency. (Appendix 17)

5.2.i Bushfire Management Plan

Large fires have occurred in the Shire area and will in the future. A large fire on Dirk Hartog is highly unlikely due to the low number of potential ignition sources, the narrow arrangement of flammable vegetation broken up by sand dunes systems and the surrounding coastal environments, beaches and ocean where fires will extinguish.

However, the BMP prepared by Bushfire Safety Consulting recognises that a fire could start and threaten the development, so a detailed and thorough assessment has been undertaken and appropriate planning proposed as necessary to ensure risks are managed to acceptable levels.

The State Planning Policy No. 3.7: Bushfire (SPP 3.7) The policy intent is to implement effective, risk-based land use planning and development to manage and/or mitigate risk to people, property and infrastructure to an acceptable level. The policy contains objectives and policy outcomes and measures as well as reference to the Bushfire Protection Criteria as outlined in the Planning for Bushfire Guidelines (WAPC 2024) (the Guidelines). The policy applies to this Local Development Plan Application because the site is located in a designated bushfire prone area on the WA Map of Bushfire Prone Areas (Figure 3). SPP3.7 and the Planning for Bushfire Guidelines provides the foundation for land use planning to address bushfire risk management in Western Australia.

The Planning for Bushfire Guidelines (2024) provides the criteria and acceptable solutions that are assessed and accommodated within this BMP. The Planning for Bushfire Guidelines (2024) is intended to inform and guide decision makers, referral authorities and proponents to achieve acceptable bushfire protection outcomes, including expectations at the different stages of planning. Section 8 of the guidelines outlines all the considerations and Bushfire Protection Criteria for Vulnerable Tourism land uses that are applicable for this application. This stage in planning is supported by this BMP; at Development Application stage further details will be provided in a BMP

and BEP consistent with SPP 3.7 and the Guidelines to support the final site layout and design of the development.

'BUSHFIRE SAFETY CONSULTANTS' visited lot 304 and its surrounding area in 2024 and prepared the attached December 2024 Bushfire Management Plan and Bushfire Emergency Plan in accordance with SPP 3.7 Bushfire- November 2024 and Planning for Bushfire Guidelines November 2024. (see Supporting Report D, ER appendix I))

'Bushfire Safety Consultants' prepared a BMP based upon an indicative draft plan for four ninety square metre accommodation units within a building envelope together with staff accommodation /visitor services/store also nominated as a 'refuge'.
The pre-development site and all vegetation classes within 2 kilometres was assessed including slopes where contour data was available and measured on-site where accessible.

The vegetation on and surrounding the site within the assessment areas is classed as vegetation type - low shrubland, vegetation classification - Class C Shrubland. The lot is sparsely vegetated with scattered low shrubs of Acacia lighuata, Diplolaeana grandiflora, Thyryptomene baeckeacea and Atriplex bunburyana (Bailey Environmental Services 2024). The vegetation exists in clumps, separated by mineral earth and open sandy areas. The fine fuels are mostly disconnected.

A number of plants were measured using a measuring tape on-site and captured in several representative photos below. Most of the vegetation averaged less than 0.3 metres in height with the occasional shrub reach 1 metre in height. It is a very open and wind exposed site, many shrubs showed obvious signs of wind pruning as they were dying on the southern wind exposed side of the plant.

Within the assessment area, over 50% of the total area is ocean or inlet vegetation dominated by succulent samphire plants and mangroves. Of the remaining vegetated land, the landscape is covered in Class C shrubland and low shrubland vegetation only. The vegetation is wind pruned and rarely exceeds 1 metre in height. The bushfire hazard level assessment confirmed the site is exposed to a moderate hazard level from the north and west, but has minimal exposure to long fire runs from the east and south

The proposed indicative development achieves all the acceptable solutions and provides outcomes-based approaches suitable to mitigate risk in this unique isolated location consistent with an eco-development in this isolated World Heritage environment. The proposal for building envelopes achieves the intent of the Planning for Bushfire Guidelines and SPP 3.7 and will be updated at Development Application (DA) stage when firmer plans are lodged for the final development at the next stage in planning approval.

Details of the asset protection zone related to the BMP is based upon the location of the 'refuge' and an indicative draft plan is included within the BMP. The careful management of each APZ is a priority for managing the site at a low threat level without compromising the physical and visual attributes of the lot's location.

The Bushfire Consultants have recommended procedures for vegetation management to minimise physical and visual impacts that comply with the section B.2 – *Siting and Design* included within *Planning for Bushfire Guidelines November 2024*.

5.2.ii Refuge Management

The inclusion of a nominated 'refuge' and onsite management of each building envelope reduces the potential risk of putting visitors into vulnerable positions by not requiring visitors ,to potentially, having to move up to 500m or more to a single refuge located elsewhere on the site (with which they may not be totally familiar) and provides direct management and support at the location without visitors

having to move to a separate and possibly remotely located refuge.

A surrounding landscape effective slope analysis was undertaken in order to provide clarity around where on-site shelter buildings could and could not be sited within the lot and achieve a radiant heat flux less than 10kW/m² with a 1200K flame temperature and FDI of 100. The FDI of 100 was selected as this represents the fire weather trigger whereby the site will be pre-emptively evacuated ahead of any days above FDI or FBI 100 (ie. Catastrophic Fire Danger Rating).

The bushfire exposure for accommodation units can achieve full compliance with the Guidelines because there is sufficient space on the development lot to contain an Asset Protection Zone so that all buildings achieve BAL-29 and lower.

By constructing an approved on-site shelter according to minimum standards, people can, as a last resort, shelter from a bushfire and can co-ordinate with emergency services an evacuation off the island if needed.

In all cases the use of a 'REFUGE' is the last alternative in the event of a fire emergency event. Closing of units and early evacuation, where possible, to a safe location prior to emergency status is the preferred avenue in the case of any forecast fire or emergency event. (see Supporting Reports B)

5.2.iii APZ's Management

An APZ is a low fuel area immediately surrounding a building. It includes a defendable space adjacent to any building which is no less than three metres in width, has minimal vegetation and is free from combustible items and obstructions.
An APZ consists of two areas: Inner Protection Area, closest to buildings, incorporating the defendable space. Outer Protection Area, for reducing the potential length of flames by slowing the rate of spread, filtering embers and suppressing the crown fire.

The BMP includes diagrams that demonstrate the required asset protection zone distances around each cluster of accommodation units required to meet SPP 3.7 requirements.

Each cluster of accommodation and staff units within a building envelope will include one unit designated as a 'refuge' in the case of a bushfire emergency occurring.

The area of each asset protection zone is directly related to the location of the 'refuge', the slope of the land and vegetation. The BMP has been prepared based upon four units of ninety square meters being in each building envelope (plus staff accommodation/visitor services and multipurpose store). The asset protection zone established relative to the staff unit being nominated as a 'refuge' holds for the proposed four ninety square metre units and staff accommodation.

Smaller sized units less than ninety square metres would allow for additional units within a building envelope without change to the area of the asset protection zone.

On site inspection and assessment of each of the proposed asset protection zone areas for each cluster of accommodation units determined that the level of vegetation management required for each area was relative to the on-ground vegetation present which mainly was 'ground cover' less than 0.5m in height.

The vegetation on site was limited and sparsely spread- complying in the main with 'ground cover' as described in Table 9 of the Guidelines- in line with its location and exposure to prevailing weather conditions for most of the year. In line with this it was established on site that there would be limited

vegetation management required to maintain asset protection zone areas in accordance with B.2 Siting and Design – *"Planning for Bushfire Guidelines" November 2024* as the vegetation was already restricted, low and requiring little or no modification within each proposed building envelope and asset protection zone area.

5.2. iv Landscaping Management

The asset protection zone will not be an area cleared of vegetation but a carefully planned management of vegetation in accordance with the information included within section B.2 Planning for Bushfire Guidelines.

- In order to maintain the asset protection zone at a low threat level a landscape vegetation plan would be developed for each building envelope and APZ area when a DA was submitted following approval of the LDP to improve the bushfire resilience of accommodation units whilst detailing the limited vegetation management required.

This plan confirms that:

- The asset protection zone would be part of a carefully managed area providing for existing vegetation to be treated with respect providing for a higher level of management within the first three metres of the accommodation as provided for in SPP 3.7 Guidelines with the inclusion of non-combustible material within the three-meter defensive zone keeping vegetation at a low threat level.

- Vegetation beyond the initial three metre defendable area allows management of that vegetation within the asset protection zone perimeter while still meeting the requirements of 'low threat', SPP3.7 and Planning for Bushfire Guidelines November 2024.

- The vegetation management requirement would be limited and related to the size, location and class of vegetation within each asset protection zone and the distance of significant vegetation from possible accommodation units and other vegetation to ultimately be guided by a landscape vegetation plan (noted in BMP) that cannot be completed until the LDP is approved.

- Fine fuels less than 6mm in thickness would be managed and removed on a regular basis to be maintained as low threat vegetation.

- Dead plants and leaf litter would be removed.

- **Groundcovers under 0.5m can be retained within the APZ with no restriction on location but must be maintained to remove dead plant material as described in fine fuels above**

- **Groundcovers greater than 0.5m in height are to be treated as shrubs and can be retained as long as they are not within 2 metres of a structure or 3metres from any windows or doors if more than 100mm**.

- Shrubs greater than 0.5m should not be located under trees (there are no trees within the Lot) or within three metres of buildings and under 5metres can be retained within the APZ as long as they are not within 3 metres of buildings and should not be planted in clumps more than 5m2 and should be separated from each other and any exposed window or door by at least 10 metres

- Vehicle passing lanes would be included within each asset protection zone southern boundary

- Each inspected and mapped asset protection zone area had limited vegetation within this area with few if any vegetation sizes exceeding 300mm: clumps not exceeding 1.5m were less than .1ha and mainly located outside the areas of the asset protection zone and outside of management requirements. Similarly clumps within asset protection zones were of minimal area and located well apart meeting the requirements -to be left insitu -provided for in the Guidelines.

Relative to the overall area of the lot (11.2985ha) and to Dirk Hartog Island (63,000ha) the total area of vegetation management required for a building envelope and APZ with one or four 90m2 accommodation unit would be limited.

The Environment Report concludes "the development of visitor accommodation on Lot 304 as proposed in the LDP can be undertaken in accordance with the Shire of Shark Bay LSP No. 4 and without any significant adverse impacts on the ecological and special attributes of Dirk Hartog Island or its surrounding waters"

The BMP policy for Lot 304 provides for the closure and evacuation from Lot 304 in the case of catastrophic fire condition being forecast - when advised by DFES, the Shire of Shark Bay, DBCA or other responsible authority or on days when a Three-day Extreme Heatwave is forecast. (see ER Appendix I)
A2.3 Clearing of native vegetation included within the BMP confirms that full compliance is achieved.

Technical fire modelling and detailed effective slope analysis was undertaken in 47 fire run locations surrounding the entire site.
In addition to this, each indicative cluster of buildings was individually assessed for effective slope and fire behaviour using AS3959 method 2 methodology.
This included a further approximate 48 potential fire runs towards the cluster of buildings and on-site shelter building.
All of this analysis has been completed to ensure the minimum amount of vegetation will need to be modified/impacted to comply with acceptable radiant heat flux standards and compliance with SPP 3.7 and the Guidelines.
The footprint of potential development impact is reduced significantly because of the analysis in the BMP.

5.2. v BMP-Evacuation Management

- The proposal for lot 304 provides for four accommodation units within each building envelope accommodating up to four visitors with a maximum of two cars per unit.
- In 2016 during the 1616 reenactment celebrations the existing barge service transported more than 80 vehicles from Steep Point to the Cape Ransonet area on Dirk Hartog Island in less than ten hours.
- The official barge assembly area approved by DBCA located close to Cape Ransonet on Dirk Hartog Island includes a clear beach area more than 2ha in area capable of accommodating more than 100 vehicles. (Appendix 12)

- DBCA website instruction:

  "Camp at Ransonet or the Dirk Hartog Island Ecolodge the night before you leave the island. Being close to the barge landing point ensures precious threatened fauna are not put at risk by driving at dawn to meet the barge". (DBCA)

  This open beach area is located at the southernmost point of the island facing the prevailing south to southwest winds making the risk of fire negligible with no vegetation for ignition
- In the event of a fire emergency all vehicles could be transported to the mainland.

5.2.vi Mitigation Processes

To minimise the potential for fires in the area of the lot Management must ensure:

- No fires are deliberately started within the lot and that all on site personnel understand that

fires are strictly prohibited.
- Vehicles and machinery must be parked on clear ground to avoid the possibility of hot engines igniting.
- Vehicles operating within the lot must be equipped with fire extinguishers.
- Smoking to be designated as not approved within the lot.
- Manage any Emergency Response Plan and BEP

5.2.vii Strategy:

- Continually monitor conditions relative to fire to ensure visitor safety.

5.2.viii Bushfire Management Actions, Responsibilities and Timing

Management Action	Responsibility	Timing
Ensure no fires are deliberately lit within Lot 304	**All Staff**	**At all times**
Ensure all onsite persons understand that fires are prohibited	**Manager**	**At all times**
All vehicles, plant and equipment to be parked where nominated	**All Staff & Visitors**	**At all times**
Ensure all vehicles equipped with fire extinguishers	**Manager & Staff**	**At all times**
Prepare a BEEP and BERP	**Manager**	**At all times**
Designate Lot 304 as a no smoking zone	**Manager**	**At all times**

5.3 Cyclone Risk Management

It would be proposed that the onsite manager/caretaker would be responsible to monitor cyclone warnings on the ABC radio and to provide any visitors with up-to-date information advising protocols to be addressed.

Accommodation units would be proposed to be built to cyclone standards.
In all cases the use of "A REFUGE" is the last alternative in the event of a cyclone emergency event. Closing of units and early evacuation, where possible, to a safe location prior to emergency status is the preferred avenue in the case of any forecast emergency event.

Strategy:

- Monitor ABC radio broadcasts for possible cyclone warning alerts. Liaise with Dirk Hartog Island managers DBCA in regard to possible Park closure

5.4 Staging-Management

It is proposed that staging of development would enable ongoing monitoring of environmental factors, by management, to allow for assessment, review, and correction if necessary.

Development managed in stages allows careful consideration to ensure existing development is not affected by any additional development but is managed in a way to provide the minimum of obstruction to existing accommodation: this could include off season timing and or the provision of prefabricated accommodation both of which would provide minimum impact: the use of eco-anchors or similar solutions minimises the opportunity for dust to be created.
Design guidelines are mandatory to all development proposed ensuring that the overall aesthetics and unit structures will be maintained no matter at what stage development is undertaken.

Strategy:

- Develop in stages to allow continual review by management of all factors that may impact on the environmental assets of the site.

5.5 Monitoring-Management

More than 100 monitoring points have been established on the lot with a photographic record made at each point looking north, south, east and west. These monitoring points establish a data base which would be used for ongoing assessment and management of impacts to the vegetation and landscape through photo reviews.

Monitoring helps to identify environmental issues on the site and assess the effectiveness of conservation efforts outlined in the Environmental Report enabling proactive measures to be put in place to safeguard the environment and visitors' well-being.

Ongoing monitoring and actions to be taken by management and staff is addressed in more detail in the ER and is essential to the successful completion of any development on the lot.

5.5.i Monitoring Strategy:

- Review monitoring sites at regular intervals.

5.5.ii Proposed Ongoing Management Review and Revision of Monitoring Results for Foreshore

Indicator	Action	Responsibility	Timing
Erosion within the foreshore area adjacent to Lot 304	• Investigate Cause • Implement appropriate control to reduce or rectify impact which could include. • *Restricting access to areas that are impacted. • Changing the access route and install fencing in consultation with DBCA. • Undertaking rehabilitation of eroded areas in consultation with DBCA • Continue annual monitoring. • Revise and update risk assessment and management actions where applicable	Manager	Immediate
Loss of terrestrial vegetation within the foreshore area due to impacts from visitor activities	• Investigate Cause • Implement appropriate control to reduce or rectify impact which could include. • Restricting access to areas that are impacted. • Changing the access route and install fencing in consultation with DBCA. • Undertaking rehabilitation of eroded areas in consultation with DBCA • Continue annual monitoring. • Revise and update risk assessment and management actions where applicable	Manager	Immediate
Rubbish observed in foreshore area between Lot 304 and the ocean	• Investigate Cause • Clean-up and correctly dispose of rubbish. • Review procedures for waste disposal. • Revise and update risk assessment and management actions where applicable	Manager	Immediate

6.0. SUMMARY

Condition 3(i)

The management plan has addressed LPS No 4 SU14 condition 3(i) and the objectives proposed:

Visitor Access

Strategy:

Visitors & Vehicles

- Vehicles and visitor movement on the site would be managed by the resident manager/staff and restricted to tracks included in the LDP and future DA.
- Management control would include closure and redirecting tracks, clear signage, temporary fencing and staff directions.
- Continual monitoring of the site and comparing photographic recorded and observed impacts would allow ongoing management decisions to be implemented regarding the impact of vehicle and visitor access implications to the environmental assets of the site and surrounding National Park.
- Minimise the number of tracks on the site.
- Track design to minimise visual and physical impacts to the site through sensitive location related to the prevailing winds and visual aspects and to minimise vegetation management requirements.
- Stage development to allow continual review.

Servicing

Strategy:

Water:

- Provision of gutters on all buildings to allow maximum capture of rainfall and no runoff onsite.
- Provision of water storage tanks within each building envelope for potable and non-potable water.
- Installation of pipeline from Two Wells for transport of non-potable water to the site.
- Provide water tanks for firefighting as noted in the BMP and additionally within each building envelope.
- Contain all water within building envelopes.

Power:

- Provision of solar and wind power options for each building envelope
- Provision of non-invasive wind turbines
- Provision of multi-purpose room for installation of power infrastructure for each envelope.

Maintenance

Strategy:

- Manage all facets of ongoing maintenance of units following construction.
- Maintain all tracks on site to allow easy vehicle access and in accordance with an approved BMP to impact upon the land in the least possible way.
- Maintain firebreaks in compliance with an approved BMP to impact in the least possible way on the land and landscape.
- Maintain any additional fire prevention areas as provided for and in compliance with an approved BMP.
- Maintain any ATU units as provided for in manufacturers specifications meeting environmental standards and the Government Sewage Policy.
- Maintain all power infrastructure to manufacturers specifications.
- Manage any pipelines used for supplying water to the site to ensure there is no breakdown, leakage or impact to the environment.

Waste Disposal- Rubbish Management

Strategy:

- All waste produced by visitors to the site must be removed by those visitors on their departure from the site.
- Ensure visitors are aware before arriving onsite that they must remove any rubbish or waste from their visit when they depart.
- Provide an area in each building envelope where visitors can store and assemble any waste and rubbish before they return it to the mainland.
- Staff waste and rubbish to be assembled and returned to the mainland 'shire tip' on a regular basis.
- Provide bio digestion options for waste and rubbish generated by staff on site if not removed back to the mainland.

Effluent Disposal

Strategy:

- Ensure ATU units are installed and operating according to manufacturer specifications.
- Continue monitoring of site and associated sites to establish environmental issues that may be occurring due to operation of ATU's.

Service Areas

Strategy:

- Proposed multi-use store within each accommodation cluster to be fitted out to contain solar infrastructure including.
- an area provided for storage of items required for servicing any development including chemicals that may be required for cleaning and other purposes etc.
- Onsite storage of fuel is not proposed.

Transport of Construction Material

Strategy:

- monitor and check all activities related to the transport to and the construction of accommodation units on the lot.
- Ensure all biosecurity matters are addressed as outlined in the Environmental Report.

Management

Strategy:

- Appoint Project Manager to manage development of Lot 304 from commencement to finish.
- Appoint onsite resident manager trained in fire and emergency procedures to manage operations on site.
- Establish general management duties.
- Outline management responsibilities.
- Ensure management and staff are fully trained in fire and emergency services and fully aware of the BMP and BEEP
- Establish protocols for bushfire emergencies and refuge operations.
- Manage vegetation in compliance with any approved BMP or other regulatory requirement guided by a landscape vegetation plan.
- Ensure management were fully aware of biosecurity and comply with DHIBIP.
- Continually monitor visitor and staff numbers to ensure compliance with any approved BMP.
- Ensure foreshore access protocols were discussed and agreed with DBCA.
- Monitor Coastal Processes as submitted in Damara reports.

- Monitor conditions regarding possible fire safety of visitors and management of any BEEP.
- Continually monitor ABC radio for possible cyclone alerts
- Review established monitoring points at regular intervals.

Map 2 Dirk Hartog Island and Sunday Island Bay

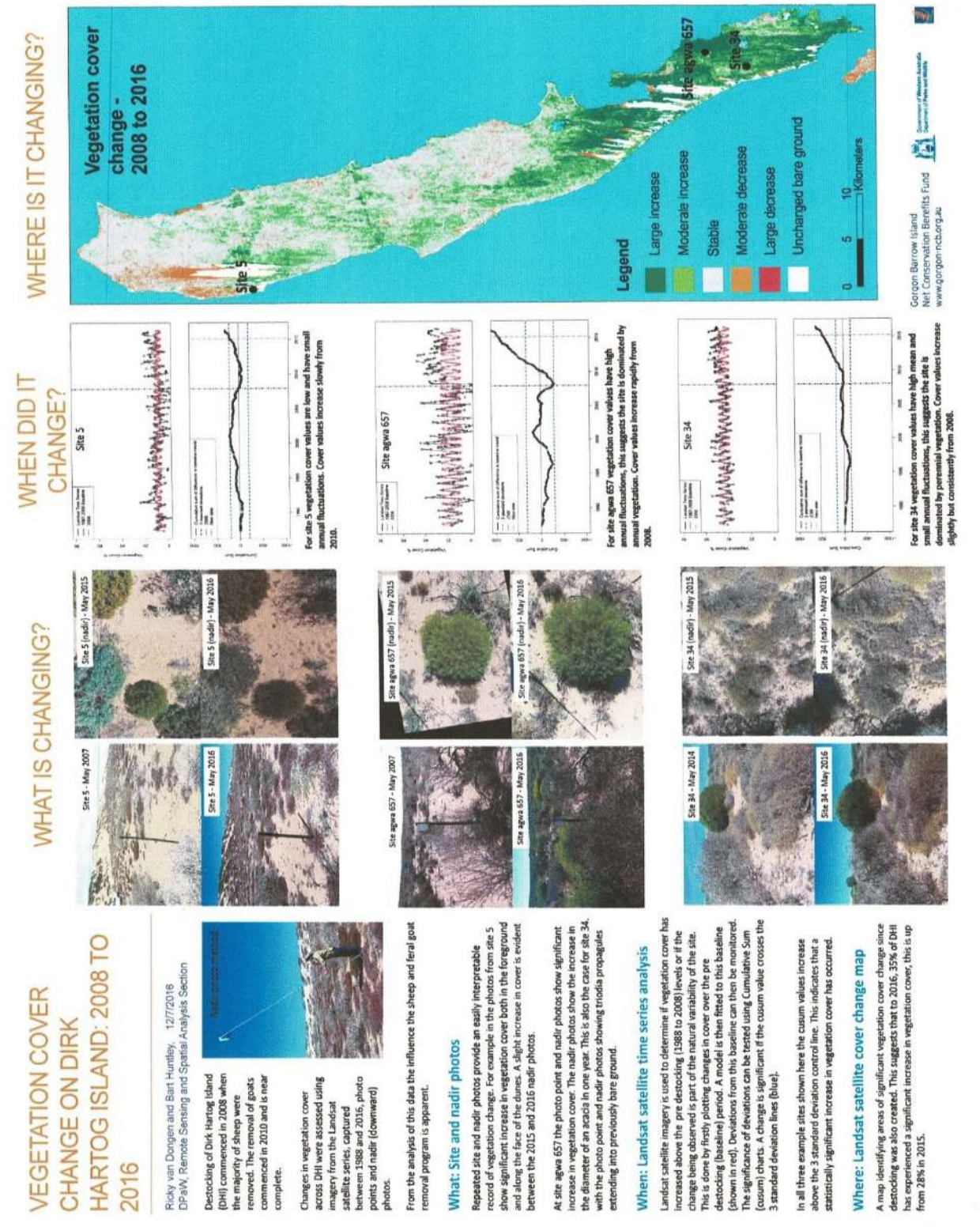
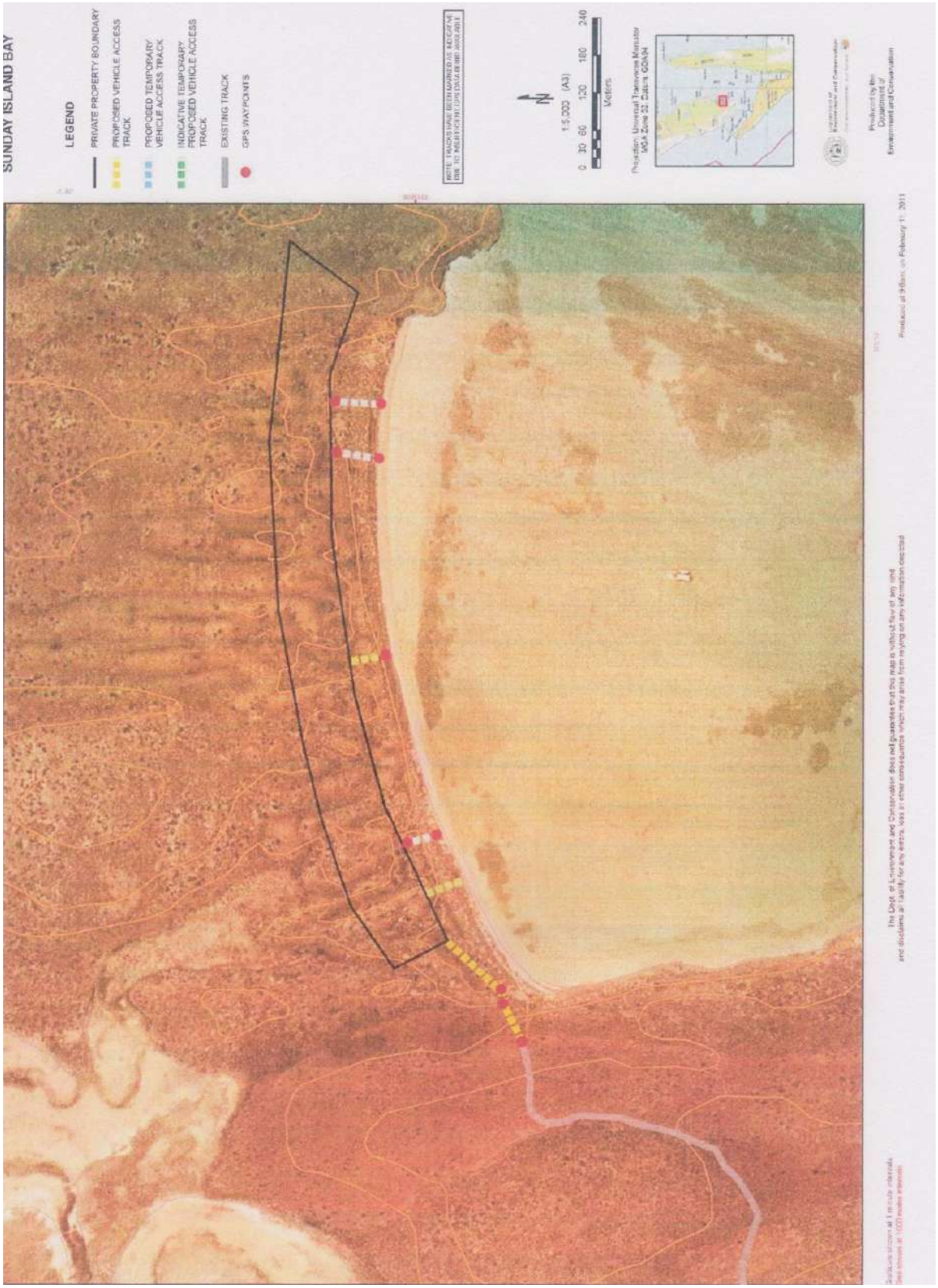
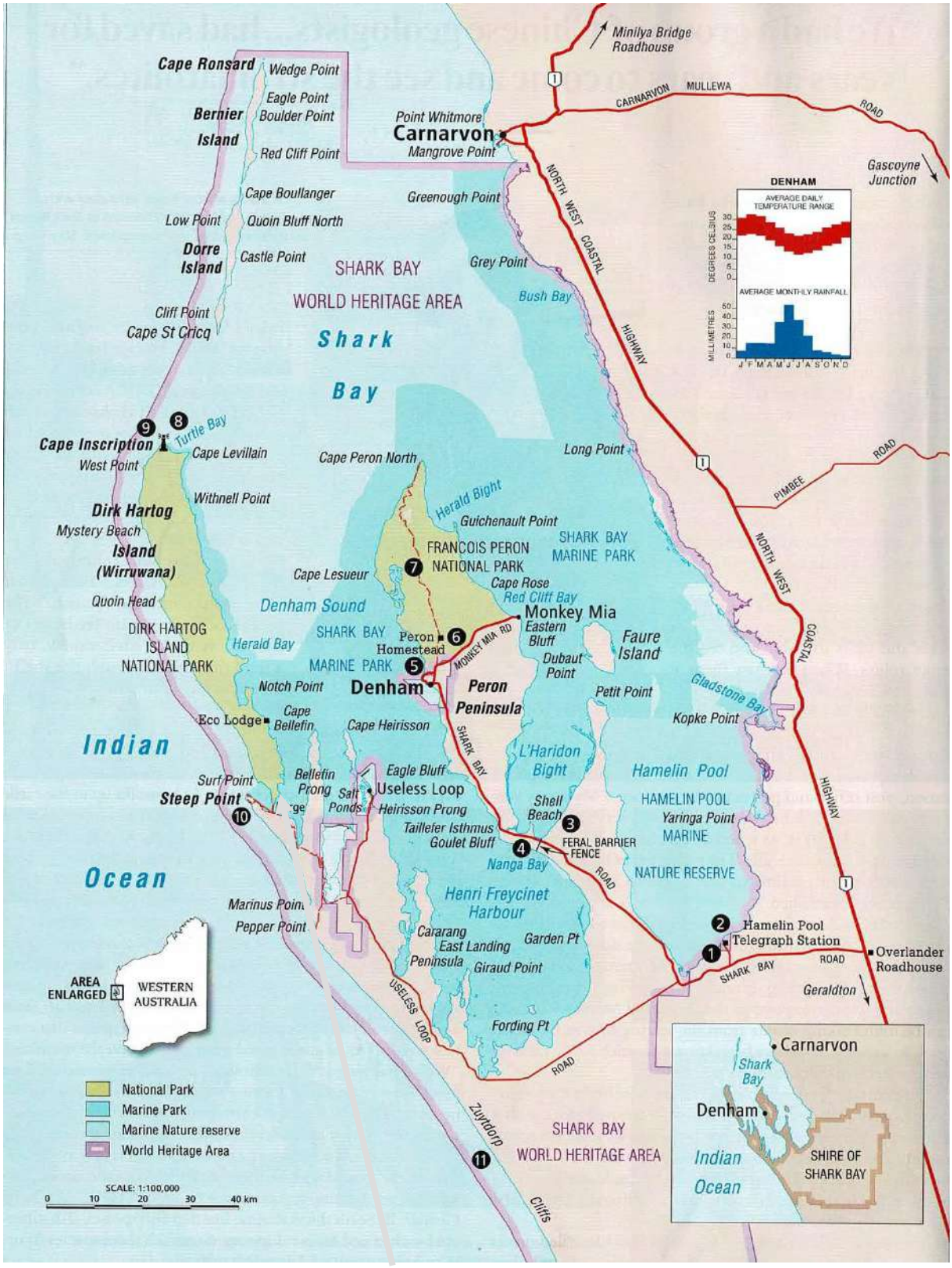


Chart 1:DBCA Vegetation Information Dirk Hartog Island 2008-2016

Plan 1 Access to Lot 304





Map 2 World Heritage Property. Sunday Island Bay

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GLOSSARY

BP	Biosecurity Plan
BMP	Bushfire Management Plan
BEP	Bushfire Emergency Plan
DG	Design Guidelines
DHIBIP	Dirk Hartog Island Biosecurity Implementation Plan
DHID	DHI Development Pty Ltd
ER	Environmental Report
DFAMP	Draft Foreshore Access Management Plan
MP	Management Plan
SBWHAC	Shark Bay World Heritage Advisory Committee
WIRRUWANA	Dirk Hartog Island- Traditional Owners Name

The objectives for establishing Design Guidelines are to provide parameters to be addressed in designing any future accommodation development proposal for lot 304 to ensure it meets the conditions of SU 14 3(ii) achieving high architectural quality, whilst being low scale, factoring in all of the attributes of the surrounding area. Design guidelines allow broad scope for architectural quality with designs to be proportionally scaled and sympathetic to the location whilst considering topography, physical characteristics, and unique character of the surrounding area.
THE SUBMISSION IS NOT AN APPLICATION FOR DEVELOPMENT

Local Development Plan
Design Guidelines
Supporting Report B

Lot 304 Sunday Island Bay
Dirk Hartog Island
February 2025

DHI Development Pty Ltd
P O Box 107 NORTH FREMANTLE WA 6159

Shark Bay World Heritage Property **Sunday Island Bay**

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1.0 INTRODUCTION

The design guidelines have been prepared by DHID Development in conjunction with Robin Adair Designer, Perth Western Australia.

Dirk Hartog Island is located within the Shark Bay World Heritage Property - an area exceeding 2,200,000 ha of land and ocean.

The island is the site of the first recorded landing of a European on Australian soil in October 1616 – Dutch Captain Dirk Hartog.

The island was the site for collection of guano used for fertilizer in the 1800's and for the harvesting of pearls in the mid 1800's. From 1864 until 2009 the island operated as a pastoral lease farming sheep for wool.

Lot 304 is an 11.2985ha freehold lot located on the northern shore of Sunday Island Bay with a frontage to the ocean exceeding one kilometre: a strip of National Park land lies between the ocean and lot 304.

Due to its remote location offshore, it was not visited on a regular basis in early years: as outboard powered boats became more prominent in the 1950's the island became a popular destination for recreational fishermen who would often camp at different points on the islands east coast.

There are significant relics from its pastoral history scattered around the island.

Now a National Park (Dirk Hartog Island National Park) the island is host to the reintroduction of many endangered fauna species from the mainland.

Sunday Island Bay provides a protected anchorage for smaller vessels in the event of a cyclone and has a sandy beach shoreline on its northern coastline which fronts Lot 304 offering the opportunity for visitors to relax, swim and appreciate the natural features of Dirk Hartog Island and the Shark Bay World Heritage Property.

Located within a National Park and the Shark Bay World Heritage Property it is essential that any development upon lot 304 deals with the location in a sensitive way to blend with the landscape and integrate with the surrounding environment to ensure design expectations are achieved and possible impacts minimised.

The land use planning and development of lot 304 on Dirk Hartog Island is controlled by the Shire of Shark Bay's Local Planning Scheme No 4 which, under Schedule B – Special Use Zones, designates the lot as within Special Use 14 ('SU14'), the objective of this zone being 'to provide for eco-tourism development'.

SU14 imposes 12 conditions and 6 sub-conditions which are required to be addressed for the planning and, in due course, the development of accommodation units for ecotourism.

Lot 304 Sunday Island Bay remains the only lot yet to achieve planning approval and development.

Three conditions under SU14 which are relevant to these design guidelines are noted and addressed in this document as follows:

- Condition 3(ii) – The proposed development is to be of high architectural quality and be designed to be low scale and sympathetic to the location taking into account topography, physical characteristics and unique character of the surrounding area. (There is no definition of what 'high quality architecture' is or what references it is intended to provide)

- Condition 3(vi) - Detailed design guidelines to control colour, materials, built form, scale, and achieve a development sympathetic to the natural character of the island may be required by the Local Government
- Condition 9 – Any design guidelines that form part of a Local Development Plan approved by the Local Government shall be enforced as if the requirements form part of the Scheme.

The LDP proposed provides for eight building envelopes within which four ninety square metre accommodation units, staff accommodation, refuge and any other buildings required to service the accommodation can be constructed. (*Clause 3(g) Covenants- 'other buildings' means any other building on the land (not comprising an Accommodation Unit) used to provide facilities or services for tourists visiting the Land for the purposes of ecotourism.*

OBJECTIVES

The objectives for establishing Design Guidelines are to provide parameters to be addressed in designing any future accommodation development proposal for lot 304 to ensure it meets the conditions of SU 14 3(ii) achieving high architectural quality, whilst being low scale, factoring in all of the attributes of the surrounding area.

Design guidelines allow broad scope for architectural quality with designs to be proportionally scaled and sympathetic to the location whilst considering topography, physical characteristics, and unique character of the surrounding area.

Addressing coastal processes and fire protection for visitors and staff is an important element when considering all aspects for design and any future development application.

The objective is to achieve architectural quality with proportionally scaled development relative to the topography and landscape while maintaining the isolation and natural setting of the Sunday Island Bay location - reflecting upon the island's pastoral history and ongoing environmental reconstruction without compromising Shark Bay World Heritage or Dirk Hartog Island National Park values.

The built form must

* Take its inspiration from the landscape, which should be symbolised in both colour and texture.

* Maintain a light footprint on its immediate environment by appearing to float above its building line

* Reflect the surroundings it sits upon, through its chosen materials,

* Appear to become partially invisible to the human eye from a distance

2.0 DEFINITIONS

Approved Plans: means plans approved by the Shire of Shark Bay
Façade: means a façade that is visually pleasing
Builder: means the building practitioner undertaking the works
Building: includes a temporary building, any part of a building (except a boundary fence) lighting, power, water supply, drainage and sewerage installation and other attachments to or parts of a building.
Building Envelope means the area of land within which buildings can be constructed, and effluent dispersed in compliance with the Governments Sewerage Policy.
Building Height means the height of any portion of a building vertically above the upper surface of the floor to the top of the roof facia excluding any chimney, plumbing and other fittings.
Building Setback means the distance between the lot boundary and the face of the external wall

facing the boundary - of an accommodation unit
Cluster means each group of accommodation units constructed within a building envelope
Construct: means build, rebuild, reconstruct, erect, re-erect, enlarge and carry out or alter a building
Design Guidelines means these guidelines
Development: means the construction of any building or works on, over or under the lot.
Earthworks: means any alteration of the natural condition or topography of the lot including any alterations to accommodate a building
Land: means the land included within Lot 304
Landscape Vegetation Plan means the plan to be prepared for any DA following approval of the LDP addressing vegetation within APZ's as required by any BMP
Lot: means the land included within Lot 304
Other Buildings: means any other buildings on the land (not comprising an Accommodation Unit) used to provide facilities or services for tourists visiting the Land for the purposes of ecotourism.
Plans and Specifications means development plans submitted to the Shire of Shark Bay
Soil: means all soil and subsoil forming part of the Lot
Staff Accommodation Unit: accommodation provided for the housing of staff personnel required in the operation of the low impact ecotourism business
Topography: means the natural features of the landscape of lot 304
Vegetation: means any tree, shrub and plant including groundcover as described in SPP 3.7 Guidelines.
Visitor Accommodation Unit: means an accommodation unit (whether as a stand-alone structure or a structure containing more than one such unit) suitable for temporary residential occupation by one or more persons.
Visitor Accommodation does not include accommodation for the caretaker or manager of the low impact ecotourism business and his or her family, Staff Accommodation and those areas of any centre lodge facilities that do not comprise bedrooms or other sleeping areas
Works: means construction of a building including but not limited to:

- Fences, screenings, walls, channels, roads and paving not attached to a building and lighting, heating, power, water, drainage, sewerage installations not so attached
- Any alteration of the natural condition or topography of a lot including earthworks
- Boundary fencing

3.0 THEME

The overriding theme for any development is to provide "a reflection on the location's isolation and natural setting embracing the landscape, the land, the sea, the sky and the environment of the location" capturing colour, texture and proportion with design. The symbolism of the islands early past, including Dirk Hartog's landing and its land use as a sheep station are noteworthy inclusions for consideration.

The architectural design should provide for unique visual experiences from each visitor accommodation unit while embracing the theme.

Each cluster of accommodation units within building envelopes are to embrace a common theme between all building envelopes and must be complementary to accommodation clusters in other building envelopes and to the theme.

All buildings must comply with the theme no matter when constructed

4.0 DESIGN PHILOSOPHY

The site of lot 304 consists of a series of stable parabolic thinly vegetated sand dunes. The prevailing wind is variable from the south through to the southwest and southeast: the existing vegetation provides base stability to the land.

The site is remote presenting challenges to the development of ecotourism accommodation that must be respectful of its coastal location.

The palette is the islands natural beauty, hardy vegetation, textures and colours.

The design must:

- respond to visitor needs while providing a rewarding experience
- Integrate appropriate quality architectural design and landscaping within the lot.
- Achieve a positive foreshore interface. (in cooperation with DBCA)
- Achieve fluid vehicle accessibility within the lot
- Address coastal hazard and bushfire risks through site responsive accommodation design and proactive management measures

The built form should be simple, elegant, complementary, interesting and in harmony with the characteristics and colours of the location using the topography and terrain to the best advantage; minimising excavation while maximising visual aspect, orientation, environmental principles and energy efficiency. Designs must integrate built forms with the existing landscape and vegetation.

Proposed accommodation units should provide a visitor experience that stimulates visitors to stay, relax and explore the island and its wilderness surrounds. Accommodation should be generous, practical and efficient allowing visitors a unique eco experience and education.

The architecture must match the eloquence of the landscape and reflect the spectacular World Heritage environment within which it sits.

The existing flora must be respected while managing all vegetation within each APZ in accordance with a vegetation management plan based upon the Planning for Bushfire Guidelines November 2024 (to be prepared as part of each DA following approval of the LDP):

in particular the objective: *"Prioritise the retention of native vegetation for biodiversity conservation, environmental protection and landscape amenity"*

The intention is to maintain the visual character of Sunday Island Bay through considered and thoughtful design. Inappropriate or obtrusive built forms that dominate the landscape or do not respect the unique character of Sunday Island Bay will not be permitted.

Complementary development within and between each building envelope is mandatory.

Energy efficient building design forms a strong link to the topography and geographical location of Sunday Island Bay and must be considered in all designs proposed.
Key principles

- a 'minimalist' response - to the variable topography within Lot 304, whereby the generally level building envelopes on the Local Development Plan have been sited such that alteration of the topography is minimised.

- Enabling the connection of future accommodation units sited in each building envelope respecting the existing landscape whilst being complementary to the topography and natural vegetation between each envelope developed.
- Passive design- that responds to the local climate to maintain a comfortable internal temperature reducing the necessity for air conditioning by incorporating the prevailing breezes, insulation and wide verandas.
- Maintain the connection to nature by including
  i. large windows allowing a visual experience.
  ii. Wide verandas providing for outdoor living and sun protection.
- Connect to the topographical features with low scale designs
- Optimise the orientation of any structure for solar panels
- Provide for rainwater harvesting
- Incorporate greywater re-use where feasible
- Construction materials should be environmentally sustainable, robust and designed to last, to reduce maintenance costs.
- Special attention to fire rated building materials and paints.
- Internal layouts should be easy to navigate and provide good cross ventilation
- Ensure the landscape and future accommodation units operate as an integrated and sustainable system within the broader ecological content
- Ensure that the massing and height of future accommodation is appropriate to the landscape setting and successfully integrates with the character of the location
- Ensure the design optimises safety minimising the risk of personal harm or accident to visitors or staff whilst accommodated within accommodation units

The design concept is to not only touch the earth lightly but to take its inspiration from the landscape and to recede into that landscape with any development proposal being proportional to and embracive of the topography, so that the physical presence of development takes account of the surrounding landscape to appear to become partially invisible to the human eye from a distance.

Consistency in design between each building envelope, irrespective of the stage of development ensures development within building envelopes is complementary.

These guidelines are mandatory for development application within each building envelope in accordance with the proposed Local Development Plan pursuant to its approval by the Shire of Shark Bay.

General principles:

Future development must:

- "Tread lightly on the earth".
- take account of the Environmental Report, Management Plan and BMP.
- have regard to possible physical impacts to the site and its landscape.
- Consider and address possible visual impacts to the site and surrounding landscape.
- Development in each building envelope is to be complementary
- consider conservation and sustainability.
- minimise any necessity for digging or dust creation.
- maximise visual aspect from accommodation units.
- ensure designs integrate and blend the built form with the proportions of the landscape and topography of the site.
- provide for consistent architectural design appropriate to the scale, form, colour, and texture including being at a scale proportional to the landscape and topography.
- allow for a shelter to be built to refuge standards in each building envelope, in conformity with any Bushfire Management Plan, providing high architectural quality, complementing

and conforming with the theme, blending with the topography and terrain to the best advantage.

- include Shark Bay World Heritage Advisory Committee colour palette for Dirk Hartog Island
- provide for energy efficient building design to achieve a high energy star rating embracing low energy and renewable principles.
- particular attention to minimising risks from possible fire events
- include the use of fire-resistant building materials and paints wherever possible.
- prevent inappropriate or obtrusive out-of-character-built form that could dominate the landscape or not respect the unique character of the island.
- provide for development to be staged allowing for ongoing review.
- Provision of ATU or composting options
- Provision of solar and/or wind power

Whilst future development plans and detailed proposals would follow on from the approval of the LDP, the Design Guidelines are required to be followed for any Development Application (DA).

5.0 DESIGN CONSIDERATIONS

In keeping with the design philosophy and principles outlined above, the following conditions would apply to any future development proposal:

- Accommodation to be designed to provide a relaxed coastal beach atmosphere to blend in seamlessly with the environment of the terrain and vegetation of the site, providing context to the area with proportional scale, profile and bulk.
- Accommodation to provide for a visual experience for visitors encouraging longer stays.
- Integration of landscape and architectural design
- Positive interface with the foreshore in cooperation with DBCA.
- Address coastal hazards and bushfire risks through site responsive building design
- Accommodation to be designed to include a dining/kitchen/lounge area to provide a hub for activities augmented by a covered outdoor area to allow visitors to enjoy the atmosphere created and view the bay in an outdoor setting.
- Accommodation to include the following criteria for best practice eco-tourism design and construction as adapted for the conditions at Sunday Island Bay:
    a. Complementary and proportional to the topography and natural environment of the site
    b. Complementary between each building envelope
    c. Designed to stand strong and to stay cool with high thermal performance and energy star rating.
    d. Low impact to the land both visually and physically in its build
    e. Windows allowing visual appreciation of nature, the landscape, surrounding ocean and sky wherever possible.
    f. Covered verandas providing protection and encouraging the outdoor appreciation of the eco- qualities of the location and surrounding land, sea, and sky.
    g. Minimal levelling or fill to the site where possible; any levelling required due to terrain conditions to, in the main, be achieved using adjustable steel supports secured by eco anchors or similar solutions that limit the creation of dust or site disturbance.

6.0 BUILT FORM

An emphasis on traditional materials that are appropriate to the environment, readily transportable, buildable and maintainable to be considered in all designs. Local materials including shell grit may be considered in the architectural and landscape themes.

All proposed building is to be designed in accordance with the minimum prescriptive requirements of codes and standards for cyclonic regional and coastal built forms

The built form including the height of any development must be appropriate to the setting such that any development is proportional to the landscape of its location and responds positively to the topography, views, vistas, and landforms - nestling into the landscape of the site with minimal, if any, impact.

- Low Visual Impact not imposing on the landscape and scenery of the site but with glazing allowing comprehensive views of the land, sea, and sky allowing visitors to engage with and enjoy an environmental experience. The siting of accommodation units to be sustainable and to not negatively impact on the landscape when viewed from near or afar.
- Low Physical Impact with minimal footprint - using innovative Eco Anchor or similar solutions resulting in minimal construction waste, dust creation and interference to the natural terrain:
- Scale, Mass, and Height – accommodation development must be proportional, embrace and respond positively to the topography of the site and its landscape in each of these elements.
- Fast Installation - can be erected in a minimum time frame and/or delivered to the site in kit or finished form.
- Thermal Efficient - providing high thermal efficiency and rating using lightweight structural panels or similar solutions.
- Relocation - Capable of translocation if required with minimum disturbance to the site.
- Fully Galvanised Structural Steel System preferred - ensuring extended life.
- Fire Resistant Building Materials and paints wherever possible- reducing the risk of fire and increasing safety outcomes for visitors and staff accommodation units.
- Environmentally Friendly – not harmful to the environment. Resource-efficient throughout its life cycle, throughout the processes of design, construction, operation, maintenance, renovation, and eventual demolition or relocation.
- Veranda's - providing protection from the sun but allowing interaction with the land, the sea and the sky.
- Services- fully integrated with no detrimental effect to the appearance, functionality, and serviceability of each accommodation unit.
- Eco Decks using high quality product requiring minimum maintenance.
- Colour Palette - Based upon the SBWHAC Dirk Hartog Island colour palette.
- Maintenance – build to be resilient to wear and tear and easily maintainable despite exposure to the severe elements of salt, wind, and sun.
- Power – based upon renewables with battery backup.
- Textures – reflecting the isolation and natural qualities of the site.
- Layout - encourage appreciation of the ecological values of its external surrounding landscape including the land, sky, and ocean.

- Refuge Standard – a separate staff/shelter/store/visitor services unit in each cluster to be constructed to refuge standard.
- Clusters – each accommodation cluster within building envelopes to be complementary and not in conflict with other accommodation clusters.

7.0 PLANNING

7.1 Building Envelopes

Each building envelope is generally level predominately for single story units - with the exception of the incorporation of a split level where it is dictated by the topography and prudent by its design and has been assessed regarding its potential for the construction of accommodation units including the natural features and topography, access to views, accessibility, existing and protected species of vegetation.

Setbacks, vegetation, level and height have been considered when designating each building envelope.

7.2 Site Planning

* Each accommodation unit cluster is to be contained within its building envelope taking advantage of the natural features, views, solar aspects and prevailing winds

* Retaining existing native vegetation is a high priority

* Strict adherence to setback is mandatory

* Accommodation units with heights, shapes, materials and colours that do not blend into the contours and landscape or meet design guidelines are unacceptable

7.3 Visual Quality

The vision for the Sunday Island Bay accommodation units is to be of a high standard of architectural design that reflects on the site's isolation and natural location.

* All accommodation units must be complementary and not in conflict with the environment of the location. Designs need to respond to and be respectful of the surrounding environment

* The key guiding principle is minimalist – the minimum alteration to the existing terrain.

* Environmental considerations are foremost in the design formulation and should take into consideration the natural vegetation on the site.

* Design should embrace the predominant natural features of the site and the characteristics of the surrounding vegetation and topography

* Accommodation units must consider the characteristics of mass and proportion, roof form and pitch, façade articulation and detailing, window and door proportions, verandas, eaves and parapets and building materials, patterns, textures and colours

* Accommodation units must respect and maintain the existing landscape character of Sunday Island Bay

* Accommodation units that do not take account of the surrounding environment or that are bulky, dominant and overpowering will not be accepted

7.4 Building Bulk and Style

The generally level building envelopes are located in a naturally undulating landscape with variable slopes. Lightweight construction materials are better suited to the coastal character and variable terrain of the location.

- Prefabricated units offer the opportunity of immediate finish but include challenges of logistics required to access the site
- the bulk of accommodation units needs to be considered in relation to the size of the site and the proximity of each building envelope and the landscape.
- The design of accommodation units should involve the use of innovative design solutions to minimise building bulk and visual obtrusiveness
- Large and bulky accommodation units with large and dominating roof forms are not acceptable.

7.5 Climate, Aspect and Energy Efficiency

All accommodation units are to include environmentally sustainable architectural design principles; measures that are easily incorporated into the design stage with the opportunity to create future cost savings and environmental advantages

- Orientation, windows and construction materials can reduce energy costs
- Screen the sun to harness cooling breezes in summer to limit the requirement for mechanical heating or cooling
- Size eaves and veranda roofs to block the high angle of summer sun
- Design roofs to provide sufficient area, pitch and orientation for solar panels
- Insulate roofs, ceilings and walls

7.6 Height Controls

The elevation at the highest point of the roof structure must not exceed the height limit as determined by the building envelope as measured above the Finished Floor Level (FFL). The maximum height will be 4.85 metres above the upper surface of the finished floor.

8.0 ACCOMMODATION DESIGN DETAILS

8.1 External Appearance

The natural landforms must be used in the architectural design of accommodation units, using the backdrop of undulating topography to best advantage, maximising views and minimising the visual impact of the built form on the environment.
Materials of a more natural and subdued tone complying with the SBWHC colour palette to create a coherent and unified environment that reflects the colours and textures of the surroundings are essential

- The design elements of the accommodation units must be compatible with and complementary to each other and sympathetic to the environment
- Architectural exterior treatments must be consistent in each building envelope
- Materials used for accommodation units must be compatible with and complementary to each other and to the overall design in style, texture, colour and character. Materials should be complementary to the sand dune environment of the site
- Exterior building colours must harmonise and blend with the colours of the locations environment and surrounding National Park and not contrast with the natural setting. Colours of exterior materials must comply with the SBWHC colour palette
- Exterior materials with a high gloss or glare finish are generally not acceptable with the exception of Solar Panels, which shall be shielded out of the general view, and any other material which is deemed

necessary to complement the design and, in the circumstance, it is allowed, is only used sparingly to the satisfaction of the Superintendent of Works

- Verandas and decks must be an integral part of an accommodation unit to provide shadow lines and the appearance of depth to facades

8.2 Roofs

It is important to consider roof design both in terms of style, pitch, materials and colour selected. Simple forms are encouraged.

- Overhangs will ensure adequate solar control and weatherproofing
- Roofs must maintain as low a profile wherever possible and be clad in non-glossy materials in colours that match with the SBWHC colour palette (excluding solar panels).
- Roof pitch must be consistent in all building envelopes with a maximum pitch of 20 degrees or less
- Roof materials are limited to metal deck and custom orb with an approved Colourbond finish
- Sheet metal work must be kept clean and simple with a minimum of exposed metal and be painted in accord with the SBWHC colour palette
- Solar equipment must integrate with the structure

8.3 Windows & Doors & Details

The proportions, style and materials (aluminium or timber) of windows and doors to exterior walls must be consistent with the architectural theme of the building

- Exterior doors must be complementary to the overall design of the accommodation units
- Exterior trims and detailing must be consistent within all building envelopes
- Columns must be proportionate to other design elements and complementary to the overall architecture

8.4 Other Buildings

Any buildings including staff accommodation and combined storage, and solar infrastructure buildings must comply with the design guidelines

8.5 Foundations and Footings

*To be read in conjunction with **Section 10.0 General Design Guidelines Detail Clause XX. Foundations & Footings***

Generally, any foundations/footings are to be provided using sure foot or similar technology to limit impact and reduce the risk of dune destabilisation. Sure-foot footings and similar solutions reduce the risk of dust creation and ground destabilisation requiring no excavation or ground disturbance for their installation.

In those circumstances that sure-foot technology is not achievable, minimal concrete footings will be allowed in such circumstances provided that it is used sparingly in a minimal length to the satisfaction of the Superintendent of Works, with appropriate dust abatement measures undertaken.

8.6 Garages, carports and outbuildings

Garages, carports and outbuildings must comply with design guidelines and any BMP requirements.

8.7 Service Pipes, Solar, Air-conditioning, Rainwater Tanks, Service Areas

- Service pipes must be taken to ground and concealed from view
- Any visible piping must be painted to match adjoining surfaces
- Hot water services and air-conditioning compressor units or any visible equipment must be screened
- Rainwater tanks to be appropriately located out of sight adjacent to accommodation units

- The location and pitch of solar panels located upon roofs must match the roof pitch
- Roof mounted air-conditioning or evaporative air conditioning units are not acceptable
- An enclosed and screened area is to be provided behind each cluster of accommodation units for the storage of waste prior to removal by visitors

8.8 Service and Utility Areas

Service and utility areas are to be restricted to areas behind accommodation units

9.0 LANDSCAPING

* A key element of the Sunday Island Bay accommodation project is the recognition of elements of the indigenous landscape as a consistent overlay that will harmonise the total development of all building envelopes into a unified theme:
* a key principle at Sunday Island Bay is minimal alteration to the existing terrain and management of vegetation within building envelopes and APZ areas minimised in line with a bushfire management plan and landscape vegetation plan.
* a landscape vegetation plan prepared following approval of the LDP will be prepared to detail vegetation management for each building envelope and APZ area as development applications are submitted.
* The design of each accommodation cluster must complement and not detract from the retention of the existing native vegetation.

9.1 Design Philosophy

Minimise vegetation management and retain existing vegetation in line with a landscape vegetation plan

9.2 General Landscape Concepts

Wherever possible keep the existing vegetation intact complying with a landscape vegetation plan as encouraged in SPP 3.7 Planning for Bushfire Guidelines November 2024 .

9.3 Existing Vegetation

Maintain and protect the existing vegetation on the site wherever possible

9.4 Stormwater

Stormwater to be retained within building envelopes

9.5 Planting

Any planting or replanting only to be indigenous plants from Dirk Hartog or as approved in cooperation with DBCA

9.6 Fencing and Screening

Fencing of areas of the site to protect existing vegetation and to manage visitors is permitted. Clearing per se must be avoided wherever possible

9.7 External Lighting

Any external lighting must be directed downwards

9.8 Bushfire

Preferred painting options – Inclusion of Fire coat Paints – or similar fire-retardant paints (see appendices)

Preferred building material options – Inclusion of Fire Crunch cladding products – or similar

nonflammable products for walls, ceilings, decks, floors and fences. (see appendices)

10.0 GENERAL DESIGN GUIDELINE DETAILS

The following list of Design Guideline details and specifications are to be addressed in any architectural designs proposed and submitted for accommodation unit approval. These will be applied in addition to, and complimentary to design objectives covered in earlier sections of this document.
Guidelines details are listed in alphabetical order.
All plans, elevations and sectional drawings must clearly show the defined 'building envelope'.
All structures must be within the defined 'building envelope'.
Development in each building envelope must be consistent and complementary to development in other building envelopes.

i. Additions or External Alterations:
Any additions, extensions, alterations, or renovations to comply with the design guidelines including changes to accommodation units, solar panels, solar hot water panels, air condition units, colour changes to external surfaces, decking or paving, extensions, enclosures, and screenings.

ii. Accommodation Details:
The natural landforms to be used in the location of accommodation units within envelopes being proportional to and using the topography to best advantage whilst maximising views and minimising visual impact of built form on the landscape.
Accommodation units:

- profile and elevations to be proportional to their location on site.
- to include extensive glazing to embrace the unique outdoor vista
- to include large undercover verandas embracing outdoor activities
- to allow for extended steel foundations to adapt to topography.
- to allow for storage/service/staff buildings to be included and integrated.
- to comply with requirements included in any approved BMP.
- materials used for accommodation clusters in all building envelopes to be compatible with and complementary to the overall design in style, texture, colour, and character.
- exterior materials with a high gloss or glare finish are generally not acceptable, notwithstanding the conditions of exception as described in Section 8.1 External Appearance: Para 1 – Dot point 5
- verandas and decks to be an integral part of accommodation clusters.
- Accommodation units to embrace the landscape and take account of the topography.
- Bulk of accommodation clusters to be considered in relation to the landscape and topography.

iii. Airconditioning
roof mounted air conditioners or roof mounted evaporative air conditioners not permitted. Air conditioners must be located out of sight.

iv. Ancillary Buildings:
Any outbuildings located within a building envelope to be complementary with accommodation clusters within the envelope.

v. Architectural details:
Architectural exterior treatments to be consistent around the entire development on all envelopes.

vi. ATU-Wastewater Systems
ATU's or like be included. (see composting)

vii. Bin Enclosures:

Bin enclosure to be integrated with the rear of accommodation and out of sight.

viii. Bulk:

Lot 304 is set in a natural undulating landscape varying between gentle and steeply sloping land at various section within the lot in line with its sand dune environment. Accommodation bulk to be proportional to the topography, landscape, and its location on site and within building envelopes.

- building bulk to be relative to the location

viv. Colours

Exterior building colours to be extracted from the SBWHAC palette of colours for Dirk Hartog Island to blend with the colours of the site's environment and surroundings.

x. Common Elements

Each cluster of accommodation units is to be complementary with common elements including roof, window, and veranda design.

xi. Composting Toilets

or similar option to be provided for (see ATU)

xii. Construction Procedures

All construction material brought onto the site to comply with the requirements included within the DHI Biosecurity Implementation Plan (2015)(Appendix 23). Any vehicle brought to the site to comply with Biosecurity requirements of the DHIBIP. Any approved temporary access to each envelope across the National Park to only be by using raised ramps at access points to be agreed with DBCA.

Any construction vehicles to only use approved tracks. Works are permitted at any times suitable to contractors. Construction waste to be removed from the site as soon as transport is available. Construction waste to be maintained in neat order prior to removal. All waste generated to be contained and not moveable by natural elements.

xiii. Containers

Shipping containers permitted for accommodation units when finished off to a high architectural quality and complying with design guidelines.

xiv. Design

- the architectural design elements in each building envelope must be compatible and complementary to each other envelope developed and sympathetic to the environment.
- Architectural exterior treatments must be consistent around each development within envelopes.

xv. Drainage

All water generated within the building envelope from structures must be captured and stored within the site

xvi. Elevations

Each accommodation cluster should provide some reference to the existing homestead accommodation and be proportional in their topographical location on site.

xvii. Energy Efficiency:

- Accommodation units to be sited within building envelopes and designed to benefit from natural light and prevailing winds.
- Solar panels can be located upon accommodation roofs or appropriately to the rear of the site out of view.
- Energy efficient accommodation design, which takes account of terrain and cooling breezes to be adopted to achieve high energy star rating.
- The orientation of accommodation with large undercover decks and extensive glazing with doors and windows to accept cooling south westerly winds to be considered in designs for accommodation units:
- materials to embrace low energy and renewable principles.

xviii. Erosion Control:

Each building envelope to be protected from erosion during and after construction.

xvix. Excavation/Clearing:

Excavation or clearing including levelling and fill - apart from that necessary for the installations of services - is to be minimised and avoided wherever possible.

xx. Foundations, Footings:

- Steel foundations and supports to be of lowest profile above ground.
- Extended steel foundations related to topography permitted.
- Steel foundations to be anchored by non-invasive eco anchors, screw piles or similar solutions.
- Concrete foundations permitted where essential to the structure.

xxi. Fencing/Screening:

- No permanent fencing to the site unless deemed essential for visitor safety and management
- Fencing to control movement within the site or for protection of vegetation permitted.
- Screening of services permitted.
- Clothes drying areas to be out of sight
- Clearing of vegetation is to be avoided wherever possible.

xxii. Features

- Each accommodation cluster should provide some reference to the existing homestead build and be complementary with:
- Wide covered verandas.
- Extensive glazing.
- Custom orb or similar roofing

xxiii. FFL

- Minimum finished floor level 4.2m AHD

xxiv. Future Development:

- Accommodation units at whatever stage constructed to be in conformity with the design guidelines.
- Communal buildings complying with design guidelines can be considered within building envelopes.
- Separate but integrated reception area complying with design guidelines permitted.

- Pagodas/gazebos can be considered outside of building envelopes complying with design guidelines.

xxv. Garages, Gazebos, Patios, Pergolas Carports and Outbuildings:

- Garages/carports for sun and salt protection may be approved, appropriately placed to the rear of accommodation units and integrated with or - separated and located in accordance with BMP requirements.
- Separate store outbuilding located behind or adjacent to and/or integrated with accommodation connected to clusters meeting design guidelines permitted. (BMP)
- Large and visually obtrusive sheds not permitted within the eight building envelopes for accommodation units.
- Gazebos, patios/pergolas may be approved.
- Outbuildings for storage beyond sight to the north of the lot may be considered

xxvi. Height Controls:

- Height of buildings is restricted to 4.85m as measured from the upper surface of the floor to the top of any roof fascia
- Height to be balanced with the topography blending with the surrounding landscape.

xxvii. Landscaping:

A key principle at Sunday Island Bay is minimal alteration to the existing terrain with vegetation management in accordance with regulatory requirements. Accommodation units and landscape to operate as an integrated sustainable system related to the ecological context of each envelope. Any required vegetation management related to any approved BMP shall be in accordance with the BMP and a landscape vegetation plan that is to accompany each development application.

Planning for Bushfire Guidelines November 2024 Section 8.2.2 states that:
"An APZ should not be seen as an area entirely cleared, but as a strategically designed space that considers how existing and future mature vegetation, and combustible features interact with and affect the buildings resilience to bushfire."

Any vegetation management is to have regard to SPP3.7 and the associated guidelines for planning in bushfire prone areas version dated November 2024. Lawned areas permitted if part of a landscape vegetation plan.
Any minor structures or infrastructure outside the defined building envelopes shall integrate with the natural landscape using appropriate materials and colours to respect the visual landscape character of the site.

xxviii. Lighting & Power:

Exterior lighting to be directed downward, recessed, or shielded so that the light source is not visible from the bay to the front of Lot 304. All externally mounted lighting fixtures to be sympathetic to the architectural theme of the accommodation and not cause disruption to nocturnal or breeding animals. Energy efficient lighting recommended.
Power to be provided using renewable technology including solar and wind.

xxix. Mass and proportions

Accommodation design to consider:

- The external mass of each accommodation unit/cluster is to be proportional to the topography and its location in the landscape.
- Accommodation units to embrace the landscape.
- Roof form and pitch to be complementary to landscape.

- Window and door proportions - Providing for unrestricted views.
- Verandas and decking - To be wide and open providing unrestricted views.
- Building materials to be lightweight to allow for above ground construction using eco anchors or similar solutions and fire-resistant materials.

xxx. Materials

- Materials of a more natural and subdued tone preferred to create a coherent and unified environment in each building envelope reflective of the SBWHAC colour palette.
- Other materials can be used provided they meet the design philosophy.

xxxi. Office/Reception

Office and reception area permitted to be included within managers/staff accommodation.

xxxii. Outdoor Visitor Areas / Non-Accommodation Buildings/Pergola's/Patios

- Outdoor visitor areas and non-accommodation buildings are permitted on the site.
- Pergolas and Patios permitted on site.

xxxiii. Painting

- All undercoat painting to include the use of Firecoat paint a fully accredited fire-retardant paint to add an extra layer of fire protection. *(Appendix 1)*

xxxiv. Paths, Paving, Pedestrian links

Track or pedestrian paths may be surfaced with limestone grounds, shell grit from an approved source or other approved non-combustible materials including raised construction should that be decided upon.

Pedestrian links may be approved between building envelopes and to the front boundary track/pedestrian access.

Clearing of indigenous vegetation is to be avoided and minimised wherever possible

xxxv. Prefabrication

Accommodation units, constructed to finish off site, permitted

xxxvi. Quality:

- Highest quality build using durable materials, high quality paints and finishes that can meet the climatic conditions and easy to maintain.

  High architectural quality designed to be stylish, complementary, and harmonious with the surrounding landscape taking account of topography and unique character of the surrounding area.

xxxvii. Roofs:

Roofs to be adaptable and complementary to the topography on the site:

- Roof Pitch variable maximum of 20 degrees
- Must maintain as low a profile as possible.
- Flat or Skillion preferred to reduce roof exposure.
- Roofs to be clad in non-glossy materials in colours that meet the SBWHAC colour palate blending with the adjacent natural hues.
- Roof materials preferred- custom orb, or Trim Dek for flat pitched roofs.
- Roof top Solar panels to integrate with the structure permitted.
- Insulated roofs
- Gutters to trap water
- Roof not to be the dominant feature.

xxxviii. Scale:

Visually the scale is to be low with each accommodation cluster to be complimentary, to positively blend with the topographical landscape and be appropriate for the setting and the scale to be proportionate to the landscape.

xxxix. Services:

- Building envelopes to be independent for power with remote screened or roof mounted solar panels.
- cross gridding for power permitted between envelopes.
- each envelope to provide for common ATU units for effluent treatment or an approved alternative.

xl. Service Pipes, Solar Panels, PV Cells, Air-conditioning Equipment and Wind Turbines

- Service pipes (water, sewer, stormwater) to be taken to ground level and concealed from view. Any visible piping to be painted to match adjoining surfaces or concealed from view by screening applied to the underside and perimeter of accommodation units.
- Hot water services and air conditioning compressors units to be located to the rear of any accommodation units- not visible from the ocean side. Any external equipment to be screened or positioned so as not to be visible.
- Solar panels to be located on roofs at the same pitch as those roofs or to the rear of lot out of view.
- Visible roof mounted evaporative and other roof mounted air conditioners not permitted.

xli. Service and Utility Areas:

- Separate integrated store to provide for operational elements of a solar system and battery location together with other servicing needs permitted.
- Enclosed area integrated within each building envelope for garbage and recyclables prior to removal by visitors permitted.
- Manager's accommodation permitted to serve as a reception/office for visitors to the site.
- Separate visitor outdoor viewing areas permitted.
- Clothes may only be dried behind accommodation units.

xlii. Shipping Containers

May be approved for temporary storage and accommodation during construction phase and for short-term accommodation if meeting design guidelines.

xliii. Site Conduct

Builders and sub-contractors:

- to be inducted regarding biosecurity matters and foreshore access restrictions by the project manager.
- to comply with occupational health and safety obligations whilst on the site
- to take all necessary precautions for the safety of persons, materials, and equipment on the site
- To maintain the site in a neat and clean condition and remove waste as it is generated.
- To remove all equipment and materials and supplies not required once a stage of works is completed.
- To ensure any equipment not required for daily use is stored neatly at one location on site.
- To maintain daily any necessity to control dust or sand on the site.
- No vegetation to be removed from the site without approvals.
- No dogs permitted except for guide dogs.

xliv. Solar Panels

Approved for rooftop or remote out of sight locations.

xlv. Storage

- Storage buildings integrated or remote and complying with design guidelines permitted in each building envelope.
- Storage buildings to incorporate the same architectural style of the accommodation.

xlvi. Style

Each accommodation cluster is to portray an architectural style that best reflects the unique landscape, the natural beauty, topography and conditions that represents "Life on Dirk Hartog Island" as expressed in Section 3.0 – THEME. Each cluster must be complimentary.

xlvii. Stormwater:

Stormwater to be captured and stored on site in rainwater tanks.

xlviii. Swimming Pool/ Plunge Pool

Swimming/Plunge Pools permitted

xlix. Theme

A consistent and common theme for all development within building envelopes is to be provided for in any DA

L. Tracks, Pedestrian Paths, and Parking:

Access tracks and pedestrian paths to be unformed and in their natural state to maintain the integrity of the location. Clearing of indigenous vegetation is to be minimised or avoided wherever possible

Shell grit or limestone grounds from approved sources may be applied to tracks and paths. Raised paths constructed out of suitable materials may be approved.

Li. Topography:

Minimal or no cut, fill or levelling of the site to enable retention and maintenance of the natural topography of the site and its ecosystems. Construction techniques to include non-invasive eco anchor or similar foundations to ensure that possible erosion of sand dunes is mitigated.

Lii. Vegetation:

A landscape vegetation plan is to be prepared at the DA stage addressing vegetation management for APZ areas encompassing building envelopes. This plan is to be followed regarding any vegetation management required by a BMP. Areas beyond building envelopes include substantial areas of the site remaining in its natural form with large areas, excluding essential infrastructure, undeveloped and on-site vegetation respected while being managed to meet any regulatory requirements.

- Retention of existing native vegetation is a high priority
- The design of accommodation units to complement and not detract from the retention of existing native vegetation.
- No introduced nonnative species shall be planted on the lot.
- Any revegetation shall not occur in conflict with the recommendations of any BMP and vegetation management plan approved by the Shire of Shark Bay

Liii. Verandas

- Wide covered verandas to screen the sun, capture cooling breezes and provide protection from rain encouraged for all accommodation units.

- Verandas and decks must be an integral part of accommodation units providing the appearance of depth.

Liv. Visual:

Accommodation units to be complimentary to each other and not in conflict with the environment of the location; accommodation units need to respond and be respectful of the surrounding and unique environment of Dirk Hartog Island and the World Heritage listed location.

Lv. Walkways

- Walkways from and on the site towards the beachfront are permitted subject to DBCA approval.
- Walkways and managed pedestrian links between envelopes are permitted.

Lvi Waste Storage

Provision for an enclosed area behind each cluster of accommodation units for waste assembly

Lvii. Water Tanks

Water tanks permitted to be located out of sight to the rear or side of accommodation units or out of sight at suitable locations within the lot.

Lviii. Windows and Doors:

- Extensive window glazing complying with cyclone requirements.
- Double glazing or laminated glazing recommended.
- Windows and doors located to capture cooling breezes and provide unrestricted viewing.
- The proportion and style of windows and doors to external walls to be consistent in all envelopes

Lviv. Wind Turbines

Wind turbines permitted within building envelopes appropriately located minimizing possible impact to the visual landscape

The Appendices include supporting documents referred to in the LDP documentation. They should be referred to when reviewing any information in this regard

Local Development Plan
APPENDICES
Supporting Report C

Lot 304 Sunday Island Bay
Dirk Hartog Island
February 2025

DHI Development Pty Ltd
PO Box 107 NORTH FREMANTLE 6159

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APPENDIX 1

WATER QUALITY REPORT 2 WELLS

Appendix 1: Water Quality Two Wells

ARL Analytical Reference Laboratory

ARL Group
Proudly Western Australian

ProMicro Science with Ethics

LABORATORY REPORT

GJ Ward
ARL Job No: 18-13713 *Revision: 00* *Date:* 4 October 2018

Potable Water Suite Sample No: Sample Description: Sample Date:	LOR	UNITS	18-13713-3 2 Wells 13/09/2018
pH	0.1	pH units	7.8
Alkalinity	5	mgCaCO3/L	250
Conductivity	0.01	mS/cm	0.75
Total Dissolved Solids	5	mg/L	360
Total Suspended Solids	5	mg/L	16
Hardness	5	mgCaCO3/L	250
Turbidity	0.1	NTU	3.2
Chloride	5	mg/L	94
Sulfate	1	mg/L	6
Nitrite-N	0.01	mg/L	<0.01
Nitrate-N	0.01	mg/L	0.06
Colour	5	PCU	64
Sodium - Dissolved	0.1	mg/L	43
Potassium - Dissolved	0.1	mg/L	11
Calcium - Dissolved	0.1	mg/L	69
Magnesium - Dissolved	0.1	mg/L	19
Aluminium - Total	0.1	mg/L	<0.1
Cadmium - Total	0.002	mg/L	<0.002
Nickel - Total	0.01	mg/L	<0.01
Iron - Total	0.01	mg/L	0.08
Lead - Total	0.01	mg/L	0.02
Copper - Total	0.01	mg/L	<0.01
Zinc - Total	0.01	mg/L	0.07

ARL GROUP
46-48 Banksia Road, Welshpool, Western Australia 6106
Telephone: 08 6253 4444 Facsimile: 08 6253 4440 www.arlgroup.com.au

Appendix 2

DBCA CORRESPONDENCE

Appendix 2: DBCA Correspondence

Government of Western Australia
Department of Environment and Conservation

Your ref:
Our ref:
Enquiries: Mr J Sharp
Phone: 9442 0325
Fax: 9386 7112
Email: sharon.bell@dec.wa.gov.au

Mr Geoff Wardle
PO Box 107
NORTH FREMANTLE WA 6159

Dear Geoff

SUNDAY ISLAND BAY LOT 304 AND OTHER MATTERS

I am writing in response to your letter of 3 December 2010 and subsequent email dated 2 March 2011 regarding access to Lot 304 at Sunday Island Bay. I have also provided information regarding access to the leasehold block at Cape Levillain which has been discussed previously.

The department's Shark Bay District Manager, Brett Fitzgerald has briefed me regarding the site visit that he undertook with yourself, Recreation and Landscape Coordinator, Tracy Churchill and Peter Berryman at Sunday Island Bay on 15 February 2011.

To confirm the outcomes of that meeting with regard to access to Lot 304;

1. A proposal to provide a new road access through Dirk Hartog Island National Park from the existing Sunday Island Bay access track to the south-western corner of Lot 304, as per the attached plan, has been submitted to the Conservation Commission of Western Australia for consideration. The Commission considered the proposal on 14 March 2011. The track will be of a simple standard similar to the existing Sunday Island Bay track, ie a single lane track established on the existing substrate without any addition of bulk raw materials such as gravel.

2. The matter of temporary access at various points from the Shark Bay Marine Park to the southern boundary of Lot 304 will be considered once a formal development proposal is prepared and the need for that access is demonstrated. Indicative locations of temporary access have been identified on the attached plan. Formal approval for temporary access will be contingent on these indicative alignments being marked in the field and agreement on a method of protection for the vegetation and landforms to be crossed by that temporary access from vehicle traction impact. The temporary 'bridging structures' would need to be constructed to prevent permanent damage to vegetation and ground surfaces and will need to be removed after the transport of construction materials for a specified phase of development is completed.

3. Pedestrian access from Lot 304 through the national park on an appropriate alignment can be approved and the specific alignment of those pedestrian access routes marked by an appropriate method. Pedestrian access would include access from the eastern end of Lot 304 to the proposed jetty discussed by you with the department previously. As confirmed in your letter of 3 December, boardwalk facilities would only be constructed on Lot 304 and end at the freehold boundary.

4. A formal proposal for a jetty structure would need to be provided for consideration by the department and endorsement by the Marine Parks and Reserves Authority.

DIRECTOR GENERAL AND ENVIRONMENTAL SERVICES DIVISIONS: The Atrium, 168 St Georges Terrace, Perth, Western Australia 6000
Phone: (08) 6467 5000 Fax: (08) 6467 5562 TTY: 1800 555 630
PARKS AND CONSERVATION SERVICES DIVISIONS: Executive: Corner of Australia II Drive and Hackett Drive Crawley, Western Australia 6009
Phone: (08) 9442 0300 Fax: (08) 9386 1578 Operations: 17 Dick Perry Avenue, Technology Park Kensington, Western Australia 6151
POSTAL ADDRESS FOR ALL DIVISIONS: Locked Bag 104, Bentley Delivery Centre, Western Australia 6983
www.dec.wa.gov.au
wa.gov.au

5. Access to the leasehold block near Cape Levillain will need to be confirmed onground. Brett Fitzgerald has confirmed that the access from the existing track to the east of the leasehold block to the north western corner of the leasehold block would appear to be the most sensible approximate location of that access track. Section 3.65 of the lease agreement states; *"The lessee must establish and maintain a track from the Leased Premises to the track through the National Pak between Sammy's Well and Turtle Bay Beach, at the lessee's expense. The location and condition of the access track is to the Lessor's specifications."* Departmental staff will mark the alignment of that track and provide a map of the alignment and the specification of the track condition for your reference.

I will write to you again once the Conservation Commission has advised the department of the outcome of their recent meeting regarding the proposal put forward for permanent road access to Lot 304.

Yours sincerely

Jim Sharp
DEPUTY DIRECTOR GENERAL PARKS AND CONSERVATION

16 March 2011

Att

From: Nicholas Detchon [mailto:nicholas.detchon@dbca.wa.gov.au]
Sent: Tuesday, 3 March 2020 10:27 AM
To: liz <liz@tpiplanning.com.au>
Cc: Michael Willcock <Michael@tbbplanning.com.au>; Allison Donovan <allison.donovan@dbca.wa.gov.au>; GERA-419-GeraldtonRecords <geraldtonrecords@dbca.wa.gov.au>; Steve Nicholson <steve.nicholson@dbca.wa.gov.au>; Gavan Mullan <gavan.mullan@dbca.wa.gov.au>
Subject: RE: Seek preliminary advice on access for Local Development Plan - Lot 304 Sunday Island Bay

Hi Liz, I have been in contact with Michael Willcock from TBB (CC'd here) who has also sought clarification regarding DBCA's expectations for access between freehold Lot 304 and the beach, through Dirk Hartog Island National Park (DHINP). With a view to providing some clarity regarding this issue to both your and Michaels' enquires, below is a summary of the key points.

I attach here several documents relating to this issue with relevant sections relating to access highlighted.

- Letter from Jim Sharp to Geoff Wardle dated 16 March 2011
- Letter from Brett Fitzgerald to Geoff Wardle dated 29 August 2013
- Public advice from the EPA concerning proposed short stay units dated 30 March 2015.

DBCA expects that the final development proposal, Local Development Plan and supporting documents relating to access will be consistent with recommendations and requirements outlined in these letters.

Construction access

The access tracks identified in the 16 March 2011 letter were regarding temporary access to Lot 304 to allow for construction purposes. The construction access track alignments were indicative only and were not intended to provide for ongoing pedestrian access.

In order to finalise these temporary construction access tracks, DBCA require:

- Development of a formal development proposal.
- The need for development of each construction access track to be demonstrated (e.g. if developing only seven units, only one access track may be needed).
- A method of protecting vegetation and the ground surface along the access track alignment from damage (e.g. development of temporary bridging structures) should be detailed and agreed to by DBCA. Temporary bridging structures should be removed after construction is completed.
- The proposed track alignments should be marked in the field to allow assessment by DBCA on-site.
- Disturbance activities on DBCA managed lands, including development of temporary construction access, will require the proponent to progress approval through DBCAs Online Disturbance Approval System (DAS). Information about the DAS is available at https://www.dpaw.wa.gov.au/management.

DBCA anticipate the exact location of required construction access tracks will be finalised following receipt of development approval of Lot 304. The inclusion of proposed temporary construction access tracks in the Local Development Plan (LDP) maps is supported. As these are indicative only, it is not critical they match exactly the coordinates taken in 2011, provided the above matters are addressed.

Pedestrian access:

- DBCA supports the development by the proponent of suitable access paths to allow pedestrian access between Lot 304 and the beach and to prevent development of informal walk tracks and associated disturbance to the DHINP.
- There is no existing agreement regarding the number or location of pedestrian access paths through the DHINP.
- It is the responsibility of the proponent to develop a plan for pedestrian paths that are appropriate for the development proposed and to demonstrate that potential impacts to the DHINP from pedestrian access will be adequately managed.
- Without final details of the development proposal (e.g. number of units, their location, staging of construction of units, occupation numbers and expected usage patterns) DBCA cannot provide detailed advice regarding pedestrian pathway design, numbers or locations. However, factors that should be considered by the proponent in developing a plan for pedestrian access include:
    - Expected usage patterns and demand during peak periods.
    - Rationale for the location and number of pedestrian access paths – an appropriate distance from units to the nearest pedestrian access path to be defined by the number of users, surface type, topography and user comfort level to ensure paths are used.
    - Site specific factors – e.g. terrain, soil type, prevailing wind direction.

  - Minimising damage to vegetation from construction and from the future use by pedestrians.
  - Methods to prevent erosion (particularly wind erosion) – e.g. development of boardwalks.
  - Visual impacts, particularly from the Shark Bay Marine Park looking towards Lot 304.
  - Ongoing monitoring and maintenance of pathways and the surrounding vegetation.
- Pedestrian access paths should provide for pedestrian access only.
- As for construction access tracks, the proponent will need to progress approval for the construction and ongoing use of pedestrian pathways through DBCAs Online Disturbance Approval System (DAS). This will also require development of a lease or licence covering the pathways, as mentioned in the attached letter dated 29 August 2013.
- DBCA supports the inclusion of proposed pedestrian access paths on the Local Development Plan maps.

I will be on Dirk Hartog Island this week with DBCA District Manager Steve Nicholson and intend to visit Lot 304, with a view to considering access while we are on-site.

Kind regards,

Nick Detchon
Land Use Planning coordinator
Midwest Region

Parks and Wildlife Service
Department of Biodiversity, Conservation and Attractions
Level 1, The Foreshore Centre, 201 Foreshore Drive, Geraldton WA 6530
PO Box 72, Geraldton, 6531
Ph. 9964 0901, F. 9964 0977
E. nicholas.detchon@dbca.wa.gov.au
W. www.dbca.wa.gov.au

Department of Biodiversity, Conservation and Attractions

PARKS AND WILDLIFE SERVICE

We're working for Western Australia.

APPENDIX 3

POWER PROPOSAL

Appendix 3: Power Proposal

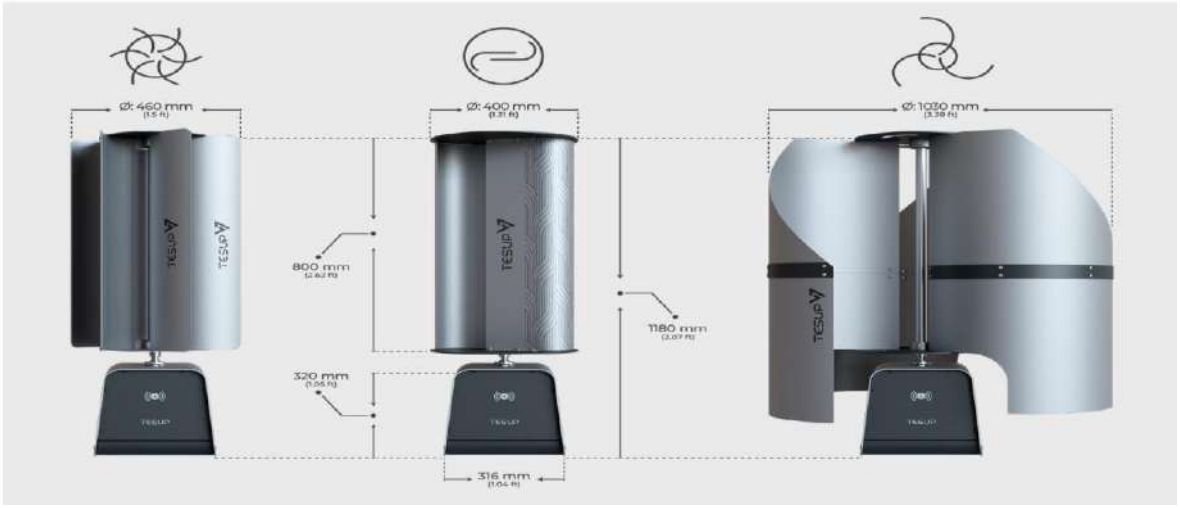
\

APPENDIX 4

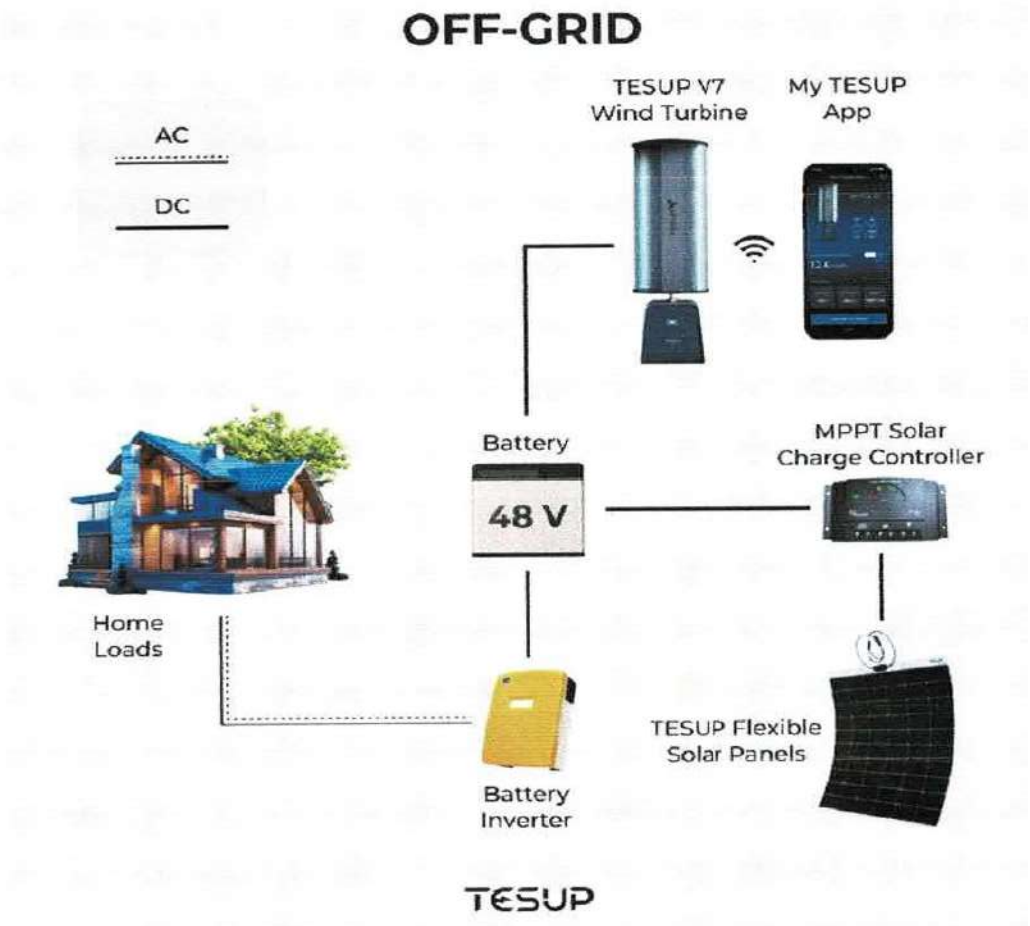
WIND POWER INFORMATION

Appendix 4: Wind Power Information

GENERAL ARRANGEMENT AND DIMENSIONS



2. Off-Grid Systems: This configuration allows for the storage of excess energy generated by the system in batteries for later use.



Vertical-axis wind turbines are more indicated when it comes to residential applications. They are easier to install and require less space. They don't have to be facing the right wind direction either. In a vertical system, air flowing from any direction can rotate the blades. They also handle turbulent winds better than horizontal wind turbines.

Horizontal-axis wind turbines have higher efficiency ratings and are more likely to operate at higher wind speeds. They are better at converting wind energy into useful mechanical motion because their blades are perpendicular to wind direction, so energy can be generated the entire way through the rotation.

The most significant differences between horizontal- and vertical-axis wind turbines are as follows:

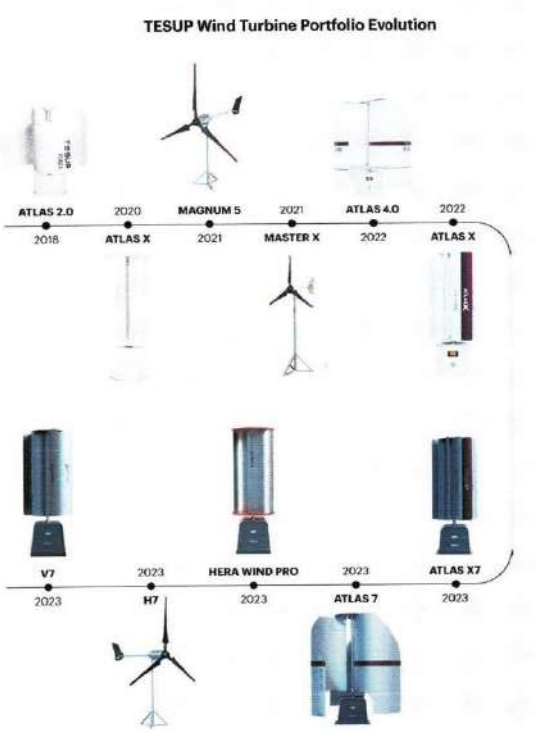
1. A horizontal-axis wind turbine has its axis of rotation parallel to the wind stream, whereas a vertical-axis wind turbine has its axis of rotation perpendicular to the wind stream.

2. Horizontal-axis wind turbines usually use three blades, whereas vertical-axis wind turbine configurations, blade shapes and the number of blades vary a lot.

3. Horizontal-axis wind turbines pivot facing the direction of the wind. Whereas vertical-axis wind turbines are omnidirectional, they do not change orientation to match the wind direction

All Tesup wind turbines are very quiet, producing only up to 40 dB, which is less than half the sound of a vacuum cleaner. Noise levels of our products are regularly checked and tested in ideal outdoor environments for wind turbine installation.

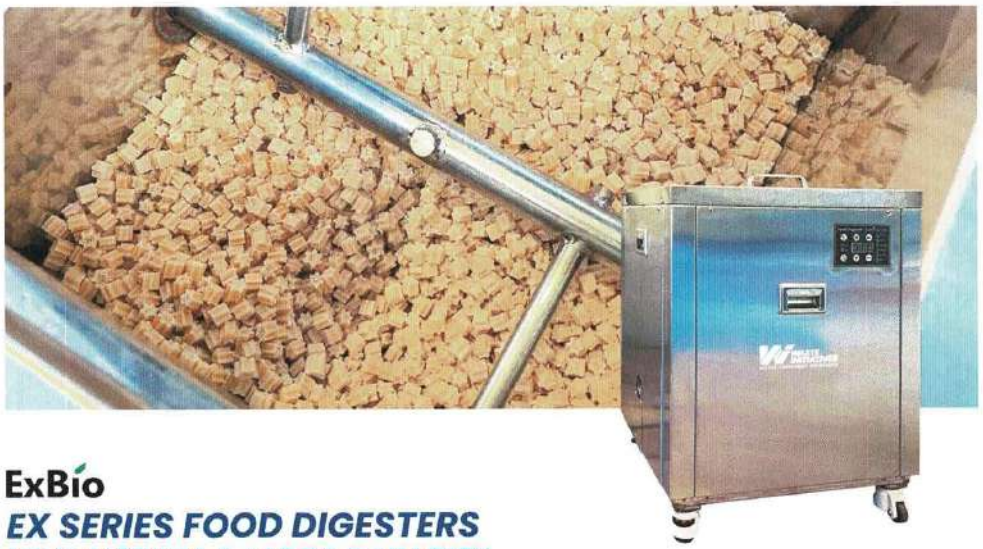
1. **Lowest Starting Wind Speed**
   Like ATLAS 7, HERA Wind Pro has the lowest starting wind speed. Its rotation starts at 4 m/s wind speed. Upon rotation, power is generated at even 3 m/s wind speed.
2. **More Rapid Acceleration**
   After rotation starts, HERA Wind Pro accelerates more rapidly versus other TESUP Wind Turbines under the same wind speeds.
3. **New innovative design and more colour options**
   HERA Wind Pro is TESUP's most innovative, compact, and premium vertical wind turbine design. It is available in 3 modern colour options: Pearl Beige, Pearl Blackberry, and Smoke Grey+Red.
4. **Less Environmental Impact & Quicker Installation**
   HERA Wind Pro has a new 2-blade shape that is produced by using less material. As a result, it is lighter, more compact, and has less environmental impact than other TESUP vertical wind turbine models. Since it has fewer blades, its installation process is shorter and takes only 15 minutes.
5. **New Enhanced Body Design**
   HERA's new body base allows easier fixing to the surface, provides better protection, and creates a cleaner look.



APPENDIX 5

BIO-DIGESTION

Appendix 5 Bio Digestion Option



ExBio

EX SERIES FOOD DIGESTERS
LOW, MEDIUM & LARGE CAPACITY

The latest in food waste processing technology, the aerobic ExBio Food Digesters Ex Series are an innovative solution, diverting your food scraps from landfill and converting it to a liquid form within 24 hours, for safe discharge as grey water.

These cutting-edge systems efficiently break down all organic food waste, converting plate scrapings, leftovers, meat, fish, bones, bread, dairy, and more into a convenient liquid form. Unlike anaerobic methods, our digesters use oxygen, select microorganisms, and warm water to process from as little as 25 kg to an impressive 10,000 kg of food waste daily (depending on the model), with minimal environmental impact.

The ExBio Food Digesters Ex Series range can manage food waste from residential, small to medium businesses, and larger commercial facilities to industrial-scale food processing plants. This solution not only provides an alternative for waste going to landfill but has significant financial benefits with payback mostly well under 12 months.

Our experienced team at Waste Initiatives is here to ensure you get the waste management equipment and solutions you require to move your business forward. Look to us for your range of custom-designed solutions, including food digesters, recycling equipment, and more.

BENEFITS

- **Quick ROI:** Return on Investment typically achieved in 1 - 3 years.
- **Cost Savings:** Reduces labor and transport expenses.
- **Landfill Reduction:** Decreases food waste disposal in traditional landfills.
- **Fast Transformation:** Converts food waste into grey water within 24 hours.
- **Simple Operation:** Safe and easy operation with minimal maintenance.
- **Continuous Feed:** Waste fed continuously, no need to wait for batches.
- **Real-Time Monitoring:** Monitors ingested and digested food quantity in real-time.
- **Odor Control:** Minimises unpleasant odors.
- **Pest Prevention:** Eliminates vermin and bugs.
- **Zero Solid Waste:** No management is needed for solid waste output.
- **Broad Food Compatibility:** Enzymes work effectively on all food groups.
- **Environmental Benefits:** Reduces methane emissions and groundwater contamination.

FEATURES THAT GUARANTEE HIGH PERFORMANCE

KEY FEATURES

Bio Star™ Accelerator

ExBio's **Bio Star™** agent utilises select microorganisms to break down food waste into water and CO_2 within its porous structure. With a substantial 1800 µm surface area, it securely houses microorganisms, preventing washout and enabling controlled aerobic decomposition in the ExBio food digester.

Stirring Technology

Stirring efficiency is high, which increases the decomposition rate. The rotating shaft of the product is positioned on the lower side at a 2.3° angle for optimal processing. A proprietary mixing pattern ensures maximum oxygen contact with food & enzymes.

Sealed Shaft Technology

The subordinate part of the shaft is hermetically sealed, meaning there is no concern of leakage and the life span of the motor and equipment is semi-permanent.

Low Power Usage

Low power usage with internal electrical inverters keeps electric consumption super low.

Microorganism Enzyme 159

ExBio's research with Bio Star™ and select microorganisms revealed biotechnical potential through growth and resilience. This resulted in the development of **medium-temp Enzyme 159**, a key component in optimising aerobic food waste decomposition within the ExBio Food Digester system.

Drainage Feature

The straight shower nozzle developed by ExBio completely removes any sludge collected at the bottom. Due to this technology, the decomposed and treated water can be discharged without any blockage.

Safety & Ease of Use

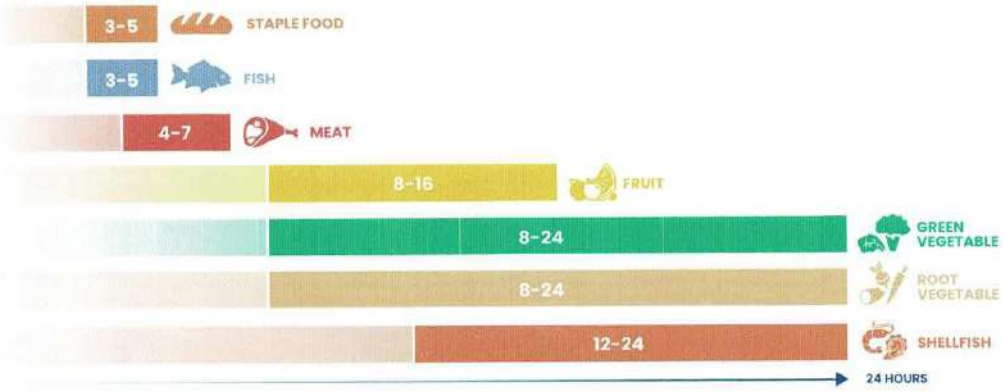
For low to medium-capacity models, features include automatic closing lids/doors, digital touch panels, emergency switches, and seamless plug-and-play functionality.

The larger capacity range boasts additional features such as an auto bin lift, automatic doors, check doors, access door for easy cleaning, high-pressure water pump, emergency stop, and breaker box access.

AEROBIC FOOD DIGESTION PROCESS

Input Bio Star & Enzyme | Input Food Waste (0-6 hours) | Mixed with Microbes (6-12 hours) | Decomposition (12-24 hours) | Discharge Greywater 24 hours)

DECOMPOSITION TIME (HRS)



Draft Waste Calculation Example

GOVERNMENT OF WESTERN AUSTRALIA

This project is supported by the Government of Western Australia and administered by the Waste Authority

Multi-Dwelling Development (MDD) and Mixed-Use Development (MUD) Waste Calculator

The below is a tool to assist Local Governments and industry in estimating the amount of general waste; food organics, garden organics (FOGO) and recyclables generated by a proposed development. Users simply need to enter the required values. It should be noted that this tool should be used in combination with the WALGA guidelines.

- (•) 2 Bin System
- ( ) 3 Bin System

Clear Form | Recalculate

Residential Less Than 12 Dwellings

Number of 1 Bedroom Apartments	0
Number of 2 Bedroom Apartments	1
Number of 3 or more Bedroom Apartments	0

Residential Greater Than 12 Dwellings

Number of 1 Bedroom Apartments	0
Number of 2 Bedroom Apartments	0

Results - Weekly Waste Generation

Residential Dwellings

General Waste	Food & Garden Organics	Comingled Recyclables	Total
130L	0L	60L	190L

Commercial Food & Beverage

General Waste	Food & Garden Organics	Comingled Recyclables	Total
0L	0L	0L	0L

Retail

General Waste	Food & Garden Organics	Comingled Recyclables	Total
0L	0L	0L	0L

Other Commercial

General Waste	Food & Garden Organics	Comingled Recyclables	Total
0L	0L	0L	0L

Totals

General Waste	Food & Garden Organics	Comingled Recyclables	Total
130L	0L	60L	190L

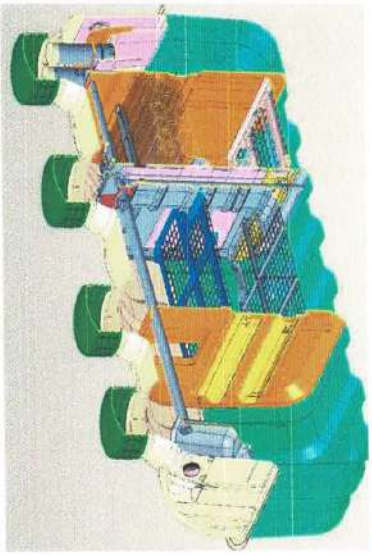
WALGA wishes to acknowledge Talis Consultants and the Waste Authority for assistance with the development of this online calculator.

APPENDIX 6

ATU _ COMPOSTING

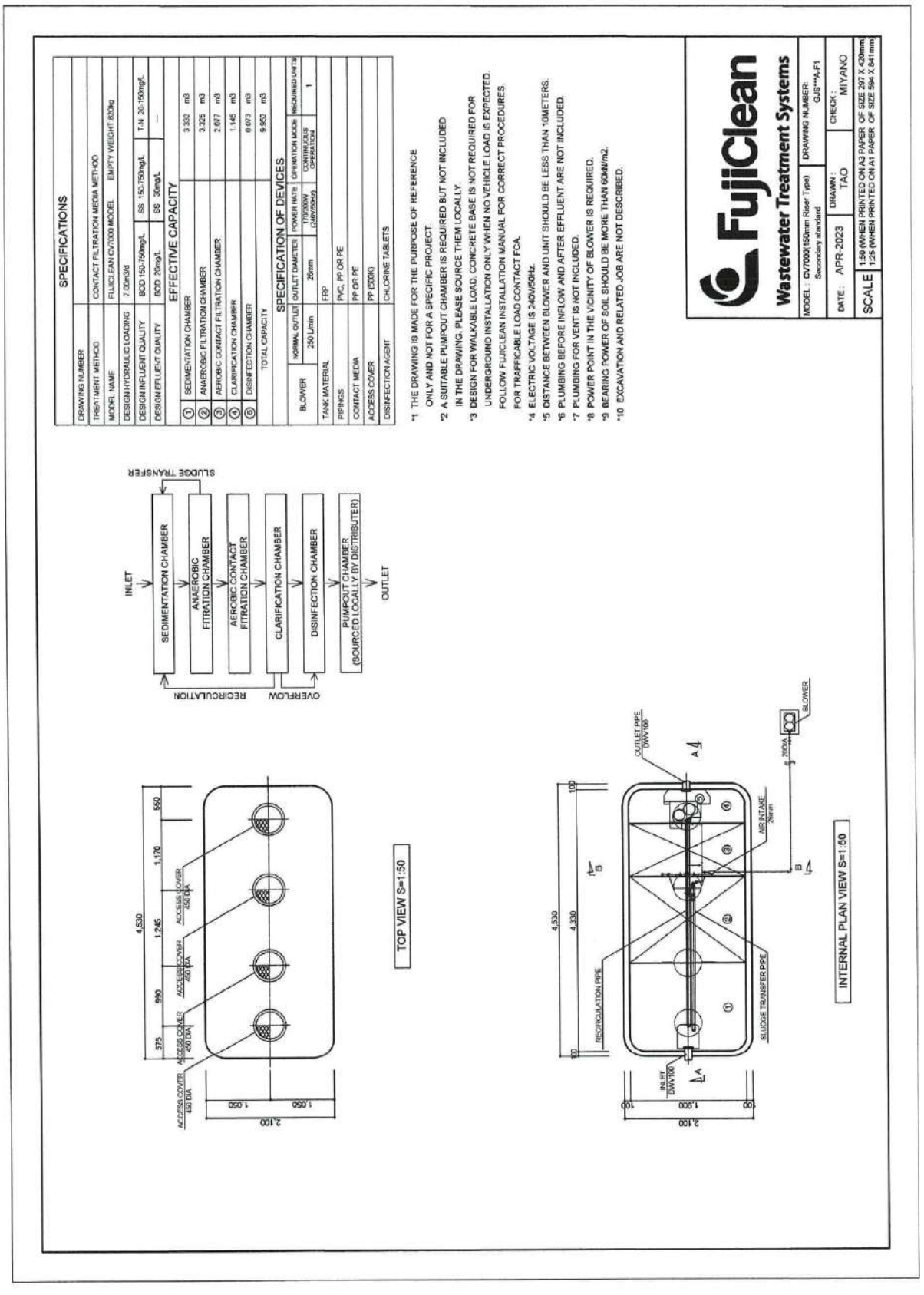
Appendix 6: ATU/Composting Options

FujiClean
CV-7000 / CV-10000



FujiClean
Australia

TOWARDS CLEAN WATER


SPECIFICATIONS
DRAWING NUMBER
TREATMENT METHOD CONTACT FILTRATION MEDIA METHOD
MODEL NAME FUJICLEAN CV7000 MODEL EMPTY WEIGHT:820kg
DESIGN HYDRAULIC LOADING 7.00m3/d
DESIGN INFLUENT QUALITY BOD 150-750mg/L SS 150-750mg/L T-N 20-150mg/L
DESIGN EFFLUENT QUALITY BOD 30mg/L SS 30mg/L —
EFFECTIVE CAPACITY
① SEDIMENTATION CHAMBER 3.332 m3
② ANAEROBIC FILTRATION CHAMBER 3.325 m3
③ AEROBIC CONTACT FILTRATION CHAMBER 2.077 m3
④ CLARIFICATION CHAMBER 1.145 m3
⑤ DISINFECTION CHAMBER 0.073 m3
TOTAL CAPACITY 9.952 m3
SPECIFICATION OF DEVICES
BLOWER NORMAL OUTLET 250 L/min OUTLET DIAMETER 25mm POWER RATE 170/200W (240V/50Hz) OPERATION MODE CONTINUOUS OPERATION REQUIRED UNITS 1
TANK MATERIAL FRP
PIPINGS PVC, PP OR PE
CONTACT MEDIA PP OR PE
ACCESS COVER PP (500K)
DISINFECTION AGENT CHLORINE TABLETS
*1 THE DRAWING IS MADE FOR THE PURPOSE OF REFERENCE ONLY AND NOT FOR A SPECIFIC PROJECT.
*2 A SUITABLE PUMPOUT CHAMBER IS REQUIRED BUT NOT INCLUDED IN THE DRAWING. PLEASE SOURCE THEM LOCALLY.
*3 DESIGN FOR WALKABLE LOAD. CONCRETE BASE IS NOT REQUIRED FOR UNDERGROUND INSTALLATION ONLY WHEN NO VEHICLE LOAD IS EXPECTED. FOLLOW FUJICLEAN INSTALLATION MANUAL FOR CORRECT PROCEDURES FOR TRAFFICABLE LOAD CONTACT FCA.
*4 ELECTRIC VOLTAGE IS 240V/50Hz.
*5 DISTANCE BETWEEN BLOWER AND UNIT SHOULD BE LESS THAN 10METERS.
*6 PLUMBING BEFORE INFLOW AND AFTER EFFLUENT ARE NOT INCLUDED.
*7 PLUMBING FOR VENT IS NOT INCLUDED.
*8 POWER POINT IN THE VICINITY OF BLOWER IS REQUIRED.
*9 BEARING POWER OF SOIL SHOULD BE MORE THAN 60kN/m2.
*10 EXCAVATION AND RELATED JOB ARE NOT DESCRIBED.
FujiClean
Wastewater Treatment Systems
MODEL : CV7000(150mm Riser Type) Secondary standard
DRAWING NUMBER: GJS***A-F1
DATE : APR-2023
DRAWN : TAO
CHECK : MIYANO
SCALE 1:50 (WHEN PRINTED ON A3 PAPER OF SIZE 297 X 420mm) 1:25 (WHEN PRINTED ON A1 PAPER OF SIZE 594 X 841mm)
INLET
SEDIMENTATION CHAMBER
ANAEROBIC FILTRATION CHAMBER
AEROBIC CONTACT FILTRATION CHAMBER
CLARIFICATION CHAMBER
DISINFECTION CHAMBER
PUMPOUT CHAMBER (SOURCED LOCALLY BY DISTRIBUTER)
OUTLET
SLUDGE TRANSFER
RECIRCULATION
OVERFLOW
TOP VIEW S=1:50
INTERNAL PLAN VIEW S=1:50
OUTLET PIPE DWV100
INLET DWV100
RECIRCULATION PIPE
SLUDGE TRANSFER PIPE
AIR INTAKE 25mm
BLOWER
ACCESS COVER 450 DIA.
4,530
4,330
1,900
2,100

1. System Outline

(1) Unit Outline

Model	CV-7000	CV-10000
Influent capacity and Effluent quality	**Influent**: ~7,000 L/day **Effluent**: BOD ≦ 20 mg/L SS ≦ 30 mg/L E.coli ≦ 10cfu/100ml ***(Secondary standard)***	**Influent**: ~7,200 L/day **Effluent**: BOD ≦ 10 mg/L SS ≦ 10 mg/L E.coli ≦ 10cfu/100ml ***(Advanced secondary standard)***
		Influent: ~10,000 L/day **Effluent**: BOD ≦ 20 mg/L SS ≦ 30 mg/L E.coli ≦ 10cfu/100ml ***(Secondary standard)***
Treatment method	Contact Filtration Bed Process	

3

ECO-REMOTE - The Most Advanced Composting Toilet System
The Eco-Remote is Australia and New Zealand's first and only remote low-flush composting toilet system. It is a fusion of proven sanitation technologies that is not only modern in function and appearance but can be installed almost anywhere.
Toilet
Up to
15 meters distance
Composting Unit and
Remote Flush Generator

APPENDIX 7

ECO-TOURISM DEVELOPMENT

Appendix 7: Ecotourism Development

ECO-TOURISM DEVELOPMENT IDENTIFIED

Generally, ecotourism has been defined as "responsible travel to natural areas that conserve the environment, sustains the well-being of the local people, and involves interpretation and education" and is tourism which is conducted responsibly. Ecotourism helps preserve and foster respect for some of the most beautiful environments on Earth: it encourages travellers to help protect the environment and contribute to local communities on a much deeper level than the tourists just passing through - building environmental and cultural awareness and respect. Ecotourism should provide positive experiences for both visitors and hosts and generate benefits towards conservation for both local people and private industry.

As early as 1988 the Shark Bay Regional Plan identified Dirk Hartog Island (Wirruwana) as a site for tourist development through the increased use of beaches and adjacent marine areas. In 1997 the review of the 1988 report confirmed this stating that the natural attractions of Shark Bay relate primarily to the marine environment and the recreational opportunities this provides with one of those attractions being Dirk Hartog Island. The Shark Bay World Heritage Property was listed in 1991 and a Strategic Plan for the property 2008-2020 was prepared by the West Australian Department of Environment and Conservation.

Previous Reports Identifying Development Opportunities on Dirk Hartog Island (Wirruwana)

The 2014 Shark Bay Local Tourism Planning Strategy identified the need for further development of ecotourism activities on Dirk Hartog Island (Wirruwana) and the 2014 Ningaloo-Shark Bay Landscape Final Experience Development Strategy stated that Dirk Hartog Island (Wirruwana) is identified as having the **potential for new eco accommodation development.**

The Shark Bay Destination 2018 states that Dirk Hartog Island (Wirruwana) offers natural environment, scenery, landscape, and beaches and identified further opportunities for the development of ecotourism activities on Dirk Hartog Island (Wirruwana).

Lot 304 and Dirk Hartog Island (Wirruwana) have been identified and referred to in numerous Government reports acknowledging and recommending the development of tourism and ecotourism accommodation facilities: -

The Shark Bay Region Plan adopted in June 1988 stated: *'the main tourist potential for Dirk Hartog Island appears to lie in increased uses of beaches and adjacent marine areas.*

The Shark Bay Regional Review Draft 1997 stated; *'the natural attractions of Shark Bay relate primarily to the marine environment and the recreational opportunities it provides; Dirk Hartog Island is one of those attractions.*

'the following locations provide opportunities of overnight tourism and recreation accommodation…Dirk Hartog Island'

The Tourism Planning Taskforce report 2006 stated; *'the key principle identified is that a sustainable tourism industry, with its many inherent benefits, requires tourism development to be undertaken for tourism purposes'.*

'it is acknowledged that tourism projects have broad multiplier benefits, particularly in regional areas'

'the primary issues identified as impeding sustainable tourism development relate to the coordination of development approval'

'the difficulties of initiation of regional tourism projects often relates to the isolated nature of the development site and lack of basic infrastructure'

The Shark Bay Terrestrial Reserves and Proposed Reserve Additions Draft Management Plan 2007 and the Dirk Hartog Island National Park Interim Management Guidelines for Necessary Operations identified Lot 304 *as "highly modified". In this area there will be high level recreation, education and interpretation and group activities specifically catered for.*

The Shark Bay Terrestrial Reserves and Proposed Reserves Additions No 75 2012 states; *'the freehold homestead and proposed adjacent lot and the proposed Sunday Island Bay freehold lots have a highly modified setting. In these areas there will be high level recreation, education and interpretation and group activities specifically catered for.*

The Shark Bay Local Tourism Planning Strategy 2014 identified; *'the need for further development of ecotourism activities on Dirk Hartog Island' plus 'the need for easier access to Dirk Hartog Island' plus 'the opportunity of marketing Dirk Hartog Island as an aspirational attraction'.*

'Dirk Hartog Island freehold lots identified as one of 16 strategic tourism sites in Shark Bay'.

The Ningaloo- Shark Bay Landscape Final Experience Development Strategy 2014 stated; '*Dirk Hartog Island is identified as having the potential of new eco accommodation development'.*

The Gascoyne Regional Tourism Strategy 2014 stated; '*strategic action identified to develop eco-tourism ventures and provide improved access to Dirk Hartog Island' and*

'Identified the need to explore and investigate the potential to develop new product experiences on Dirk Hartog Island'.

The State Planning Strategy -2050 stated; *'one of the governments State Tourism Development Priorities include ecotourism initiatives' and*

'an increase in tourism infrastructure to exploit the States unique opportunities is important for the future diversification of the economy, especially regionally' and

'There is a need for a substantial increase in short stay accommodation in strategic regional areas and a need to identify eco-tourism sites and have them developed'.

The Gascoyne Regional Planning and Infrastructure Framework 2015 identified; *tourism nodes and minor tourism nodes on Dirk Hartog Island National Park*

The Gascoyne Coast Sub-Regional Strategy Part A Strategic Planning 2018 noted; *'Dirk Hartog Island is recognised as a minor tourism node providing overnight accommodation' and*

'at Dirk Hartog Island both Sunday Island Bay and the Homestead are recognised as sites for tourism development'

Shark Bay Destination 2018 states; *Dirk Hartog Island offers natural environment, scenery, landscape and beaches' plus 'further development of ecotourism activities on Dirk Hartog Island identified' and 'improved access important for Dirk Hartog Island' and 'visiting Dirk Hartog Island is one of the top experiences of visiting Shark Bay'.*

In January 2023 the Department of Biodiversity, Conservation and Attractions called for submissions to prepare a "Dirk Hartog Island Recreation and Tourism Opportunities Analysis to identify issues and challenges and provide recommendations to improve visitor experiences whilst managing the islands natural and cultural values.

Planning for Tourism/Ecotourism

In November 2023 the Department of Planning, Lands and Heritage and the Western Australian Planning Commission issued a

POSITION STATEMENT 'Planning for Tourism and Short-term Rental Accommodation' and

GUIDELINES- 'Planning for Tourism and Short-term Rental Accommodation Guidelines.

Both the guidelines and the position statement are ACTIVE and IN FORCE and have direct relevance to the proposal for Sunday Island Bay which have been proposed in compliance with both the Position Statement and Guidelines.

GUIDELINES

Western Australia's environment and landscape character creates a unique and attractive holiday destination and **ecotourism is one of the State's key tourism markets**. Eco-tourism attractions are popular with locals and visitors alike, and include the coastline and waterways, mountain ranges and ancient landforms, unique karri, tingle and jarrah forests and native wildlife, as well as a range of nature-based activities such as hiking, rock climbing, swimming, kite surfing, bushwalking, four-wheel driving and caving.

Where relevant, eco-tourism proposals should consider the following:

• bushfire management in accordance with SPP 3.7 and State bushfire guidance;

• consistency with relevant zone objectives;

• impact on natural landscape, environment and conservation values;

• appropriate servicing and infrastructure to accommodate the proposed use in an environmentally responsible manner;

• design guidelines and visual impact;

• coastal setbacks in accordance with relevant State planning policy;

• impact on social and cultural values of the area or site; and

• consistency with any relevant national, state and local policy and guidance

1 Guidelines referred to -Tourism Objectives:

Tourism objectives should be consistent with the strategic vision to guide appropriate tourism development throughout the locality. In defining tourism objectives, the following may be addressed:

• the nature and importance of tourism to the local economy in strategic plans/policies;

• support for tourism and short-term rental accommodation through local planning scheme zones and provisions;

• facilitating a variety of holiday accommodation types including short-term rentals, caravan parks and camping grounds in preferred locations;

• protection of tourism precincts and sites for future tourism development to meet estimated demand, and from incompatible and/or conflicting land uses

• encouraging innovative tourism and short-term rental accommodation and facilities that respond to market needs;

• tourism growth and development that reinforces unique and local tourism identity and features; and

• the impact of tourism uses and tourism and short-term rental accommodation on local housing supply.

A tourism objective should be clear, consistent with the goals and vision of the local government strategic plan, and responsive to the tourism characteristics of each locality

2 Guidelines referred to -potential locations

Selection and justification of potential tourism locations should consider the following:

• the demand for a proposed tourism use, informed by the local tourism profile;

• access for pedestrians, vehicles and/or public transport;

• provision and access to tourist amenity (for example landscape, views, proximity to attractions);

• compatibility of tourism development with surrounding land uses;

• land constraints (for example steep slopes, coastal setbacks, water courses);

• vulnerability to natural hazards (for example bushfire, cyclone, flood, erosion);

• scale of tourism development and location suitability

3 Guidelines referred to- accessibility, uniqueness, setting, tourism activities and land availability

* Adequate existing or proposed transport links

* A prominent and/or unique landmark of significance Setting

* The site's views, or outlook that encourages recreational tourism activities

* the site has or is within easy access of attractions and amenities that promote tours, fishing, historic sites, walk trails, environmental interpretation, cafes, restaurants, shops, or is capable of development for activities

* the site represents a limited amount of land suitable for a significant tourism use

4 Guidelines referred to- zoning.

A variety of tourism development can be accommodated within tourism, mixed use and **special use zones.**

In local government areas where tourism is economically significant, the local planning strategy may identify potential tourism zones for the local planning scheme where they do not already exist. **Where a tourism site has different or additional objectives to the standard tourism and mixed use zone objectives, the site may be considered as a special use zone to enable specific objectives unique to the site or tourism use to be included in the objectives for that zone/site only (**for example caravan park)

5 Guidelines referred to accommodation.

There are many different types of tourist accommodation available in Western Australia, and a variety of controls exist to manage their use. As referenced in section 3 of the Position Statement, the term tourist accommodation means short-term accommodation and includes traditional accommodation (for example a caravan park, chalet, serviced apartment, hotel) and short-term rentals (holiday house, holiday unit, holiday apartment, hosted accommodation)

Traditional Accommodation refers to the following land uses:

• cabin;

• chalet;

• caravan park;

• hotel;

• motel;

• serviced apartment; and

• tourist development

POSITION STATEMENT

Western Australia's many natural and man-made features and attractions provide substantial opportunities for tourism, which is a significant contributor to the State and local economies, particularly in regional areas. **Tourism encompasses an array of development types, sizes and locations, and includes accommodation, attractions, facilities, infrastructure and other ancillary services.**

Appropriate planning and management of tourist areas and uses is necessary for their promotion and retention, to prevent encroachment from incompatible land uses, to protect the amenity, environmental and landscape values of tourist areas, and to address potential land use conflict.

The Position Statement applies to all tourism and short-term rental accommodation proposals within all regions of Western Australia and should be applied in conjunction with the Planning for Tourism and Short-term Rental Accommodation Guidelines (the Guidelines).

- In the Position Statement the term 'tourist accommodation' refers to all traditional forms of tourist accommodation land uses provided within the Planning and Development (Local Planning Schemes) Regulations 2015 (LPS Regulations), aside from those broad use types listed under Section 3.1 – Exclusions.
- Similarly, the term 'short-term rental accommodation' refers to hosted or unhosted uses of this specific type which will be reflected in new land use definitions under the LPS Regulations.

In general, strategic and statutory planning decisions should:

• Encourage a range of tourist accommodation, including short-term rental accommodation, choices and experiences as required.

• Encourage sustainable ecotourism that recognises and complements Western Australia's unique and sensitive natural environment, heritage and Aboriginal culture

- Be consistent in the use of tourism land use and accommodation definitions contained in the LPS Regulations and State Planning Policy 7.3: Residential Design Codes.
- Promote the location of tourist accommodation in areas with the highest tourism amenity (for example beach access, views, facilities, availability of services) and adequate separation from, or management of, any interface with residential land uses.
- **Ensure areas used exclusively for strategic tourism sites and precincts are zoned as Tourism or Special Use**

Hosted accommodation is considered a low-scale form of short-term rental accommodation because the host resides on the site and can manage any issues that may arise with respect to amenity, noise and other impacts.

It is intended that hosted accommodation, where the owner or occupier of the dwelling is present when guests are staying overnight, should not require a development approval, and should be represented as such in the zoning table.

APPENDIX 8

GENERAL INFORMATION

Appendix 8: General Information

Dirk Hartog Island (Wirruwana)(61,000ha) (.0286% 0f SBWHP) is located within the Shark Bay World Heritage Property (SBWHP) (2,200,905ha) which is a conservation and ecotourism resource of world significance: it is the largest Island off the West Coast of Australia and is a declared National Park (DHINP) bordered by the Shark Bay Marine Park.

The Dirk Hartog Island (Wirruwana) National Park and the adjacent Shark Bay Marine Park are administered by the Western Australian Department of Biodiversity, Conservation and Attractions (DBCA). The island is managed under a *draft* "Interim Management Guidelines for Necessary Operations" document established by DBCA in 2010.

Freehold Lot 304 Sunday Island Bay is located on the southeast coast of the island and is zoned Special Use 14 within the Shire of Shark Bay Local Planning Scheme No 4 adopted in 2018.

An earlier submission for the development of seven chalets upon Lot 304 (11.295ha or .00051% of SBWHP) ***was referred to and approved*** *by the Environmental Protection Authority of Western Australia.*

In advice notes received in response to the referral it was stated:

"The EPA has identified Flora and Fauna, Inland Waters Environmental Quality, Coastal Processes and Amenity as the preliminary environmental factors relevant to this proposal under Part1V of the EP Act. In considering the potential direct and indirect impacts of the proposal on the preliminary environmental factors, the EPA has particular regard to:

- *The important environmental values but the relatively small geographic footprint and scale of the proposal in context of Dirk Hartog Island; and*
- *The presence of other statutory processes …….*

In summary, although the proposal raises several environmental issues, the EPA's objectives for the preliminary environmental factors can be met through the satisfactory implementation of this public advice and through other statutory decision-making processes. As a result, ***the EPA considers that the likely environmental impacts of the proposal are not so significant as to warrant formal assessment.***

The proposed LDP is a high-level document to GUIDE FUTURE DEVELOPMENT and as such **IT IS NOT AN APPLICATION FOR DEVELOPMENT OF ACCOMMODATION UNITS.** This report deals with the site as it is and the possibility of impacts should future development be approved and how such possibilities can be mitigated and/or managed.

Following the endorsement of the Shire of Shark Bay LPS No 4 in 2018 and the revised requirements of development in declared bushfire prone areas introduced in 2019, 2021 and 2022 (including advice from the Shire's town planning consultant in this regard in 2020)– the prior LDP was reviewed with a fresh approach including revising the location, size and number of building envelopes **.(the number of envelopes was reduced by more than 75% and the total area of all building envelopes was reduced by almost 80%).** Apart from any future proposed accommodation clusters located within envelopes and any necessary infrastructure on the lot it is proposed that the remainder of the site would remain undeveloped in its natural state.

Referral documents prepared for submission to the Department of the Environment and WA Department of Environment in 2015 including the consideration of BMP requirements and the responses received have formed a basis for assessing environmental impacts and proposing building envelopes, construction methods and materials and to assess and address possible impacts to the site both physically and visually.

Condition 1 of SU 14 part of the Shark Bay Local Planning Scheme states:

"The objective of the zone is to provide for eco-tourism development" although *this is not defined within LPS No 4 or SU14.*

The Shark Bay Local Planning Scheme No 4 DOES NOT DEFINE the meaning of "ecotourism development" nor 'development' although it defines the use 'tourist development' (a 'D' use in SU14) as meaning a building, or group of buildings forming a complex, other than a bed or breakfast, caravan park or holiday accommodation, used to provide –

a. Short term accommodation for guests; and
b. Onsite facilities for the use of guests; and

c. facilities for the management of the development

Eco Tourism Australia advise that:

"There are varying interpretations of ecotourism development and there is not a national consistency in this across Australia that we have found".

In their response to an LDP lodged in 2020 **the Shire advised that the definition of eco-tourism development (*although not specifically defined or included within LPS No4 or SU 14)* was 'ecologically sustainable tourism' (*the definition generally accepted and ascribed to 'ecotourism' within LPS No 4*)! THIS IS NOT THE DEFINITION OF 'ECOTOURISM DEVELOPMENT' which has no generally accepted finite definition. (***Ecotourism Australia)***

The Shark Bay Local Planning Scheme No 4 DEFINES the use "holiday accommodation" (a "D" use in SU14) as meaning 2 or more dwellings on one lot used to provide short term accommodation for persons other than the owner of the lot.

The Shark Bay Local Planning Scheme No 4 DEFINES the use "camping ground" (a "D" use in SU14) as meaning an area used for a camping ground as defined in the Caravan Parks and Camping Grounds Act 1995 section 5 (1)

The objective of the zone being to provide for **eco-tourism development** does not necessarily refer to physical construction of built facilities but rather implies providing opportunities **to develop eco-tourism products** that meet and conform with the criteria of eco-tourism. Built facilities however are proposed for eco-tourists!

Ecotourism has been defined as **"responsible travel to natural areas that conserve the environment, sustains the well-being of the local people, and involves interpretation and education"**: tourism which is conducted responsibly to conserve the environment and sustain the well-being of local people. Ecotourism helps preserve and foster respect for some of the most beautiful environments on Earth. It encourages travellers to support protection of the environment and contribute to local communities on a much deeper level than the tourists just passing through - building environmental and cultural awareness and respect. It should provide positive experiences for visitors and generate benefits towards conservation for both local people and private industry: a position endorsed and supported in the LDP and its supporting documentation.

Condition 3 (v) of SU14, part of the Shark Bay Local Planning Scheme, requires the preparation of an environmental report prior to any application for development upon the site:

An Environmental Report that demonstrates that any LDP prepared and any proposed use and/or development will: -

1 *have a low impact on the natural environment,*
2 *not compromise the high conservation values and*
3 *have regard for the need to protect the ecological values and special attributes of the island.*
4 *the report should include`*
a. *Information on building envelopes*
b. *Visitor numbers*
c. *A vegetation assessment*
d. *How biosecurity measures to mitigate the risks of feral incursions and disease impacts to the National Park will be achieved*

The Western Australian EPA's "Guidance Statement for the assessment of Development Proposals in Shark Bay World Heritage Property No. 49 November 2000" states**.**

Under EPA proposal 2- "THE ISSUE" ….

"While World Heritage listing does not prevent development (S7.7,Anon., 1997), there is obviously an expectation that developments are carefully evaluated from an environmental point of view and only allowed to proceed if they can be implemented in a way which does not compromise the values for which the area was listed"

In response to the 2015 submission for development approval of seven chalets on lot 304(located on less than .0053% of lot 304) in 2015 the EPA advised:

"The EPA considers that the likely environmental impacts of the proposal are not so significant as to warrant formal assessment."

" if implemented consistent with this public advice, it is not likely to have a significant impact on the environmental factor of amenity or inland waters environmental quality.

"the EPA considers that potential impacts to flora and vegetation and fauna can meet the EPA's objectives through regulation and mitigation of impacts by other regulatory processes and the implementation of this public advice."

The EPA considers that the mitigation of the potential effects on the environment can be regulated by other statutory decision-making processes and through the implementation of this public advice and other best practice measures."

Regional Setting

Dirk Hartog Island is the largest island (61,000ha) off the west coast of Australia; its traditional owners are Malgana. It is the site of the first recorded landing of a European on Australian soil in October 1616: it represents .0277% of the SBWHP while the site represents .0000051%. *The traditional owners Malgana refer to the island as Wirruwana*.

"At the regional scale, the ecology of Dirk Hartog Island is strongly influenced by its long, narrow shape and the local climate generated, particularly temperature and rainfall. The large size of the island and the relative intactness of the vegetation ensure the maintenance of the integrity of ecological processes."

The island is located on the Edel and Shark Bay 1:250,000 map sheets. The nearest point of the island lies about 35 kms in a westerly direction from the main local township of Denham across Denham Sound. The island is approximately 80kms long by about 10kms wide at its widest point and lies at the western side of the Shark Bay embayment with its long axis in a southeast to northwest direction.

The island is located within the Shark Bay World Heritage Property adjacent to the Shark Bay Marine Park and was declared a National Park in 2009 (Dirk Hartog Island National Park): The National Park and Marine Park are administered by the Department of Biodiversity Conservation and Attractions (DBCA).

DBCA continue their operations on the island to create an iconic National Park within the Shark Bay World Heritage Property and to reintroduce endangered species aiming to return the island to as close to its original condition ('return to 1616') as it is possible to achieve: undertaking an ecological restoration using funds provided by Chevron under the NCBF and internal department funds. Early goals for the "RETURN to 1616" restoration project have already been met: Sheep, goats and cats have been eliminated from the island; The reintroduction of endangered fauna species has begun and proved successful in the first years of the program.

The Site

The site consists of only 11.298ha (28 acres) of vacant freehold land.

Sunday Island Bay is located towards the southeast of the island some 5 kilometres from Cape Ransonnett the most southerly point on the east coast of the island which is approximately 5kms from Steep Point the most Westerly point of the Australian mainland: it was the site for the first homestead constructed in the mid 1800's for management of pastoral activities.

The Shark Bay World Heritage Property encompasses a total area of 2,200,905ha (100% of SBWHP) of which the land content is 748,306ha (34% of SBWHP) and the ocean or marine content has a total area of 1,452,594ha (66% of SBWHP).

Dirk Hartog Island has a total area of around 63,000ha (APPROX. 2.8% of SBWHP) which is represented by five land systems with three of these land systems making up 99% of the total area.

* Inscription Approx. 24.3% of total area or 14,823 ha
* Birrida Approx. 0.7% of total area or 427ha
* Littoral Approx. 0.6% of total area or 366ha
* Coast Approx. 41.9% of total area or 25,559 ha
* Edel Approx. 32.5% of total area or 19,825ha

Lot 304 is an 11.295ha (28 acre) (.0185% of Dirk Hartog Island and .00051% of SBWHP) freehold lot located on Dirk Hartog Island on the edge of the Shark Bay Marine Park and the Dirk Hartog Island National Park; it is within the Shark Bay World Heritage Property (2,200,905ha). The site was rezoned from 'rural' to 'special use' in 2018 within the Shire of Shark Bay LPS No 4 as Special Use 14 with the objective of the zone being for 'ecotourism development'*(not defined in SU14)* **.** Lot 304 at Sunday Island Bay is included within the Edel Land system and consists of a comparable land area of:

i. .00051% of SBWHP
ii. .05697% of the total Edel land system and
iii. .01851% of the total of all the land systems on Dirk Hartog Island.

Proposed building envelopes at Sunday Island Bay have a total area of approximately 1.86ha or

i. .000084% of SBWHP
ii. .0030% of Dirk Hartog Island
iii. 16.5% of Lot 304

The possible total 'accommodation building area' of 4 chalets at Sunday Island Bay is some .036ha or

i. .0000016% of SBWH
ii. .000059% of Dirk Hartog Island
iii. .318% of Lot 304

The aesthetic values of the site are related directly to its isolation and natural environs despite early pastoral operations: the values of Dirk Hartog Island are described within a recent 2023 document from DBCA listing outstanding universal values included in criteria viii marine environment, criteria viii terrestrial environment, criteria ix and criteria x of the WH listing.

Topography, Geology, Vegetation and Soil

The site at Sunday Island Bay is classified within the Edel Land System which comprises approx. 32.5% of the total island area and occurs in the eastern and south-eastern parts of the island. It consists of undulating sandy plains with minor low dunes, limestone rises and some saline flats, low cliffs and tall or low heath.

Lot 304 is undulating with hills and re-entrant which allow full protection from the prevailing wind, spectacular views, and the opportunity to create a world class ecotourism destination. From the southern boundary the site rises to between 10 and 20m AHD at various points towards the northern boundary of the lot.

The vegetation of the Edel Land System consists of tall and or low open heath or low shrub land and is atypical to the eastern coastline of the island. Typically, the soils of Dirk Hartog Island are sandy. In Lot 304 the soils are similar but contain a small proportion of limestone outcrops to the east of the site. Typically, of the Edel Land System, sand and sand over limestone, the Sunday Island Bay site is sand over limestone and minimal sand over limestone anchored by a stable but sparse native vegetation cover typical of the Edel Land System. (Appendix 15,16).

Climate

The island is located midway between the northern and southern climatic regions. It experiences a Mediterranean climate with hot dry summers but only moderately cool winters when it also receives its major rainfall. Being at the bottom edge of the cyclone zone it may also receive cyclonic rain over summer; this however is not consistent.

The average rainfall for Denham, the nearest town to the site, is approx. 200mm per annum with the majority falling during winter: historically Dirk Hartog Island receives more rainfall than the mainland. Cyclonic summer rain can double the rainfall received each year. These occasional summer storms have not caused any major erosion but directly contribute to the ground water of Dirk Hartog Island.

The predominant wind direction recorded at the site is southwest to westerly in the afternoon and easterly to south easterly in the mornings during the months of April through to October. Over the summer months the predominant winds are south westerly as indicated in the attached tables for Denham (Appendix 6).

Heritage

Dirk Hartog Island's traditional owners are the Malgana: A Malgana Heritage Survey of freehold land located on Dirk Hartog Island was conducted in 2007 and the Sunday Island Bay site was visited during this inspection: an agreement was completed

with the Malgana in 2009. A Clearing permit issued by DWER in 2021 for the construction of a chalet noted – ***'there are no mapped Aboriginal Sites of Significance within 10 km of the application area'. The traditional owners call the island Wirruwana.***

Dirk Hartog Island is one of Australia's most significant historical locations and the landing site of the first European -Dirk Hartog- to leave a record of his visit to Australia at Cape Inscription (approx. eighty kilometres from Sunday Island Bay) in 1616. The site is included on the Australian Heritage list of significant locations.

The island was part of Western Australia's early pastoral history being a sheep station from the mid 1800's until 2009: there are significant historical locations and relics from this time. Sunday Island Bay was the location for the first homestead built on the island around 1879, for ongoing pastoral activities, until it was dismantled and moved to homestead bay.

APPENDIX 9

SUMMARY IN REGARD TO THREATS AND RESPONSES TO THREATS

Appendix 9: VALUES - SUMMARY IN REGARD TO THREATS AND RESPONSES TO THREATS

Identified possible threats to the World Heritage Values and integrity of the site at Sunday Island Bay include:

Increased numbers of visitors

a) Trampling

It is proposed that all visitors would receive both a pre visitation briefing via information brochures and internet information and an onsite induction regarding not straying from the authorized paths that would be created within the development zone and beyond the development zone as agreed with DBCA. It is proposed that vehicular access would be limited.

Each accommodation unit would provide an information instruction sheet regarding access around and beyond the development.

b) Uncontrolled access

Pets (except guide dogs) would be prohibited.

Firearms would be prohibited.

Poisons would be prohibited.

Only visitors arriving by 4wd, or marine vessel would be able to access the accommodation units.

Visitors would be limited to only accessing the site via fixed access routes.

c) Rubbish

Waste would be required to be removed by visitors upon departure or dealt with as described in a proposed operational Waste Management Plan incorporating incentives and disincentives managed by the on-site manager.

d) Weeds

Visitors would be provided with pre-information bio-security sheets and instructed on arrival as to the importance of ensuring that they do not bring any type of weed or seeds from the mainland when visiting the site. Additionally, they would be instructed on the necessity of adhering to all tracks when moving over the development site and beyond. A draft operational Biosecurity Plan has been prepared to be finalised when any DA is approved.

e) Flora

There are no known endangered or listed species recorded on the site and the low impact construction methods combined with the design ensure minimal impact to the site and no cause for concern on species present.

f) Fauna

DBCA are currently releasing endangered fauna species on the island. As these populations grow there may be incursions on the freehold lot. Due to the building and design process, there would be little if any change to the habitats on site and thus the ability of these new species to live within the location. Substantial areas (more than 80%) of the site would remain undeveloped.

g) Aquatic

Due to the location and operational management plus the distance from the foreshore and low impact building processes including the use of atu units or composting options in accordance with the State government sewerage policy it is not anticipated that development would have any impact on the aquatic environment as confirmed in a site and soil evaluation report.

h) Introduced Pests

With visitors arriving is the possibility of bringing pests on to the island that could interfere with the RETURN to 1616 project and upset the balances being sought by DBCA. Pests could be brought onto the island in packaging, clothing or within vehicles. All visitors will be clearly advised prior to arrival of the critical nature to ensure that they do not bring pests with them.

i) Mitigating Factors

All visitors would be advised prior to arrival of what they should and should not bring to the island and this would be monitored and reinforced on arrival by direct contact with staff. In particular the aims of a weed free and pest free location would be emphasized in verbal instructions, written information and clearly visible signs. (Separate draft operational site biosecurity Plan has been prepared).

2 Visual pollution

a) Buildings

The site is only visible from remote vantage points from the ocean at more than 2 kilometres following channels that pass the bay or from Lot 305 on the opposite side of the bay.

All accommodation units would be low key, small scale and designed to blend with the landscape as shown in the design guidelines. The materials would be colour controlled as per the pallet provided by the Shark Bay World Heritage Consultative Committee, be low impact on the environment and low scale designed to blend with and seen in context with the landscape. (Refer to separate Design Guidelines).

Development envelopes have been designated for the construction of accommodation as shown within the LDP prepared for the site to minimize impact and comply with low scale. The site is not visible from the main Dirk Hartog Island track.

b) Infrastructure

Any infrastructure required on the site would be designed to provide the minimum footprint and blend into the landscape. Refer to separate Design Guidelines.

APPENDIX 10

OUTSTANDING UNIVERSAL VALUES OF THE SHARK BAY WORLD HERITAGE AREA

Appendix 10: Outstanding Universal Values of the Shark Bay World Heritage Area

Values relevant to Dirk Hartog Island

The terrestrial and marine environments on and around Dirk Hartog Island directly contribute to three of the four criteria upon which the World Heritage Status of Shark Bay is based. To understand how this very special place fits into the bigger 'World Heritage Area' picture, specific features are highlighted where Dirk Hartog Island contributes to the Statement of Outstanding Universal Value for the Shark Bay World Heritage Area.

SHARK BAY WORLD HERITAGE PROPERTY

FOUR NATURAL CRITERIA FOR OUV

CRITERIA vii

Outstanding examples representing the major stages of the earth's evolutionary history.

- Stromatolites and microbial mats of Hamelin pool
- Hamelin Pool and L'haridon Bight and Holocene deposits

CRITERIA viii

Outstanding examples representing significant ongoing geological process, biological evolution and man's interaction with his natural environment.

Marine Environment

- Unique hydrological structure, banks and sills, steep salinity gradients, three biotic zones
- Faure sill
- Hypersaline environment of Hamelin Pool
- Microbial communities
- Fragum eragatum shell deposits
- High genetic biodiversity (e.g. snapper, venerid clams, bivalves)
- Seagrass meadows, and their role in the evolution of the marine environment
- Wooramel seagrass bank, expanse of meadows and diversity of seagrass species
- Carbonate deposits and sediments
- Northern limit of transition region between temperate and tropical marine environments, resulting in high species diversity (e.g. 323 fish species, 218 bivalve species, and 80 coral species)

Terrestrial Environment

- Botanical province transition zone, most pronounced in the southern parts of Nanga and Tamala
- Range limits (145 plant species at northern limit, 39 species at southern limit, and 28 vascular plant species endemic).
- Isolation of fauna habitats on islands and peninsulas resulting in survival of threatened species
- Range limits and fauna species richness (100 species of herpetofauna – 9 endemics, 230 species of birds representing 35% of Australia's total species)
- Species evolution illustrated in Rufous Hare Wallaby and Banded Hare Wallaby.

CRITERIA ix

Superlative natural phenomena, formation or features, for instance, outstanding examples of the most important ecosystems, areas of exceptional natural beauty or exceptional combinations of natural and cultural elements.

- Stromatolites
- Hypersaline environment of Hamelin Pool
- Faure sill
- Wooramel seagrass bank
- Coastal scenery - Zuytdorp cliffs, Dirk Hartog Is, Peron Peninsula, Heirisson and Bellefin Prongs
- Fragum beaches of L'haridon Bight
- Inundated birridas and lagoons such as Big Lagoon.
- Strongly contrasting colours of the dunes/cliffs, beaches and adjacent ocean of Peron Peninsula
- Abundance of marine fauna (dugongs, dolphins, sharks, rays, turtles and fish)
- Annual wildflower season display.

CRITERIA x

The most important and significant natural habitats where threatened species of animals or plants of outstanding universal value still survive.

- Five out of Australia's 26 endangered mammals (Shark Bay mouse, Banded Hare-Wallaby, Rufous Hare-Wallaby, Western Barred Bandicoot, and Burrowing Bettong) survive in Shark Bay
- Bernier Island subspecies of Ash-grey mouse
- 12 threatened reptiles (e.g. Baudin Island Skink and Woma)
- Endemic Sandhill Frog
- 35 migratory bird species

- Threatened Thick Billed Grasswren
- Endemic Dirk Hartog subspecies of the southern emu-wren
- Dugong (approx. one eighth of the world's population)
- Humpback Whale and Southern Right Whale migratory staging post
- Loggerhead and Green Turtles (loggerhead rookery)
- Some threatened flora species

APPENDIX 11

DBCA INFORMATION BROCHURE

Dirk Hartog Island National Park

Wirruwana

Island Protection

Return to 1616 Ecological Restoration Project

Department of Biodiversity, Conservation and Attractions

PARKS AND WILDLIFE SERVICE

SHARK BAY

RECYCLE Please return unwanted brochures to distribution points

Above A survivor, the knob-tailed gecko is now thriving after the removal of pest species.

Above A predator, the chuditch will be the last animal species returned to the island.

Boating to the island

Follow the previous advice on how to pack carefully for your trip. When visiting the island by boat, install and check rodent bait stations on your vessel. Maintain bait potency by replacing as per manufacturers advice.

Take care to avoid native animals at all times when driving on the island. Please note:

- Animals often use vehicle tracks to move from place to place.
- Native mammals are most active from dusk to dawn. Please take extra care when driving between these times.

Island Protection – during your stay

- Fires are not permitted within the national park.
- Keep to existing tracks and camp at designated campsites to avoid damage to native vegetation.
- Bag all your rubbish and remove it from the island when you leave.
- Secure and store all rubbish away from animals.
- Make sure human waste is covered immediately, buried to at least 30cm and located at least 100 metres away from your campsite.
- Native wildlife is protected by law and should not be disturbed in any way.

More information

Department of Biodiversity, Conservation and Attractions
Parks and Wildlife Service
Shark Bay District
61–63 Knight Terrace, Denham WA 6537
Ph: (08) 9948 2226
Email: sharkbayenquiries@dbca.wa.gov.au
www.sharkbay.org/restoration

Front cover (clockwise from top) Banded hare-wallaby, greater stick-nest rat, dibbler, chuditch, western grasswren, Shark Bay bandicoot, and brush-tailed mulgara.

Illustrations – Ian Trapnell, Kristy Day, Parks and Wildlife.

Department of Biodiversity, Conservation and Attractions

PARKS AND WILDLIFE SERVICE

SHARK BAY

Information current at September 2020.
This publication is available in alternative formats on request.

2020_442-09 4800

Above The Asian house-gecko is a pest species. Ensure your camping gear is cleaned and free of any animals before leaving home. *Photo - Gary Hearle*

Clean your vehicle/camper trailer

Spaces underneath and inside vehicles accumulate soil and seeds that can spread disease and weeds if allowed to hitch a ride.

Clean your vehicles:

1. before packing and leaving home; and again
2. before driving onto the barge to travel to the island.

Ensure you clean:

- the underside of your vehicles including tyres, sump, radiator and gearbox guard plates.
- inside vehicles including seat crevices, floor and under floor mats.

Above DBCA staff releasing a banded hare-wallaby. *Photo - Richard Manning*

Return to 1616 – Ecological Restoration Project

Dirk Hartog Island is Western Australia's largest island. When visited by Dirk Hartog in 1616, the island was in pristine condition with a rich mammal fauna and flourishing vegetation. Since this first European landing on Australian soil, introduced plants and animals have degraded the island causing the local extinction of native species. *Return to 1616* is an ambitious project helping to restore the island's natural ecosystems. Introduced sheep and goats have been removed because their grazing and trampling damages native plants and reduces the food and shelter available for native animals. Feral cats are efficient hunters and have been eradicated from the island to make it safe for native animal species that are gradually being returned. These are the Shark Bay bandicoot, dibbler, chuditch, brush-tailed mulgara, greater stick-nest rat, desert mouse, Shark Bay mouse, heath mouse, woylie, boodie and western grasswren. In addition, rufous and banded hare-wallabies, have been included to improve their long-term survival. These animals are in need of conservation protection. Some are threatened and others extinct on the mainland. To find out more about the project, visit www.sharkbay.org/restoration.

Below Shark Bay bandicoots were returned to the island in 2019.

Above Reintroduction of dibblers bred at Perth Zoo began in 2019. *Photo - Perth Zoo*

Island Protection – before you leave home

Insects, weed seeds and pests including the Asian house-gecko and other small reptiles can infest camping gear while in storage and can hitch a ride with you when you travel. Bringing non-native species to Dirk Hartog Island can harm native plants and animals. The following tips will help to prevent pest species becoming established on the island.

Pack for the trip with care

- Don't bring any animals including pets to the island.
- Remove insects, soil, seeds, spiders and other animals from your camping gear, footwear and clothes.
- Don't bring firewood to the island.
- Pack equipment for a final vehicle clean at the barge site.
- Pack food in clean, sealed, plastic or metal containers instead of cardboard which can harbour pests.
- Ensure fresh food is free of soil, insects and snails.

Appendix 11: DBCA Information Brochure

APPENDIX 12

BUSHFIRE VEGETATION MANAGEMENT/PAINTS/BUILDING MATERIALS RESEARCH/NOTICE

Appendix 12: Bushfire Vegetation Management/Paints/Building Materials Research/Notice

The potential sources of ignition in the area are:

- Deliberately lit fire
- *Deliberately lit fires are unlikely due to limited access and personnel on the island.*
- Lightning strikes
- *Lightning strike is unlikely due to location of the island and general weather conditions. Summer lightening events in the Shark Bay area are usually associated with high relative humidity and rainfall which are two factors that are not conducive to wildfire ignition or spread.*
- Accidental causes most probably related to vehicle accidents and sparks from vehicle exhausts.
- *Accidental causes unlikely due to limited numbers of vehicles permitted on the island and a requirement that vehicles do not travel off tracks: and operation of the vehicle barge being stopped from December till late February during summer months main fire season.*
- Escapes from unauthorised campfires
- *Escape from campfires is unlikely as open fires are strictly prohibited on DHI.*
- Escapes from prescribed burns. (*There have been no prescribed burns on DHI).*
- Incorrect disposal of cigarettes
- *Possible but limited numbers accessing DHI and the resistance of salt laden shrubs to ignite and carry fire limits this possibility.*

Fire history implies that that wildfire occurrence on Dirk Hartog Island is highly uncommon, and research suggests that a specific set of fire weather events would be required for ignition and wildfire spread to be possible due to:

- A lack of ignition sources
- Lack of fire weather that promotes wildfire, where days exceeding 'Low to Moderate' and 'High' fire dangers occur less than 5% of the time due to a high, year around relative humidity likely to be the result of the islands maritime influence (BoM 2012)
- The occurrence of salt laden air and low flammability shrublands. Research by Ward 1997 revealed that certain vegetation types including some acacia shrubland species, do not easily ignite due to containing moisture contents and salt loads. Wanya samples, a predominant scrub vegetation on Dirk Hartog Island, were recorded on Peron Peninsular to contain a moisture content of 200% and a salt load conductivity of about 4000uS/cm and it is probable that this also applies on DHI.
- A result of Wards research was that numerous attempts at aerial ignition of Wanya scrub were unsuccessful.

No evidence of bushfire occurrence

There is no evidence of bushfire occurrence within or directly adjacent to Lot 304.

Consistent with this observation, advice from former DBCA staff (Strategon 2016) confirms that past prescribed burning attempts in the locality of Peron Peninsular have been unsuccessful due to the low combustibility of vegetation beyond areas dominated by Spinifex vegetation. (The vegetation at Lot 304 and surrounding is similar to that at Peron Peninsular)

The majority of the vegetation in the development area and surrounds is comprised of shrubs, with minimal grass or herb species present in the understory due in some part to the prevailing winds and close proximity of the ocean and wetlands.

Using the FESA Rural Urban Bush Fire Threat Analysis (RUBTA) authored by Smith Bushfire Consultants Pty Ltd a modified AUSLIG vegetation classification for a vegetation assessment would be used.

In the case of Lot 304 the use of modified RUBTA vegetation classifications would see the overall vegetation classified more specifically as either Low Shrubland (22) with a foliage cover of 10-30% or Low Open Shrubland (21) with a foliage cover of less than 10% (low shrubs less than 2 metres).

In line with this analysis and the slopes on the site the Fire Hazard would be regarded as low. The

BMP however classes the vegetation more broadly as Class C Shrublands in compliance with AUSLIG and SPP3.7.

SPP 3.7 Bushfire 2024 and Planning for Bushfire Guidelines November 2024 provide new and updated classification that have been included within the BMP and BEP prepared by Bushfire Safety Consulting. (see BMP,BEP,ER and MP)

Based upon research undertaken by Ward the probability of factors required to produce a significant wildfire aligning is considered highly unlikely, which is supported by the lack of fire history on DHI. Estimates of the likelihood of significant wildfire occurrence in the Shark Bay area are in the range of 50 to 100 years, where research by Ward (2010) suggests that for a wildfire to occur in these environments, the shrub layer needs to reach a state of over maturity to provide substantial dead material which could take longer than 50 years to occur.

In addition, conditions for a large fire to occur must be extreme and would probably result from a prolonged drought followed by extreme fire weather, possibly associated with a 1 in 70-to-100-year event. (Ward 1997)

Lot 304 is surrounded by ocean on three sides and by a birrida on the fourth side; fuel levels are low, and the prevailing winds assist in blowing fine and dead material from the site.

Refuge included within each Building Envelope

In view of the extended width of the lot (almost 1100m), and probable staging, the nomination of a refuge and onsite management within each envelope is proposed as a more acceptable solution to a remotely located refuge.

As vegetation management/modification is directly related to a ‘refuge’ any proposed vegetation management would be limited to APZ’s around the refuge and adjacent units located within building envelopes – significantly reducing the area of such management requirements whilst still meeting SPP3.7 and providing protection for visitors in line with the Guidelines recommendations

Three accommodation units located within each building envelope, with one nominated as the refuge, substantially reduces the area of vegetation management/modification that would be required to meet the conditions of the BMP proposed and provides more control over visitors staying within a pod.

The small area of and the careful and sensitive location of building envelopes assists to minimises any impact on the visual appearance of the lot and the natural setting that exists for ecotourism accommodation to be developed -from vegetation management for a BMP.

Open Pathway Access to Separate and Remote Refuge

Smith bushfire consultants supporting documents considered the impact on vegetation management/modification and visitor safety for an open-air pathway to access a separate refuge located on the lot and the requirement to modify vegetation over an extended area related to access tracks.

In view of the width of the site (almost 1100m) the level of vegetation management required for an open path to a refuge (plus visitor safety) was considered outside acceptable ecological impact and not in conformity with the Shires letter of October 2020 recommendations. It was concluded that a separate and possibly remote refuge would have a significant adverse impact on the required size of the asset protection zone and the vegetation management/modification required for land surrounding any open path. It would also include a larger refuge building to accommodate all one hundred persons permitted on the site in compliance with regulations and involve multiple staff accounting for visitor locations and then directing them to the refuge. Having staff resident in each pod of three units allows them to intimately know who they are and where they might be on any day just as the visitor would intimately know where the refuge was located within their cluster.

- Visitor's lives can be put at risk if the possible distance of travel between an accommodation unit and a remote refuge could be significant: a situation may arise that could put visitors lives at risk.
- Additionally, although open air access to a refuge from an accommodation unit was seriously considered it was discounted because of the extensive level of vegetation management required to achieve the required heat flux of less than 4 kW/m² using the required 1200 K flame temperature. This is higher than the AS 3959 flame temperature of 1090 K.
- The level of vegetation management to achieve the open-air access requirements from a accommodation unit to a remotely located refuge is considered unacceptably high, and not in line with low impact eco development as recommended by the Shire and proposed by the owners.
- In all cases the use of "A REFUGE" is regarded as the last alternative in the event of a fire emergency event. Closing of units and early evacuation, where possible, to a safe location prior to emergency status is the preferred avenue in the case of any forecast fire or emergency event.

The supporting BMP and BEP address all aspects and meets SPP 3.7 based upon approval of the proposed LDP building envelopes and includes vegetation management in line with published research reports to minimise the potential impact on the vegetation but maintain building protection requirements to the site whilst still meeting SPP3.7 Bushfire November 2024 requirements.

RUBFTA

Using the Fire and Emergency Service Authority (FESA) - Rural Urban Bush Fire Threat Analysis (RUBTA) authored by Ralph Smith from Smith Bushfire Consultants Pty Ltd a modified Australian Surveying and Land Information Group (AUSLI vegetation classification for a vegetation assessment would be used.

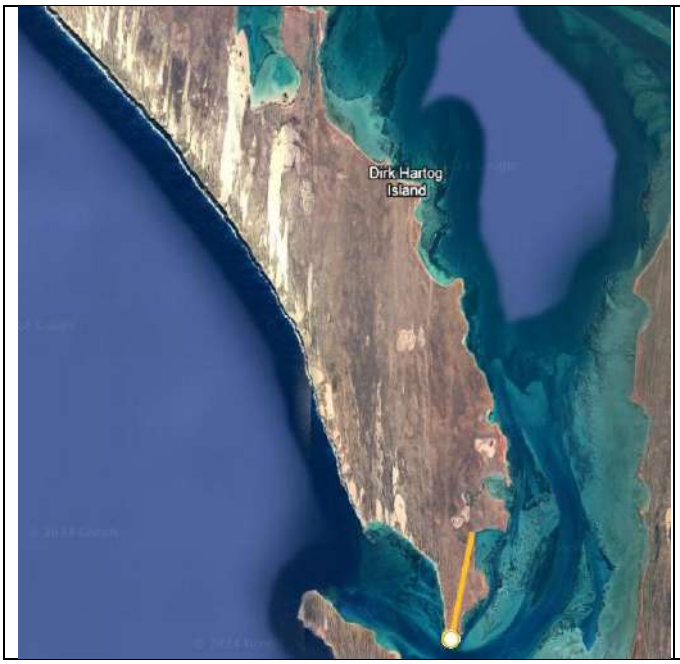
The method for the assessment of bush fire hazard is similar to that used in Planning *for Bush Fire Protection (FESA)* and also *Australian Standard 3959*. The methodology rates bush fire hazard using a combination of vegetation type, distance from vegetation and slope. Any mechanism that modifies any one of these three components will also modify the fire hazard.

In the case of Lot 304 the use of modified RUBTA vegetation classifications would see the overall vegetation classified more specifically as either Low Shrubland (22) with a foliage cover of 10-30% or Low Open Shrubland (21) with a foliage cover of less than 10% (low shrubs less than 2 metres).

In line with this analysis and the slopes on the site the Fire Hazard would be regarded as low.

The BMP however classes the vegetation more broadly as Class C Shrublands in compliance with SPP3.7.

Camping /Assembly Area prior to barge transport back to mainland



4 kilometres from Sunday Island Bay to Cape Ransonnet

13 kilometres from homestead to Sunday Island Bay

camping and assembly point prior to barge transport back to mainland

APPENDIX 13

SHIRE OF SHARK BAY FIRE NOTICE

Appendix 13: Shire of Shark Bay Fire Notice

BUSH FIRE FIREBREAK NOTICE AND REQUIREMENTS

NOTICE TO ALL OWNERS AND / OR OCCUPIERS OF LAND
IN THE SHIRE OF SHARK BAY

In accordance with Section 33 of the Bush Fires Act 1954, you are required to carry out fire prevention work on land owned or occupied by you as set out in this Notice by the dates specified. If the requirements of this Notice are not met by the due date or are not completed to the satisfaction of an inspecting officer, an on-the-spot fine of $250 will be issued. The maximum fine for failure to comply is $5,000. Council can also enter upon the land and carry out required works at the owner/occupier's expense.
Reference (Section 33 Bush Fires Act 1954)

All landowners and occupiers of land within the Shire of Shark Bay shall comply with the dates set out in this notice or within 14 days of becoming the owner or occupier of land if after that date clear firebreaks and maintain them up to and including the last date set out in this notice pending on the location of the property, in accordance with this notice.
Where a property is affected by an approved bushfire management plan, the property owner and or occupier must still comply with all requirements in this notice and with **ALL** additional requirements outlined within that plan.

FIRE BREAK NOTICE 2024/2025

DENHAM GAZETTED TOWNSITE.

Refers to all land within the Department of Fire and Emergency Services gazetted town site of Denham.
Must be installed before 1 November and maintained clear of all flammable material to 31 October inclusive.

Where the land is 2,024 square meters or less:	Where the land is greater than 2,024 square meters:
· Maintain all dry grass on the land to a height no greater than 50mm · Ensure no tree crowns overhang buildings · Prune trees and shrubs and remove dead flammable material within 1.5m around all buildings · Ensure the roofs, gutters, and walls of all buildings on the land are free of flammable matter · Establish and maintain the entire lot to an Asset Protection Zone standard, external to any buildings, and within the lot boundaries	· Install and maintain a minimum 3-meter-wide by 4-meter-high clearance, continuous (no dead ends) trafficable fire break as close as possible inside the entire perimeter of the land. · Keep a 20m low fuel Asset Protection Zone, clear of all flammable material, around all buildings and Structures · Establish and maintain the entire lot to an Asset Protection Zone standard, external to any buildings, and within the lot boundaries

PASTORAL & RURAL LAND

Refers to all land outside the Department of Fire and Emergency Services gazetted town site of Denham.
Must be installed before 1 November and maintained clear of all flammable material to 30 April inclusive.

· Install and maintain a minimum 3-meter-wide by 4-meter-high clearance (for pastoral lands recommended 6-15m wide break be installed dependent on fuel loading and vegetation), being a continuous (no dead ends) Trafficable fire break as close as possible inside the entire perimeter of the land.
· Keep a 20m low fuel Asset/building Protection Zone, clear of all flammable material, around all buildings and Structures

ALTERNATE STYLE FIREBREAK

If you consider it impracticable or environmentally damaging to carry out the requirements set out in this Notice, you can apply to the Shire of Shark Bay by 1 October for permission to provide alternative firebreaks or other fire prevention measures. In the absence of written approval for alternative measures, the owner/occupier must adhere to the requirements of this Notice. For further information, contact the Shire of Shark Bay.

BUSH FIRE FIREBREAK NOTICE AND REQUIREMENTS

NOTICE TO ALL OWNERS AND / OR OCCUPIERS OF LAND IN THE SHIRE OF SHARK BAY

FIREBREAKS

Shall consist of a strip of land free of all flammable material with the intention of minimizing the spread or extension of a bushfire and providing safe access on the property for emergency vehicles and other firefighting operations. Firebreaks may be constructed by one or more of the following methods:

- Ploughing
- Mulching
- Cultivating
- Scarifying
- Raking
- Burning
- Chemical spraying

Or other method approved by an authorized officer.

https://publications.dfes.wa.gov.au/publications/a-guide-to-constructing-and-maintaining-fire-breaks

Asset / Building Protection Zone

Maintain a fuel-reduced zone around all buildings and assets which extends 20 meters from the outermost point of all buildings and assets.

- Gutters, roofs, and walls of all buildings to be free of flammable matter and maintained.
- Trees over 5 metres in height within the 20-metre zone to be under-pruned up to 2 metres.
- Trees or shrubs within 2 metres of a building/asset shall be pruned to a height no greater than 2 metres and/or pruned away from the building/asset to a distance greater than 2 metres.
- Maintain all dry grass on the land to a height no greater than 50mm inside of the 20m zone.
- Fuel loads within the 20-metre zone is reduced and maintained to no more than 2 tonnes per hectare.

https://publications.dfes.wa.gov.au/publications/building-protection-zone-standards

ADDITIONAL WORKS

In addition to the requirements of this Notice, regardless of land size and location, you may be required to carry out further fire prevention works to reduce hazards considered necessary by an Authorised Officer. Any further requirement would be specified by way of a "work order" forwarded to the address of the owner(s) and/or occupier(s).

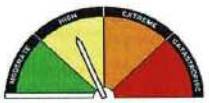
Some examples of these could be:

- remove accumulated fuel such as leaf litter, twigs, dead bush, and dead trees capable of carrying a running fire.
- reduce unmanaged grasses/weeds by slashing, mowing or other means.
- reduce long grasses in areas not being grazed or cultivated by slashing, mowing, bailing, or by other means.
- reduce vegetation to a low-threat state from the outer edge of the firebreak through to the property boundary (e.g., no long grass, overhanging branches).

Green Waste and Mitigation Burning in the Shire of Shark Bay

RESTRICTED BURNING Between the 1st of October to the 30th of November & 1st of April to the 30th of April each year during this period:

- A permit is required to burn, permits will only be issued for fuel mitigation burning of the bush, green waste, or campfires.
- Burning is prohibited on any day when the Fire Danger Rating reaches High, Extreme, or Catastrophic
- Burning is prohibited when a Total Fire Ban has been declared.
- During the Restricted Burning Periods, you are only allowed to burn on days that are Moderate.



Fire Danger Ratings are on the BOM website: http://www.bom.gov.au/wa/forecasts/fire-danger-ratings.shtml

Burning is Prohibited from the 1st of December to the 31st of March each year inclusive.

APPENDIX 14

DBCA ADVICE TO LESSEES IN REGARD TO CLOSURE PROTOCOLS FOR NATIONAL PARKS

Government of **Western Australia**
Department of **Parks and Wildlife**
Parks and Visitor Services

Your ref:
Our ref:
Enquiries:
Phone:
Email:

Dear Lessee

NATIONAL PARK AND RECREATION SITE CLOSURES DUE TO FIRE DANGER RATING

I wish to inform you of Parks and Wildlife's protocols in relation to bushfire risk and park closures and provide you with information that may assist in planning your own response to bushfire risk.

Following the catastrophic Black Saturday bushfires in Victoria, and more recent fires in Western Australia such as Parkerville in 2014, community expectations for response and management of fire risk have changed (see Attachment 1 for further information).

Western Australia has adopted the new nationally agreed Fire Danger Rating scale to help communities understand information about bushfire risk (see Attachment 2.). More information on the Fire Danger Ratings is available on the Department of Fire and Emergency Services (DFES) website www.dfes.wa.gov.au .

Every day during the fire season the Bureau of Meteorology (BOM) forecasts an outlook of the fire danger index by considering elements of the predicted weather including temperature, relative humidity, wind speed, and dryness of vegetation. State fire agencies, in consultation with the Bureau, then consider a range of other factors relating to that area to set the Fire Danger Rating. Factors include the length of time the fire danger index has been elevated, the extent of fire already in the landscape, fuel and dryness and the likelihood of weather events such as lightning.

Fire Danger Ratings are communicated to the wider community through weather forecasts, newspapers, radio, TV and on websites.

Parks and Visitor Services
Locked Bag 104, Bentley Delivery Centre, Western Australia 6983
Phone: (08) 9334-0333 Fax (08) 9334-0253 Email: rod.quartermain@dpaw.wa.gov.au
www.dpaw.wa.gov.au

Appendix 14; DBCA ADVICE TO LESSEES IN REGARD TO CLOSURE PROTOCOLS FOR NATIONAL PARKS

PARKS AND WILDLIFE CLOSURE PROTOCOLS

Closures will apply to parks and recreation sites according to the fire danger rating for the designated Bureau of Meteorology (BoM) weather forecast district (see Attachment 3). While a park or reserve will be declared closed, it will not be possible to physically restrict access to areas that are not fenced or gated.

A list of closed parks will usually be provided on the Parks and Wildlife website www.dpaw.wa.gov.au and through the general and social media during the day before the forecast Very High to Catastrophic Fire Danger day. Occasionally the Department may only receive short warning that a Very High to Catastrophic Fire Danger day will be declared and notification may be on the day of closure. As soon as a decision is made to close parks it will be communicated through the above mentioned methods.

Closure duration is based on the daily forecast period which is reviewed at the beginning and end of each day and will be confirmed in information releases.

People planning to visit parks and recreation sites during these periods of Very High to Catastrophic Fire Danger conditions should review their plans and avoid bushfire prone areas. Those already in bushfire prone areas should leave the night before or early in the morning to avoid the risk.

During periods of higher fire risk throughout the bushfire season, Parks and Wildlife will provide information regarding park closures and bushfire risk, while recognising the need for people to take responsibility for their own actions and safety. Parks and Wildlife will endeavour to do this in a way that doesn't discourage enjoyment of Western Australia's parks and waterways and will take the following action in response to the highest levels of Fire Danger Rating in relation to bushfire risk and public visitation:

Catastrophic Days
On days of Catastrophic Fire Danger Rating, all parks and reserves managed by Parks and Wildlife identified as significant bushfire risk will be closed.

Extreme / Severe / Very High Days & Other Bans
On days of Extreme, Severe and Very High Fire Danger Rating the majority of parks should remain open. However, there are exceptions where parks will be closed including: where an area is identified as high bushfire risk; where existing fire suppression commitments reduce response capacity; and on any day with a Total Fire Ban. Harvest Bans and Vehicle Movement Bans issued by local governments may also require area closures in some circumstances.

ACTIONS FOR TENANTS AND LEASE/LICENCE HOLDERS

All tenants, lease and licence holders need to be aware of the bushfire risk and safety issues that may affect their clientele and themselves.

Parks and Wildlife will be closing parks and recreation sites in high fire risk areas on days of Catastrophic fire danger rating and some parks on days of Extreme, Severe and Very High, as well as during Total Fire Bans (as above) from time to time. Parks and Wildlife will not be closing any commercial business or tenant activity, however closed parks, sites and areas will be unavailable for normal business activities on these days. You are advised to consider your response on days when park closures are in place. Your operation and emergency response procedures should include alternatives that avoid bushfire prone areas or other suitable arrangements during conditions that result in Catastrophic, Extreme, Severe or Very High days, and days of declared Total Fire Ban.

Lease holders / occupiers are legally responsible for the safety and wellbeing of people on your lease. Licensed commercial operators have similar legal responsibilities regarding client safety

and compliance with your licence conditions. If you are concerned about your legal liability please seek your own legal advice.

Attached is an information note that provides further background on bushfire risk management. Also attached is the DFES table outlining the Fire Danger Ratings and what it means to you, and maps indicating the BoM weather zones in which the warnings will apply. As a lessee, tenant, or licence holder you need to confirm which zone(s) you operate in and take steps to ensure the safety of your clientele.

The department will make every effort to provide you with information about closures through our 'Parks Trails and Road Closure' page in the 'Park Alerts' section of the Parks and Wildlife website as well as the Commercial Operator email alerts. Information will also be posted on Parks and Wildlife's Facebook and Twitter pages. Also we have alert apps for Apple and Android devices which cover both alerts and park and road closures. These can be downloaded from the Apple App store or Google Play store.
Apple https://itunes.apple.com/au/app/dpaw-alerts/id767156295?mt=8
Android https://play.google.com/store/apps/details?id=main.project.dpaw&hl=en However, we urge you to keep informed through the formal bushfire information channels listed below:

- Department of Fire Emergency Services website: www.dfes.wa.gov.au .
- Tune into emergency broadcasters: ABC and local commercial radio stations
- Ring the Department of Fire and Emergency Services for emergency information on 13 DFES (13 3337)
- Department of Parks and Wildlife's website: www.dpaw.wa.gov.au

Park closures are likely to be an uncommon occurrence, however each bushfire season is different. Managing bushfire risk under adverse conditions and in remote locations is complex. Should you wish to discuss what may be considered appropriate management actions in relation to your operation on Parks and Wildlife managed-lands in these conditions, please contact your local District office. Alternatively, should you have any lease or licence administration queries please contact Malcolm Briggs for leases (08 9334 0216) or Gerard Ots for commercial operator licences (08 9334 0516).

Your cooperation in this matter is greatly appreciated.

Yours sincerely

Rod Quartermain
Manager, Policy and Tourism Branch
Park and Visitor Services Division

22 December 2014

Attachment 1. **PARKS AND WILDLIFE INFORMATION NOTE**

Department of Parks and Wildlife

Information Note
Parks and Wildlife Visitor Management Strategies for Adverse Fire Weather Conditions - March 2014

This information note is to inform people in the recreation and tourism industry of one of the management strategies utilised, by the Department of Parks and Wildlife (Parks and Wildlife), to mitigate bushfire risk to visitors to bushfire prone areas. This strategy involves the closure of Parks and/or recreation sites due to Very High to Catastrophic Fire Danger Ratings.

Over recent years there have been a number of situations involving bushfire prone areas throughout Australia which have caused fire and emergency agencies to review key areas of bushfire management. As the Department of Parks and Wildlife manages significant amounts of bushfire prone areas it is incumbent on the Department to consider information, generated by such reviews, in relation to visitors to national parks and other recreation and tourism opportunities. Parts of these reviews provide information applicable to department-managed lands and the risk people face when in bushfire prone areas during days experiencing dangerous fire weather conditions.

Parks and Wildlife and its predecessors have managed bushfire and other adverse weather event risks to its visitors for decades and during that time the closure of parks and sites has been a risk mitigation tool used by managers. Fire danger related park closures have in general, but not exclusively, been in response to actual fire incidents.

In Western Australia the level of risk that bushfires pose to these areas under adverse conditions is described by DFES's Fire Danger Rating System. This system rates fire danger from Low - Moderate through to Catastrophic as potential fire behaviour increases in ferocity. A key outcome of the Victorian 2009 inquiry was the review of the DFES 'Fire Danger Rating System' and the addition of a 'Catastrophic' category. Also, it recommended the need for clear advice to be provided to the community on what the categories mean and what you should do during those conditions.

The new rating system includes information for categories such as;

- Catastrophic - "Put your survival first and leave bushfire risk areas the night before or early in the day – this is your best option" and;
- Severe & Extreme - "Only stay if you are prepared to the highest level and able to actively defend your home if a fire starts".

Suppression of fires in the upper end of the scale becomes more difficult and in certain conditions impossible. When the fire hazard is elevated suppression can become too difficult or impossible to ensure the safety of life and evacuation is generally the only strategy available. Experience has shown that the timeframes to evacuate visitors from threatened areas and the level of resources required to carry out all aspects of an incident's management overstretch the department's capacity and may compromise visitor and fire fighter safety.

With the severity of fire incidents increasing and the changing public perception toward how government agencies should respond to the threat of bushfire, agencies need to review their management practices regularly. This, and the need to consider the recommendations from inquiries such as that into Victoria's Black Saturday fires of 2009, has resulted in the recent review of the department's procedures and systems when managing recreations areas, visitors and bushfire threat.

There are a range of management or mitigation actions to improve visitor safety available to the department, including but not limited to: early detection; rapid bushfire suppression response; forest fuel hazard reduction through prescribed burning; mechanical fuel reduction and management of visitor exposure to bushfire prone areas. The department uses all of these measures where practicable, however, the effectiveness of some measures are significantly reduced as fire danger levels increase. In addition, the

agency's capacity to adequately respond to new fire incidents is significantly reduced when resources are already committed to bushfire suppression operations elsewhere. More recently the department has formalised and begun implementation of an operational policy: "Closure of Recreation Sites Due to Very High to Catastrophic Fire Danger Rating" to adopt this revised position.

Parks and Wildlife managers are required to work with these new ratings, consider community expectations and determine how the rating system applies to visitors to land managed by the department. Clearly, visitors to Parks and Wildlife managed lands are not in a position to 'defend' and few sites have been identified that provide adequate safety against bushfire risks. All aspects of a park's operation are taken into consideration when determining bushfire risk management, including commercial operations and other planned events. Managers' do not take the decision to close areas lightly, understanding fully the potential impacts on the community and businesses. The closure of areas is determined by District and Regional Managers and delegated Duty Officers. The timing of informing the community and commercial operations is a complex issue and may vary slightly depending on BoM forecast information and the occurrence of fires.

Commercial operations licenced by Parks and Wildlife have a list of conditions informing and governing aspects of their operation. Included in licence conditions is advice that "Many parts of Department managed lands may, at some time of the year, be subject to full or partial closure for a variety of reasons". Closures relating to fire or fire risk are put in place for the safety and protection of visitors to a park. The Commercial Operations Licence conditions also state: "No guarantee of access – The operator acknowledges that nothing in the licence guarantees the operator access to any area of Department managed lands and the Director General may, at any time and from time to time, close or restrict access to any area of Department managed lands without prior notice to the operator."

Commercial Lessee's on Parks and Wildlife managed land are included in the distribution of fire danger alerts and notification of park closures, with the onus to manage the safety of visitors to their lease area remaining with the lessee. The exception to this is where the lease is situated within a park that is to be closed. Lessees in this situation should liaise with staff at the local office.

Parks and Wildlife has been reviewing the latest information and further developing plans to manage bushfire risk to visitors in the lead up to this fire season. Recent work has included:

- A focus on the South West forest region's recreation sites and parks (Swan, South West and Warren Regions)
- Identification of bushfire hazard areas
- Assessing risk to visitors
- Determining risk management actions (develop a decision matrix to guide staff in implementing actions)
- Developing a Communication procedures and;
- Developing Standard Operating Procedures for specific sites, parks or groups of parks should closures or evacuations be required.

The vast majority of Parks and Wildlife sites are situated in or adjacent to bushfire prone areas. Visitor perception of bushfire risk and what visitors should do in these areas to stay safe ranges greatly with a significant proportion having little or no knowledge. Parks and Wildlife must consider the level of visitor understanding and the potential for panic reactions when assessing the risk to visitors in bushfire prone areas. In addition to this the following elements are considered when determining management action for each area:

- Forest fuel loading & proximity to visitor areas
- Potential ignition sources – previous history, lightning, arson, accidental
- Protection strategies implemented and effective for the area
- Area terrain – steep, flat
- Difficulty of fire suppression – ease of suppression access, response times,
- Suppression resources available
- Level of vehicle egress, single or multiple routes
- Visibility affected by smoke on egress under key wind directions
- Safe assembly areas/structures
- Visitor numbers
- Visit timing
- Activities undertaken in area

- Spread of visitors across area locations e.g. trails
- Range of visitor type – e.g. children to elderly, disabled, family groups, in cars or buses & on bicycles
- Duration on site
- Entry fee charged
- Likely consequences – fatality, serious injury should a threat be realised.

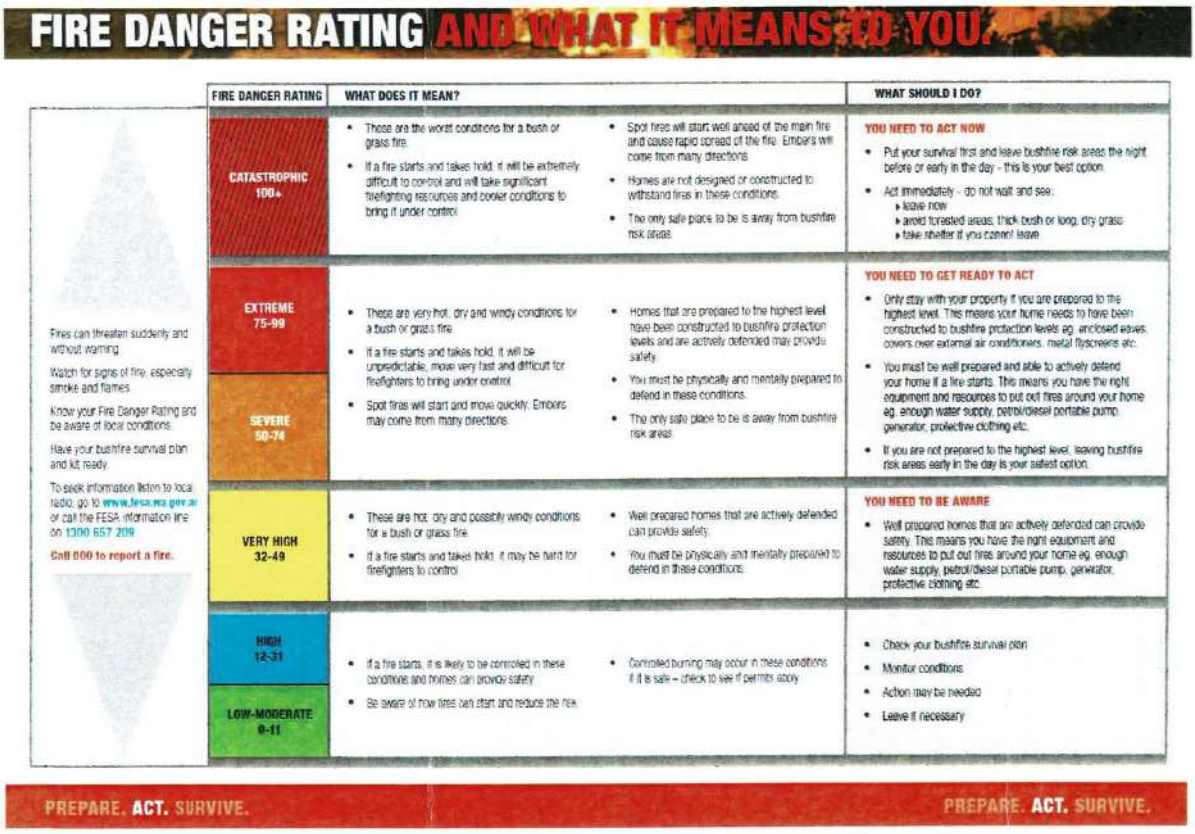
Other factors beyond the department's control also impact visitor management. In the case of the weekend of 11 & 12 January 2014 some local authorities put a 'Vehicle Movement Ban' in place affecting the Off-road Vehicle Areas of Gnangara and Pinjar, effectively closing the areas to the designated activity. Formal closure of these areas was then implemented by Parks and Wildlife. Elsewhere vehicle movement bans saw the cancellation of 4WD driver training courses.

The events of the Parkerville fire, on 12 January 2014, provide a good example of the nature of the task before Parks and Wildlife managers and highlight the government and community's limited capacity to address fire incidents in adverse weather conditions.

Other parallels in community response to the forecast conditions were also noted, including the closure of all walk trails in Kings Park and the cancellation of events such as horse racing meetings.

Historically, closures due to forecast fire danger ratings number under 5 per year for the metro area. Planning for adverse fire danger ratings will help to lessen the impact on your visitors' experiences and your business. It is suggested that you develop alternative activities for such situations. Liaison with our District office in the area of your operation may assist you in that planning and preparation.

Attachment 2. **DEPARTMENT OF FIRE AND EMERGENCY SERVICES FIRE DANGER RATING TABLE**



FIRE DANGER RATING AND WHAT IT MEANS TO YOU

Fires can threaten suddenly and without warning.

Watch for signs of fire, especially smoke and flames.

Know your Fire Danger Rating and be aware of local conditions.

Have your bushfire survival plan and kit ready.

To seek information listen to local radio, go to www.fesa.wa.gov.au or call the FESA information line on 1300 657 209.

Call 000 to report a fire.

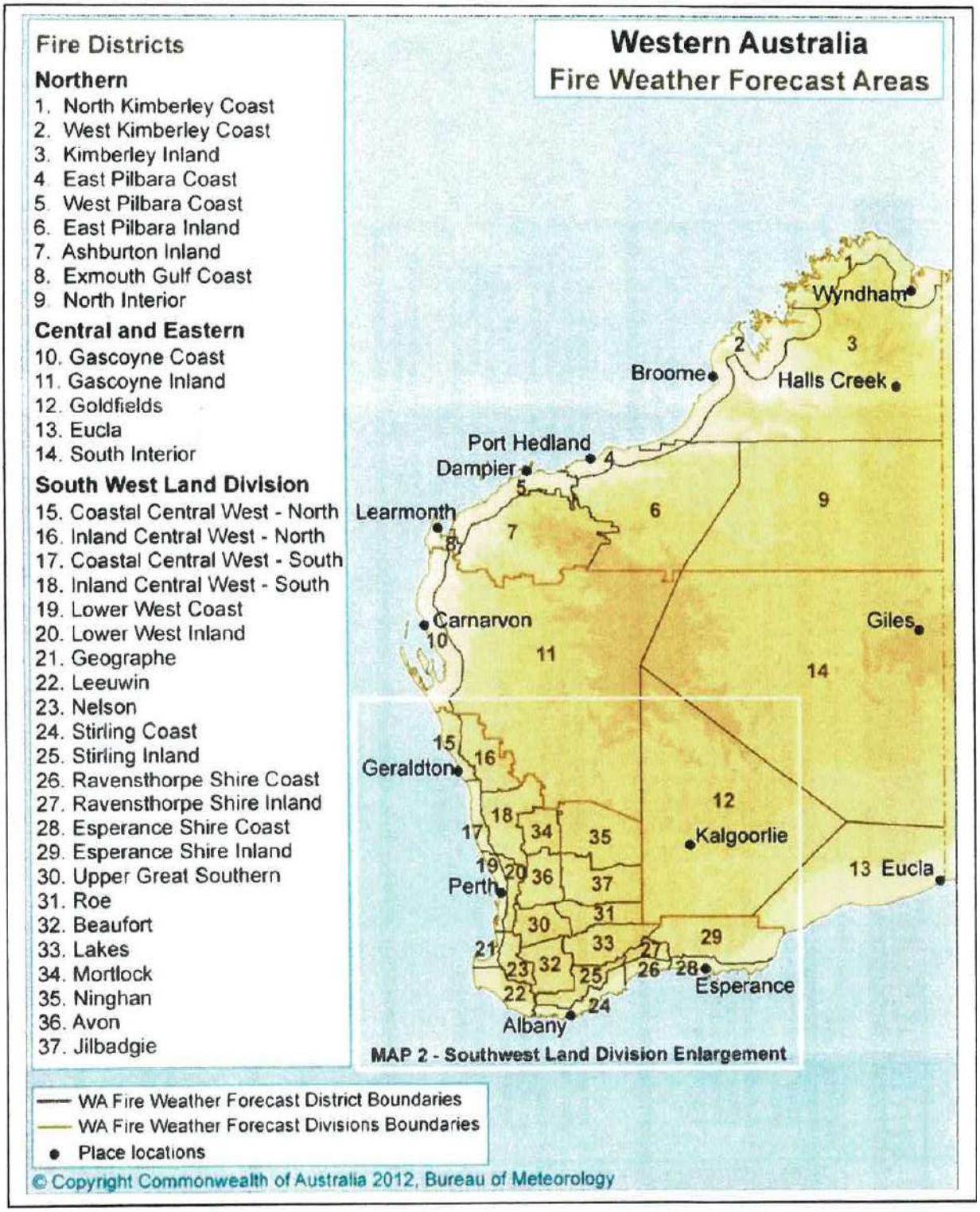
FIRE DANGER RATING	WHAT DOES IT MEAN?		WHAT SHOULD I DO?
CATASTROPHIC 100+	• These are the worst conditions for a bush or grass fire. • If a fire starts and takes hold, it will be extremely difficult to control and will take significant firefighting resources and cooler conditions to bring it under control.	• Spot fires will start well ahead of the main fire and cause rapid spread of the fire. Embers will come from many directions. • Homes are not designed or constructed to withstand fires in these conditions. • The only safe place to be is away from bushfire risk areas.	YOU NEED TO ACT NOW • Put your survival first and leave bushfire risk areas the night before or early in the day - this is your best option. • Act immediately - do not wait and see: ▸ leave now ▸ avoid forested areas, thick bush or long, dry grass ▸ take shelter if you cannot leave.
EXTREME 75-99	• These are very hot, dry and windy conditions for a bush or grass fire. • If a fire starts and takes hold, it will be unpredictable, move very fast and difficult for firefighters to bring under control. • Spot fires will start and move quickly. Embers may come from many directions.	• Homes that are prepared to the highest level have been constructed to bushfire protection levels and are actively defended may provide safety. • You must be physically and mentally prepared to defend in these conditions. • The only safe place to be is away from bushfire risk areas.	YOU NEED TO GET READY TO ACT • Only stay with your property if you are prepared to the highest level. This means your home needs to have been constructed to bushfire protection levels eg. enclosed eaves, covers over external air conditioners, metal flyscreens etc. • You must be well prepared and able to actively defend your home if a fire starts. This means you have the right equipment and resources to put out fires around your home eg. enough water supply, petrol/diesel portable pump, generator, protective clothing etc. • If you are not prepared to the highest level, leaving bushfire risk areas early in the day is your safest option.
SEVERE 50-74			
VERY HIGH 32-49	• These are hot, dry and possibly windy conditions for a bush or grass fire. • If a fire starts and takes hold, it may be hard for firefighters to control.	• Well prepared homes that are actively defended can provide safety. • You must be physically and mentally prepared to defend in these conditions.	YOU NEED TO BE AWARE • Well prepared homes that are actively defended can provide safety. This means you have the right equipment and resources to put out fires around your home eg. enough water supply, petrol/diesel portable pump, generator, protective clothing etc.
HIGH 12-31	• If a fire starts, it is likely to be controlled in these conditions and homes can provide safety. • Be aware of how fires can start and reduce the risk.	• Controlled burning may occur in these conditions if it is safe – check to see if permits apply.	• Check your bushfire survival plan. • Monitor conditions. • Action may be needed. • Leave if necessary.
LOW-MODERATE 0-11			

PREPARE. ACT. SURVIVE. PREPARE. ACT. SURVIVE.

APPENDIX 15

BOM FIRE WEATHER FORECAST AREAS/BOUNDARIES

Appendix 15: BOM FIRE WEATHER FORECAST AREAS/BOUNDARIES



APPENDIX 16

DFES FIRE BAN DECLARATIONS

Appendix 16: DFES Fire Ban Declarations

Government of Western Australia
Department of Fire & Emergency Services

DFES
Department of Fire & Emergency Services

NUMBER OF TOTAL FIRE BAN DECLARATIONS						
KIMBERLEY	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Shire of Broome	0	8	0	3	0	0
Shire of Derby/West Kimberley	0	7	0	3	0	0
Shire of Halls Creek	0	6	1	1	0	0
Shire of Wyndham-East Kimberley	0	2	1	1	0	0
PILBARA	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Shire of Ashburton	11	10	3	19	9	14
Shire of East Pilbara	12	10	9	16	0	3
Shire of Exmouth	4	2	3	9	2	10
City of Karratha	7	9	2	16	23	22
Town of Port Hedland	11	6	9	13	11	7
MIDWEST GASCOYNE	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Shire of Carnamah	6	11	17	18	18	14
Shire of Carnarvon	16	21	17	28	0	2
Shire of Chapman Valley	14	19	20	42	21	17
Shire of Coorow	6	11	17	18	18	13
Shire of Cue	11	10	12	18	0	0
Shire of Dandaragan	6	11	17	18	18	11
City of Greater Geraldton	14	18	20	42	22	18
Shire of Irwin	1	8	15	13	14	8
Shire of Meekatharra	11	11	8	18	0	0
Shire of Mingenew	8	17	16	33	17	14
Shire of Moora	5	11	16	11	15	11
Shire of Morawa	8	17	16	33	17	14
Shire of Mount Magnet	11	10	12	18	0	0
Shire of Murchison	11	11	10	18	0	0
Shire of Northampton	14	19	20	42	21	17
Shire of Perenjori	5	12	17	11	16	15
Shire of Sandstone	22	13	14	20	0	0
Shire of Shark Bay	16	20	17	28	0	1
Shire of Three Springs	5	11	16	11	15	10
Shire of Upper Gascoyne	11	11	10	21	0	0
Shire of Victoria Plains	5	11	16	11	15	10
Shire of Wiluna	26	19	23	27	0	0
Shire of Yalgoo	11	10	11	18	0	0
GOLDFIELDS MIDLANDS	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**
Shire of Beverley	2	14	14	7	13	5
Shire of Bruce Rock	2	12	12	7	11	4
Shire of Coolgardie	13	18	8	6	0	0
Shire of Cunderdin	2	13	14	7	13	5

Total Fire Ban Declarations
Last Updated May 2024

Contact regulation.compliance@dfes.wa.gov.au
Page 1 of 4

Appendix 17

BUILDING MATERIAL OPTIONS - FIRE

Appendix 17: BUILDING MATERIAL OPTIONS - FIRE

FIRECRUNCH BUILDING MATERIALS

GENERAL FEATURES

- Fireproof to extremely **high temperatures (1200 c) FRL90/90/90.**
- Meets BAL 12.5 to 40 and FZ (Flame Zone) to maximum irradiance 50kW/m2 - consult the rural fire authorities in your area to confirm to the Local Asset Protection Zones (APZ) requirements.
- **Non Combustible. AS/1530.1 AS/1530.4-2005/16, AS/3837**
- **AS/3959, AS/1530.8.2 BUSH FIRE COMPLIANT**
- All weather product (interior/exterior when sealed).
- Resistant to flooding and prolonged water immersion.
- Resistant to mould,mildew and kills bacteria
- Totally resistant to termites, protects expensive timber framing.
- Low thermal conductivity ~0.44 (W/ mK).
- High Australian insulation Batt combination R values.
- Acoustic Rating Rw 62 +Ctr 52 / 10mm sheets .Discontinuous frame .
- Strike resistant, durable and 10 x stronger than plasterboard.
- Non polluting, non toxic. low CO^2
- Prevents bacterial growth. NO VOC
- Green Product - very low CO^2 emission in manufacturing 5%.
- FireCrunch virtually carbon neutral.
- Can be cut, drilled, sawn or planed like timber. Use timber tools
- No special trades tools required. no pre drilling like CFC
- Can be textured, rendered, painted, tiled etc.
- **100% recyclable material. Green labelled.**

ONE BUILDING PRODUCT MULTIPLE APPLICATIONS **WALLS, FLOORS AND CEILINGS INTERNAL AND EXTERNAL** FIRECRUNCH.COM.AU

FireCrunch
Australian Certified Building Solutions

HOW IS FIRECRUNCH DIFFERENT?

Australian FIRE TESTED by the CSIRO /NATA AS/1530.4-2005//2016
FCA MAGNESIUM-OXIDE BUILDING & LINING BOARD

FIRE TESTED BY CSIRO / BCA

- FireCrunch will not burn and has been tested to 1200°c with no combustion or flame out. CSIRO /MOGO NSW.
- FireCrunch does not hold water and so superheated steam will not "blow out" the product as it may do with standard building bricks in fire conditions.
- FireCrunch will not burn in a fire storm. FireCrunch is applicable in BAL 12.5 to 40 and F7 flame zone regulation areas when used to protect exposed timber framing eaves joists etc(AS3959). Tested by the CSIRO to worst case scenario fire storm conditions.
  Meets AS/1530.8.1 & 8.2, and AS/3837 .**CSIRO. *NATA LABS Tested***
  AS/1530.4-2005 (2025 Exp)
  (NON ASBESTOS TESTED NATA CLEARSAFE NSW (AS/4964) Non Chloride.
- FireCrunch insulation properties help protect internal furnishing from internal combustion and flash burning from high external temperatures.
- FireCrunch will not ignite from ember attacks. Bushfire ember attack is the largest single national contributor to home loss.
- FireCrunch is 8 to 10 times stronger than normal plaster board products and insulates from intense heat and cold.
- FireCrunch will not degrade or break down in water and resists mould and mildew so is ideal for flood prone areas.
- FireCrunch is of no interest to termites and KILLS bacteria.

FireCrunch will save your home from a burn down

ONE BUILDING PRODUCT MULTIPLE APPLICATIONS **WALLS, FLOORS AND CEILINGS INTERNAL AND EXTERNAL** FIRECRUNCH.COM.AU

GENERAL FEATURES

- Fireproof to extremely **high temperatures (1200 c) FRL90/90/90.**
- Meets BAL 12.5 to 40 and FZ (Flame Zone) to maximum irradiance 50kW/m2 - consult the rural fire authorities in your area to confirm to the Local Asset Protection Zones (APZ) requirements.
- **Non Combustible. AS/1530.1 AS/1530.4-2005/16, AS/3837**
- **AS/3959, AS/1530.8.2 BUSH FIRE COMPLIANT**
- All weather product (interior/exterior when sealed).
- Resistant to flooding and prolonged water imersion.
- Resistant to mould,mildew and kills bacteria
- Totally resistant to termites, protects expensive timber framing.
- Low thermal conductivity ~0.44 (W/ mK).
- High Australian insulation Batt combination R values.
- Acoustic Rating Rw 62 +Ctr 52 / 10mm sheets .Discontinuous frame .
- Strike resistant, durable and 10 x stronger than plasterboard.
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- **100% recyclable material. Green labelled.**

ONE BUILDING PRODUCT MULTIPLE APPLICATIONS **WALLS, FLOORS AND CEILINGS INTERNAL AND EXTERNAL** FIRECRUNCH.COM.AU

PAINTING OPTIONS

FIRECOAT PAINTS

TECHNICAL AND EDUCATION

The release of the ground-breaking FIRECOAT range is the culmination of years of dedicated research and development by leading scientists and engineers from the University of NSW Sydney.
The exterior paint has been accredited with a BAL-40 rating by independent body, The National Association of Testing Authorities (NATA), Australia's leading accreditation body.

WHAT IS THE BAL RATING SYSTEM?

The BAL rating is the Australian standard for measuring the risk of a home's exposure to ember attack, radiant heat, and direct flame contact. The BAL rating determines the construction and building requirements necessary to protect homes in bushfire prone areas.

There are six levels of the BAL rating in accordance with the Australian Standard – AS 3959:2018 Construction of buildings in bushfire-prone areas. The ratings increase as fire severity increases. The higher the BAL rating of materials, the more protection is provided to structures as fire severity increases.

BAL	Description of risk - Bush Fire Attack Level
BAL – LOW	Low risk potential fire.
BAL – 12.5	Risk is primarily from potential embers during a fire
BAL – 19	Moderate risk, particularly from embers and burning debris.
BAL – 29	High risk, particularly from embers, debris and heat.
BAL – 40	Very high risk. Likely to be impacted by embers, debris, heat and potentially flames.
BAL – FZ	Extreme risk. Directly exposed to the flames of a potential fire front.

HOW DO FIRECOAT PAINTS COMPARE TO OTHER PAINTS?

No other paint on the market globally offers the protection of FIRECOAT.

See frequently asked questions for more information.

PROTECTING YOUR PROPERTY FROM FIRE

In addition to using FIRECOAT undercoats there are a number of measures you can take to protect your assets from fire. Visit the Your Home Government website for more ideas on bushfire protection.
Some low-cost options include:

- Sealing all gaps around the house with appropriately specified joining strips or flexible silicon-based sealant
- Installing appropriately specified building membranes behind weatherboards or other external cladding when they are being replaced
- Installing appropriately specified building membranes beneath existing roofing (especially tiled roofs) when it is being replaced for maintenance
- Installing draught excluders at the base of side-hung doors, and draught seals around window and door frames
- Sealing vents and weep holes in external walls with aluminium mesh (<2mm gap)
- Sealing around roofing and roof penetrations with appropriately specified flexible silicon-based sealant
- Installing non-combustible gutter guards
- Putting non-combustible metal mesh over areas of windows and doors where they can be opened
- Reducing the amount of bushfire fuel around the house to create an asset protection zone or a defendable space.

In the event of a bushfire, it is recommended that you leave your property as soon as possible and follow advice provided by your local fire-fighting service. For further guidance and tips on protecting yourself and your property during a bushfire, refer to the Rural Fire Service website.

FIRECOAT EXTERIOR

TOUGH, DURABLE, WATER-BASED EXTERIOR UNDERCOAT USING INNOVATIVE POLYMER TECHNOLOGY FOR FIRE PROTECTION.

- Rating BAL-40, offering the highest level of fire protection of any paint on the market
- For use on a variety of substrates including render, timber, aluminium, steel, concrete, plasterboard and brick.
- Non toxic and safe
- Retains efficacy for up to 10 years
- Easy to apply with spray, roller or brush
- Developed in partnership with experts at the University of New South Wales Sydney
- Available in light grey colour
- Available in 4L and 10L

FIRE RETARDANT CERTIFICATIONS

- AS 3959:2018 (BAL 40) - Extremely high bushfire rating
- AS 5637.1-2015 - Fire Classification | Group 1 AS/NZS 3837
- AS 1530.4-2014 - Steel Protection | FRL 120/-/-
- AS 1530.4-2014 - Plaster board wall system* | FRL -/30/30
- ASTM D2898 Method B - Accelerated weathering testing
- ISO 5660 - Heat release and smoke production
- *Plasterboard wall system: 13 mm standard grade plasterboard over 35 mm x 70 mm timber framing with glass wool insulation.

FIRECOAT INTERIOR

DURABLE, WATER-BASED INTERIOR UNDERCOAT PAINT USING INNOVATIVE FIRE-RETARDANT POLYMER TECHNOLOGY.

- Offering the highest level of fire protection of any interior paint on the market today
- Classified as EN 13501-1 (Bs1/d0) in accreditations EN 13823 & EN ISO 11925-2. The highest flame-retardant rating for any internal paint
- Smooth paint finish

- For use on internal finishes including timber and plasterboard.
- Non toxic and safe
- Retains efficacy for 10 years
- Easy to apply with spray, roller or brush
- Developed in partnership with experts at the University of New South Wales Sydney
- Available in white
- Available in 4L and 10L
- Not suitable for exteriors

FIRE RETARDANT CERTIFICATIONS

- Classified B-s1,dO in accreditations EN 13823 & EN ISO 11925-2.
- This is the highest flame retardant rating for an internal paint.
- AS/NZS 1530.3:1999

APPENDIX 18

COVENANTS

Appendix 18: Covenants

CONVENANTS

1. The transferee, as registered proprietor of the land hereby transferred (**Land**), to the intent that it shall bind itself, its transferees, successors in title and assigns as registered proprietor of the Land from time to time, as covenantor COVENANTS with the Minister for Lands, as covenantee, under section 15 of the *Land Administration Act 1997* as follows:

   (a) the Land may only be used for the purpose of low impact ecotourism, which includes the provision of Visitor Accommodation Units and Staff Accommodation in accordance with subclauses (b) to (g) inclusive;

   (b) the number of Visitor Accommodation Units that may be built or placed on the Land must not exceed the number (rounded down to the nearest whole number) that is three times the number of hectares in the Land (for example, if the Land is 17.3 hectares, the number of Visitor Accommodation Units may not be more than 51 – 17.3 x 3 = 51.9, rounded down to 51);

   (c) if permission is given by any relevant Governmental Agency for the Land to be subdivided, the number of Visitor Accommodation Units on all subdivided parts of the Land in the aggregate must not exceed the maximum number allowable under subclause (b) in respect of the Land before it was subdivided;

   (d) the floor area, that is under a roof and enclosed, of each Visitor Accommodation Unit must not exceed 90m^2, provided that any verandah that is not enclosed or is not used as a sleeping area is not to be included in the floor area calculation;

   (e) the Staff Accommodation that may be built or placed on the Land must not provide for:

      (i) the number of staff personnel being housed to be more than the number calculated by a staff to guest ratio of 1:1; and

      (ii) a floor area of more than 35m^2 per staff personnel being housed;

   (f) if permission is given by any relevant Governmental Agency for the Land to be subdivided, the Staff Accommodation on all subdivided parts of the Land in the aggregate must not exceed the limits permissible under subclause (e) in respect of the Land before it was subdivided;

   (g) each Accommodation Unit, and any other buildings, must be built or placed on the Land in accordance with all relevant Government (local, State and Commonwealth) and statutory approvals;

   (h) a person may not occupy an Accommodation Unit on the Land for more than three (3) months in every calendar year, except for:

      (i) a caretaker or manager of the low impact ecotourism business conducted on the Land, and his or her family; and

(ii) staff personnel required in the operation of the low impact ecotourism business conducted on the Land, who are accommodated in Staff Accommodation and then in any calendar year only so many personnel and only for so long as they are reasonably required to provide services to tourists visiting the Land;

(i) no fauna or flora that is not native to the Land may be brought onto, placed or kept on the Land, except with the prior written consent of the Minister for Lands; and

(j) it will:

(i) fully comply with any quarantine management plan of any Governmental Agency relating to Dirk Hartog Island, in place from time to time;

(ii) cooperate with any programs of any Governmental Agency designed to eradicate pests from Dirk Hartog Island,

but only to the extent that an unreasonable financial burden is not imposed on the covenantor in so complying or cooperating.

2. The covenants in clause 1:

(a) run with and burden the Land, and are enforceable against the transferee as registered proprietor of the Land, and its successors in title; and

(b) are for the benefit of the Minister for Lands, as covenantee.

3. For the purposes of these covenants:

(a) "Accommodation Unit" means either or both a Visitor Accommodation Unit and Staff Accommodation;

(b) "Dirk Hartog Island" means the island of that name on which the Land is situated;

(c) "ecotourism" means ecologically sustainable tourism with a primary focus on experiencing natural areas that fosters environmental and cultural understanding, appreciation and conservation;

(d) "Governmental Agency" means any government or any governmental, local government or authority, or semi-governmental administrative, fiscal or judicial body, department, commission, statutory body corporate established for a public purpose, authority, tribunal, agency or entity;

(e) "low impact" means low impact on the environment having regard to the number of tourists visiting the Land and the facilities and other services provided for their use;

(f) "Minister for Lands" means the body corporate continued under that name under section 7(1) of the *Land Administration Act 1997*;

(g) "other buildings" means any other buildings on the Land (not comprising an Accommodation Unit) used to provide facilities or services for tourists visiting the Land for the purposes of ecotourism;

(h) "Staff Accommodation" means accommodation for the housing of staff personnel required in the operation of the low impact ecotourism business conducted on the Land;

(i) "Visitor Accommodation Unit" means an accommodation unit (whether as a stand alone structure or a structure containing more than one such unit) suitable for temporary residential occupation by one or more persons, but does not include:

(i) accommodation for the caretaker or manager of the low impact ecotourism business conducted on the Land, and his or her family;

(ii) Staff Accommodation;

(ii) those areas of any centre lodge facilities that do not comprise bedrooms or other sleeping areas;

(j) a reference to the singular includes a reference to the plural and vice versa;

(k) a reference to any gender includes a reference to each other gender;

(l) a reference to the transferee as covenantor includes the registered proprietor of the Land from time to time and its and each of their legal personal representatives, successors in title and permitted assigns;

(m) where, at any time, the registered proprietor of the Land is two or more persons, their liability under these covenants is joint and several;

(n) a reference to a person includes a reference to a body corporate or unincorporated body.

APPENDIX 19

VEGETATION ASSESSMENT

Appendix 19: VEGETATION ASSESSMENT

GOVERNMENT OF WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: CPS 9201/1

File Number: DWERVT7417

Duration of Permit: From 2 July 2021 to 2 July 2023

PERMIT HOLDERS

DHI Development Pty Ltd, Mr John Gardner, Mr Leon Frederick Hodges and Ms Verity Fay Hodges

LAND ON WHICH CLEARING IS TO BE DONE

Lot 304 on Deposited Plan 50257, Dirk Hartog Island

AUTHORISED ACTIVITY

The permit holder must not clear more than 0.038 hectares of native vegetation within the area cross-hatched yellow in Figure 1 of Schedule 1.

CONDITIONS

1. Avoid, minimise, and reduce impacts and extent of clearing

In determining the native vegetation authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

(a) avoid the clearing of native vegetation;

(b) minimise the amount of native vegetation to be cleared; and

(c) reduce the impact of clearing on any environmental value.

2. Weed management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds*

(a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;

(b) ensure that no known weed-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared; and

(c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

3. Wind erosion management

The Permit Holder must commence construction no later than three months after undertaking clearing authorised under this Permit, to reduce the risk of soil erosion by minimising the exposure time of soils prior to construction.

4. Directional clearing

The permit holder must conduct clearing activities in a slow, progressive manner from south to north to allow fauna to move into adjacent native vegetation ahead of the clearing activity.

5. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	(a) the species composition, structure, and density of the cleared area; (b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the size of the area cleared (in hectares); and (e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 1 of this permit; and (f) actions taken to minimise the risk of the introduction and spread of weeds in accordance with condition 2 of this permit; and (g) actions undertaken in accordance with condition 3 of this permit; and (h) actions undertaken in accordance with condition 4 of this permit.

6. Reporting

The permit holder must provide to the *CEO* the records required under condition 5 of this permit when requested by the *CEO*.

DEFINITIONS

In this permit, the terms in Table 2 have the meanings defined.

Table 2: Definitions

Term	Definition
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*.
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
department	means the department established under section 35 of the *Public Sector Management Act 1994* (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
EP Act	*Environmental Protection Act 1986* (WA)
fill	means material used to increase the ground level, or to fill a depression.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
weeds	means any plant – (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

Ryan Mincham
2021.06.09
20:43:39
+08'00'

Ryan Mincham
MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20 of the Environmental Protection Act 1986

9 June 2021

SCHEDULE 1

The boundary of the area authorised to be cleared is shown in the map below.

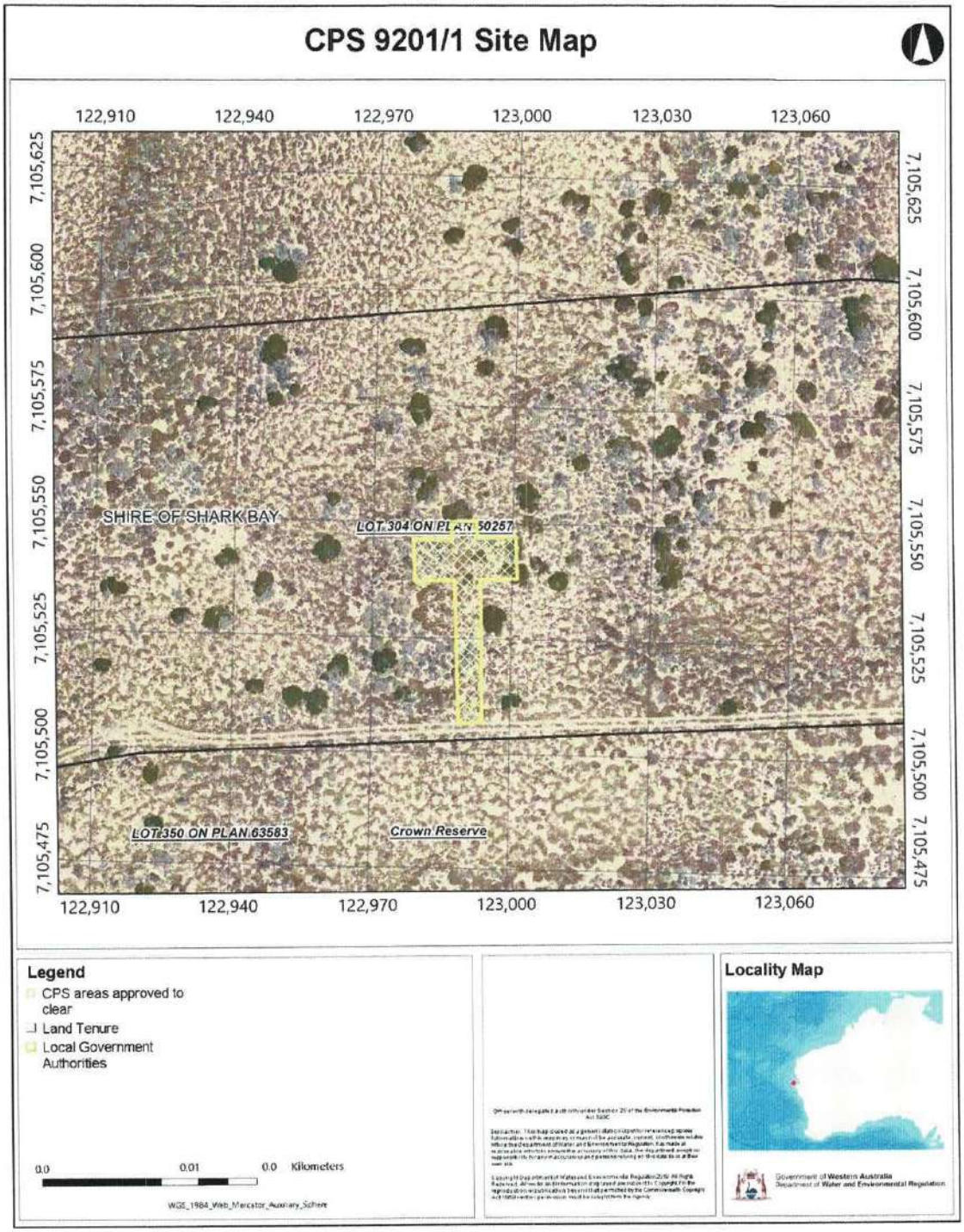

Figure 1: Map of the boundary of the area within which clearing may occur

Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9201/1
Permit type:	Area permit
Applicant name:	DHI Development Pty Ltd, Mr John Gardner, Mr Leon Frederick Hodges and Ms Verity Fay Hodges
Application received:	29 January 2021
Application area:	0.038 hectares of native vegetation
Purpose of clearing:	Construction of a house
Method of clearing:	Mechanical
Property:	Lot 304 on Deposited Plan 50257, Dirk Hartog Island
Location (LGA area/s):	Shire of Shark Bay
Localities (suburb/s):	Shark Bay

1.2. Description of clearing activities

The vegetation proposed to be cleared is 0.038 hectares of native vegetation contained within a single contiguous area (see Figure 1, Section 1.5) for the purpose of constructing a dwelling. The application area is located on Dirk Hartog Island, Shark Bay.

1.3. Decision on application

Decision:	Granted
Decision date:	9 June 2021
Decision area:	0.038 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 14 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix B), relevant datasets (see Appendix F.1), the findings of a flora and vegetation survey, the clearing principles set out in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration that the application area is located adjacent to a national park and World Heritage Area.

The assessment identified that the proposed clearing may result in:

- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values; and
- impacts to conservation significant flora.

After consideration of the available information, the Delegated Officer determined the proposed clearing is unlikely to have long-term adverse impacts on conservation significant flora or adjacent vegetation and can be minimised and managed to be unlikely to lead to an unacceptable risk to environmental values.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid and minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds;
- undertake slow, progressive one-directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity;
- commence construction no later than three months after undertaking clearing to reduce the risk of erosion.

1.5. Site map

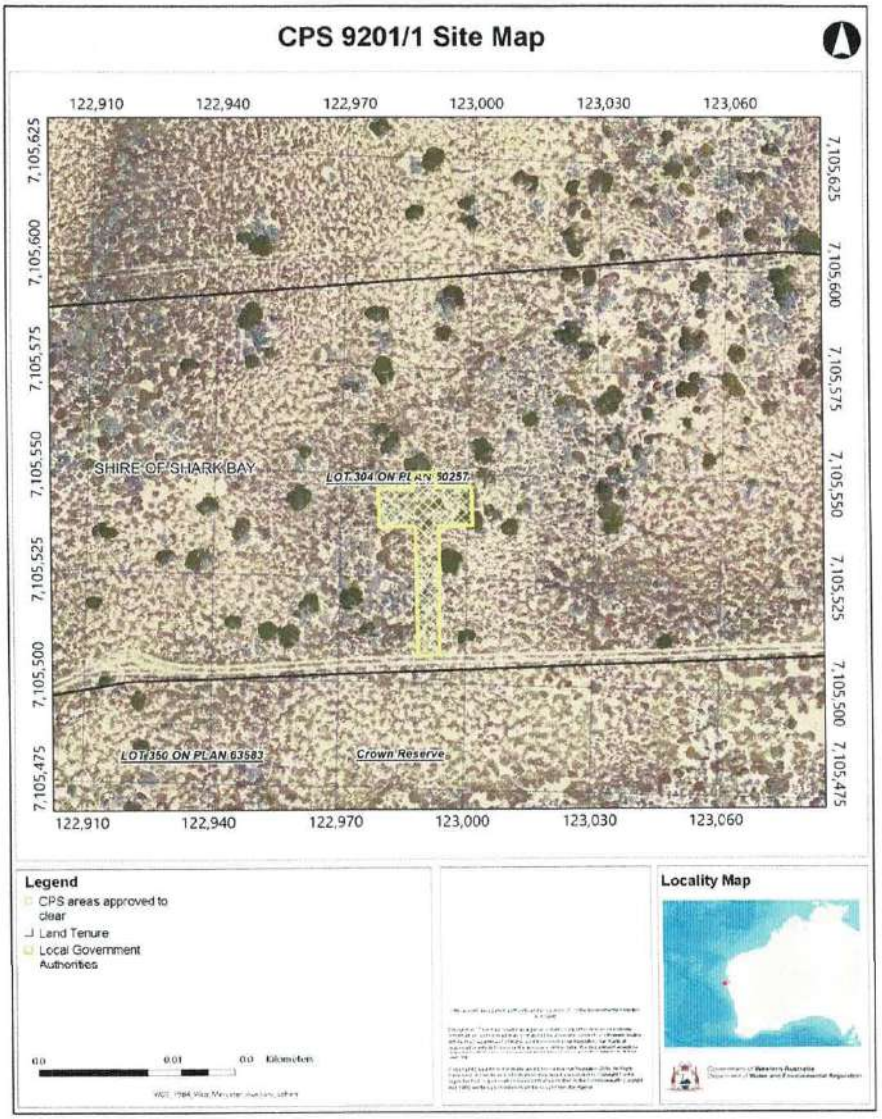

Figure 1: Map of the application area. The area cross-hatched yellow indicates the area authorised to be cleared under the granted clearing permit.

2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

Given the small scale of the clearing area and based on the results of a targeted flora survey, the Delegated Officer is satisfied that no further measures for avoidance and mitigation of the impacts of the clearing are warranted.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix B) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix C) identified that the impacts of the proposed clearing present a potential risk to conservation significant flora. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Biological values (Flora) - Clearing Principles (a)

Assessment

A desktop assessment identified that 34 flora species of conservation significance from 147 records occur within the local area. Of these, three species occur in the same soil, vegetation, and habitat type as the application area:

- *Lepidium biplicatum* (P3)
- *Ptilotus alexandri* (P2)
- *Thryptomene repens* (P2)

A targeted flora survey was undertaken by Ecosystem Solutions (Applicant, 2021b) on 4 and 5 September 2019 with a focus on the proposed areas of disturbance. Potential suitable habitat was surveyed for the presence of conservation significant flora. Known locations of conservation significant flora within similar soil types to the application area were inspected before the formal survey was undertaken of the application area. These species included *P. alexandri* and *L. biplicatum*. Any species not able to be identified in situ were sampled and botanical advice was sought from the Western Australian Herbarium (Applicant, 2021b)

DWER's assessment of a previous clearing permit (CPS 8163/1) over the site noted that *Thryptomene baeckecea* may have been incorrectly identified and had the potential to be the Priority 2 species *T. repens* (DWER, 2020).

Samples taken during the targeted flora survey (Applicant, 2021b) were identified by a botanist at the Western Australian Herbarium as *T. dampieri*, a common species on Dirk Hartog Island (Applicant, 2021b). Noting the perennial nature of *T. repens, P. alexandri,* and *L. biplicatum,* the timing of the survey is considered adequate in identifying the presence of these species.

The desktop assessment did not identify any records of priority species within the application area, or within close proximity. The species list for the relevé associated with the application area did not identify any priority flora to be present (Applicant, 2021b).

The application area is located within the Yalgoo Vegetation Complex (Hartog) which retains approximately 100 percent of the pre-European extent.

Given the size of the application area, the findings of the flora survey and the confirmed identification of *T. dampieri*, it is unlikely that any conservation significant flora occur within the application area.

Conclusion
For the reasons set out above, it is considered that the potential impacts of the proposed clearing on conservation significant flora are low and will not represent a significant residual impact. Given the approximate 100 percent retention of pre-European vegetation within the Yalgoo vegetation complex, the clearing does not represent a significant risk to biodiversity.

The identification of samples taken during the assessment by the Western Australian Herbarium satisfy concerns held by DWER for the previous clearing permit (CPS 8163/1).

Conditions
No flora conditions required.

3.3. Relevant planning instruments and other matters

Other relevant authorisations required for the proposed land use include:

- Development approval under the *Planning and Development Act 2005* (issued by the Shire of Shark Bay on 19 December 2019).

The Shire of Shark Bay (2021) advised DWER that existing local government approvals are still valid. The Shire did not have any objections or further comments regarding the clearing as per this application.

The Shark Bay World Heritage Advisory Committee advised that they had no objections to the proposed clearing, however, recommended that a condition be placed on the permit to minimise wind erosion (DBCA, 2021).

There are no mapped Aboriginal Sites of Significance within 10 km of the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

End

Appendix A. Additional information provided by applicant

Summary of comments	Consideration of comment
Floristic Survey	The floristic survey supplied by the applicant was assessed to inform the impact of the clearing on conservation significant flora.
Correspondence with Botanist	The correspondence between the applicant and a botanist at the WA herbarium identifying a *Thryptomene* species within the application area was assessed to help inform the potential impact of the clearing on conservation significant flora.
Site Photos	Photos supplied by the applicant were assessed to determine the species composition and condition of the application area.

Appendix B. Site characteristics

B.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is part of an expansive tract of native vegetation in the extensive land use zone of Western Australia. It is located within Dirk Hartog Island, an undeveloped island approximately 36 km west of Denham. The application area is surrounded by remnant vegetation, with the beach 30 m south and 500 m to the east. Aerial imagery indicates the local area (50-kilometre radius from the centre of the area proposed to be cleared) retains at least 95 per cent of the original native vegetation cover.
Ecological linkage	The application area is not located within any formal, mapped ecological linkages. Given the small size of the application area, it is unlikely to serve a significant, informal ecological function.
Conservation areas	The application area is located within the Shark Bay World Heritage Area and within an area on the Register of National Estate. The application area is directly adjacent to the Class A Dirk Hartog Island National Park and approximately 30 m from the Shark Bay Marine Park.
Vegetation description	Photographs supplied by the applicant and a field survey undertaken by Ecosystem Solutions in September 2019 (Applicant 2021b) indicates the vegetation within the proposed clearing area consists of *Acacia ligulata, Thryptomene dampieri, Scaevola crassifolia, Senecio pinnatifolius, Poaceae sp.* and *Spinifex longifolius*. Representative photos are available in Appendix E. The vegetation present is broadly consistent with the mapped vegetation type(s): • Yalgoo - Beard 1100, which is described as Hummock grassland; shrub steppe; mixed ericoid shrubs & spinifex (Shepherd et al, 2001) The mapped vegetation type retains approximately 100 per cent of the original extent (Government of Western Australia, 2019).
Vegetation condition	Photographs supplied by the applicant indicate the vegetation within the proposed clearing area is in Very Good to Excellent (Keighery, 1994) condition, described as: • Excellent - Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.

Characteristic	Details
	• Very Good - Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing. The full Keighery (1994) condition rating scale is provided in Appendix D. Representative photos are available in Appendix D.
Climate	The mean annual rainfall for the area is between 200 mm and 300 mm. The evapotranspiration for the application area is between 200 mm and 300 mm.
Topography	The elevation of the application area ranges from 5 to 10 m AHD.
Soil description	The soil is mapped as being within the Edel System (237Ed) described as undulating sandy plains with occasional dunes, limestone rises and saline flats supporting acacia shrublands with some saltbush and heath communities.
Land degradation risk	< 3% of the map unit has a high susceptibility of subsurface compaction
Waterbodies	Aerial imagery indicates that a non-perennial salt lake is located approximately 870 m from the application area. The ocean is located approximately 30 m from the application area.
Hydrogeography	The application area is not within any proclaimed ground or surface water areas or within any public drinking water source areas.
Flora	There are 147 flora records from 34 species of conservation significance within the local area. The most common species is the Priority 3 *Triodia plurinervata* with 20 records, followed by *Triordia bromoides* (Priority 4) with 16 records. A total of 16 species are found on the same soil type as the application area. The closest records to the application area are 4 species, *Lepidium biplicatum* (P3), *Melaleuca huegelii subsp pristicensis* (P3), *Triodia bromoides* (P4), and *Triodia plurinervata* (P3) located approximately 1.5 km to the south-west. Another 36 records are found within Dirk Hartog Island.
Ecological communities	The application area does not intersect and Priority or Threatened Ecological Communities. There are no TECs or PECs within the local area.
Fauna	The local area contains 1891 records from 70 conservation significant fauna (including aquatic and marine species). The most common species is the Vulnerable Shark Bay Rufous Hare-Wallaby (*Lagorchestes hirsutus*) with 752 records. The Vulnerable Western Barred Bandicoot (*Perameles bougainville)* and Vulnerable Banded Hare-wallaby (*Lagostrophus fasciatus fasciatus)* have 105 and 169 records within the local area respectively. Given the extent of clearing and the representation of the vegetation within the Yalgoo complex, it is unlikely the clearing will represent significant habitat for local fauna.

B.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Yalgoo	5,057,325.85	4,923,840.47	97.36	1,576,718.27	31.18
Beard Vegetation complex*					
Yalgoo vegetation complex 1100*	31,549.39	29,885.41	94.73	15,540.57	49.26
Beard Vegetation Complex within IBRA Bioregion					
Yalgoo vegetation complex 1100 (Hartog)	113.41	113.41	100	108.93	96.05

*Government of Western Australia (2019a)

B.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix F.1) and survey information, impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (Local Area)	Are surveys adequate to identify? [Y, N, N/A]
Lepidium biplicatum	P3	Y	Y	Y	1.6	8	Y
Ptilotus alexandri	P2	Y	Y	Y	6.9	4	N
Thryptomene repens	P2	Y	Y	Y	5.7	7	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

Appendix C. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: The local area contains records of conservation significant flora that occur on the same soil, vegetation, and habitat type as the application area. The assessment of a previous clearing permit over the area raised concerns of the misidentification of a priority 2 species. Given the results of the field survey and the small scale of clearing, it is unlikely that the area proposed to be cleared represents an area of high biodiversity value relative to other remnant vegetation within the local area.	Not likely to be at variance	Yes *Refer to Section 3.2.1, above.*

Assessment against the clearing principles	Variance level	Is further consideration required?
Principle (b): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."* Assessment: The area proposed to be cleared contains suitable habitat for a number of conservation significant fauna. Given that the Yalgoo vegetation complex on Dirk Hartog Island retains approximately 100% of its pre-European vegetation and the application area represents a small fraction (0.038 ha), it is unlikely the clearing will impact significant fauna habitat.	Not likely to be at variance	No
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: The local area does not contain any flora listed as 'Threatened' under the BC Act that occur on the same soil type as the application area. A survey (Applicant 2021b) did not identify any Threatened flora within the relevé inside the application area.	Not likely to be at variance	No
Principle (d): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."* Assessment: The area proposed to be cleared does not intersect any mapped ecological communities listed as 'Threatened' under the BC Act and does not contain species indicative of a threatened ecological community.	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		
Principle (e): *"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."* Assessment: The extent of the mapped vegetation type and native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.	Not likely to be at variance	No
Principle (h): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area."* Assessment: Given its small extent, the proposed clearing is not likely to have an impact on the environmental values of the adjacent Dirk Hartog Island National Park.	Not likely to be at variance	No
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: The application area is located approximately 850 m from the nearest waterbody, an ephemeral salt lake, and is located approximately 100 m from the Indian Ocean. Given this, the proposed clearing is unlikely to impact on- or off-site hydrology and water quality.	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The surveyed soils are highly susceptible to wind erosion. Noting the size of the application area, the proposed clearing is not likely to have an appreciable impact on land degradation. The Shark Bay World Heritage Committee recommended the inclusion of a wind erosion condition on the permit. The Department has adopted this advice in determining to grant the permit.	Not likely to be at variance	No
Principle (i): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."* Assessment: Given no watercourses, wetlands or Public Drinking Water Sources Areas are recorded within the application area or within close proximity, the proposed clearing is unlikely to impact surface or groundwater quality.	Not likely to be at variance	No
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: Given the extent of the clearing and the distance to the nearest ephemeral salt lake (850 m), the proposed clearing is unlikely to contribute to flooding or waterlogging.	Not likely to be at variance	No

Appendix D. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.

Condition	Description
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely, or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix E. Photographs of the vegetation

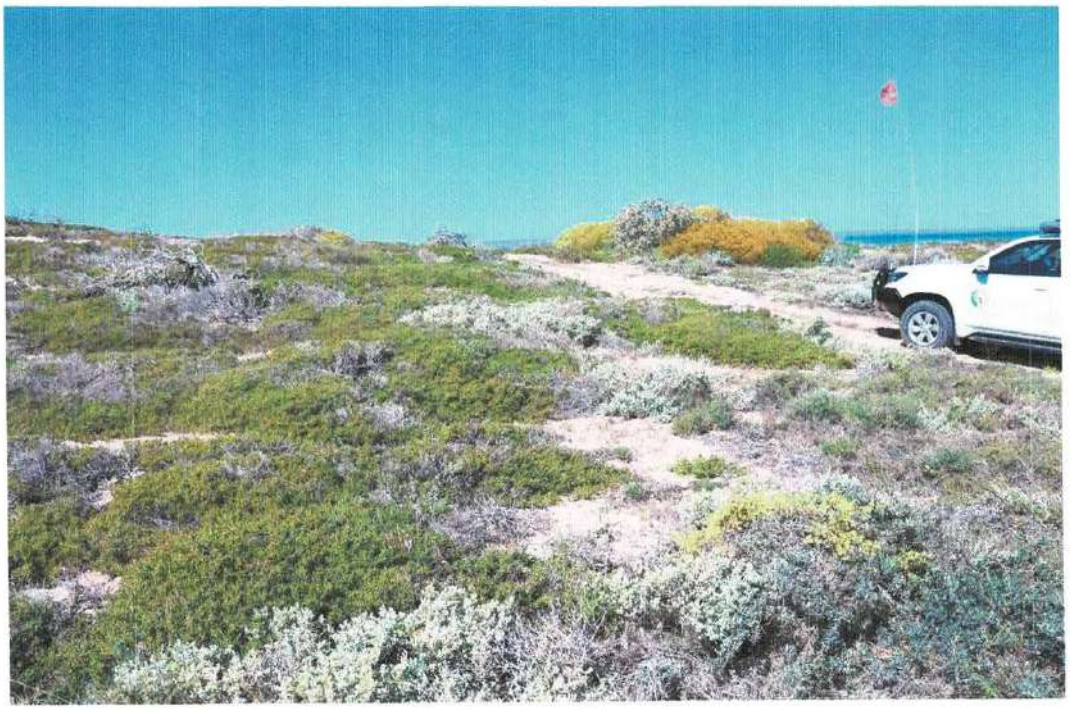

Figure 2: Photographs of the application area (Applicant, 2021b)

Figure 3: Photograph of relevé 2 (Application Area) (Applicant, 2021b)

Appendix F. Sources of information

F.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)

- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

F.2. References

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Government of Western Australia
Department of Water and Environmental Regulation

Mr John Gardner
1 Pannell Road
BATEMAN WA 6150

via email: john285@bigpond.com
Attn: Mr John Gardner

Dear Mr Gardner,

APPLICATION TO CLEAR NATIVE VEGETATION UNDER THE *ENVIRONMENTAL PROTECTION ACT 1986* – CLEARING PERMIT CPS 9201/1 GRANTED

I refer to your application for a permit under section 51E(1) of the *Environmental Protection Act 1986* (the EP Act), to clear 0.038 hectares of native vegetation at Lot 304 on Deposited Plan 50257, Dirk Hartog Isalnd, for the purpose of constructing a house. The application was received by the Department of Water and Environmental Regulation (DWER) on 29 January 2021, and assigned the reference CPS 9201/1.

The Delegated Officer has assessed your application and determined that a clearing permit be granted under section 51E(5) of the EP Act. This permit authorises the permit holder(s) to clear native vegetation, subject to the terms, conditions, and restrictions specified. Note that multiple parties are listed as joint permit holders in this case which reflects those parties listed on the certificate of title provided with your application.

A copy of the permit and the associated decision report are attached to this notification, and are now also available on DWER's website (at https://www.der.wa.gov.au/our-work/clearing-permits/clearing-permits-available-for-public-appeal) for the public to view, as required under regulation 8 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. Please read the conditions on the permit carefully and note that there are penalties for non-compliance with those conditions. If you wish to discuss this permit and/or its conditions, please contact DWER.

Subject to compliance with any pre-clearing conditions on the permit, clearing must not be undertaken before the permit duration commencement date stated on the permit.

Please also note that in undertaking the clearing authorised under this permit, the permit holder(s) must have regard to avoiding clearing, minimising clearing, and reducing the impacts of clearing on any environmental value.

Please note that as the permit requires the submission of a report on specified matters, this should be provided electronically via email to: info@dwer.wa.gov.au.

If you are aggrieved by any of the conditions of the permit, an appeal may be lodged with the Minister for Environment, via the Office of the Appeals Convenor. If lodging an appeal, it must be in writing, setting out the grounds of the appeal, and be received within 21 calendar days of being notified of the decision. For further information or to lodge an appeal, please contact the Office of the Appeals (see contact details below):

Prime House, 8 Davidson Terrace Joondalup Western Australia 6027
Locked Bag 10 Joondalup DC WA 6919
Telephone: 08 6364 7000 Facsimile: 08 6364 7001
www.dwer.wa.gov.au

Office of the Appeals Convenor
Level 22 Forrest Centre
221 St George's Terrace, PERTH WA 6000
Tel: 6364 7990 Fax: 6364 7999
Email: admin@appealsconvenor.wa.gov.au
Website: www.appealsconvenor.wa.gov.au

Note that third parties may also appeal against the grant of this permit or its conditions. Please note that, while an appeal is lodged by a third party is under consideration:

- if the appeal is against the grant of this permit, then under section 101A(9) of the EP Act, the permit is deemed not to have been granted and clearing cannot commence until the appeal is determined; and
- if the appeal is regarding a condition(s) of the permit, then under section 101A(6), the permit continues to have effect and clearing can commence in accordance with the conditions of the permit.

For more information about complying with your permit to clear native vegetation, please refer to *Fact Sheet 4: Complying with your clearing permit* found at: https://www.der.wa.gov.au/our-work/clearing-permits/49-fact-sheets.

Compliance with the terms, conditions, or restrictions of this permit does not absolve the permit holder from responsibility for compliance with the requirements of all Commonwealth, State, and local government legislation.

If you have any queries, please contact the Environmental Officer, as listed above.

Yours sincerely

Ryan Mincham
2021.06.09
20:42:07
+08'00'

Ryan Mincham
MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under section 20
of the Environmental Protection Act 1986

9 June 2021

Attached: Clearing permit (CPS 9201/1)
Decision report for CPS 9201/1

APPENDIX 20

DRAFT FORESHORE ACCESS MANAGEMENT PLAN

Appendix 20: Draft Foreshore Access Management Plan

DRAFT

FORESHORE/ACCESS MANAGEMENT PLAN

DECEMBER 2024

FORESHORE/ACCESS MANAGEMENT PLAN

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FORESHORE/ACCESS MANAGEMENT PLAN

1 INTRODUCTION

Dirk Hartog Island is the largest Island off the West Coast of Australia:

The Dirk Hartog Island National Park and the Shark Bay Marine Park -both included within the Shark Bay World Heritage Property- are administered by the Western Australian Department of Biodiversity, Conservation and Attractions (DBCA). The management for Dirk Hartog Island National Park is undertaken jointly with the traditional owners The Malgana and DBCA and is guided by the Shark Bay Terrestrial Reserves and Proposed Reserve Additions Management Plan, 2012.

Sunday Island Bay is located on the southeast coast of the island overlooking the Shark Bay Marine Park.

- Lot 304 is an 11.295ha (28 acre) freehold lot located at Sunday Island Bay.
- The land is zoned 'special use' in the Shires of Shark Bay Local Planning Scheme No 4.
- The Shire of Shark Bay LPS No 4 SU14 relative to lot 304 states that **'the objective for the zone is to provide for eco-tourism development'!**

A 'strip' of land – part of the DHINP lies between the Lot and the ocean (marine park) and is the subject of this plan.

*The Shire of Shark Bay Local Planning Scheme No 4 - SU14, relative to development of Lot 304, states that a Foreshore Management Plan **may be required** and referred to the Department of Biodiversity, Conservation and Attractions (Parks and Wildlife Services) for endorsement where a physical foreshore exists between the site and coast as a condition of development.*

Following review by the EPA regarding an earlier submission in 2015 for a seven-chalet development advice was provided recommending that the:

"Foreshore Management Plan" be expanded to an "Access Management Plan" that addresses impacts to DHINP resulting from the construction and operation of the submitted proposal. The plan should include, but not be limited, to the following:"

- *Protocols to minimize impacts to DHINP during construction which could include clear signage, operator information, and (where necessary) temporary fencing or pegging.*
- *Protocols to minimize impacts to DHINP during operation through appropriate management of visitor access and recreation.*
- *Monitoring and rehabilitation procedures and protocols for areas within the DHINP that are disturbed as a result of the construction or operation of the submitted proposal, with particular emphasis on the foreshore area adjacent to the development.*
- *Procedures in accordance with the DHIBIP to ensure that the development does not introduce or proliferate non-indigenous terrestrial species to or on Dirk Hartog Island*

Additional advice in this regard has also been provided by DBCA.

The establishment of ecotourist facilities on Lot 304 will lead to additional visitation to this location and access over the 'strip' between the lot and the ocean will need to be managed appropriately to minimize possible impacts.

The objective of this plan is to provide clear guidelines and management protocols to be implemented to manage and minimize the potential impacts of operation activities upon the foreshore environment in order to:

- Meet the EPA's objectives for amenity and terrestrial environmental quality as described in EPA notification dated 30 March 201

2 KEY OBJECTIVES

- Establish protocols for management of access over the 'strip' -to minimize impacts.

- Demonstrate how impacts resulting from crossing the 'strip' can be controlled and managed during.
- a. construction
- b. ongoing operations.
- Establish protocols for monitoring and rehabilitation.
- Demonstrate compliance with the DHIBIP 2014-15.

3 LDP PROPOSAL

The LDP proposal is for the nomination of development envelopes(eight) for the staged development of the site for ecotourism. **The LDP is not an application for development!**

- Development envelopes are proposed to provide for up to four ninety square meter accommodation units for visitors and one unit for staff accommodation nominated and built to Refuge standard in each envelope.
- Staging allows review and revision where appropriate.
- If the site was fully developed the maximum number of visitors to the location would be limited to one hundred with visitor accommodation units located within eight development envelopes.
- If access over the' strip' – between Lot 304 and the foreshore-for pedestrians was applied for DBCA advise that they would consider boardwalks or other structures within the national park and for approved structures an appropriate lease or license would be developed. It is proposed however that access to the foreshore from lot 304 should be via unformed fenced tracks.
- As each development envelope is located some distance apart it has been assessed that in order to reduce site impact that separate access paths to each development envelope would be operationally and environmentally advantageous limiting impacts to site and preventing visitors taking short cuts to other access paths if one is not located conveniently to an accommodation cluster.
- As the 'strip' consists of the same soil and vegetation subject to the same prevailing winds the location of pathways is about the design to limit impacts that may be caused by their establishment: design to be agreed on site with DBCA.
- DBCA advise that they will consider access over the National Park strip when a development application is prepared. Until the LDP with building envelopes is approved by council a development application cannot be prepared
- The location of a pedestrian track for each stage would be proposed to allow each accommodation unit within a cluster to achieve reasonably direct access over the 'strip': the preferred location would be subject to inspection and agreement with DBCA.
- It is anticipated that pedestrian access over the 'strip' would be used regularly by visitors.

4 MANAGEMENT

Pathways/tracks over the 'strip', agreed to onsite with DBCA, for operations during construction and when the facilities are operational requires ongoing management. A key objective both during construction and ongoing operations is to minimize impacts through management protocols.

Management options to minimize damage to vegetation and to prevent erosion include:

- Design
- Fencing
- Closing pathways
- Relocating pathways
- Raised boardwalks.

5 VISUAL

Visual impacts are considered as part of managements role in cooperation with DBCA to ensure that the location and design of pedestrian accessways provide for the least possible visual impact.

6 ACCESS

a. VEHICLES

i. Protocols During Construction.

- A letter from former DEC Director Jim Sharp dated March 2011 confirmed that temporary access to lot 304 across the strip of DHINP land during the construction stage at a number of locations would be considered once a formal development proposal was prepared and the need for that access demonstrated: this was confirmed in an email from Nicholas Detchon(DBCA) on March 3, 2020
- Following inspection of the site by G Wardle and B Fitzgerald (DBCA) access to the foreshore via these temporary access points has been documented by map for the movement of any building materials, machinery and workers to and from the site during construction.
- An email from Nicholas Detchon dated 3 March 2020 advises that 'the construction access track alignments were indicative only and were not intended to provide for ongoing pedestrian access. DBCA anticipates the exact location of required construction access tracks will be finalized following receipt of development approval of lot 304.
- DBCA advised that the mapped locations are an indication only of their location and that they are subject to final 'onsite' inspection and the submission/development of a formal development proposal. **The LDP is not a submission for development but an application for approval of building envelopes after which an application for development may be submitted**
- Apart from agreed access over the fore shore via agreed and approved raised vehicle access routes during construction there would be no permanent access over the vegetated foreshore area for vehicles when construction was completed with access to the site only available via the formal access track to the west of the lot.
- Final construction access locations are to be agreed on site with DBCA.
- Agreed construction access routes are to be bridged by appropriate raised infrastructure to minimize the possibility of impact to the site both physically and visually.
- Temporary bridging to be removed at the conclusion of a stage of development
- Contractors to be inducted on site and provided with documented information on biosecurity and access matters emphasizing the necessity of strict compliance (*BP, WMP)*
- Clear signage is to be provided during construction to ensure all contractors are aware of the protocols for accessing lot 304.
- Temporary fencing and or pegging may be used where necessary to exercise additional controls.
- All contractors to be inducted and briefed on their first day in regard to safety matters whilst crossing the 'strip' between the lot and the ocean.
- Additionally information to be provided in regard to the necessity of following all directions in regard to safety and access.
- Signage would be displayed at crossing points to confirm the protocols that are essential in regard to safety including fire safe points whilst crossing that area of the National Park.

ii. Protocols During Operations

Currently there is one official formal track into Sunday Island Bay that accesses both lot 304 and the marine park in the southwest corner of the bay: access to the foreshore is always available via this route. (Letter dated 14 February, 2012 with plan) Visitors arriving in their own vehicle would access development at Lot 304 via the Sunday Island subtrack located in the south west corner of the bay. There is no access across the 'strip' for vehicles.

b. PEDESTRIANS

- A letter from former director Jim Sharp from DEC (DBCA) dated 16 March, 2011in regard to access to the foreshore confirms that pedestrian access from lot 304 through the National Park on an appropriate alignment can be approved and the specific alignment of those pedestrian access routes marked by an appropriate method.
- An email from Nick Detchon dated 3 March 2020 states that ' DBCA supports the development by the proponent of suitable access paths to allow pedestrian access between Lot 304 and the beach and to prevent development of informal walk tracks and associated disturbance to the DHINP.
- It is proposed that one pedestrian access path per development envelope may be applied for following approval of the LDP.
- Any pedestrian access to the beach over the 'strip' to be along designated access tracks that are yet to be agreed upon and approved by DBCA.
- Details regarding alignment of any access ways proposed would be submitted within a development application following onsite inspection with DBCA.
- It is anticipated that the beach could be accessed from the site for a range of uses.
  a) Walking
  b) Swimming
  c) Boating
  d) Fishing
  e) Recreation in general
  f) Vehicle barge access
- Upon arrival at the site visitors would be inducted by a resident caretaker/manager providing clear information regarding following protocols and signage when entering and or crossing the DHINP to reduce the possibilities of impact to the pathways and surrounding vegetation.
- Visitors would be informed during initial induction of the regulations in regard to the prohibition, movement or removal of any souvenir style of local product including plants(seeds,seedlings,flowers) shells, corals, rocks and small animals(frogs,lizards and insects).
- Pedestrian access way to be agreed upon with DBCA prior to the lodgment of a DA for each envelope. If approved the access would be controlled unformed natural tracks/paths for pedestrian access across the 'strip' from lot 304: boardwalks may be considered in the future if appropriate for managing impacts.
- The restriction of pedestrian access across the DHINP 'strip' to one track per development envelope provides mitigation to impacts that could result from too many access points or uncontrolled access and allows ongoing management and review of possible impacts.
- The manager would provide information regarding:
  a. Access routes to and from DHINP to lot 304.
  b. Biosecurity Issues
  c. Recreation activities using the foreshore.

7 MONITORING

In line with key performance indicators - on going monitoring of vegetation both upon the lot and the adjacent DHINP 'strip' between the lot and the ocean would be undertaken by the onsite manager/caretaker.

- A monitoring program including remediation actions to be established for pathways/tracks crossing the 'strip'.
- Photo monitoring points would be located to provide ongoing records of any impacts created due to access protocols crossing the DHINP 'strip'.
- Photos would be taken and compared regularly for changes in vegetation density.
- The Coastal processes report prepared by Damara establishes additional protocols for kpi's and remediation works when required.
- The onsite manager/caretaker would undertake both management and remedial action to ensure any impacts to the 'strip' from visitors would be addressed immediately. This may include:

a. fencing in or out areas of the site to manage movement within the site

b. fencing any agreed access paths over the DHINP and or the southern boundary

8 KEY PERFORMANCE INDICATORS(KPIs)

It is proposed that KPIs would be established regarding pedestrian tracks proposed for the area between the lot and the ocean including.

(i) Erosion

(a) AIM- no erosion on the National Park land area between the lot and the foreshore

(b) REMEDIAL-Fencing put in place to stop erosion, change access route, in consultation with DBCA and re vegetation of any eroded areas.

(c) REVIEW-Assess annually.

(ii) Vegetation damage

(a) AIM-no damage to vegetation on the National Park land 'strip' between the lot and the ocean

(b) REMEDIAL-fencing or barriers put in place for protection of vegetation, in consultation with DBCA - undertake replanting - change access route.

(c) REVIEW-assess annually.

(iii) Sand movement

(a) AIM-no sand movement on the National Park land 'strip' between the lot and the foreshore

(b) REMEDIAL-fencing or barriers put in place to stop sand movement - change access route-in consultation with DBCA - re- vegetation.

(c) REVIEW-assess annually.

9 BIOSECURITY

The DHIBIP 2014-15 would be followed directly in regard to biosecurity as provided for in the Environmental Report and Management Plan. Visitors and contractors would be inducted regarding following the protocols included within these plans.

10 PROTOCOLS TO MINIMISE IMPACTS TO DHINP DURING CONSTRUCTION

* Contractors inducted by the project manager.

* Access across DHINP during construction limited to only using agreed access routes

* Access over DHINP for vehicles and movement of construction material during construction limited to raised ramps at agreed locations to ensure minimal impact on the 'strip'.

* other access to site limited to existing vehicle track located in south west corner of Sunday Island Bay

11 PROTOCOLS TO MINIMIZE IMPACTS TO DHINP DURING OPERATION

* access to site limited to existing vehicle track located in south west corner of Sunday Island Bay

* All visitors inducted by onsite manager on arrival at site and provided with details of access routes within the lot and to the DHINP

* Track plan provided to all visitors on arrival providing details of access routes within and upon the DHINP

12 PROTOCOLS FOR REHABILITATION PROCEDURES

* Photo Monitoring points reviewed regularly

* re-vegetation to only be using plants already located on DHINP or as approved by DBCA.

* Closing Tracks
* Re location of tracks
* Raised Boardwalks

13 TARGETS AND ACTIONS

a. General Management Target

General Management targets have been listed below to measure and report against the relevant EPA environmental objective

Environmental Factor	EPA Environmental Objective	Management Targets
Terrestrial Environmental Quality	To maintain the quality of land and soils so that the environmental values, both ecological and social are protected	No unauthorized loss or degradation of vegetation outside Lot 304 No uncontained refuse within the project area or in the surrounding environment
Amenity	To ensure that impacts to amenity are reduced as low as reasonably practicable	Maintain the amenity of the area and the health of the surrounding environment by minimizing indirect impacts such as dust and noise from any construction activity Protect the amenity and surrounding environment by limiting disturbance where possible and by progressive revegetating disturbed areas
Terrestrial Fauna	To maintain representation, diversity, viability and ecological function at the species, population and assemblage level	Protect fauna and its habitat by ensuring no unauthorized clearing or earthworks No fauna mortality resulting from any construction or visitor activities on the lot
Inland Waters Environmental Quality	To maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected	Prevent sediment from lot 304 entering the ground and surface water environment

Table 1: General management Targets

b. Risk Based Management Actions

Risk based management actions have been identified and prioritized in the table below. The actions focus on future operations activities that have the highest likelihood of causing environmental impact and were developed to reduce potential impacts of operation activities upon the foreshore environment.

The foreshore between lot 304 and the ocean is vested in the Conservation and Parks Commission and managed by DBCA.

Risk and key impacts	Management actions	Risk Based Priority	Timing
Uncontrolled access to the foreshore area has the potential to degrade vegetation leading to erosion	Provide formalized pedestrian access ways to the beach	**High**	At all times
	If required undertake revegetation of areas disturbed by Visitor activities as detailed in the contingency actions in Table	**Medium**	At all times
	Install signage and fencing to ensure access to the foreshore is via designated tracks	**High**	At all times
	If required provide an extended raised boardwalk that is constructed to specifications agreed by DBCA	**Medium**	At all times
	Induct all visitors to the location of the necessity to follow only authorized and signed access routes	**Medium**	At all times

	Provide educational material in each accommodation unit providing clear details and maps showing access routes from the accommodation units to the beach front	**Medium**	At all times
Unregulated disposal of rubbish within the foreshore area has the potential to impact on the amenity of the area	Provide educational material in each accommodation unit outlining the waste disposal protocols including. *all rubbish (cans, bottles, plastic, paper to be stored in allocated area before removal by visitors back to the mainland * no rubbish to be dumped or left on foreshore areas	**Medium**	At all times
	Induct all visitorsto the location of the necessity to follow waste management protocols	**Medium**	At all times
	Install signage at all accessways to the beachfront informing visitors of rubbish disposal protocols	**Medium**	At all times

Table 2: Risk based management actions

c. Management Targets

Management targets have been developed to measure and report against the relative EPA environmental objective

Environmental Factor	EPA Environmental Objective	Management Targets
Terrestrial Environmental Quality	To maintain the quality of land and soils so that the environmental values, both ecological and social are protected	i. No erosion within the foreshore area adjacent to the accommodation ii. No uncontained refuse within the area or in the surrounding environment
Amenity	To ensure that impacts to amenity are reduced as low as reasonably practicable	Protect the amenity and surrounding environment by limiting disturbance where possible and by progressive revegetating disturbed areas

Table 3: Management Targets

d. Monitoring Program to Achieve Management Targets

The purpose of a monitoring program is to inform, through the management targets, if the environmental objective is being achieved, as well as to determine if management actions need to be reviewed and revised.

Indicator	Parameter	Monitoring Method	Frequency	Location
No erosional features within the foreshore area adjacent to Lot 304	Erosion	Site Inspection	Annually during peak visitor season	Within the foreshore area adjacent to Lot 304
No loss of vegetation within the foreshore area due to impacts from visitor activities	Vegetation	Site Inspection	Bi-annually	Within the foreshore area adjacent to Lot 304
The beach is free of rubbish	Littering	Site Inspection	Weekly	Within the foreshore area adjacent to Lot 304

Table 4: Monitoring Program to achieve management targets

14 Review and Revision

In the event that management targets are not met, DHID will investigate the potential cause and any potential impacts that may have resulted. If the management targets are not met, and it is deemed to be the result of development of Lot 304, the following corrective actions will be implemented.

Corrective Actions

Performance Indicator	Action	Responsibility
Erosion within the foreshore area adjacent to Lot 304	1-Investigate cause 2-Implement appropriate control to reduce or rectify impact which could include a.Restricting access to areas that are impacted b. Changing the access route and install additional fencing in consultation with DBCA c. Undertaking rehabilitation of the eroded area in consultation with DBCA d. Continue annual monitoring e. Revise and update risk assessment and management actions where applicable	**DHID**
Loss of terrestrial vegetation within the foreshore area due to impacts from visitor activities	1. Investigate cause 2. Implement appropriate control to reduce or rectify impact which could include: a. Restricting access to areas that are impacted b. changing the access route and install additional fencing in consultation withDBCA c. undertaking revegetation of the impacted area in consultation with DBCA. Rehabilitation will include replanting of species from Dirk Hartog Island 3 Continue annual monitoring 4 Revise and update risk assessment and management actions where applicable	**DHID**
Rubbish observed in foreshore areas	1. Investigate cause 2. Clean-up and correctly dispose of the material 3. Review procedures for waste disposal 4. Revise and update risk assessment and management actions where applicable	**DHID**

Table 5: Corrective Actions

APPENDIX 21

VISUAL IMPACT ASPECTS

Appendix 21: VISUAL IMPACT ASPECTS

VISUAL IMPACT

The remote location of the Sunday Island site within an enclosed bay facing southeast and more than thirty kilometres, over ocean, from the local township of Denham provides minimum opportunity for visual impact to the general community.

The scale of any proposal would be insignificant compared to the area of Dirk Hartog Island, the Shark Bay World Heritage area and even the lot itself: design guidelines ensure any proposal is consistent and in conformity with the local character of the site. The design guidelines propose that accommodation units visual outline should wherever possible, blend with the background landscape and that they may be of a scale proportional to the topography.

Due to the small size of building envelopes, their location, the scale of possible construction identified in design guidelines inclusive of covenants and the sites' remote location and on-site management -with limited opportunities for observation- it is not anticipated that there would be any significant visual impacts during construction or operations if a development (DA) was approved and units constructed in the future.

This report has considered and reviewed the publication Visual Landscape Planning in Western Australia published by the Western Australian Planning Commission. Any development application DA would take full account of the publication when a DA is to be prepared.

12.1 Visual Assessment

Condition 11 of SU14 states 'that a Visual Impact Assessment **may** be required to demonstrate that any development will not negatively impact on World heritage values or detract from the scenic qualities of the land'.
A preliminary Visual Assessment has been undertaken using the development on lot 305, as a reference base for visually assessing impacts to Lot 304. Both Lot 304 and 305 were observed onsite, by helicopter and from a vessel offshore and a photographic record collected both onsite and aerially by drone to assess visual aspects of development.

Impacts:

As Lot 304 is remotely located on Dirk Hartog Island the impact to persons passing Sunday Island Bay by boat, effectively the only way to sight any building structures, would be minimal. An existing accommodation facility in the bay on Lot 305(apart from an out of context shed-which is not contemplated for Lot 304) is barely visible from either passage passing the island at that location.

Photo 1: Accommodation unit on Lot 305 (drone photo)

Unlike Lot 305, Lot 304 is located on the northern side of the bay and effectively not visible to vessels travelling south until well past the bay and only visible for a short time when travelling north until sight of the north shoreline disappears behind Sunday Island and the bay southeast corner.

Photo 2: Accommodation and shed on Lot 305 (drone photo)

Photo 3: Looking to Lot 304 from Lot 305

It is not possible to proceed with development planning until an LDP is approved.
As suggested by the Shire's planning consultant - a visual impact assessment could be triggered by a development approval for any proposed development if deemed necessary. Photo 1 and 2 above, of accommodation development on Lot 305, provides clear views of visual aspects of such development on the land. It is proposed that Lot 304 would provide similar aspects to the accommodation shown in photo 1 and photo 2 while design guidelines exclude any building that dominates the skyline as the shed on Lot 305.

- Any proposed accommodation unit included within a DA would be located within one of the

proposed building envelopes and would be proposed to be positioned on the site to blend seamlessly into the background with a small footprint and low profile as provided for in design guidelines.

- The SBWHAC colour choices for DHI would be adhered to achieving maximum blending with the terrain and in turn minimising possible visual impact – effectively camouflaging the physical presence in their surroundings. (*DG's*)
- In line with the location of building envelopes located at more than 4.2mAHD - viewing of the ground surface area of each building envelope is almost impossible from an offshore view as is the case with Lot 305. Any surface vegetation management of any area of any building envelope is not visible from any offshore location. The vegetation management of any building envelope has been carefully addressed and will comply with SPP3.7 and Guidelines version 1.4 and will be complementary to development and surrounding vegetation.

Photo A: Location of building envelope 1 beyond hill -not visible from ocean (photo from 400m)

Photo B: Location of building envelope 2 beyond hill-not visible from ocean (photo from 400m)

Photo C: Location of building envelope 3 beyond hill-not visible from ocean (photo from 400m)

Photo D Location of building envelope 4-land not visible from ocean (photo from 400m)

Photo E Location of building envelope 5 11m behind non visible boundary (photo from 400m)

Photo F Location of building envelope 6 (photo from 400m)

Photo G Location of building envelope 7 (photo from 400m)

Photo H Location of building envelope 8 (photo from 400m)

12.2 Ocean Passages

There are two ocean passages passing Sunday Island Bay which are used depending upon vessel size and tidal conditions.

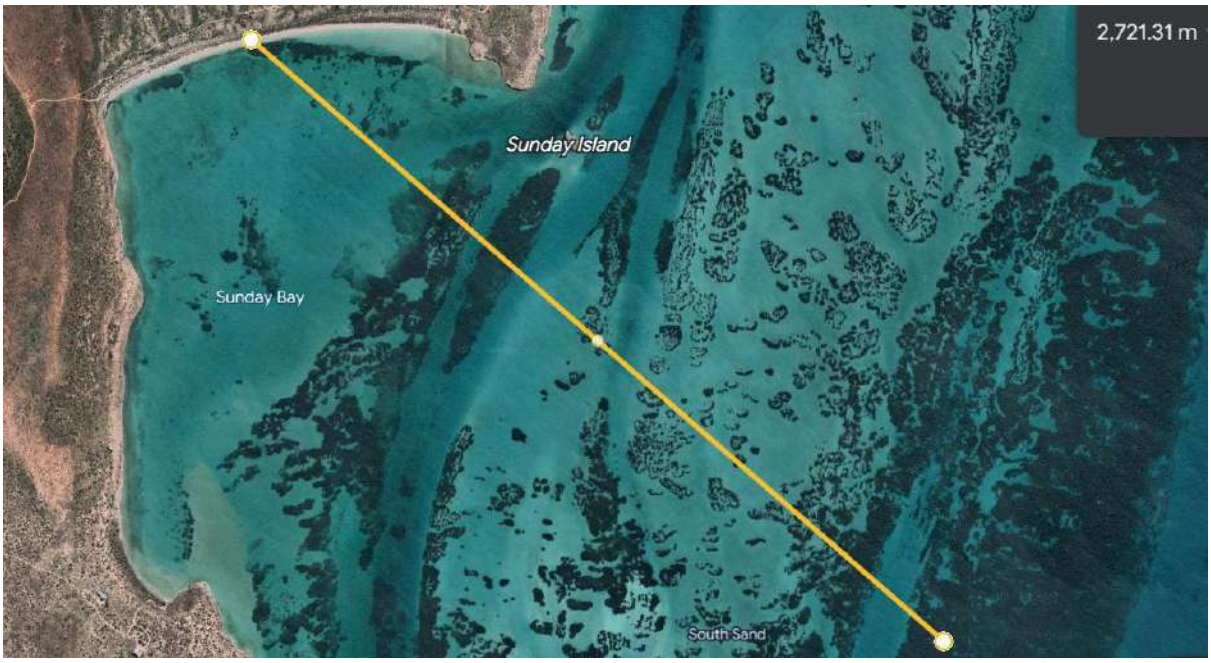
Vessels and small boats passing the bay travelling in a southerly direction would always be at approximately 2.5 kilometres from the site which would, due to the passages and direction of travel, make the site impossible to observe until the vessel was at least 2 kilometres past the site and then only by looking backwards in a northerly direction (highly unlikely). This makes even the sighting of any accommodation units on Lot 304 almost impossible demonstrating minimal visual impact as is the case with Lot 305 on the opposite side of the bay. (See Appendix 17- visuals)

Vessels and small boats passing the bay travelling in a northerly direction will sight the bay initially from about 4 kilometres depending upon the passage followed -again at a distance making it almost impossible to identify any built structure as proposed in the design guidelines until much closer to the site.

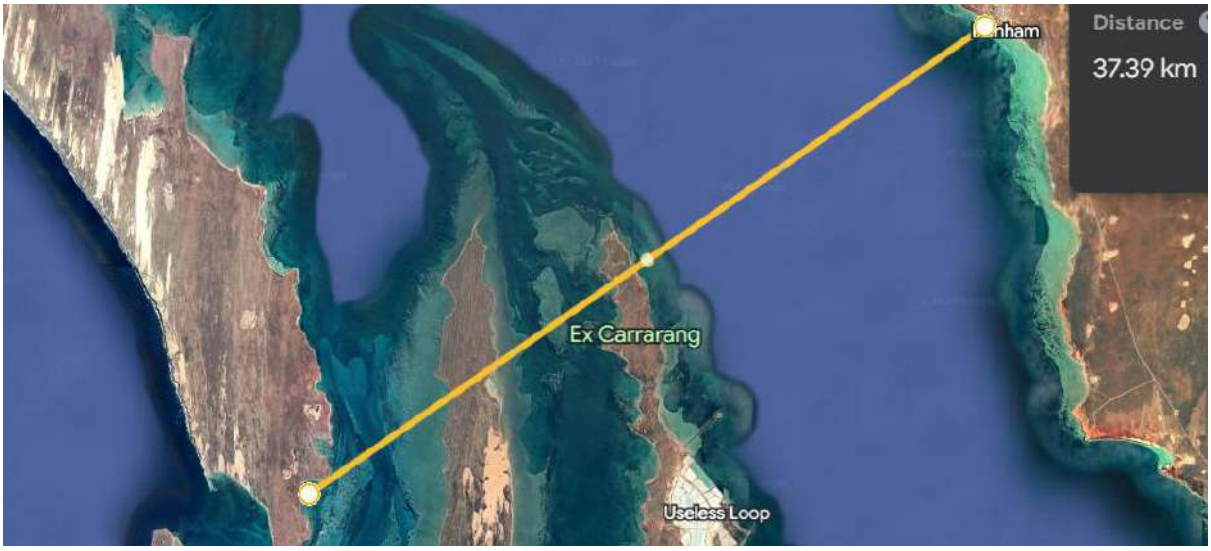
The frequency of vessels passing in either direction is minimal and limited to in the main privately owned fishing vessels coming from Denham or Steep Point and or commercial and/or charter vessels coming from Denham or from Perth. Due to the strong southerly winds experienced during the summer period from October to March there is less boat movement in Shark Bay and particularly near Sunday Island Bay due to its distance from Denham and relative to the ocean conditions.

The site is not viewable from the main Dirk Hartog Island track from Cape Ransonnet to Cape Inscription and would not present any visual impact for vehicles travelling this route. The site is viewable from private freehold Lot 305 as is 305 visible from Lot 304.

1.665 kms Distance from Lot 304 to Lot 305

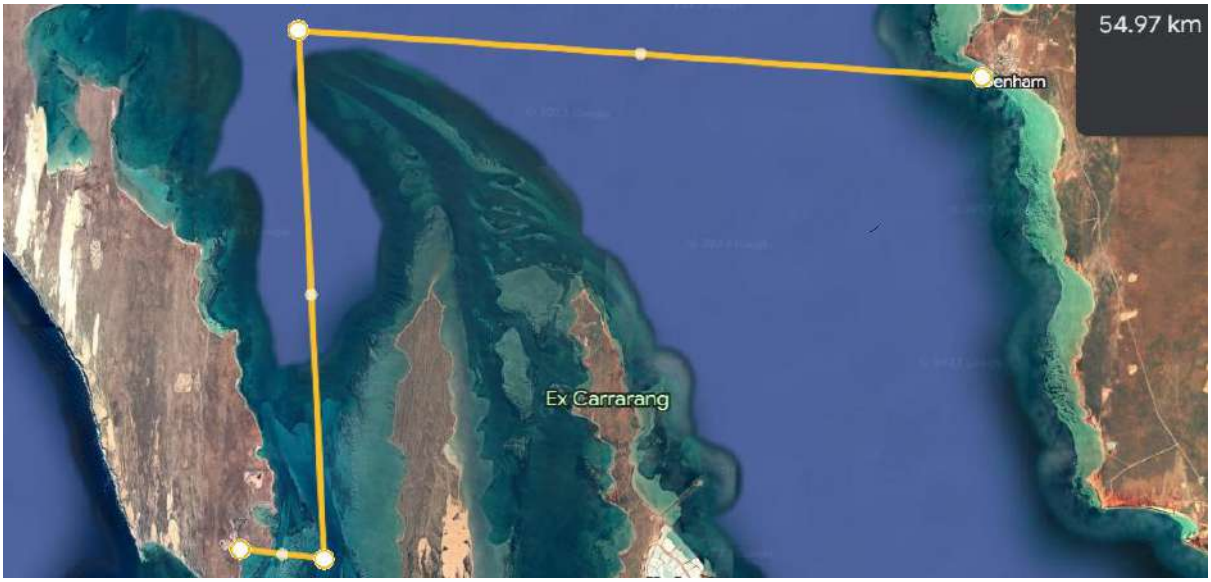


2.721km from Lot 304 to main ocean passage



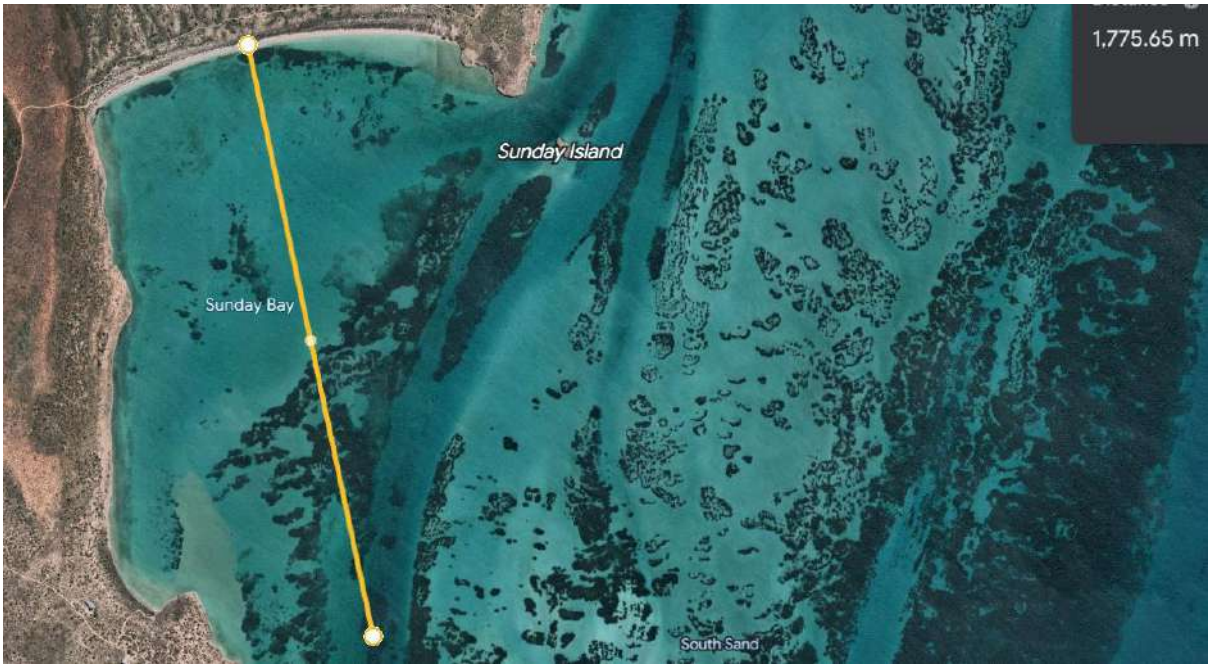
37.39 kms distance as the crow fly's from Denham to Sunday Island Bay

2.83 kms from Lot 304 to point at minor channel where visible to boats



54.9 kms distance via boat to Denham from Lot 304

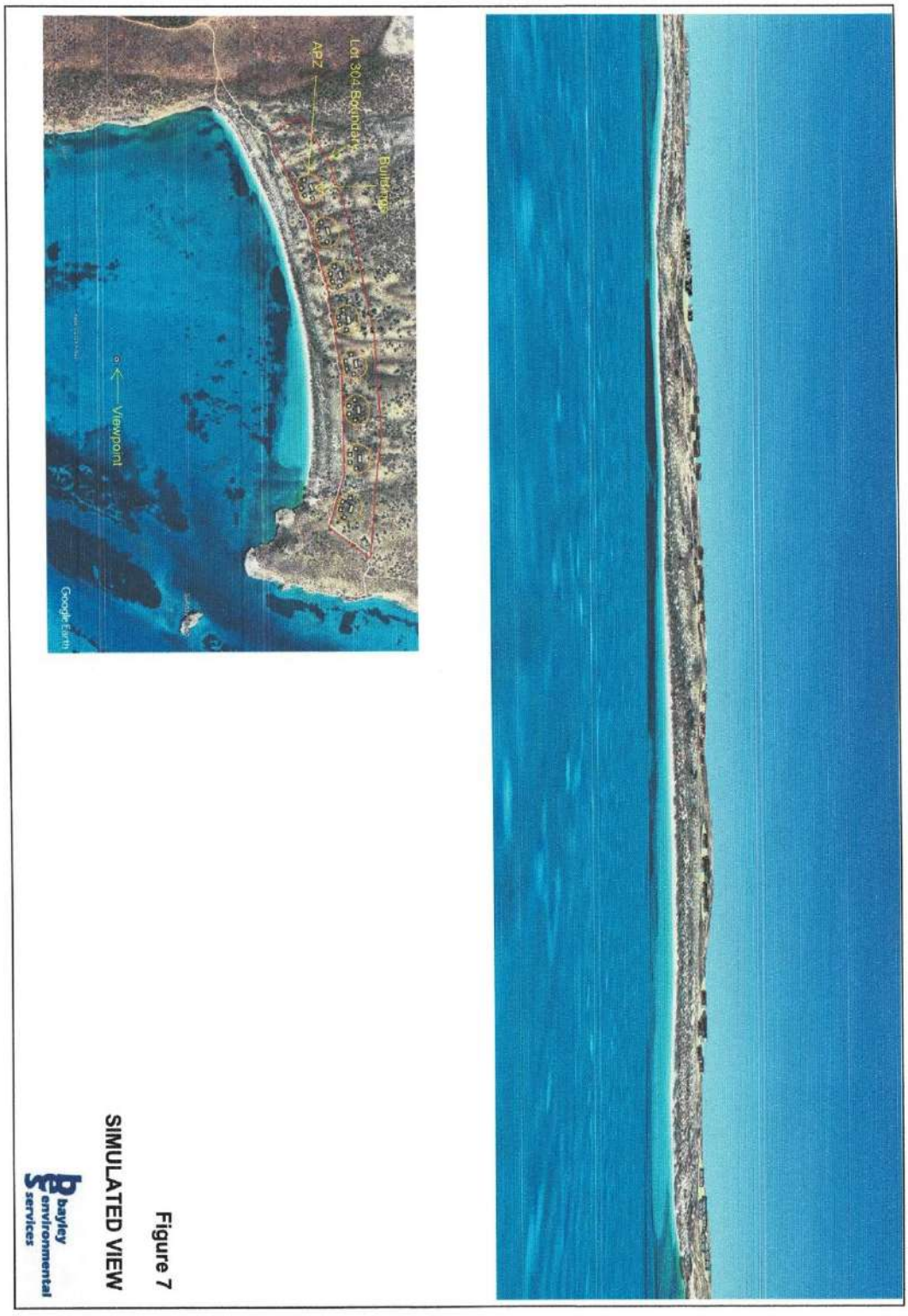
4.24 kms from Lot 304 to main channel where boats first sight Lot



1.77 kms from Lot 304 where boats sight the lot

Looking to Lot 305 from approx. 750m

Looking to Lot 304 from Lot 305



Simulated Visual from Environmental Report

APPENDIX 22

RESPONSE TO SHIRE COMMENTS 2024

APPENDIX 22: Response to Shire Comments 2024

2024 Soft Submission

A soft submission of a completely new LDP application was provided on behalf of DHI Development Pty Ltd, on Shire of Shark Bay directions to Amanda Butterworth from Allerdings for preliminary comment in 2024.

The comments provided by Allerdings town planners are addressed in this appendix as follows

Local Development Plan and Report – Detailed Officer Comments

The following comments are provided on the documentation lodged to date.
Responses in red

LDP conditions

Condition 4.2 appears to suggest that effluent disposal can be located outside the building envelope. LPS4 definition of building envelope is that building envelopes include land required to accommodate effluent disposal.
REFER LDP REPORT Condition 4.2 CLARIFICATION

Condition 7.3 refers to the Dirk Hartog Biosecurity Implementation Plan 2015, however this is not included in the LDP technical appendices.

THE DHIBIP IS A PUBLIC DOCUMENT REFERRED TO IN THE REFERENCE SECTION THE REPORT NOW ATTACHED APPENDIX 23

Condition 9.1 states development applications are to address effluent disposal having regard to the site and soil assessment evaluation. The site and soil assessment valuation is required to form part of the LDP. An assessment of effluent disposal capabilities is required for the LDP to demonstrate that the land is capable of accommodating the proposed development contemplated in the LDP.

SITE & SOIL EVALUATION REPORT NOW ATTACHED (REFER ER APPENDIX F)

Condition 9.3 refers to wind turbines. The Shire has previously advised that wind turbines are not supported.

NEW ERA SMALL WIND TURBINES ARE PROPOSED. WIND TURBINES ARE REGARDED AS IMPORTANT TO MAINTAINING POWER IN ONE OF THE WINDIEST LOCATIONS IN THE WORLD

THE TURBINES PROPOSED ARE NOT SITE INVASIVE OR POSING A VISUAL IMPACT AS THE TURBINES IN DENHAM DO.

THESE TURBINES WILL ATTACH TO OR BE CLOSELY LOCATED TO ACCOMMODATION UNITS AND WILL BE DIFFICULT TO EVEN SIGHT FROM ANY LOCATION PASSING SUNDAY ISLAND BAY

DETAILS INCLUDED IN APPENDIX 3 & 4

SEE VISUAL PAGE 136

Condition 13.1 states that the covenants provide details in relation to the staff accommodation and the ratio of staff to guests. Please provide a copy of the covenants such that this can be reviewed in relation to the total number of persons.

COVENANTS INCLUDED IN APPENDIX 18

Coastal setbacks

The LDP Section 3 states "Coastal consultants Damara advice was included in the previous LDP and Damaras report on the coastal setbacks was deemed "Achieved" in the Shire's report and was validated by Damara in December 2021. The LDP also refers to correspondence from Demara dated 2023. Please update the report to include all correspondence and reports from Damara providing an assessment of this proposal and any updated CHRMAP.

DAMARA REPORTS NOW ATTACHED (SEE ER Appendix B)

Bushfire Issues and Bushfire Management Plan

A NEW BMP HAS BEEN PREPARED BY A LEVEL 3 BUSHFIRE PRACTITIONER

- ***Local Development Plan references to BMP***

Page 10 of the LDP states that the BMP recommends that "the building envelopes need to be located no less than 36m from the southern boundary of Lot 304." The LDP is to be updated to show this minimum setback.

A NEW BMP BY A LEVEL 3 BUSHFIRE PRACTITIONER HAS BEEN REVISED AND ATTACHED (REFER ER APPENDIX I). SETBACK NOW 11m in NEW BMP

Page 10 says that access is via "an informal 4WD track". Please confirm if the existing track meets the BMP requirements or if it must be upgraded and if so responsibilities for maintenance of the track to the required specification.

A NEW BMP BY A LEVEL 3 BUSHFIRE PRACTITIONER HAS BEEN REVISED AND ATTACHED (REFER ER APPENDIX I)

Page 11 of the LDP report refers to advice from Demara which refers to the minimum finished floor level of 4.2m AHD. The Demara correspondence needs to be included in the LDP. The LDP text is to be updated to state the Minimum FFL of 4.2m AHD.

LDP CONDITIONS AMENDED: SEE LDP Condition 5.0

Page 18 states all buildings will be founded on pylons – this needs to be in LDP text and included in the design guidelines.

INFORMATION UPDATED AND INCLUDES ECO ANCHORS AND SIMILAR METHODS IN TEXT AND DESIGN GUIDELINES
SEE 5.0

Page 18 states that "The vegetation within Lot 304 has been inspected onsite assessed and addressed in the BMP which identifies there is no evidence of threatened and priority flora (or fauna)". There is no reference as to whether this survey was undertaken by a suitably qualified person.

ECO SYSTEM SOLUTIONS AND LANTZKE REPORT ADDED AND REFERENCED (refer ER Appendix C,D and E)

A Bushfire Emergency Evacuation Management Plan (BEEP) is to accompany the BMP. It is noted that the last resort is to shelter in place but there is no other detail provided in regard to if a catastrophic forecast was in place. For example, there is no process outlined for any required evacuation. Page 38 of the Environmental Report refers to closure and evacuation. It is not clear whether the only option being considered is for guests to be accommodated in the refuges, and there is no information on the process for managing panicked guests on site, or how communication be maintained across all refuges in the event of a fire with possible loss of power and communication. A BEEP needs to be provided as part of the LDP technical documents.

BUSHFIRE SAFETY CONSULTANTS LEVEL 3 PRACTITIONER HAS PREPARED NEW BMP & BEEP (Refer ER Appendix I)

- Bushfire Management Plan

The Shire Council did not support individual refuse shelters proposed in a previous LDP for this lot – refer to the attached Council minutes dated 26 August 2020. There is no guarantee that Council will form a different view and support several shelters spread over the lot.

BUSHFIRE SAFETY CONSULTANTS LEVEL 3 PRACTITIONER HAVE PREPARED REVISED BMP & BEEP AND CONFIRMED THE INCLUSION OF SHELTERS IN EACH BUILDING ENVELOPE. (Refer BMP, ER Appendix I AND MP)

The Shire has previously liaised with the Department of Planning, Lands and Heritage (DPLH) regarding shelters on Lot 304, and they agreed that 'it was not intended for each proposed building to meet these (on site shelter) requirements, but for the development (as a whole) to consider.' DPLH agreed that it would make the emergency management operators' jobs easier if patrons and staff could shelter in one location – see attached email dated 4 August 2022.

BUSHFIRE SAFETY CONSULTANTS LEVEL 3 BUSHFIRE PRACTITIONER HAVE SUBMITTED NEW BMP SUPPORTING INDIVIDUAL SHELTERS AS DEVELOPMENT PROCEEDS (Refer ER Appendix I)

Whilst the current Bushfire Management Plan hasn't been accepted, the Shire has referred it to the Department of Fire and Emergency Services for comment. This is in line with the advice from DPLH that stakeholders such as DFES should be consulted early. Once the DFES advice is received, the Shire will liaise with you

further.

Specific comments on Bushfire and the Bushfire Management Plan (BMP) are included below. These comments are not an assessment of the BMP as DFES input is necessary, however outlines where there are discrepancies.

Page 7 – the BMP is based upon each building envelope accommodating 3 units. Figures 8 and 9 (pages 18 and 19) assume that the refuge is the middle unit, therefore the BMP is based on 2 units. However, the LDP is based upon up to four accommodation units and a refuge. The plan included on page 7 has each of the 2 accommodation units measuring 14 metres x 7 metres which exceeds the 90m2 permitted under the covenant. The content of the BMP is inconsistent with the information in the proposed LDP.
FOLLOWING DISCUSSIONS WITH DPLH OFFICER NEW BMP SUBMITTED IN COMPLIANCE WITH SPP3.7; BUSHFIRES AND PLANNING FOR BUSHFIRE GUIDELINES NOVEMBER 2024 (Refer ER Appendix I)

Page 18 - Figure 8 provides the APZ around the refuge. The LDP needs to clarify whether this plan identifies the extent of clearing required for each building envelope. Page 27 of the BMP identifies that a 30-metre upslope and 36m downslope APZ is required along with a 3 metre defendable space. The Shire requests that the APZ be provided as a separate scaled image and also be superimposed on the LDP plan for greater clarity.

NEW BMP PREPARED BY BUSHFIRE SAFETY CONSULTING COMPLYING WITH SPP 3.7 AND PLANNING FOR BUSHFIRE GUIDELINES 2024 (Refer ER Appendix I)

INDICITIVE DRAFT PLANS INCLUDED IN BMP CLEARLY SHOWING APZ'S (Refer ER Appendix I)
ENVELOPE 1 NOW INCLUDES APZ ON LDP PLAN.

Page 27 states that driveways will exceed 70m in length and will comply with the guidelines. It isn't clear whether the driveways are of a sufficient width and whether passing bays are proposed.

NEW BMP PREPARED BY BUSHFIRE SAFETY CONSULTING COMPLYING WITH SPP 3.7 AND PLANNING FOR BUSHFIRE GUIDELINES ADDRESSING ALL MATTERS (Refer ER Appendix I)

Page 29 – this refers to a 3-unit accommodation building, however the LDP refers to 4 units plus staff within each building envelope. The BMP needs to relate to, and reflect, what is proposed in the LDP.
NEW INDICITIVE DRAFT PLAN FOR 4 UNITS INCLUDED IN BMP

Visual Assessment

As outlined on Page 27, it is noted that the report states that the frequency of vessels passing in either direct is minimal and limited to in the main privately owned fishing vessels and/or commercial and charter vessels coming from Denham or from Perth. However, this does not negate the need for a visual assessment to be undertaken. It is requested that visual assessment be undertaken showing the required FFL of

each of the pods and an envelope to show maximum height in relation to the sightlines from the bay.

ONLY ONE ENVELOPE IS VISIBLE FROM OCEAN SIDE OF LOT. ADDITIONAL VISUAL IMPACT INFO IN APPENDIX 21, LDP SUBMISSION AND ER.(SEE CONDITION 5 OF LDP CONDITIONS)

Page 20 of the Management plan refers to correspondence from Demara dated April 2023 – this needs to form part of the LDP.

DAMARA REPORT INCLUDED AND UPDATED IN 2024 (Refer ER Appendix B)

The report refers to the building envelopes being less than 1.66ha. Given there are 8 building envelopes, this equates to 2,000m2 per building envelope. The building envelope is to include:

BUILDING ENVELOPES NOW TOTAL APPROX 1.84HA OR APPROX 16% OF THE LOT
DRAFT INDICITIVE PLAN NOW DRAWN FOR BMP
DRAFT ENVELOPE LAYOUT INCLUDED HEREIN

- Staff unit/refuge;
- 4 units for up to 4 people measuring up to 90m2 each;
- Verandahs for each unit (as referred to the design guidelines);
- Store for batteries, services and waste;
- Water tank for potable water and water tank for non potable water;
- Walkways;
- Water tanks for fire use – noting that the BMP identify a location of the water tanks for fire use outside the building envelope;
- Effluent disposal and irrigation areas (Page 46 of Environmental report estimate approximately 200m2);
- Meeting required separation distance between the accommodation and the irrigation area;
- Garage is to be located within the building envelope;
- Wind Turbine (Page 49 of Enviro report)

It is essential that an indicative plan be provided to demonstrate how all of these elements could be accommodated within each building envelope.

INDICITIVE DRAFT PLAN PREPARED FOR BMP BUT WILL NOT BE INCLUDED IN THE LDP SINCE THIS IS NOT AN APPLICATION FOR DEVELOPMENT. ALL ITEMS NOTED ABOVE WILL FIT EASILY INTO BUILDING ENVELOPES AS SHOWN HEREIN

Management Plan

Page 7 refers to onsite manager and staff. The documents need to clarify how many staff will be accommodated within each building envelope.

REPORTS UPGRADED TO PROVIDE INFORMATION

Page 8 refers to a project manager, resident manager, caretake and staff. The documents need to confirm staff numbers per building envelope and where these staff will be located. There needs to be provisions ensuring there are sufficient staff

to manage guest in the event of an emergency situation, such as a bushfire.

REPORTS UPGRADED TO PROVIDE INFORMATION

Page 9 refers to waste management plan and biosecurity plan. The report needs to detail where this information is provided in the report.

THIS REFERENCE TO PLANS IS NOW DELETED AS INCLUDED AND ADDRESSED WITHIN MP AS REQUIRED BY SU14 3(I)AND NOTED IN ER

Page 10 refers to a 10m shell grit apron around each cluster and a 3m mandatory shell grit. The documents need to clarify if 13m of vegetation is proposed to be cleared for the shell grit

apron. If the shell grit apron is to be maintained, this is to be detailed in the Management Plan.

10m NOW DELETED FROM DOCUMENTS AS NO LONGER CONSIDERED FOLOWING NEW BMP

Page 10 renewable power – there is insufficient information and detail on where renewable power will be located. Page 14 says renewable power is required to be located within the building envelope, therefore the documents are to be updated to state this.

PAGE 14 DOES NOT SAY THIS
LOCATION NOW INCLUDED IN THE MANAGEMENT PLAN. DETAILED LOCATION WILL FORM PART OF A DA

If each accommodation unit can provide for up to 4 persons and each building envelope has up to 4 units plus a staff member (or possibly more than 1 staff member), noting eight building envelopes are proposed, plus a project manager. This equates to a maximum capacity of 137 people; it needs to be detailed how the visitor numbers will be limited to a maximum of 100 across the 8 building envelopes. It is noted that the report refers to an average of 12 visitors be envelope, however the supporting documentation does not provide details of capacity of accommodation units.

REPORT REVISED TO PROVIDE MORE INFORMATION
CAPABILITY IS 4 PER UNIT AS DESCRIBED IN ALL DOCUMENTS
VISITOR AND STAFF NUMBERS ARE CONTROLLED THROUGH A PROPOSED COMPUTOR BOOKING SYSTEM AND MAY NOT EXCEED 100 IN TOTAL AS POINTED OUT IN SUBMISSION

Page 13 Unformed access routes. The documents need to confirm if this complies with the BMP.

NEW REVISED AND UPDATED BMP ATTACHED ADDRESSING ALL MATTERS COMPLYING WITH SPP3.7 AND GUIDELINES 2024 (Refer ER Appendix I))

Page 15 – potable water and non-potable water. The water storage tanks are to be within the building envelope. Indicative sizes and locations to be provided.

DRAFT PLAN PREPARED SHOWING THIS BUT NOT INCLUDED IN LDP AS NOT A DEVELOPMENT APPLICATION. ATTACHED HEREIN

The reliability, quality and location of the water source/bores also needs to be addressed in more detail, as this issue was raised by the Department of Water and Environmental Regulation in their submission on the previous LDP.

THIS HAS BEEN ADDRESSED HOWEVER POTABLE WATER WILL BE CARTED TO SITE TO MEET ANY REQUIREMENTS IF OTHER SOURCES NOT SUFFICIENT

Page 16 – Report to be updated to state that waste from cleaning will be stored in the storage building.
NOT SURE WHAT THIS IS ABOUT?? STORAGE OF WASTE PRIMARILY IN SCREENED AREAS BEHIND ACCOMMODATION PRIOR TO REMOVAL BY VISITORS

Page 18 –A Geotech report needs to be provided to support the assumptions about distance to groundwater. The Department of Water and Environmental Regulation commented on the previous LDP that 'depth to groundwater was not demonstrated' and recommended that 'further information to be provided on depth to ground water to determine if there is sufficient clearance from bottom of wastewater treatment system, as per the Government Sewerage Policy'. Any geotechnical reports regarding depth to groundwater are to be undertaken at a time that the groundwater level is highest, usually in late August or September.

SEE S&S Evaluation REPORT, ENVIRONMENTAL REPORT AND MANAGEMENT PLAN
SEE LDP Condition 4.2
THE GOVERNMENT SEWERAGE POLICY EXPLANATORY NOTES STATE WITHIN SECTION 5.3 THAT
"WHERE ON-SITE SEWERAGE DISPOSAL IS PROPOSED THE POLICY REQUIRES THE APPLICANT TO DEMONSTRATE THAT THE SITE IS SUITABLE FOR LONG TERM ON-SITE SEWERAGE DISPOSAL" (SEE S&S REPORT)
"IF A SITE AND SOIL EVALUATION IS PREPARED IN ACCORDANCE WITH THE POLICY PROVISIONS OF SCHEDULE 1 AT THE APPROPRIATE PLANNING STAGE, IT WILL BE SUFFICIENT TO SUBMIT WITH A PLANNING APPLICATION. IT IS NOT THE INTENT OF THE POLICY TO REQUIRE GEOTECHNICAL INVESTIGATIONS AS PER AS 1726:2017 GEOTECHNICAL SITE INVESTIGATIONS
The Report prepared by Martin Wells complies with this explanatory note.

Page 19 refers to a site and soil evaluation updated in July 2023, the LDP is to be updated to include this as an appendix. The site and soil evaluation has not been assessed as a copy was not provided.
REPORT NOW INCLUDED ER Appendix F

Page 19 refers to operational biosecurity plan, the LDP is to be updated to include this as an appendix or it should be detailed where this information is provided within the appendices. Any Biosecurity Plan needs to clearly state the measures that will be taken on Lot 304 to achieve biosecurity requirements, as was outlined by the Department of Biodiversity, Conservation and Attractions (DBCA) in their submission on the previous LDP.

PAGE 19 REFERS TO A "DRAFT" OPERATIONAL BIOSECURITY PLAN AND SPECIFICALLY STATES THAT IT WOULD BE FINALISED AND SUBMITTED WITH ANY FUTURE DA.

THIS REFERENCE HAS NOW BEEN DELETED AND BIOSECURITY IS ADDRESSED IN SECTION 11 OF THE ER AS REQUIRED BY SU14 3(V).

APPENDIX 23 INCLUDES THE DHIBIP WHICH WILL FORM THE BASIS FOR FUTURE BIOSECURITY

Design Guidelines

The design guidelines need to be updated to include:

- Required FFL;
- **UPDATED PAGE 16 DG** XXIII AND ldp conditions
- Maximum wall and overall height or number of storey's; and
- **UPDATED PAGE17 DG** XXVI
- Stipulate roof pitches.
- **UPDATED PAGE 18 DG** XXXVII

The design guidelines need to ensure that each building envelope is developed to a consistent theme, the design guidelines do not provide for consistency between each building envelope.

UPDATED ADD THEME TO DG PAGE 20 XLIX

The design guidelines at page 10 allow for safari tents – this has not been detailed in BMP or elsewhere in the guidelines. Inclusion of a safari tent does not provide high architectural qualities.

DELETED

Page 10 details that secondhand buildings are permitted – this is not supported by the Shire as achieving the high architectural qualities expected for future development in this location.

DELETED ALTHOUGH IT WAS ACCEPTED IN EARLIER SUBMISSION

Page 11 and 12 refer to wind turbines. The Shire has previously advised that they do not support wind turbines, so reference to wind turbines should be deleted.

ADDITIONAL DETAILS PROVIDED SEE HEREIN

Page 11 states that swimming pools may be permitted. The Shire would be highly reluctant to support a series of pools and would only consider a single guest pool with more substantial information on water source, size/capacity, wastewater disposal, automated filtration system, chemical storage, water turnover and management, noting that it would require approval by the Department of Health. The Shire's Environmental Health Officer can only comment if more detailed information is included.

THIS IS NOT A DEVELOPMENT APPLICATION
SWIM/PLUNGE POOL INCLUDED TO ASSIST IN BUSHFIRE CONTROL AND TO APPEAL TO HIGH INCOME VISITORS

Page 11 refers to solar panels being in a "remote out of site location". Solar panels should be confined to the building envelope.
LPS No 4 and SU14 conditions do not confine solar panel location to building envelopes

ADDITIONAL INFORMATION PROVIDED RE SOLAR PANELS LOCATION WITHIN DOCUMENTS

Note: Environmental report page 24 refers to "double story accommodation" the height of the units needs to be detailed in the design guidelines.

DESIGN GUIDELINES AMENDED TO INCLUDE MAXIMUM HEIGHT OF 4.85M

Environmental Management Plan

SU14 CONDITION 3(V) PROVIDES FOR AN ENVIRONMENTAL REPORT – NOT AN ENVIRONMENTAL MANAGEMENT PLAN

Page 24 refers to "double story accommodation" matters to do with building height need to be in the LDP and design guidelines.
NEW INDEPENDENT ENVIRONMENTAL REPORT

DESIGN GUIDELINES and LDP REVISED

Page 27 refers to a site and soil evaluation that is not included in the documentation and needs to be provided as an appendix. The Shire's Environmental Health Officer will comment on the site and soil evaluation once provided.

REPORT NOW INCLUDED ER APPENDIX F

Page 29 refers to a flora significance assessment 2019 which needs to be provided as an appendix.

REPORT NOW INCLUDED ER APPENDIX C,D & E

Page 30 refers to an EPA report on a separate proposal in 2015 and DBCA comment on the airstrip. This does not relate to the Subject Site.
THIS WAS PROVIDED AS A DIRECT COMPARISON AND IS REGARDED AS RELEVANT but NOW DELETED

Pages 31 and 32 refer to a clearing permit from 2021 – this should be deleted or needs to be amended to detail the extent of clearing proposed in that application comparative with the amount of clearing proposed in this LDP. This information should be deleted or a copy of the DWER clearing permit and approved plan included as an appendix.

THE LDP DOES NOT PROPOSE ANY CLEARING AS THIS WILL BE ADDRESSED WITHIN A DEVELOPMENT APPLICATION AND FINALISED BMP- BUT COPY OF CLEARING PERMIT INCLUDED IN APPENDIX 19

Page 34 refers to the Dirk Hartog Island Biosecurity Plan however it is unclear if the Biosecurity measures are from the 2012 Biosecurity Plan or are proposed by the owners. This needs to be clarified in the LDP documentation. The LDP conditions refer to a 2015 Dirk Hartog Island Biosecurity Plan which should be included as an appendix to the LDP.

DHIBIP NOW ATTACHED AT APPENDIX 23

Page 39-41 Visual assessment. The images are from 2.5km away. Closer photos and perspectives are required and should show the envelopes to 2 storeys as that is what the environmental report refers to.

NEW IMAGES PROVIDED FROM 400M OFFSHORE

2 STOREY ARE NOT PROPOSED BUT SPLIT LEVEL RELATED TO TOPOGRAPHY IS CONSIDERED AS AN OPTION WITH MAXIMUM HEIGHT NOMINATED WITHIN DG's AND LDP CONDITIONS

Page 44 – the assumption of about 2.5 litres per person per day being sufficient water should be verified by suitably qualified person. Estimates should be based on maximums and realistic water needs, rather than assumed minimums.

THIS IS NOT AN ASSUMPTION BUT BASED ON GOVERNMENT WEB SITES AND DETAILS NOW INCLUDED. IRRESPECTIVE SUFFICIENT POTABLE WATER WILL BE TRANSPORTED TO SITE TO MEET ANY REQUIREMENTS

Page 46 referred to an updated Site and Soil Evaluation in 2023.This needs to be provided as an Appendix.
SITE AND SOIL REPORT NOW INCLUDED ER APPENDIX F

Page 46 refers to a minimum infiltrative area of 58m2 – the calculations by the suitably qualified person need to form part of an appendix to the LDP.

NOW AMENDED S&S REPORT NOW INCLUDED AND AREAS INCLUDED IN ER AND MP

Page 46 Section 14.3. The calculations are based on average number of people across the whole site. However, if each envelope is designed to accommodate a max of 4 units each accommodating up to 4 persons, this equates to 16 guests with possibly 2 staff per pod, this equates to 2,520L per day per envelope. A report by a suitably qualified person needs to verify the ground suitability, effluent disposal requirements, effluent disposal method and compliance with the State Government Sewerage Policy.

SITE AND SOIL REPORT NOW INCLUDED (Refer ER Appendix F)

Page 48 references Demara reports/correspondence which hasn't been

provided as part of the appendices.

REPORTS NOW INCLUDED ER APPENDIX B

Page 49 references wind turbines. This is to be deleted as the Shire is not supportive of wind turbines. The Shire may consider power sourced from solar and batteries however visual impact needs to be addressed.

NEW ERA SMALL TURBINES ARE PROPOSED AND FURTHER DETAILS HAVE BEEN PROVIDED IN APPENDIX 3 & 4 AND HEREIN THIS APPENDIX

Page 50 discusses monitoring. The LDP needs to clearly outline the strategies proposed to be implemented if the monitoring finds that the targets are not met.
NOW INCLUDED AND DETAILED

Appendices

Page 12 Appendix 3 includes an environmental impact assessment, which is not prepared by a suitably qualified person and should be deleted.
THERE IS NO MANDATORY REQUIREMENT FOR QUALIFICATIONS OF ANY PERSON PREPARING SUCH A REPORT - NOW DELETED WITH NEW INDEPENDENT ENVIRONMENTAL REPORT INCLUDED

Page 18 Appendix 5 statement of environmental effects. This is not prepared by a suitably qualified person and should be deleted.
THERE IS NO MANDATORY REQUIREMENT FOR QUALIFICATIONS OF ANY PERSON PREPARING SUCH A REPORT - NOW DELETED WITH NEW INDEPENDENT ENVIRONMENTAL REPORT INCLUDED

Page 62 Appendix 21 – there is no consistency in regard to materials, built form or any relevance to the design guidelines.

PROVIDED TO PROVIDE INDICITIVE INFORMATION NOW DELETED

Summary

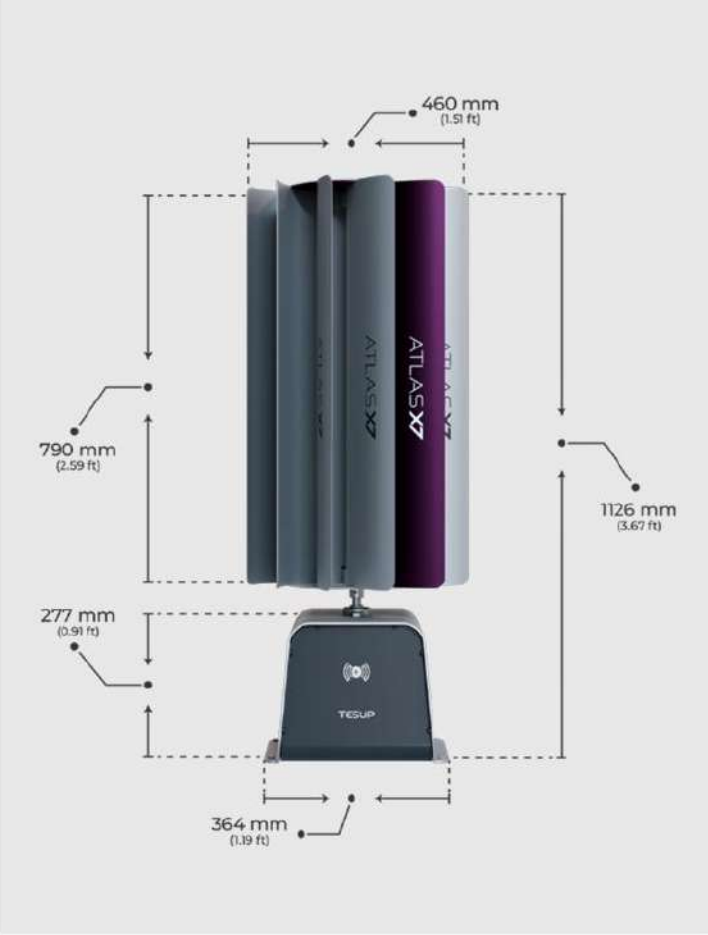
The LDP refers to an average of 12 guests per building envelope however the LDP does not provide information as to how the number of guests in each envelope would be controlled to ensure equity across the eight building envelopes. Further information is to be provided to detail measures within the LDP which demonstrate how compliance with the caveats and scheme provisions will be achieved.

INFORMATION ON VISITOR AND STAFF NUMBERS CONTROL NOW INCLUDED. CAVEATS ARE NOT ASSESSABLE BY THE SHIRE?

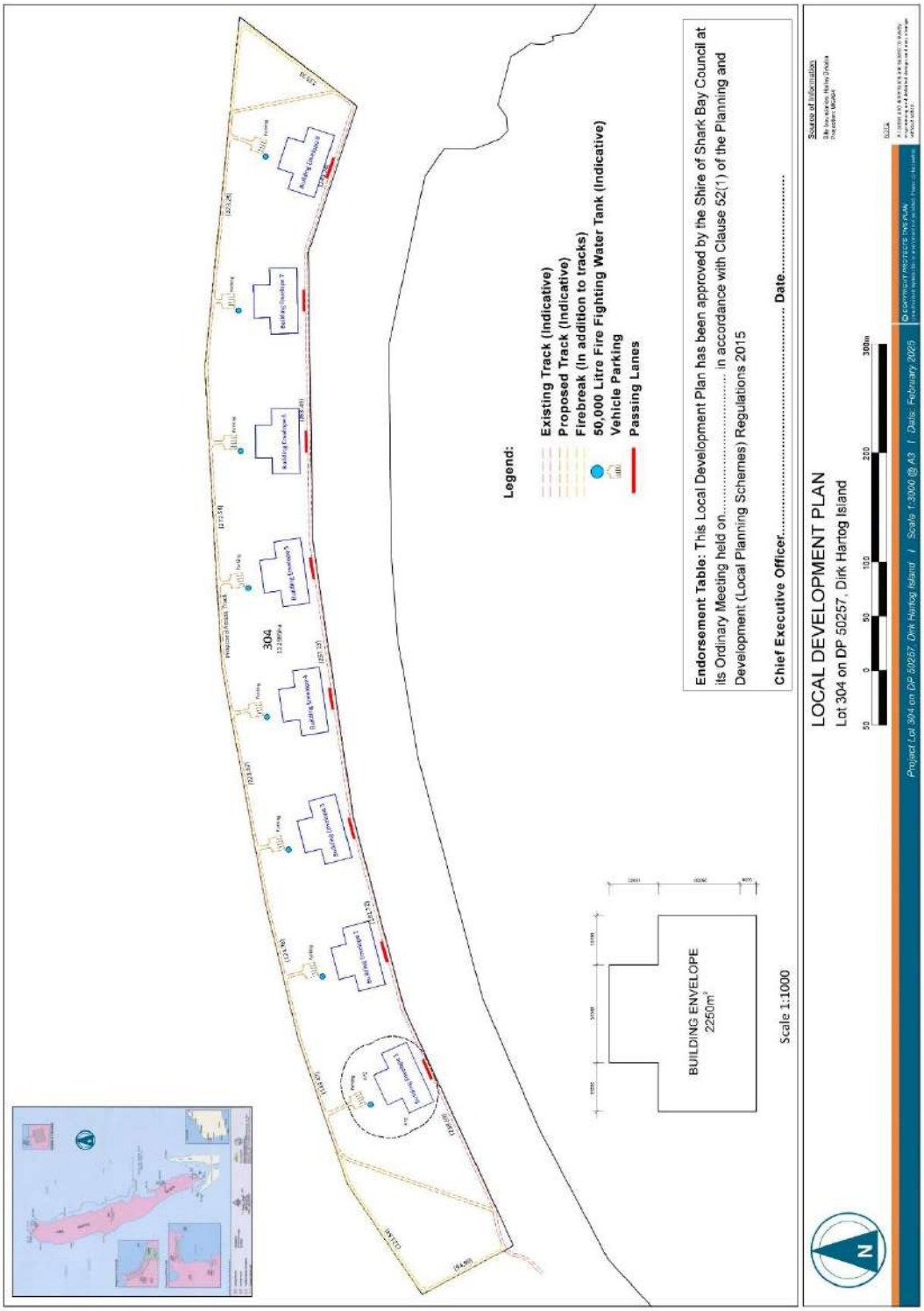
The Shire considers that more detailed and comprehensive work needs to be progressed to support any proposed Local Development Plan for the lot. The Shire is of the view that the application as submitted is insufficient for the LDP to be accepted for processing.

The Shire has only been able to undertake a limited assessment at this stage as not all of the information has been provided. If you seek future support of an LDP by the Shire of Shark Bay Council, it is strongly recommended that you take additional

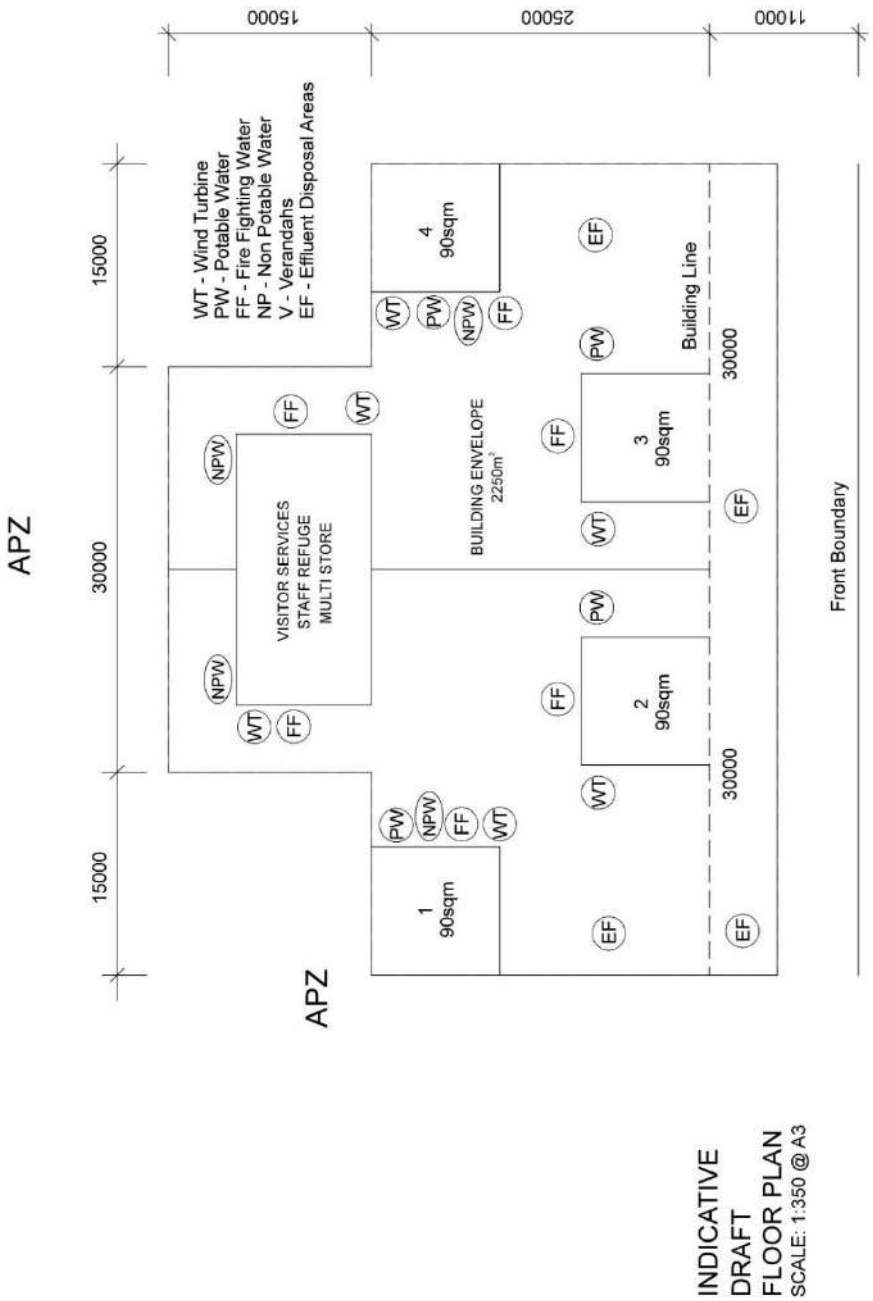
time to review the detailed officer comments provided in this letter



Proposed wind turbine dimensions



LDP with APZ on Envelope 1



Indicative layout showing infrastructure

APPENDIX 23

DHIBIP

DIRK HARTOG ISLAND BIOSECURITY IMPLEMENTATION PLAN

A shared responsibility

Department of Parks and Wildlife

John Asher and Keith Morris

June 2014 (Revised June 2015

Department of Parks and Wildlife
Locked Bag 104

Bentley Delivery Centre WA 6983
Phone: (08) 9219 9000

Fax: (08) 9334 0498

www.dpaw.wa.gov.au

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Questions regarding the use of this material should be directed to:

Keith Morris

Science and Conservation Division
Department of Parks and Wildlife PO
Box 51

Wanneroo WA 6946

Phone: 08 94055159

Email: keith.morris@dpaw.wa.gov.au

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This document is available in alternative formats on request.

Please note: urls in this document which conclude a sentence are followed by a full point. If copying the url please do not include the full point.

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PREFACE

The purpose of this plan is to provide guidance for implementing biosecurity actions to prevent the establishment of new invasive species on Dirk Hartog Island and assist in the success of the "Return to 1616" Dirk Hartog Island ecological restoration project. This plan will be principally implemented by the Department of Parks and Wildlife through its staff, volunteers and contractors with the voluntary cooperation of freehold land owners, tourism operators, private lease holders, visitors to the island, Malgana people, the Shire of Shark Bay and the Australian Maritime Safety Authority by implementing the biosecurity measures outlined in the Dirk Hartog Island Biosecurity Plan (Astron 2012).

Information in this document was based primarily on the Dirk Hartog Island Biosecurity Plan (Astron 2012) and more detailed information on the topics covered in this implementation plan can be found therein.

The department would like to acknowledge and thank the following people and organisations who provided information and/or assisted in the development of this Biosecurity Implementation Plan for Dirk Hartog Island.

- Chevron Australia Pty Ltd
- Geoff Wardle
- Kieran Wardle
- Paul Anderson, Shark Bay Shire
- Bobby Hoult, Malgana representative
- Department of Parks and Wildlife Shark Bay District staff, and
- Dirk Hartog Island Ecological Restoration Project Management Committee

VISION

Biosecurity is a set of preventative measures (quarantine, surveillance and control/eradication) designed to reduce the economic, environmental and community impact of animal and plant pests, weeds and diseases. It is an essential component for the ecological restoration of Dirk Hartog Island.

Our vision is that biosecurity is recognised as a shared responsibility by the Shark Bay and wider community. We believe that working towards this vision will enable the Department of Parks and Wildlife and other Dirk Hartog Island land managers to effectively meet the current and future challenges posed by biosecurity risks. The effective management of biosecurity risks will in turn contribute to community wellbeing by supporting a stronger economy and healthy environment.

1 INTRODUCTION

Dirk Hartog Island is Western Australia's largest island, covering 63,000 hectares and spanning almost 80 kilometres in length. Situated in the Shark Bay World Heritage area on the far western edge of the Australian continent, the island shelters the shallow waters of Shark Bay. The first European landing in Australia occurred on Dirk Hartog Island in 1616. The island was named after the Dutch sea captain who landed at Cape Inscription, the northernmost tip of the island, aboard the *Eendracht*. English explorer William Dampier also visited the island aboard HMS *Roebuck* in 1699, making many detailed observations of the wildlife and vegetation.

In 1616 the island was pristine, with at least 13 ground-dwelling native mammal species. These included small kangaroo-like boodies and woylies, and western barred bandicoots, chuditch and dibblers.

From the 1860s until 2009, the island was used by pastoralists to run sheep. The Cape Inscription lighthouse was established in 1910 and goats were introduced by the lighthouse keepers to provide meat and milk. By the late 20th century, the island had become popular with fishing enthusiasts, divers and snorkelers. Feral cats had been introduced and by this time feral cats and goats were well established on the island and only three small mouse- sized native mammal species persisted: the ash-grey mouse, sandy inland mouse and little long-tailed dunnart.

In 2009 Dirk Hartog Island became a national park, providing the Western Australian government, through the Department of Parks and Wildlife with the opportunity to restore its natural environment in partnership with the island's other land managers and the Shark Bay community.

A conservation priority

As part of a World Heritage area, Dirk Hartog Island has international conservation significance for birds, marine turtles and reptiles, seascapes and landscapes. Its importance on a world scale will be enhanced with the successful re-establishment of lost mammal species, which will make it one of the world's most important islands for mammal conservation.

Threatened species currently inhabiting the island include the western spiny-tailed skink, the Dirk Hartog Island southern emu wren, the Dirk Hartog Island rufous field wren and the Dirk Hartog Island white-winged fairy wren. The native vegetation on the island comprises spinifex grassland and shrubland. At least 266 native plant species, including 10 species of conservation priority (2012), have been recorded there.

Return to 1616: ecological restoration project

The department has embarked on an ambitious project to remove all sheep, goats and feral cats from Dirk Hartog Island, re-establish healthy vegetation and re-introduce mammal species once known to exist there. Significant funds are being invested by the department and the Gorgon Barrow Island Net Conservation Benefits Ffund in a partnership that has the potential to yield world-class conservation outcomes over the next 20 or more years.

The Dirk Hartog Island ecological restoration project will see some of the most extensive feral animal eradications ever attempted in the world with the removal of goats and feral cats. It is at the global forefront of science, conservation and land management. The ground breaking project aims to re-introduce 10 native mammal species that once existed on the island and introduce a further two species considered likely to have been there. It will also involve weed management, vegetation reconstruction and fire management. Biosecurity protocols will be implemented to prevent the introduction of high-risk invasive species such as black rats, and the re-introduction of cats. The benefits of restoring the environment of Dirk Hartog Island were identified in 1995 in a plan initiated by the Wardle family. The plan was prepared to instigate the successful operation of a nature-based tourism facility while at the same time managing the natural resources and environmental values in such a way so as to ensure the long term sustainability of Dirk Hartog Island (Enviroplan 1995). The ecological restoration project underway will complement this plan through the establishment of native mammals on the island that are rarely seen elsewhere.

The project also provides an opportunity to foster scientific research with a focus on island ecological restoration, with the prospect of partnerships with science and tertiary institutions. The department will consult closely with other key stakeholders, including private landowners, the Shire of Shark Bay, the Australian Maritime Safety Authority and the Malgana community. The department will also consult with the Shark Bay community and provide them with progress reports during delivery of the project.

Biosecurity

Biosecurity measures to protect the island from the accidental introduction of pest and weed species are a major consideration. This biosecurity implementation plan for the island provides protocols and guidelines for the inspection and cleaning of vehicles, equipment and machinery to prevent the accidental introduction of weeds, pests and wildlife diseases.

Biosecurity refers to "mitigating the risks and impacts to the economy, the environment, social amenity or human health associated with pests and diseases" (NEBRA 2012). Invasive or pest species can impact on native flora and fauna in their extent and/or area of occupancy, through competition for food, habitat or direct predation. Invasive species can also impact on tourism through changes in aesthetic and recreation values. Biosecurity is important for the proliferation and diversity of native species, and will have ecological, social and economic benefits on Dirk Hartog Island. Dirk Hartog Island has the potential to support a diverse native mammal assemblage, if critical non-indigenous species are eradicated and future biosecurity actions are implemented.

Historically there have not been any biosecurity strategies to prevent the arrival of non-indigenous species on Dirk Hartog Island. Non-indigenous species (NIS) were introduced to Dirk Hartog Island for pastoral purposes and domestic use, accidentally and as pets and have caused grazing pressure, habitat degradation, competition for resources and predation. NIS are implicated as the main factors in the local extinction of some native species (Burbidge and Manly 2002; Algar *et al*. 2011), and predation by feral cats is a listed key threatening process under the Commonwealth's Environment Protection and Biodiversity Conservation Act (1999). Ongoing damage is currently being mitigated with the removal of stock species and cats (Algar *et al*. 2011, DEC 2011).

In August 2012, the Dirk Hartog Island Biosecurity Plan was produced which provides an assessment of risk, mitigation strategies for existing NIS, and mitigation strategies to prevent further introductions. This implementation plan is secondary to the Biosecurity Plan and aims to provide a mechanism to implement the aims of the Biosecurity plan, to minimise future

damage to ecosystems on Dirk Hartog Island. Success of biosecurity on Dirk Hartog Island requires collaborative action from landowners, land managers and the community to prevent invasion, and detect and eradicate invasive species if they evade preventative measures.

The Department of Parks and Wildlife has principal responsibility for the implementation of this plan through its staff, volunteers and contractors. However, the success of the "Return to 1616" ecological restoration project will only be achieved through cooperation and the combined efforts of the department, landowners and managers and the Shark Bay community with the implementation of the biosecurity measures outlined in this plan.

1.1 Goals and objectives

The goal of the Dirk Hartog Island Biosecurity Implementation Plan is to provide a practical process of quarantine, surveillance and control / eradication to minimise the risk of introduction or proliferation of NIS and diseases to or within Dirk Hartog Island.

The objectives of the implementation plan are to:

- provide standard operating quarantine procedures and protocols to minimise the likelihood of introduction of NIS and diseases
- provide methods of surveillance to enable early detection of NIS and diseases to eradicate or minimise severity of impact to biodiversity, economy or culture
- provide guidelines to control and, where appropriate, eradicate non-indigenous species while minimising negative impacts on native flora and fauna

2 THE SITE

Dirk Hartog Island is the largest island in Western Australia, covering approximately 63 000 hectares. Dirk Hartog Island National Park was established in 2009 and covers the majority of Dirk Hartog Island, and is an ex-pastoral lease purchased by the Western Australian government. Land tenure on Dirk Hartog Island also includes an area of Unallocated Crown Land at the northern end of the island (Reserve 14918), private freehold (Lot 62, 303, 304 and 305), a reserve for the 'use and benefit of Aboriginal people' (Reserve 50326) and land vested with the Shire of Shark Bay for the purpose of 'heritage precinct' (Reserve 46663) (Figure 1).

Steep limestone cliffs dominate the western side of Dirk Hartog Island while the eastern side of the island is dominated by a low limestone coastline of shallow bays and inlets and sandy beaches. The vegetation is low and shrubby consisting of spinifex hummock grassland and mixed open chenopod shrubland interspersed with areas of bare sand and birridas (gypsum claypans) (DEC 2012). Terrestrial invertebrate fauna on Dirk Hartog Island is poorly understood, but it is possible that it comprises a unique assemblage of short range endemics (Astron 2012).

From the 1860s to 2007, the main land use on Dirk Hartog Island was for pastoral purposes. Sheep (*Ovis aries*) and horses (*Equus caballus*) were introduced in the 1860s to early 1900s for the purpose of pastoralism and goats (*Capra hircus*) for domestic use by the lighthouse keeper, the sheep and goats persisted until destocking began in 2007. There are now no horses on the island and the last known sheep were removed in February 2013. Goat abundance has been severely reduced by an ongoing eradication program due for completion by June 2018 (Heriot, Parks and Wildlife, *pers. comm*.). Rabbits (*Oryctolagus cuniculus*) were introduced in the mid 1800s, but they failed to establish and are not known to have been re-introduced since. Cats (*Felis catus*) and house mice (*Mus musculus*) spread throughout the island soon after European settlement (Burbidge 2001). Cat eradication is currently being implemented with the goal of complete eradication of cats by June 2018 (DEC 2011). The black rat (*Rattus* spp.) is another significant pest species implicated in island eradications worldwide (Astron 2012). Surveys in 2011 and 2013 for black rats have been conducted on Dirk Hartog Island and at Denham, Useless Loop and Monkey Mia in 2014 with none detected and these will continue on a regular basis.

The intrinsic natural values of Dirk Hartog Island have now changed the main anthropogenic use of the island to tourism and conservation. Tourism includes day visits through to extended stays either camping within the national park or staying on freehold land. The Dirk Hartog Island lodge operates a barge between Cape Ransonnet and the mainland which allows tourists to bring their own vehicle across to the island. The Department of Parks and Wildlife also operates a barge between Denham and Herald Bay to transfer department personnel, vehicles and equipment for the ecological restoration project. The eastern side of the island is relatively easy to access by the boating public and is 35 km from Denham across Denham Sound or 1.5 km from the southern tip to the mainland across South Passage. The island's numerous bays and inlets on the eastern side are also used as a safe anchorage by passing vessels. The ease of access to the island by the boating public presents significant challenges for the successful implementation of biosecurity actions.

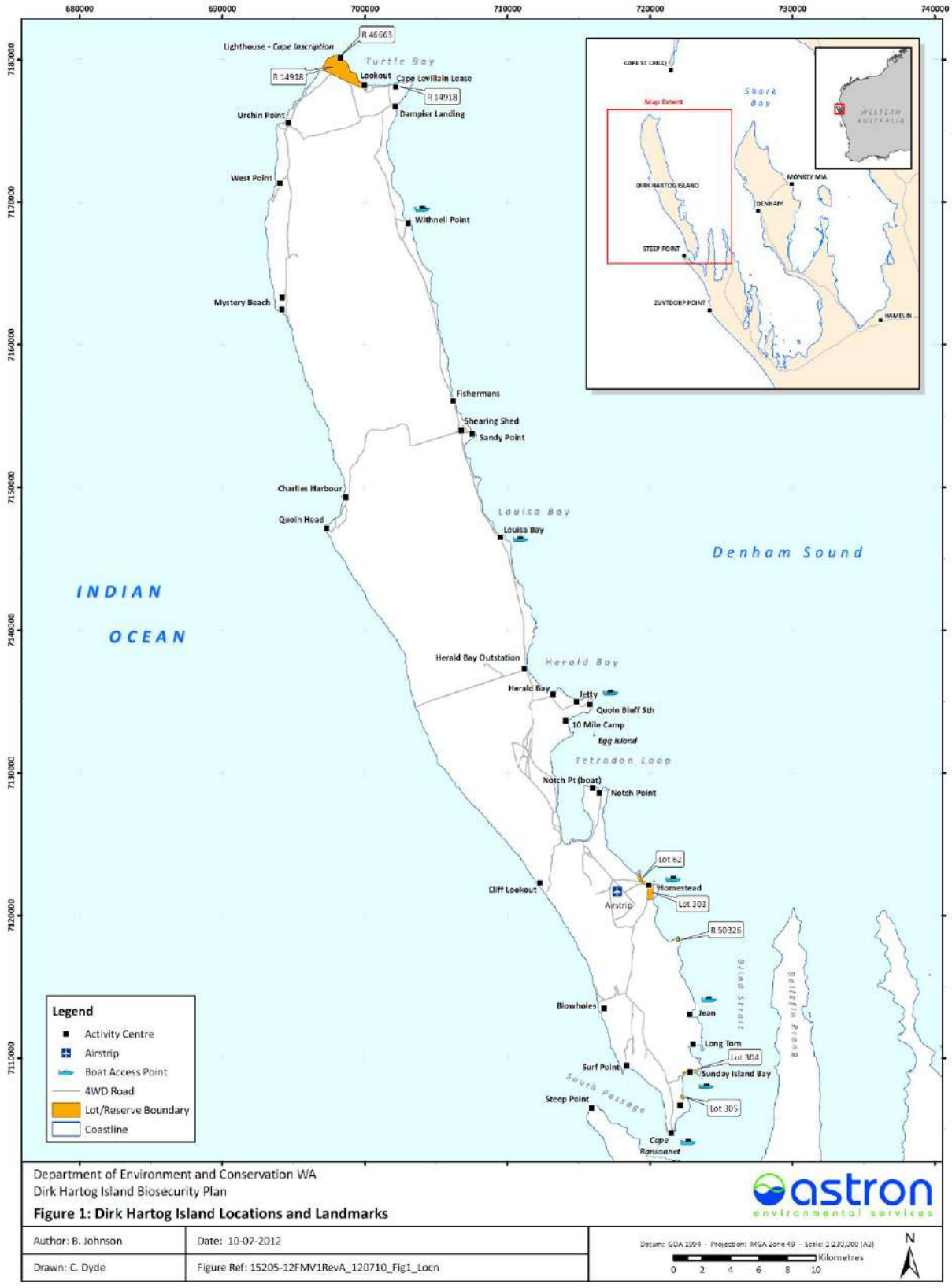


Figure 1. Map of Dirk Hartog Island

3 LEGISLATIVE FRAMEWORK

On state and national levels, the primary legislation relevant to this biosecurity plan

are:

- Intergovernmental Agreement on Biosecurity (2012)
- *Conservation and Land Management Act 1984* (CALM Act) governs the declaration and management of protected areas and imposes certain obligations relating to management planning of these areas.
- *Wildlife Conservation Act 1950* provides for specific protection of native flora and fauna on all lands and waters within State boundaries.
- (Commonwealth) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), contains provisions relating to the protection of nationally-listed threatened species and ecological communities and listing of key threatening processes. It also provides protection for world heritage properties and national heritage places. Established by regulation under the EPBC Act, the Australian World Heritage Management Principles provide a guiding framework for managing heritage properties; specifically for preparing and implementing management plans and programs.
- *Environmental Protection Act 1986* (EP Act), which provides for environmental protection in Western Australia through the development of Environmental Protection Policies and the assessment of development proposals and planning schemes for environmental impacts.

Other relevant legislation includes:

- *Biosecurity and Agriculture Management Act 2007*
- *Aboriginal Heritage Act 1972*
- *Bush Fires Act 1954*
- *Heritage of Western Australia Act 1990*
- *Land Administration Act 1997*
- *Native Title Act 1993*
- *Plant Diseases Act 1914*
- *Biological Control Act 1986.*

4 HIGH RISK INVASIVE SPECIES

The level of risk for NIS incursion to Dirk Hartog Island can be assessed by assigning a category of likelihood and a level of consequence for individual species when no quarantine barriers are in place. Scores for likelihood and consequence were multiplied to give a comparative NIS risk score for Dirk Hartog Island (Table 1). Scores of 15 and above place species into a high risk category. Likelihood is an assessment based on the identified pathways to Dirk Hartog Island and review of other island NIS incursions (Astron 2012). A full definition of consequence is supplied in Table 2. A list of the highest risk NIS are listed in Table 3.

Any other non-indigenous and potentially invasive species entering Dirk Hartog Island should also be considered and a risk assessment will be conducted by the department if any new invasive species is found on Dirk Hartog Island (see Section 8).

Table 1: Risk matrix for non-indigenous species introduction and establishment on Dirk Hartog Island. Red shading indicates high risk (score 15-25), yellow indicates moderate risk (score 5-12), green indicates low risk (score 1-4) (Astron 2012).

Likelihood of Occurrence	**CONSEQUENCE**				
	1 - Insignificant	**2 - Minor**	**3 - Moderate**	**4 - Major**	**5 - Catastrophic**
5 - Common occurrence		Invertebrates (10) H-mouse (10)			
4 - Likely					Black Rat (20)
3 - Possible			African boxthorn (9) Ruby dock (9) Mexican poppy (9) Geckoes (9)	Dog (12) *Verbesina* (12) Kapok (12) Tramp ants (12)	Cat (15)
2 - Unlikely		Cane toad (4)		Rabbit (8)	Fox (10)
1 - Practically impossible				Goat/sheep (4)	

Table 2: Definition of consequences relating to the risk matrix for non-indigenous species introduction to Dirk Hartog Island (Astron 2012).

Consequence	**Definition**
Catastrophic	• risk of extinction for native species • very serious environmental degradation • significant ecosystem alteration • persistent, difficult and very costly to eradicate.
Major	• significant impact on native species • serious environmental degradation • ecosystem alteration • eradication possible but costly.
Moderate	• impact on native species • some environmental degradation • ecosystem impact limited to individual native species • possible to eradicate at some cost.

Minor	• minor impact on individual native species • little environmental degradation • minor impact on ecosystems • may not establish and easy to eradicate.

Consequence	**Definition**
Insignificant	• negligible impact on individual native species • negligible environmental degradation • negligible impact on ecosystems • highly unlikely to establish and easy to eradicate.

Table 3: Highest risk invasive species if introduced to or persisting on Dirk Hartog Island

Invasive species	Current or potential future threat	Consequence	Likelihood of invasion or re-invasion	Risk Category (Shaded as per Table 1)	Probable entry points	Impact description	Goal
VERTEBRATES							
Black rat, *Rattus rattus*	Potential future	Catastrophic	Likely	High	Boat	Predation by exotic rats on Australian offshore islands of less than 1000 km^2 is listed as an EPBC Key Threatening Process.	Complete eradication
Cat, *Felis catus*	Current and potential future	Catastrophic	Possible	High	Boat, car	Cats have been implicated in the demise of many, if not all, medium size mammals once known to be present on the island (Burbidge 2001; Burbidge and Manly 2002). Predation by feral cats is listed as an EPBC Key Threatening Process.	Complete eradication
Dog, *Canis lupus familiaris*	Potential	Major	Possible	Moderate	Boat, car	Wild dogs can hunt small mammals, predate on loggerhead sea turtle eggs and hatchlings, spread	Dogs are not permitted on Dirk Hartog Island

						parasites, disease and weed seeds, and cause land degradation.	National Park.
Rabbit	Potential future	Major	Unlikely	Moderate	None expected	Competition and land degradation by feral rabbits is listed as an EPBC Key Threatening Process.	Complete eradication
House mouse, Mus musculus	Current and potential future	Minor	Common Occurrence	Moderate	Boat	House mice have been implicated in reducing seabird breeding success and depletion of invertebrates and small skinks on islands worldwide (MacKay *et al*. 2007).	Minimise presence. It may not be feasible to eradicate or control due to the size of the island.
Geckoes	Potential future	Moderate	Possible	Moderate	Boat, vehicle, equipment	Potential threat to biodiversity in terms of direct competition with native species for resources and indirectly though causing community-level changes to ecosystems.	Prevent
Cane Toad	Potential future	Minor	Unlikely	Low	Boat, car, food	Key threatening process	Prevent
Goats, *Capra hircus*	Current	Major	Practically	Low	None	Competition and land	Complete eradication

			impossible		expected	degradation by unmanaged goats is listed as an EPBC Key Threatening Process.	
Sheep	Current	Major	Practically impossible	Low	None expected	Land degradation and damage to native flora through grazing.	Complete eradication
INVERTEBRATES							
No high risk species currently identified (Tramp ants assessed as highest risk at Moderate). Conduct a risk assessment and prepare a species action plan as and when required.							
PLANTS * denotes ecological impact according to the department's Invasive Plant Prioritisation Process - Mid-West Weed Assessment (DEC 2008)							
Couch (*Cynodon dactylon*)	Current	Minor	Possible	Moderate	Boat, cars	High* Couch spreads rapidly by seed and runners.	Eradication
Wild radish (*Raphanus raphanistrum*)	Current	Moderate	Possible	Moderate	Cars	High* Wild radish is a prolific seeder with long seed dormancy. It is also allelopathic and suppresses competition and is toxic to animals. The seed is spread by animals, wind and water.	Eradication
Japanese pepper (*Schinus terebinthifolius*)	Current	Moderate	Likely	Moderate	Boat, cars	High* Japanese pepper can dominate ecosystems and the berries are spread by birds.	Eradication

Castor oil plant (*Ricinus communis*)	Current	Moderate	Likely	Moderate	Boat, cars	Moderate* Caster oil forms a deep tap root and can out-compete native species. The seeds are poisonous and known to kill birds.	Eradication
Lupin (*Lupinus cosentinii*)	Current	Minor	Likely	Moderate	Cars	Moderate* Blue lupin is a common weed of roadsides and ungrazed areas, invading bush land, heath and disturbed areas. The seeds have some dormancy.	Eradication
False sowthistle (*Reichardia tingitana*)	Current	Moderate	Likely	Moderate	Cars	High* False sowthistle seeds are light and fluffy and can be spread over long distance by the wind.	Control
Ice plant (*Mesembryanthemum crystallinum*)	Current	Moderate	Likely	Moderate	Sea birds	High* Ice plant can form dense mats that prevent the germination of other plants.	Control
Fourleaf allseed (*Polycarpon tetraphyllum*)	Current	Moderate	Likely	Moderate	Cars	Low* Fourleaf allseed is a prolific seeder.	Control
Ruby dock (*Acetosa vesicaria*)	Future	Moderate	Possible	Moderate	Cars, soil	High* Invades disturbed areas impacting native flora and reducing habitat for native fauna. Toxic to grazing animals.	Exclusion (Alert species)

Kapok bush (*Aerva javanica*)	Future	Major	Possible	Moderate	Cars, soil	High* Highly invasive. Displaces native flora and seed spread by wind, animals, vehicles and soil movement.	Exclusion (Alert species)
Mexican poppy (*Argemone ochroleuca*)	Future	Moderate	Possible	Moderate	Cars, soil	High* Declared plant for Shire of Shark Bay, toxic to stock and humans.	Exclusion (Alert species)
African boxthorn (*Lycium ferocissimum*)	Future	Moderate	Possible	Moderate	Birds, cars	High* Weed of National Significance. Highly invasive and known to impact native fauna breeding sites due to spines and dense habitat.	Exclusion (Alert species)
Crownbeard (*Verbesina encelioides*)	Future	Major	Possible	Moderate	Cars, soil	High* Invades disturbed areas and can create a monoculture. Impacts native flora and is toxic to animals.	Exclusion (Alert species)
PATHOGENS AND DISEASE							
Animal Diseases – There is a possibility of animal diseases already on Dirk Hartog Island through the presence of sheep, goats and cats. Native mammals translocated to the island will be subject to the usual department hygiene protocols - SOP No: 16.2 (DPaW 2013). **Plant pathogens** – Due to the aridity of the island common south west pathogens are considered unlikely to survive. Conduct a risk assessment and prepare a species action plan as and when required.							

Eradication, control and exclusion weed species (Astron 2012)

5 MOST LIKELY PATHWAYS FOR INTRODUCTION

5.1 Vessels, Vehicles and Aircraft

The most likely departure and entry points for NIS to enter or exit Dirk Hartog Island are from boat or kayak (including private boats, charter boats to and from Denham and a vehicle carrying barge between Steep Point and the island and Parks and Wildlife barge from Denham to Herald Bay), or aircraft. Less common but also possible is unassisted crossing of the channel separating Dirk Hartog Island from the mainland as this is only 1.5 km wide.

Departure and entry is concentrated at sites on the southern half of the island where the Steep Point and Herald Bay barges land, near the homestead where charter boats cross, and at the airstrip. In addition, approximately half of the coastline at Dirk Hartog Island is accessible by boat so entry and exit points are diffuse. The major pathways and potential invasive species associated with these pathways are described in Table 4 and Table 5.

Table 4: Major departure and entry points for potential invasive species on Dirk Hartog Island.

Pathway	Main departure and entry points	Main activities	Main goods introduced	Potential invasive species
Small vessels (including sea kayaks)	Sandy beaches	• Fishing and recreation Sailing Commercial fishing and shipping activities	• Camping equipment and supplies	• Exotic plants for garden, shade and ornament • Released pet animals (including dogs and cats) • Non-indigenous plants for agricultural purposes or rehabilitation use in saline or disturbed areas • Invasive species from deliberate environmental vandalism • Parasites or disease on avian, marine fauna or translocated animals • Weed seeds • Rats • Invertebrates • Pathogens
	Turtle Bay and other east coast locations e.g. Whithnell Point, Sunday Island Bay	• Recreation boats and research visits during the turtle nesting season	• Camping equipment and supplies	
	Herald Bay	• Parks & Wildlife staff		

Pathway	Main departure and entry points	Main activities	Main goods introduced	Potential invasive species
Barge (s) (Private & Parks & Wildlife)	Cape Ransonnet & Herald Bay barge landings (current) and potential future homestead barge landing	• Visitors • Commuting Parks & Wildlife staff • Servicing the ecological restoration project	• Vehicles • Building materials • Equipment • Machinery • Household goods	• As above
Light aircraft	Airstrip	• Visitors to Dirk Hartog Island • Freehold property owners • Commuting Parks & Wildlife staff • Other visitors including contractors	• Perishables and other supplies for the homestead	• Invertebrates • Parasites and disease • Weed seeds
Helicopter	Helipad at Cape inscription, airstrip or other locations on Dirk Hartog Island	• lighthouse servicing • feral animal control • tourism	• construction material	• Invertebrates • Parasites and disease • Weed seeds
Swimming	Sandy beaches	• Natural cause		• Rodents • Cats
Driftwood	Sandy beaches	• Natural cause		• Invertebrates • Parasites and disease • Weed seeds
Carried by birds	Island-wide	• Natural cause		• Weed seeds • Parasites and disease
Carried by storm winds	Island-wide	• Natural cause		• Invasive birds • Weed seeds
Ship wreck	Island-wide	• Accidental	Not applicable	• Cats • Rodents • Invertebrates • Parasites and diseases

5.2 Pathways for Spread on Island

Table 5: Pathways for spread on Dirk Hartog Island.

Main vector	Pathway	Activities	Potential invasive species
4WD vehicles including quad bikes	Primary pathway • Public tracks • Management tracks	• Tourism • Parks & Wildlife research and management	• Weed seeds • Invertebrates • Parasites and disease • Pathogens
Machinery	• Development including the proposed tourism developments at Sunday Island Bay and Cape Levillain • Works to implement and maintain the ecological restoration project	• Ground disturbance • Visitation by barge and boats • Arrival of construction materials	• Weed seeds • Invertebrates • Pathogens
By foot (footwear and clothing)	• Camp sites • Main heritage areas • Walk paths	• Tourism • Parks & Wildlife research and management	• Pathogens • Weed seeds
Boat	• Camp sites • Popular bays and landing beaches • Barge landing sites	• Tourism • Parks & Wildlife research and management	• Invertebrates • Weed seeds • Pathogens
On native and reintroduced fauna including mammals, birds and reptiles	• Throughout	• Natural	• Parasites and diseases • Weed seeds
Ingestion and defecation by animals	• Throughout	• Natural	• Weed seeds • Parasites and disease
Wind	• Throughout	• Natural	• Weed seeds
Water	• Throughout	• Natural	• Parasites and disease • Weed seeds
Transport of soil and basic raw materials	• Development sites • Freehold • Parks & Wildlife accommodation sites • Camp sites	• Building • Roading • Airstrip	• Pathogens • Weed seeds

6 PREVENTION MEASURES

6.1 Pathway Barriers

To successfully implement biosecurity measures, there need to be multiple barriers preventing invasive species getting on to vehicles, vessels, aircraft, freight and building supplies and protocols in place to detect NIS should they elude the initial barriers.

Barriers to prevent invasive species entering Dirk Hartog Island are outlined in Table 6.

Table 6: Barriers to prevent invasive species entering Dirk Hartog Island

Main pathway	Preventative measures	Method of communicating prevention measures
Small vessels	• Promotion of Biosecurity Protocols • Inspection prior to departure for Dirk Hartog Island i.e. maintain vessels in a clean and tidy state • Public communication and awareness in Shark Bay area and further afield, targeting the recreational boating community	• Biosecurity signage at boat departure and arrival points in Shark Bay • Make available Dirk Hartog Island National Park - Island protection brochure to all boating public and provide to all camping permit holders • Regular articles in Inscription Post and Shark Bay Watch
Barge	• Regular inspections, maintain in a clean state • Avoid transporting high risk items and material onto Dirk Hartog Island (see text box below) • Clean all vehicle, machinery and equipment using methods described in the standard operating procedures. • Inspect and clean/treat all building materials, tools and equipment prior to arrival at the barge transfer point • Install rodent control and surveillance systems on barges and island service vessels • Establish and maintain facilities allowing comprehensive inspection and treatment barriers.	• Vessel Biosecurity and Inspection Log • Barge services to DHI to implement the DHI Quarantine protocols and guidelines • Provide all passengers the Quarantine Implementation Checklist prior to travel • Provide visitors with the Dirk Hartog Island National Park – Island protection brochure
Light aircraft and Helicopter	• Regular inspections, maintain in a clean state. • Avoid transporting high risk items and material onto Dirk Hartog Island (see 'High risk items' list after this table) • Install rodent control and surveillance systems on aircraft • Use departure facilities that allow for comprehensive inspection and treatment of items and material before loading.	• Provide all passengers the Quarantine Implementation Checklist prior to travel • Provide visitors with the Dirk Hartog Island National Park – Island protection brochure • AMSA to include biosecurity protocol with helicopter contract

Freight (including personal equipment) and building supplies	• Check for soil, seeds or animals before loading. • Wrap and seal in plastic, or transport in sealed containers.	• Include biosecurity protocols with contracts or tenders. • Ensure personnel aware of biosecurity protocols.

Main pathway	**Preventative measures**	**Method of communicating prevention measures**
Swimming	• Observe and report	• Signage and brochures to request island visitors to report unusual animal and weed sightings to Parks & Wildlife
Driftwood	• Observe and report	• Signage and brochures to request island visitors to report unusual animal and weed sightings to Parks & Wildlife
Carried by birds	• Observe and report • Known bird rookeries to be inspected for new to island weeds	• Signage and brochures to request island visitors to report unusual animal and weed sightings to Parks & Wildlife • Implementation of the DHI Weed Management and Action Plan
Carried by storm winds	• Observe and report	• Signage and brochures to request island visitors to report unusual animal and weed sightings to Parks & Wildlife

High risk items include

- animals, including pets and unscreened reintroduced native animals
- any plant material including native or introduced plants, tube stock, seeds or flowers; and mulch
- soil including soil and mud adhering to vehicles, aircraft, cargo etc.
- brickies sand, basic raw material for roads or aggregate unless sourced from an approved supplier and delivered in premixed bulk bags
- unsealed containers
- second-hand cardboard boxes
- second-hand power equipment or machinery whereby their complex nature makes detailed thorough inspection and clean down impracticable
- untreated or second-hand timber products including firewood and wood with bark not complying to AS1604.

- Personal equipment

6.2 Stakeholders

A list of stakeholders, their area of priority or responsibility and their role in biosecurity prevention associated with that area is shown in Table 7.

Table 7: List of stakeholders and roles in biosecurity prevention.

Stakeholder	Priority locations	Role in biosecurity prevention
Small vessel users (including the community, tourists, local fishermen, Parks & Wildlife staff)	• Sandy beaches	• Observe & report potential NIS to Parks & Wildlife • Check own vessels and personal equipment for NIS • Follow quarantine protocols • Advise others of quarantine protocols
Tourism operators	• Cape Ransonnet barge landing • Airstrip (s) • Dirk Hartog Island Lodge • 4WD tracks throughout island	• Observe & report potential NIS to Parks & Wildlife • Provide advise & quarantine protocols to visitors • Check visitors vehicles, vessels and aircraft for NIS • Check own vessels and/or aircraft for NIS • Follow quarantine protocols
Private lessees	• Cape Levillian ecotourism lease	• As above
Freehold landowners	• Freehold lots	• Observe & report potential NIS to Parks & Wildlife • Check own vessels for NIS • Check building supplies and equipment • Follow quarantine protocols • Advise others of quarantine protocols
Malgana people	• Tumbledown Point Reserve	• As above
Shire of Shark Bay	• Heritage precinct – Cape Inscription	• As above
Australian Maritime Safety Authority	• Lighthouse Reserve	• Follow quarantine protocols • Ensure helicopter contractor is aware of and follows quarantine protocols
Department of Parks and Wildlife	• Dirk Hartog Island National Park • Herald Bay barge landing	• Education through brochures, signs, and meetings • Provide quarantine protocols and brochures to tourism operators and potential island visitors • Follow quarantine protocols • Surveillance • Incursion response & implement operational plans

7 SURVEILLANCE

7.1 Pre-border inspection

The department will implement this Biosecurity Implementation Plan through its staff, contractors and volunteers. Adoption of the plan and protocols by other Dirk Hartog Island land owners/managers, visitors and the local community will be voluntary. The department hopes that the benefits derived by the community from an island where pests are restricted and controlled, and the native plants and animals restored will encourage other island users to adopt this plan and its protocols as best practice.

All reasonable steps to prevent the transfer of NIS and high risk material to Dirk Hartog Island need to be taken. This should include pre-border (i.e. prior to departure) inspections of the Parks and Wildlife barge, other barges and commercial operators and recreational vessels, and all of their cargo, that intend to make landfall on Dirk Hartog Island. The department will conduct inspections of its own vessels and owners and operators of commercial and recreation vessels are encouraged to conduct their own inspections to assist in the implementation of this plan. Inspections should be conducted in accordance with the guidelines and protocols appended to this Plan. These include: Appendix 1 - Guidelines for vehicle and machinery clean down; Appendix 2 – Guidelines for small vessel biosecurity; Appendix 3 - Guidelines for importation of building materials; Appendix 4 - Dirk Hartog Island Biosecurity Strategy - Island quarantine protocol for Parks and Wildlife staff, contractors and volunteers; Appendix 5 - Dirk Hartog Island Quarantine Implementation Checklist for Parks and Wildlife staff, contractors and volunteers and Appendix 6 - Dirk Hartog Island Quarantine Protocol - Notes on inspection of equipment and food including mitigation measures.

Department staff involved with the translocation of native fauna to Dirk Hartog Island as part of the Dirk Hartog Island ecological restoration project will refer to and utilise *Standard Operating Procedure 16.2 Managing disease risk in wildlife management, SOP No: 16.2, Department of Parks and Wildlife, 2013*. This document is intended as an operational guide to minimise the risk of disease hazards. Guidance is designed to raise awareness among department personnel of the potential for disease transmission and to provide advice in regard to minimising the risk of disease transmission between wildlife populations and from wildlife to department personnel and their families (DPaW 2013).

All reasonable measures should be taken for equipment, vehicles, machinery etc. to be cleaned / sealed prior to arrival and loading onto barges at departure points. Barges and vessels carrying cargo should be inspected prior to loading of equipment, vehicles etc. (particularly interior areas such as holds and storage areas) and after loading, immediately prior to departure. It is recommended that all vessels transferring people, equipment, vehicles and machinery to Dirk Hartog Island complete and carry a Vessel Biosecurity Log as shown at Appendix 7.

Items that should be inspected include:

- vehicles and machinery
- cargo, baggage, freight, containers and toolboxes
- packing materials
- equipment
- foodstuffs

- wood materials
- construction materials
- clothing, footwear and luggage.

Vessels known by the department to be travelling to Dirk Hartog Island should be provided with communication material and advice on biosecurity. Island biosecurity pamphlets and the guidelines appended to this plan are available at the department's Shark Bay office.

Aircraft travelling to Dirk Hartog Island should also have pre-border inspections carried out and a biosecurity induction provided by the department to pilots and local air charter companies. Pilots should also provide a biosecurity induction for passengers carried to Dirk Hartog Island. Aircraft may be inspected by the department both pre and post border for this purpose. Any operator contracted by the department to provide a service to Dirk Hartog Island will have biosecurity principles and compliance conditions included in the contract. Other air services to Dirk Hartog Island will be encouraged to implement biosecurity measures and be provided by the department with communication material, and given advice on biosecurity measures.

As with vessels, aircraft inspections should be conducted in accordance with the guidelines appended to this Plan at Appendices 4, 5 and 6.

Where possible, remote surveillance detection systems should be established at Denham marine facilities, Denham airport and on barge and service vessels to provide early warning of the presence of NIS. The department can provide advice on appropriate and effective detection systems.

7.2 Post-border inspection

Where possible the following post-border measures should be followed:

- All cargo should be unloaded and unpacked in a clean and open area during daylight hours.
- It is preferable to have personnel familiar with the identification of high risk NIS responsible for unloading and unpacking (the department can provide information on high risk NIS).
- Foodstuff storage areas should have detection and surveillance systems in place (the department can provide advice on detection and surveillance systems).
- Vessels should be inspected again once making landfall on Dirk Hartog Island.
- Newly arrived vehicles and machinery, and their contents should be inspected to ensure no high risk NIS have arrived on Dirk Hartog Island.

8 AUDIT AND REVIEW

Unscheduled audits of biosecurity performance and implementation of this plan and its protocols by the department will be conducted at times by project management and senior district staff.

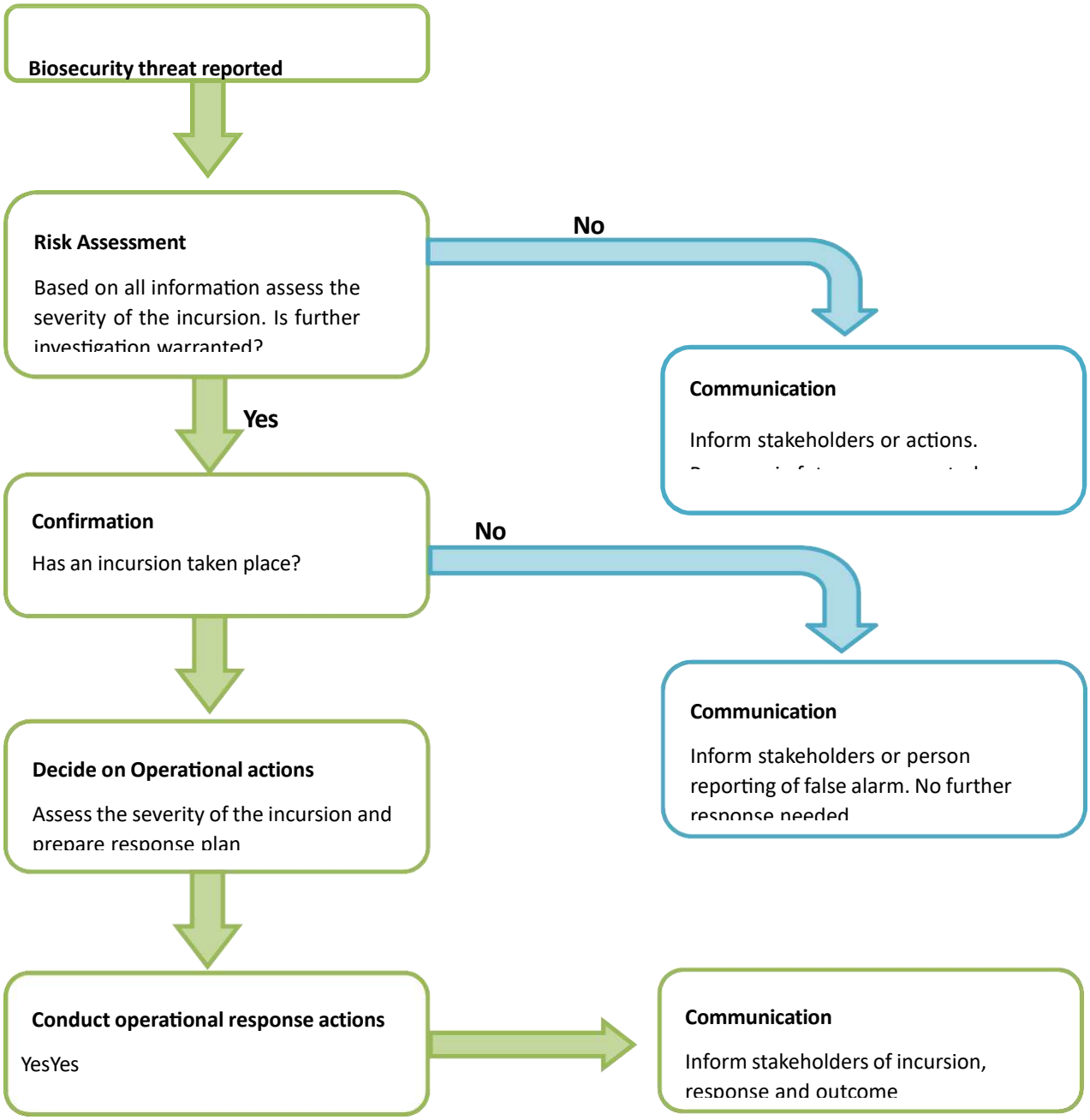
A five year major review of this biosecurity implementation plan will be undertaken. This plan may also be subject to review as situations change in regards to access, barge replacement, development progress, tenure amendments and reintroduction plans.

9 INCURSION RESPONSE

Effective response to an incursion relies primarily on the threat being detected and reported in a timely manner. Once detection has occurred, it should be reported to the department's Shark Bay District office as soon as possible and the decision making process outlined below will determine the operational response. Time is particularly important in responding to incursions, and this should ideally occur before the species has had a chance to spread, breed and establish a population.

Species action plans for the two high risk invasive species to Dirk Hartog Island shown in Table 3 will be applied in the event of an incursion by these species. A species action plan developed by Chevron Australia Pty Ltd for the Barrow Island Gorgon Project "*Gorgon Project, Quarantine Species Action Plan Black rat, Rattus rattus Linnaeus 1758, July 2009"* will be used for reference in the event of a black rat incursion on Dirk Hartog Island. A species action plan will be prepared by the department concerning the potential re-introduction or continuing persistence of the feral cat following conclusion of the cat eradication program.

Decision making process



10 STANDARD OPERATING PROCEDURES

The following documents have been developed to assist quarantine and are appended to this plan:

- Appendix 1 Guidelines for vehicle and machinery clean down
- Appendix 2 Guidelines for small vessel biosecurity
- Appendix 3 Guidelines for importation of building materials
- Appendix 4 Dirk Hartog Island Biosecurity Strategy - Island quarantine protocol for Parks and Wildlife staff, contractors and volunteers
- Appendix 5 Dirk Hartog Island Quarantine Implementation Checklist for Parks and Wildlife staff, contractors and volunteers
- Appendix 6 Dirk Hartog Island Quarantine Protocol - Notes on inspection of equipment and food including mitigation measures
- Appendix 7 Vessel Biosecurity and Inspection Log

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APPENDIX 1

Guidelines for Vehicle and Machinery Clean down

Standard: That no mud or soil, plant material and/or fauna are present in any form or quantity after internal and external inspection. It is expected that vehicles and machinery are cleaned by owners prior to arrival at the barge transfer point.

1. If available, position the vehicle or machine at a hard-surfaced and fully contained washdown facility.

2. Immobilise the vehicle/machine in a stable and safe position, engine off, handbrake on, chocked if necessary.

3. Unload/remove all cargo and loose items.

4. Examine the vehicle/machine to determine the extent of plant material and soil accumulation.

5. Give special attention to hard to access areas such as under vehicle spare tyres, protective guards, radiators and cross-members. Remove belly plates and guards if possible.

6. Use compressed air to clean internal areas and radiators and then high pressure water to clean tyres, wheel arches, underneath and all panels.

7. Storage areas, toolboxes and all other containers should also be inspected and cleaned.

8. Re-inspect for cleanliness and replace all removed items.

9. Move vehicle/machine directly to barge for loading.

APPENDIX 2

Guidelines for Small Vessel Biosecurity

Standard: That no plant material and/or fauna are present in any form or quantity after internal and external inspection. It is expected that small vessels, including camping gear, food and equipment are cleaned and inspected by owners prior to arrival at the point of departure.

1. Inspect vessel prior to departure for Dirk Hartog Island. i.e. maintain vessel in a clean and tidy state. Check vessel interior for:
    - insects
    - rodents, and
    - plant material
2. Avoid transporting high risk items and material to Dirk Hartog Island, including
    - pets
    - plant material, either native or introduced plants, seeds or flowers
    - soil and mud adhering to camping gear and equipment
    - unsealed containers
    - cardboard boxes
    - fire wood
3. Install rodent bait stations or wax baits on vessels in easy to access or visible locations (for further advice check with the Department of Parks and Wildlife).
    - Inspect bait stations or baits regularly
    - Baits need to be replaced every six months to retain potency
4. Fumigate vessel and cabin spaces with insecticide if the vessel has not been used for some time or if insects and spiders are evident.
5. Carry all garbage back to the port of origin and dispose of appropriately.

APPENDIX 3

Guidelines for importation of building materials

Standard: That no mud or soil, plant material and/or fauna are present in any form or quantity after inspection of building materials and tools and equipment. Sand and aggregate should be free of plant material and/or fauna. Building materials, tools and equipment should be inspected and cleaned/treated by owners prior to arrival at the barge transfer point.

Crates and Pallets

- Crate floor, sides, crevices and corners should be free from discernible evidence of soil, animals, insects, webs, nests of any kind, seeds, plant material or bark.
- Materials, equipment and goods in crate should be free of discernible evidence of soil, animals, insects, webs, nests of any kind, seeds, plant material or bark.
- Goods should be wrapped in foil and sealed or, wrapped in clear plastic and sealed.
- Interior of the crate sprayed with a residual insecticide.
- Pallet has been shrink wrapped in clear plastic, with an opening at the top to allow fumigant entry.
- Pallets and materials should be shrink-wrapped at the point of sale.
- Pallets should be made from plastic, aluminium or steel.
- Pallet floor must be clean.
- Pallet frame must be clean.
- Pallet base must be clean.
- Pallet should be sprayed with residual insecticide prior to shrink-wrapping.
- Materials, equipment and goods on pallet should be free of discernible evidence of soil, animals, insects, webs, nests of any kind, seeds, plant material or bark.
- Goods should be sprayed with a residual insecticide prior to shrink-wrapping.

Steel and pipe

- All materials should be new.
- All surfaces should be washed.
- All faces should be viewed and free of any discernible evidence of plant material and seeds, invertebrates and vertebrates.
- Residual insecticide should be applied to surfaces.
- Where possible all inner surfaces should be washed clean and dried.
- All inner surfaces should be viewed and free of any discernible evidence of plant material and seeds, invertebrates and vertebrates (applies to Box Section Tube)

Packaging

- Residual insecticide should be applied.
- All ends should be capped after internal surfaces inspected (applies to Box Section Tube).

- Preventative fumigation should be carried out on packaged equipment/materials.
- All external surfaces of drummed or bucketed products should be cleaned.
- Components with non-drainable crevices or chambers should be covered and protected.
- There should be no sawdust, dirt and other debris present in containers.

Packaging Material

- All packaging products should be new.
- Packaging should be transparent shrink wrap, no black or other coloured shrink wrapping should be used.
- Minimise areas where soil, plant materials and seeds, invertebrates, vertebrates may collect.
- Polystyrene – should only be in form fitted blocks, not foam pellets.
- All boxes, cartons and crates should be vacuumed prior to use.
- All boxes, cartons and crates should be new.
- Goods should not be stored directly on the ground.
- The following packaging materials should not be used:
  - Hay
  - Straw
  - Husk
  - Bamboo
  - Palm fibres
  - Hemp
  - Wood shavings

Sand and aggregate

- Sand and aggregate should be delivered to the island in bulker bags.
- Bulker bags should be free of discernible evidence of soil, animals, insects, webs, nests of any kind, seeds, plant material or bark prior to filling.
- Full bulker bags should be free of discernible evidence of soil, animals, insects, webs, nests of any kind, seeds, plant material or bark prior to loading onto the barge.
- Sand and aggregate should be sourced from locations known to be free of high risk weeds not present on Dirk Hartog Island, e.g. Ruby dock (*Acetosa vesicaria*), Crownbeard (*Verbesina encelioides*).
- Bulker bags should be treated with residual insecticide after filling.
- Crushers, screens, washers and tanks should be inspected and cleaned immediately prior to a production (batch) run with compressed air and/or high pressure water, or steam cleaned.

Tools and tool boxes

- External surfaces of tool boxes should be cleaned.
- Internal surfaces of tool boxes should be cleaned and free of discernible evidence of soil, plant material, seeds, vertebrates and invertebrates.
- The corners, cracks and crevices of tool boxes should be clean.
- All surfaces of tools should be cleaned and free of discernible evidence of soil, plant material, seeds, vertebrates and invertebrates, with particular attention to nooks and crannies.
- Hollow sections should be blown out with high pressure compressed air.

APPENDIX 4

Recommended island quarantine protocol

For Parks & Wildlife staff, contractors and volunteers

WHY IS THIS PROTOCOL NECESSARY?

This quarantine protocol is part of the Department of Parks and Wildlife's Biosecurity Strategy to prevent introductions and establishment of introduced, or non-indigenous species (NIS) to Dirk Hartog Island National Park (DHINP). Protocols for the monitoring and detection, and eradication of NIS will also be developed.

Dirk Hartog Island is Western Australia's largest island (~63,000 ha) and once supported a diverse array of native fauna. Thirteen species of native mammal were present on the island at the time of discovery by Europeans in 1616. All but three of these have become extinct on the island, and many have restricted distributions elsewhere. The introduction of cats, goats and sheep over the last 200 years have been significant factors in these extinctions. Dirk Hartog is also the site of the largest loggerhead turtle rookery in WA, and still supports the threatened Dirk Hartog Island southern emu-wren, Dirk Hartog Island rufous fieldwren, Dirk Hartog Island white-winged fairy-wren and western spiny-tailed skink. There are also 10 plant species of conservation priority (2012). Recognition of Dirk Hartog Island's biodiversity conservation values was one of the reasons for the establishment of the Shark Bay World Heritage Area in 1991.

The majority of Dirk Hartog Island was declared a National Park in 2009. Over the next 20 years (2012 – 2031), the department will undertake an ecological restoration project which will eradicate the introduced feral cats, feral goats and sheep, control weeds and reintroduce the native mammal species that once occurred on the island. Returning the mammals will not only improve the conservation status of these mostly threatened species, and return the ecological processes that digging and burrowing native animals bring to a landscape, such as aeration of soil, improved water penetration, nutrient recycling, seed dispersal and germination. In addition, the return of native mammals to DHINP will provide eco-tourism opportunities for the Shark Bay community and research opportunities for improving our knowledge of ecological restoration processes.

WHO IS THIS PROTOCOL FOR?

While the National Park covers most of Dirk Hartog Island, there are several other land owners and managers on the island. This quarantine protocol, and the other biosecurity protocols for monitoring and detection, and eradication of NIS, will apply to all department operations on the island. Implementation of these protocols by the department demonstrates its commitment to good quarantine practices to ensure the success of the conservation and restoration program. It is hoped that all land owners, managers and visitors to Dirk Hartog Island will recognise that biosecurity on the island is a shared responsibility that will lead to a more attractive and sustainable island ecosystem, and so embrace these biosecurity protocols.

While this protocol has been developed for use on Dirk Hartog Island, it is also applicable to other islands managed by the department within the Shark Bay World Heritage Area.

This protocol is to be followed by all department personnel, contractors and volunteers working on DHINP. It applies to any vehicles, vessels, aircraft, goods and personnel taken to DHINP for any purpose. The object is to prevent any NIS being taken to the island, as this may lead to damage to the existing island ecosystem and the establishment of additional introduced species.

Table 1 identifies the most important pathways by which introduced species could be transported to Dirk Hartog Island unless quarantine rules are followed.

PATHWAY	EXAMPLES OF ORGANISMS
Personnel and luggage	Seeds, reptiles (e.g. skinks and geckoes)
Food and perishables	Mice, invertebrates (e.g. snails, caterpillars), seeds, fungi
Vehicles, trailers, vessels, aircraft and mobile equipment	Seeds, weeds, cats, mice, rats and reptiles such as geckoes
Sand and aggregate	Mites, invertebrates (e.g. earthworms, insect larvae) Micro-organisms including *Phytophthora*, frogs, weeds, seeds.
Field / research equipment (including traps, tents etc)	Mice, rats, reptiles, invertebrates (e.g. ants, snails, cockroaches, spiders), seeds, animal diseases.
Crated or loose building materials, equipment and goods	Reptiles, cats, mice, rats, seeds, weeds.

Table 1. Pathways for introduction of NIS to Dirk Hartog Island.

PLANNING YOUR TRIP

Seek approval

- Parks and Wildlife staff, research collaborators and contractors must notify the department's Denham office (08 9948 2226) of their proposed visit and provide an itinerary of activities. Parks and Wildlife research staff must complete and forward a field trip advice form to the department's Denham office at least two weeks ahead of the scheduled activity.
- Any activities involving flora or fauna on DHINP will be subject to the relevant access, animal welfare and scientific collecting licences.

Trip preparation

- The team leader reviews all the quarantine protocols and ensure that all team members will comply with them.
- Clean all equipment to be taken to DHINP the island and ensure it free from any organic material.
- Ensure any vehicles, vessels or aircraft are clean and free of any soil, invertebrates, vertebrates and organic material. Ensure that owners and operators of vehicle, vessels, and aircraft are aware of the quarantine procedures applying to DHINP before contracting them and have compliance with them included in contract specifications. If not, arrange to brief them on what is required. If vehicle/vessel/aircraft hygiene is unsatisfactory, clean or use another (clean) vehicle/vessel/aircraft or postpone the trip until they meet quarantine standards.
- Vehicles, vessels and aircraft used by the department will have a quarantine log detailing their quarantine history, and include information on baiting, inspections, cleaning and any quarantine issues.
- Check all food and ensure it is packed and checked according to the quarantine rules.
- Check personnel luggage, clothing and footwear before loading onto the vehicle, vessel or aircraft.
- Make sure there is enough time to do all trip preparation activities – rushing may lead to mistakes.
- Complete the Checklist below to assist with preparation and compliance with this protocol.

Equipment and building materials

- Equipment to be taken to DHINP should be assembled in a clean area with a cement floor.
- Thoroughly inspect all equipment (including personal equipment such as tents and swags/bedrolls) for any signs of insect, seed and other organic and inorganic contamination. Wash and clean as necessary.
- All traps and other field equipment must be scrupulously clean with no soil, animal, plant or bait residue. A high pressure water cleaner is useful for this. Small traps must be packed in sealed (e.g. with duct tape) rodent- and insect-proof boxes. Large (cage) traps must be wrapped in plastic or placed in sealed containers after cleaning. Hessian or cloth used for shade or shelter in traps must be brand new and checked for contamination, particularly seeds.
- Check all equipment and store in rodent and insect-proof boxes (e.g. aluminium or plastic). Spray storage boxes with insecticide and leave for at least 12 hours before packing. Computers, cameras, GPS receivers, and radios must be individually checked and placed into clean air-tight containers.
- Take equipment boxes directly to the departure point, keeping under cover and preventing contamination along the way. Check external surfaces of boxes before loading and re- clean if necessary.
- Where possible, equipment that is going to be used repetitively over a period of time (e.g. traps, camping gear) should be purchased new, taken to Dirk Hartog Island and left in a secure store on the island.

- Building materials should be new and where possible sealed by wrapping in plastic / heat shrink to prevent contamination by unwanted plants, seeds and animals prior to, or during transport to the island.
- Soil / sand / aggregate should be sourced from a clean site and be free of weeds, seeds and other organic material, and transported to Dirk Hartog Island in sealed containers.

Personal clothing and footwear

- All clothing must be clean and free from soil and seeds. Look carefully at velcro joiners, in pockets, socks and trouser cuffs. Normal washing may not kill all organisms.
- Boots and other footwear must be completely free from soil and seeds. Inspectunderlaces, flaps and the sole treads. Clean them with a stiff brush and wash with a disinfectant.

Food and water

- Water must be transported in clean plastic containers.
- Don't take soil contaminated fruit and vegetables.
- Check fruit and vegetables for invertebrates.
- Pack all food into sealed, clean containers.
- Keep containers in the clean, secure area – do not set them down on soil or other dirty areas before loading.

Plants

- Taking live plants, seeds and rootstock onto DHINP is prohibited, unless for authorised research and management activities.
- The removal of native plants and seeds from DHINP is also prohibited, unless for authorised research or management activities.

Animals

- Taking domestic animals and pets onto the DHINP is prohibited, unless for authorised research and management activities
- Native animal translocations will only be undertaken following preparation of Translocation Proposals and approval by the department's Animal Ethics Committee and Director of Science and Conservation. Translocation Proposals will include protocols to ensure animals and equipment do not transport unwanted plants and animals, or disease to Dirk Hartog Island.
- The removal of native animals from DHINP is also prohibited unless for authorised research or management activities.

Parks and Wildlife vessels

- It is the vessel's master who is responsible for ensuring a quarantine compliant vessel. The master and crew need to ensure that any people, vehicles, trailers and equipment carried is quarantine compliant. They should not accept any passengers or cargo unless they are quarantine compliant.

- Parks and Wildlife operated or contracted vessels will require a quarantine log to be kept detailing the relevant quarantine history for the vessel. This log will include a history of baiting, bait inspections, cleaning, inspections of cargo and passengers and any compliance issues.
- Any vessel contracted by the department will have the quarantine requirements and enforceability included in the contract specification.
- Make sure the vessel's master / operator is aware of this protocol and that they and the crew abide by it.
- Check that the vessel has been inspected and is clean. Arrange fumigation or spraying as necessary. Ensure that rodenticide is in place.
- Ensure that crew members do not throw garbage containing seeds into the sea when they are close to an island, and that they carry all garbage back to the port of origin and dispose of appropriately.

WHILE ON DIRK HARTOG ISLAND

Landing

- Carry only the minimum equipment necessary to do your work or for recreation.
- Never throw soil, plants (including seeds) or animals into the sea near an island – place contaminants in a sealed container and return to the mainland.
- Check that all equipment taken ashore is yours and meets quarantine requirements.
- Reduce the amount of time the vessel or aircraft used for transporting personnel and equipment is on DHINP.

Camping

- Camp only on bare sand areas – do not damage native vegetation, and in areas designated for camping.
- Collect all garbage in sealed containers and return it to the mainland. Separate inorganic recyclable waste (cans, bottles etc) from organic waste. Ensure all waste is stored where animals cannot access it.
- Make sure human waste is covered immediately and completely buried to at least 30 cm. Use toilets provided where possible.
- Do not light fires using timber, either imported or natural. All cooking is to be with fuel stoves.
- Be aware that introduced house mice and several weed species occur on Dirk Hartog Island. Prevent your equipment and food boxes from being contaminated by house mice, weeds and other organic materials while on the island. It is important not to transport plants and animals around DHINP, or between DHINP and the mainland.
- Be observant for any plant or animals that you don't believe is native. Report any sightings to the department's District Manager, Shark Bay District.

AFTER THE TRIP

Reporting

- Following a trip to Dirk Hartog Island all Parks and Wildlife staff, contractors and collaborators, must provide a report to the department's Shark Bay District Manager if any of the following are observed:
  (1) problems encountered with quarantine;
  (2) unusual plant or animal sightings;
  (3) unauthorised camps or other structures; or
  (4) sightings of introduced species.

Storage of equipment

- Clean equipment.
- Store any equipment that is going to be taken back to Dirk Hartog Island in a secure and clean area.
- Where possible, store equipment on Dirk Hartog Island.

APPENDIX 5

DEPARTMENT OF PARKS AND WILDLIFE

DIRK HARTOG ISLAND

Quarantine Implementation Checklist

For Parks & Wildlife staff, contractors and volunteers

The successful ecological restoration of Dirk Hartog Island National Park is dependent on successful eradication of feral goats, sheep and feral cats, and preventing any further introductions of non-indigenous plants and animals. All Parks and Wildlife staff, contractors and volunteers must use this checklist prior to visiting Dirk Hartog Island and other islands within the Shark Bay World Heritage Area.

Personal Gear

□ Is your footwear clean and free from soil and seeds?

- Wipe shoe tread with a dilute bleach or antiseptic solution.
- Inspect treads, laces, inside folds and flaps of footwear.

□ Are your clothes, pockets and day packs free of soil, plant seeds and animals such as cockroaches and spiders?

- Pay particular attention to velcro and socks as these often trap seeds.

□ Have you checked your sleeping bags, bedding and swags to make sure they are free of soil and stowaways?

□ Have you checked your baggage and containers for soil, plant material and animals directly prior to departure? Ensure you have checked the base and lip of each container.

□ Have you checked all wooden items thoroughly for invertebrates such as borers?

Food

□ Is all food transported in clean (internal and external surfaces) sealed containers?

□ Have you checked fresh food for presence of soil and invertebrates such as ants, spiders or snails?

- Wash potatoes and other root vegetables.
- Check leafy greens for invertebrates.

Vehicle

□ Is your vehicle and trailer clean inside and outside? Check particularly the undersides, radiator and tyres of the vehicle. Vegetation and soil often gets jammed between sump guard plates and gearbox guard plates. If in doubt, wash-down and clean inside and outside of vehicle.

□ Inspect vehicles again after wash-down and prior to leaving the mainland:

CHECK – CLEAN – CHECK AGAIN.

□ Go directly to barge after wash-down (preferably via a hard surfaced road)

Vessel

- □ Are all your vessels equipment, cargo, baggage, freight, containers and toolboxes clean and free of plant and animals?
- □ Have you inspected the vessels interior for pests, especially insects, rodents and seeds? Has the vessel been baited with rodenticide and residual insecticide?
- □ Do you have rodent detection devices and bait stations on board the vessel? These must be inspected regularly and any possible detection reported to the department's Shark Bay office. If a mouse or rat is detected on board, it must be killed or captured for positive identification and disposed of appropriately. Baits need to be replaced every six months to retain potency.

Aircraft

- □ Are the aircraft (including luggage lockers) and its equipment clean and free of soil, seeds and animals?
    - Check particularly seat crevices, carpets and tyres.
- □ Are the equipment, food and personal items being loaded onto the aircraft clean and free of soil, seeds, plants and animals?
- □ Is the loading area a hard surface, clear of plant material, seeds and loose soil?
- □ If transporting animals for approved translocations, is there a barrier provided to prevent fouling of the aircraft interior?

Equipment and building materials

- □ Is your equipment and / or building material clean of soil, plant material and animals.
    - Inspect closely.
    - Purchase new where possible.
    - Place in sealed containers where possible.
    - Transport raw materials such as sand, aggregate and cement from a clean (i.e. weed free) site in new sealed bags.
- □ Are you transporting high risk materials such as used cardboard containers, untreated timber, unsealed items? If so, they need to be clean and free of soil, plant material and animals. Replace cardboard with plastic or metal. Use new where possible.

Animals and Plants

- □ No animals or plants (including pets, native and introduced species, tube stock, seeds, flowers or mulch) are to be taken to the Dirk Hartog Island National Park unless part of an approved management program such as eradication or fauna translocations.
- □ Any animals taken to Dirk Hartog Island for approved purposes must be in good health and screened for disease.

Surveillance

- □ Please be vigilant when preparing to go to Dirk Hartog Island and look out for any plants or animals that might be hitching a ride.
- □ When on the island, please look out for plants and animals that may have been introduced.

APPENDIX 6

DEPARTMENT OF PARKS AND WILDLIFE
ISLAND QUARANTINE PROTOCOL

RECOMMENDATIONS ON INSPECTION OF EQUIPMENT AND FOOD INCLUDING MITIGATION MEASURES

Clean and secure storage and preparation area

There should be adequate area set aside for:

- storage and maintenance of equipment used on islands;
- checking and packing supplies needed for the programmes on the islands;
- cleaning and checking items returned from the islands.

Design

- The area must be well lit with no dark corners.
- All removable items need to be taken out and the entire store checked for any gaps and sign of pest damage.
- For rodent proofing, all entrances and holes > 5 mm must be securely sealed, including; under doors (e.g. by using a metal "lip"), around holes for drainpipes or wiring, around windows etc.
- For invertebrate proofing, all gaps must be sealed, however this will probably be impractical and other invertebrate detection and control will be required.
- All windows and doors must shut securely (vents or fly-screen mesh may be required).
- The room should be lined and the floor sealed (painted) to enable easier cleaning / maintenance.
- The store must be clean before use and all rubbish removed.
- No perishable foods to be kept in the store, except those about to be taken to an island.

Vertebrates

Rats and mice are the main targets, but watch out for reptiles (e.g., geckoes, skinks, small snakes) and their eggs, and for frogs. This area should be secure and clean and continuously baited with fresh rodenticide (use a second generation rodenticide such as brodifacoum – pellets are fine, but use wax blocks in damp areas). Follow inspection procedures as laid down below for invertebrates.

When checking gear, place set, unbaited Elliott traps against the walls in the corners of the store, so that a rat or mouse emerging from equipment will run into them.

Invertebrates

Awareness and careful inspection are the most important things for invertebrate biosecurity. It comes down to being aware that invertebrates could be a problem and that **everything** needs to be inspected closely to ensure there are no free-loading passengers.

Ensure that no food sources, which may attract animals like ants, are in or around the quarantine gear store. Water-tight plastic barrels are excellent, as they will be insect-proof as well as waterproof. (These should also largely prevent post-packing infestation.) A clean store area is also important, as this makes it much easier to detect any new arrivals. Pest control should be in operation around the perimeter of the building and should prevent ants establishing inside however, it cannot be relied upon entirely; there is always the need for inspection as well.

Inspecting and packing gear in a clean, open, indoor area is really important. Any pest that emerges is easily seen and can be dealt to quickly, before it escapes. The inspection area should be large enough to allow tents to be unfolded away from the already inspected gear, so that any discovered pest cannot escape into the inspected gear pile. Make sure that the inspection area is clean before you start.

When undertaking the inspection, most invertebrates will be dislodged by shaking or sharply tapping the gear with a timber pole or something similar.

- For items like tents, the more eyes looking the better. If Argentine ant or a similar threat is present, it should make itself very obvious when shaken or tapped but you have to look to see it!
- Most invertebrates will be hiding in folds in material or against the seams, so carefully check these high-risk areas.
- Any holes or recesses in gear should be tapped/hit up-side down, e.g., check for ants in a spade handle. (If you pick up two spades and bang them together while looking for animals the size of ants, you will see them straight away.)
- Check any areas where invertebrate frass is found.
- Ants are good to concentrate on, as the animal to look for, because they are likely to be the smallest invertebrate present.

Clearly, if something does fall out then a closer inspection is warranted and possibly the use of an insecticide spray. Permethrin-based sprays should be used as they have a residual effect, and will kill bugs that walk over the treated surface for up to a couple of months, depending on exposure to weather, etc. Pyrethroid (pyrethrum) based products are knock-down only, and have no residual life beyond about an hour.

In particularly high risk sites (where Argentine ants or similar may be present), keep a can of fly- spray handy so that any invertebrates that fall out can be sprayed immediately. This is more effective than trying to squash ants running in every direction when a nest is discovered.

With bigger items like the boat itself, bang the hull or pontoon and look. Do this in several places as invertebrates generally hate foreign noise, and will attempt to move away from it. Slow- moving animals like slugs and snails are the exception rather than the rule. For them, it comes down to careful inspection. On charter boats, increasing awareness is important. "Take no prisoners" is the rule, squash first and ask questions later!

Weeds

Seeds stowing away on machinery, equipment, building materials, containers, backpacks, clothing or boots have been the mode of entry for some weeds becoming established on islands in the past. Visually check all such items and ensure they are clean and seed-free. Wash large items with a high- pressure hose.

Diseases and microorganisms

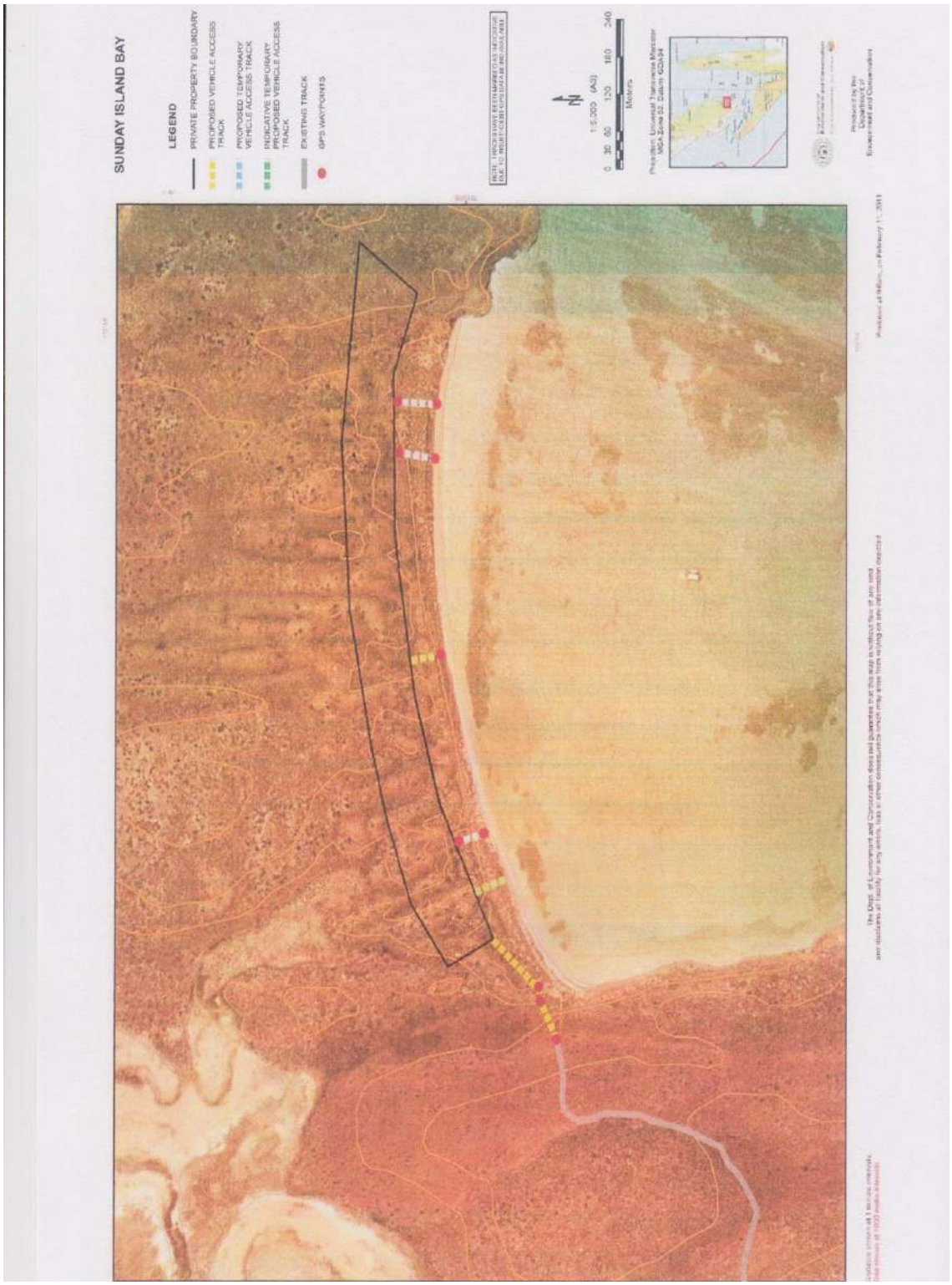
Ensure all equipment and building materials are dry and free of soil. Do not take equipment previously used for animal trapping or handling unless it has been sterilised. Sterilise secateurs. Use clean paper and clean metal (not cardboard) separators in plant presses.

APPENDIX 7

DEPARTMENT OF PARKS AND WILDLIFE

Vessel Biosecurity and Inspection Log

Date	Destination	Nº of POB	Type of load	Rodent baits present Y/N	Fumigation Y/N	Load & gear inspected Y/N	Vessel inspected Y/N	Comme (including any remedi



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GLOSSARY

BEP	Bushfire Emergency Plan
BMP	Bushfire Management Plan
DG	Design Guidelines
DHIBIP	Dirk Hartog Island Biosecurity Implementation Plan
ER	Environmental Report
MP	Management Plan
SBWHAC	Shark Bay World Heritage Advisory Committee
WIRRUWANA	Dirk Hartog Island- Traditional Owners Name

This Environmental Report has been prepared in response to Condition 3(v) of the Local Planning Scheme to document the environmental characteristics of Lot 304 and its surroundings, describe the LDP and intended future developments, examine the potential environmental impacts and set out management measures to avoid or ameliorate those impacts. Specifically, the report aims to address: protection of the conservation values of the Shark Bay World Heritage Property and Dirk Hartog Island National Park; demonstration that ecological values and special attributes of the island can be protected; biosecurity measures to mitigate feral incursions and disease impacts to the Dirk Hartog National Park; and demonstration that the proposed development will have low impacts in terms of development footprint, visitor numbers, disturbance to vegetation and fauna, solid and liquid waste disposal, traffic, bushfire hazard and visibility.

THE SUBMISSION
IS NOT AN APPLICATION FOR DEVELOPMENT

Local Development Plan Environmental Report - Section 1 Supporting Report D

Lot 304 Sunday Island Bay
Dirk Hartog Island
January 2025

DHIDevelopment Pty Ltd PO Box 107
NORTH FREMANTLE WA 6159

SUNDAY ISLAND BAY, DIRK HARTOG ISLAND
LOCAL DEVELOPMENT PLAN

ENVIRONMENTAL REPORT

Prepared for

DHI Development Pty Ltd
PO Box 107
NORTH FREMANTLE WA 6159

Report No. J24020
23 December 2024

BAYLEY ENVIRONMENTAL SERVICES
30 Thomas Street
SOUTH FREMANTLE WA 6162

Sundowner Nominees Pty Ltd as trustee for the Bayley Cook Family Trust ABN 20 822 598 897
trading as Bayley Environmental Services

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1.0 INTRODUCTION

1.1 Summary of the Proposal

DHI Development Pty Ltd (DHID) proposes to establish eight building envelopes within Lot 304 Sunday Island Bay, Dirk Hartog Island. Each building envelope will measure about 2,300m^2 in area and will contain one to four accommodation units to be used for low-key tourist accommodation along with staff accommodation/refuge and other facilities. The total number of accommodation units will be limited by covenant to no more than 33, each accommodating no more than four people, and the total number of people in the development (visitors and staff) at any one time will be no more than one hundred.

Figure 1 shows the conceptual development plan. Figure 2 shows an aerial view of the site and its surroundings.

The site is comprised of Lot 304 on Deposited Plan 50257, Sunday Island Bay. The 11.2985ha site is one of four freehold lots on Dirk Hartog Island. There are two freehold lots located at Sunday Island Bay and two at Homestead Bay.

The project will be developed over a staged development period. An onsite manager will undertake the ongoing management, maintenance and letting of each accommodation unit using a computer booking system to ensure that the total number of persons on site does not exceed one hundred.

The building envelopes are all at least 11m from the front boundary of Lot 304 and at least 75m from the high water mark of Sunday Island Bay.

1.2 Qualifications and Experience of the Author

This Environmental Report has been prepared for DHI Development Pty Ltd by Phillip Bayley B.Sc., an environmental scientist with over 40 years' experience including 35 years as a private consultant.

This report has been prepared based on published information, guidelines, agency comments and documents provided by DHI Development Pty Ltd including previous environmental assessment reports, specialist botanical, coastal engineering, fire hazard assessment and site assessment reports.

1.3 Planning and Policy Framework

1.3.1 Shire of Shark Bay Local Planning Scheme No. 4

The land use planning and development of lot 304 on Dirk Hartog Island is controlled by the Shire of Shark Bay Local Planning Scheme No 4. Under the Scheme, Lot 304 is designated as Special Use Zone 14 (SU14), the objective of which is to provide for eco-tourism development. The Scheme lists a number of "D" (discretionary) uses that may be approved by Council in SU14. These include tourist development, camping ground and holiday accommodation.

The Scheme imposes twelve conditions and six sub-conditions on SU14 that are required to be addressed in the planning and development of eco-tourism accommodation units. Condition (3) states: "Prior to commencement of development of Lot 304 a Local Development Plan shall be prepared in accordance with Part 6 of the Planning and Development (Local Planning Schemes) Regulations 2015 addressing conditions 3(i) to (vi)."

Condition 3(v) of the Scheme requires 'An Environmental Report that demonstrates that the LDP and proposed use and/or development will have a low impact on the natural environment, not compromise the high conservation values and have regard for the need to protect the ecological values and special attributes of the island. The report should include information on building envelopes, visitor numbers, a vegetation assessment and how biosecurity measures to mitigate the risks of feral incursions and disease impacts to the National Park will be achieved.'

In 2019 the Shire advised that "A thorough Local Development Plan will essentially pave the way for future development applications, and the subsequent development application process should then be relatively straightforward".

The Local Development Plan (LDP) is a high-level document prepared to guide future development of the land included in the LDP. It is not an application for development or development approvals. Applications for development approval can only be submitted following approval of the LDP.

1.3.2 Dirk Hartog Island Biosecurity Implementation Plan

In 2014 the manager of the Dirk Hartog Island Ecological Restoration Project notified stakeholders that it had agreed upon and was implementing a Dirk Hartog Island Biosecurity Plan (DHBIP) based upon a draft prepared by Astron Environmental (2012). A copy of the implementation plan was provided and is referred to in the following information. The purpose of the Biosecurity Plan is to provide guidance for implementing biosecurity actions to prevent the establishment of new invasive species on Dirk Hartog Island and assist in the success of the "Return to 1616" Dirk Hartog Island ecological restoration project.

The DHIBIP will be principally implemented by the Department of Biodiversity, Conservation and Attractions (DBCA) through its staff, volunteers and contractors, with the voluntary cooperation of freehold landowners, tourism operators, private lease holders, visitors to the island, traditional owners, the Shire of Shark Bay and the Australian Maritime Safety Authority. Development proposals for Lot 304 will comply with the DHBIP.

1.4 Covenants

Lot 304 has covenants registered on the title, regarding ecotourism and the environment, to the benefit of the West Australian Minister for Lands.

Covenant 1(a) confirms the intended use of Lot 304 for ecotourism, stating "The land may only be used for low impact eco-tourism which includes the provision of visitor accommodation units and staff accommodation in accordance with subclauses (b) to (g) inclusive". Covenants 1(b) and 1(d) limit the number and sizes of visitor accommodation units that may be built on Lot 304.

A positive covenant for the benefit of each freehold lot provides a water easement for the transport of water from existing wells on the island to the freehold lots.

Other covenants relate to environmental matters including flora and fauna (3(i)) and quarantine (3(j)). A list of the covenants applying to Lot 304 is included in the LDP report.

1.5 Previous Approvals

An earlier development proposal, subject to Shire of Shark Bay LPS No. 3, to construct seven self-contained accommodation units for ecotourism activities was referred to and approved by the Western Australian Environmental Protection Authority and the Commonwealth Department of the Environment in 2015, prior to LPS No. 4 being adopted. The proposal received development approval from the Shire of Shark Bay, with Federal and State EPA responses confirming that the proposal was not significant enough to warrant formal assessment. The EPA's advice on the 2015 proposal is attached in Appendix A.

In 2021 the Department of Water and Environmental Regulation (DWER) issued a clearing permit for the construction of an accommodation unit on Lot 304. In its decision report the DWER noted that 'It is considered that the potential impacts of the proposed clearing on conservation significant flora are low and will not represent a significant residual impact. Given the approximate 100 percent retention of pre-European vegetation within the Yalgoo vegetation complex, the clearing does not represent a significant risk to biodiversity'.

1.6 Previous Studies

Lot 304 and the wider surroundings of Dirk Hartog Island have been subject to numerous studies over previous years. Those specifically related to this proposal include:

- Dr Ian Lantzke (B.Sc(Hon)., Ph.D., Dip.Ed. (UWA) (Hon. Associate, Centre for Ecosystem Management ECU.) surveyed the vegetation of Sunday Island Bay and Turtle Bay near Cape Inscription in 2008, 2009, 2011 and 2012.

- Gary McMahon (B.Sc. M. Env. Mgmt., C.EnvP) (Ecosystem Solutions) visited the site in 2019 and prepared a Flora Significance Assessment and Bushfire Management Plan (BMP) for Lot 304.

- Ralph Smith (Smith Bushfire Consultants) visited the site in 2022 and 2023 when preparing a BMP and Bushfire Emergency Plan (BEP) for the site.

- Michael Glendinning Town Planner visited the site in 2022 when assessing the site for development of the LDP.

- Rohan Carboon (Bushfire Safety Consulting) visited the site in September 2024 while preparing the final BMP and BEP for the site.

The site surveys have included physical inspections by foot and vehicle, aerial helicopter and drone surveys and observations from a vessel offshore.

1.7 Scope of This Report

This Environmental Report has been prepared in response to Condition 3(v) of the Local Planning Scheme to document the environmental characteristics of Lot 304 and its surroundings, describe the LDP and intended future developments, examine the potential environmental impacts and set out management measures to avoid or ameliorate those impacts.

Specifically, the report aims to address:

- protection of the conservation values of the Shark Bay World Heritage Property and Dirk Hartog Island National Park;

- demonstration that ecological values and special attributes of the island can be protected;

- biosecurity measures to mitigate feral incursions and disease impacts to the Dirk Hartog National Park; and

- demonstration that the proposed development will have low impacts in terms of development footprint, visitor numbers, disturbance to vegetation and fauna, solid and liquid waste disposal, traffic, bushfire hazard and visibility.

2.0 EXISTING ENVIRONMENT

2.1 Regional Setting

Sunday Island Bay is located on the south-east coast of Dirk Hartog Island, which is the largest island off the west coast of Australia. The island lies approximately 31km west of Denham across Denham Sound and about 5km north of Steep Point, the most westerly point on the Australian mainland. The island is almost 80km long by 10km wide and forms the western boundary of Shark Bay with its long axis in a south east to north west direction.

Dirk Hartog Island lies on the edge of the Shark Bay Marine Park and was declared a National Park in 2018. It is within the Shark Bay World Heritage Property. The National Park and the Marine Park are administered by the Western Australian Department of Biodiversity, Conservation and Attractions (DBCA) together with the traditional custodians of the island, the Malgana people.

Lot 304 is an 11.2985ha freehold lot facing south-east across Sunday Island Bay towards the mainland. Lot 304 has more than one kilometre of frontage to Sunday Island Bay and is separated from the beachfront by a 100m band of foreshore and nearshore land which is part of the Dirk Hartog Island National Park and the Shark Bay Marine Park. Lot 304 occupies approximately 0.018% of the total area of Dirk Hartog Island.

2.2 Climate

The climate of Dirk Hartog Island is semi arid, although informal rainfall records collected by the former pastoral station over 100 years indicate that it receives more rain than the adjacent mainland.

The site is located midway between the northern and southern climatic regions. It experiences a Mediterranean climate with hot dry summers and mild winters. The average rainfall for Denham, the nearest town to the site, is 221.2mm per annum, with the majority (72%) falling between the months of May and September. Occasional summer cyclones can deliver major rainfall up to twice the annual average. Figure 3 shows mean annual rainfall for Denham.

The prevailing wind direction during the months of April to October is east to south-east in the mornings and west to south-west in the afternoons. Over the summer months (November to March) the winds are mainly south-westerly to southerly. Figure 4 shows wind roses for Denham.

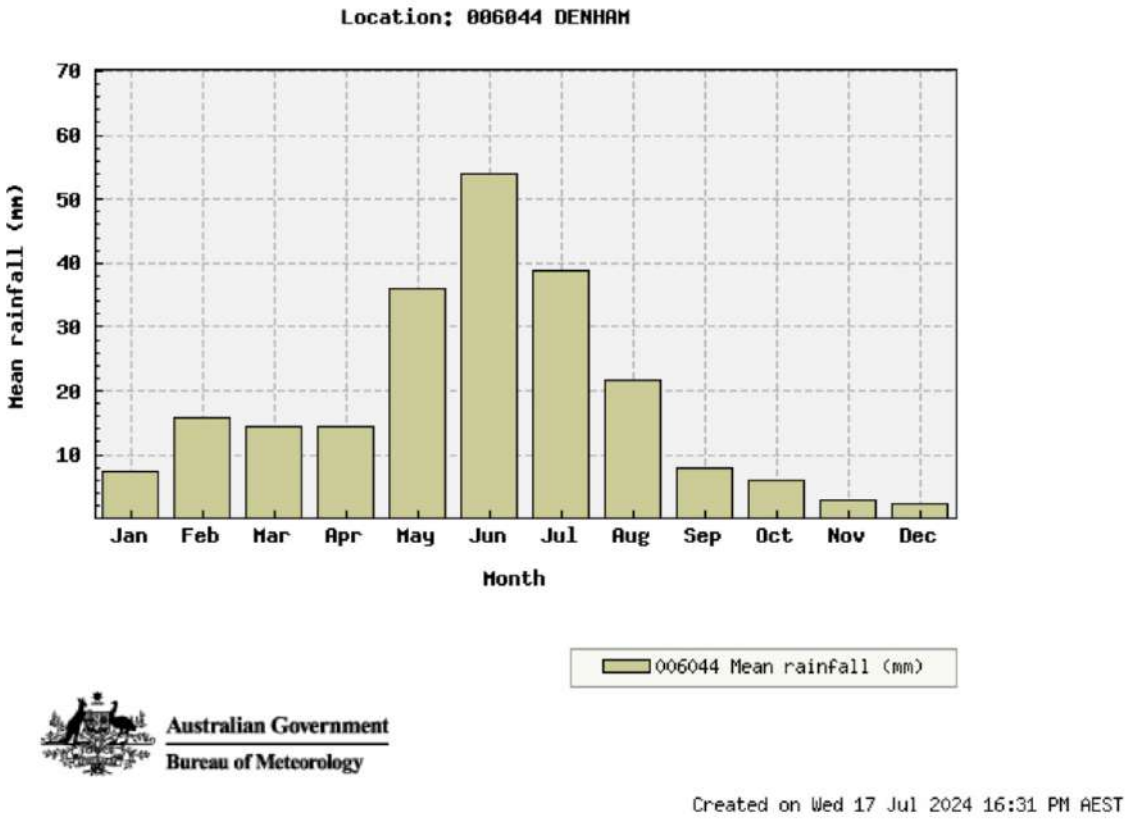

Figure 3 Denham Mean Rainfall

2.3 Physiography

2.3.1 Geology

Playford *et al*. (2013) described the geology of Dirk Hartog Island as consisting of sand dunes of Holocene to late Pleistocene age overlying Pleistocene aeolian limestone (Tamala limestone). The Tamala Limestone forms precipitous cliffs up to 150m high on the west coast of the island, with discontinuous cliffs and headlands up to 30m high on the east coast.

The sand dunes that mantle the Tamala Limestone in the vicinity of Sunday Island Bay are part of the Carrarang Sand unit, which typically consists of pale coloured, weakly lithified, calcareous sands. The sands form various types of dunes including parabolics (long and scoop shaped) that are common on Dirk Hartog Island as well as much of the Edel Land Peninsula on the mainland to the south.

2.3.2 Land Systems

Dirk Hartog Island has an area of almost 63,000ha which is represented by five land systems, with three of these making up 99% of the island. These land systems are:

- Coast - Approx 41.9% of total area or 25,559 ha
- Edel - Approx 32.5% of total area or 19,825ha
- Inscription - Approx 24.3% of total area or 14,823 ha
- Birrida - Approx 0.7% of total area or 427ha
- Littoral - Approx 0.6% of total area or 366ha.

Broad-scale mapping by Payne *et al.* (1978) shows Lot 304 as part of the Edel land system, which is described as 'Undulating sandy plains with occasional dunes, limestone rises and saline flats; low acacia shrublands with some saltbush and heath communities.' Figure 5 shows the land system mapping.

With the benefit of more detailed aerial photography and site-specific observations, Wells (2023) considered Lot 304 to be more correctly described as part of the Coast land system, which is described by Payne *et al*. (1978) as 'Strongly developed coastal dunes with narrow swales, limestone plains, wave-cut platforms and beaches, supporting diverse tall and low shrublands.'

The last reports from the WA Department of Agriculture prior to the island's return to the State described the Dirk Hartog Island Station condition as mostly good or fair except in the vicinity of some stock watering points, with little erosion in spite of continual stocking during a hundred years of pastoral activity.

The 1980-82 map *Land Systems of the Carnarvon Basin,* prepared jointly by A.L. Payne and P.J. Curry for the Department of Agriculture and G.F. Spencer and W.J. O'Brien for the Department of Lands and Surveys confirmed that there was no wind erosion or water erosion and that the pasture rating within 1-2 kilometres of Sunday Island Bay was good and that most plants within the area were desirable species.

The earlier pastoral activities have led to the widespread distribution of buffel grass (*Cenchrus ciliaris*) and double gee (*Emex australis*) around former stock watering points. There is no double gee and limited buffel grass within the site.

All sheep and goats have now been removed from the island, which has greatly improved the general range condition of the island.

2.3.3 Topography

Lot 304 is an elongated strip of undulating dune terrain parallel to, and starting approximately 75 m inland from, the coastal high water mark. It lies along two sets of orthogonal dunes with the principal set parallel to the coast and the secondary set at right angles.

The lot consists of undulating sandy plains with minor low dunes, limestone rises, saline flats and low cliffs. Gentle gradients (less than 10%) occur on upland crests and within swales, while gradients on the dune side-slopes are predominantly moderate (10–15%) with minor areas reaching 20–25%. The elevation ranges from a low point of 2.4m AHD

in the south-west corner to a high point of 20.5m AHD on the northern boundary. Figure 6 shows the topography of the site.

2.3.4 Soils

The soils of Dirk Hartog Island are predominantly calcareous deep sands derived from weathering of Tamala limestone. The soils of Lot 304 are similar but contain areas of limestone outcrop, particularly to the east of the site.

Topographic units A, B and C shown on Figure 6 encompass most of Lot 304 with elevated undulating parabolic dunes that are roughly aligned inland and perpendicular to the coast. The soils here are consistently deep, rapidly drained, pale calcareous sands but with slightly darker variants within upland swales or depressions. Sampling and analysis of the soils in these units show they most commonly have a moderate phosphorus retention index (PRI), indicating a moderate ability to filter and retain nutrients from effluent.

Topographic unit D represents a small area of lower-lying swale (depression) within the south-western portion of Lot 304. The soil profile here shows a typical slightly darker calcareous sand for a swale up to 60 cm depth, then a buried weathering layer (strong brown sand) over rock (presumed limestone).

2.4 Hydrology

2.4.1 Surface Hydrology

Lot 304 is internally draining with no surface runoff. This is the result of the topography, a low annual rainfall, a high annual evaporation rate and a surface cover of highly permeable sand. There are no watercourses or wetlands on the property.

2.4.2 Groundwater

There are no existing bores or wells on or near Lot 304. Based on the depth of existing wells on the east coast of Dirk Hartog Island, the ground water is between 10m and 25m below the proposed building envelopes.

Given the site's proximity to the coast (75-195m from the high-water mark) and assuming a groundwater gradient in the order of 1:200, the groundwater level within the site is expected to be less than 1m AHD, or between 8m and 24m below ground level.

2.5 Coastal Processes

Sunday Island Bay has a relatively stable coast, with most contemporary variation (over 1972-2013) occurring at the eastern extent of the site. Existing foredunes seaward of

Lot 304 exhibit older erosion-recovery cycles from rotation within Sunday Island Bay, with longitudinal dunes to landward indicating the limit of most of the contemporary coastal variability (Damara, 2014).

A technical report on coastal processes prepared by Damara (2014) was provided to and accepted by Council in an earlier submission. The report was updated and/or confirmed in 2019, 2021, 2023 and 2024. The Damara report and updates are attached in Appendix B.

State Planning Policy 2.6 – *State Coastal Planning* sets out a range of measures to ensure that development in coastal locations appropriately considers coastal risk and environmental considerations. Given its coastal location, the LDP incorporates a provision to require that the siting of any development will have regard to the provisions of SPP2.6, which will be appropriately addressed at the development application stage.

2.6 Vegetation and Flora

2.6.1 Vegetation and Flora Surveys

In 2008 Dr Ian Lantzke (B.Sc. (Hons), Ph.D., Dip.Ed., Hon. Associate, Centre for Ecosystem Management, ECU) conducted a botanical survey of Lot 304 and surrounding areas. His report is attached in Appendix C.

Ecosystem Solutions Pty Ltd surveyed the vegetation of Lot 304 in 2019. The survey included desktop analysis, searches of the DBCA Naturemap Database, the EPBC Act Protected Matters Search Tool and a reconnaissance survey in accordance with EPA guidelines. The report of the survey is attached in Appendix D.

The findings of these vegetation surveys are summarised below.

2.6.2 Vegetation Type and Condition

The main vegetation associations on Dirk Hartog Island are:

- Spinifex hummock grassland with an overstorey of either *Acacia coriacea, Pittosporum phylliraeoides* over *A. ligulate* or *Diplolaena dampieri*.

- *Exocarpus sparteu*s shrubs over *Triodia* spp. In other areas *Acanthocarpus preissii* and *Atriplex bunburyana*, Chenopods or shrubs over hummock grasses across most of the island.

- Mixed open Chenopod shrubland of *Atriplex* spp, *Olearia axillaris* and *Frankenia* sp. Adjacent to the Western coastline and slightly inland in more protected sites, *T. plurinervata, Triodia* sp, *Melaleuca huegelii, T. baeckeacea* and *Atriplex* sp.

- On the east coast there are small patches of mixed open heath of *Diplolaena dampieri, Myoporum* sp. and *Conostylis* sp.

The vegetation of Lot 304 ranges from tall open heath to low open heath with hummock grasslands and some low open shrubland. The dominant vegetation type is scattered shrubs of *Acacia ligulata* over Open Heath of *Diplolaeana grandiflora* and *Acacia ligulata* in some areas, over Low Closed Heath of *Thryptomene baeckeacea*, *Frankenia pauciflora, Acacia ligulata, Atriplex bunburyana* and *Atriplex vesicaria*. Other common species include *Senecio pinnatifolius*, *Acanthocarpus preissii* and *Spinifex longifolius* as well as numerous introduced grasses (Poaceae).

The lot is sparsely vegetated in line with its location and its earlier pastoral activities, with areas of scrub no higher than 0.3m interspersed with small areas of low shrubs no higher than 1m and less than 5m^2 in area, linked by areas of open sand held together by underlying vegetation root systems.

The area between the lot and the ocean is more sparsely vegetated, with large areas of open sand down to the beach and the prevailing south-westerly winds regularly blowing any loose vegetation including dried seaweed away from the area.

Overall the vegetation within the site is relatively consistent in both species and structure, with densities varying with topography. These variations are generally not significant and occur as small gullies or depressions within the coastal areas.

Lot 304 was part of the previous pastoral lease on Dirk Hartog Island and was grazed by sheep and goats for almost one hundred years, leading to some degradation of the vegetation condition, although a survey by the Department of Agriculture and the Department of Lands and Surveys in 1980-82 (Payne *et al.*, 1982) confirmed that the vegetation around Lot 304 was in good condition. An area around the southeast corner was further degraded during its occupation by a hermit in the mid-eighties, but has recovered significantly since being vacated.

Utilising the scale developed by Keighery (1994), the overall vegetation of Lot 304 was assessed as Good (significant alteration to vegetation structure and density due to past grazing, but the basic vegetation structure remains and there is the ability for it to regenerate). The areas of tracks have been assessed as Completely Degraded.

2.6.3 Flora

Dirk Hartog Island is located at the transition zone of two major botanical provinces: the eucalypt-dominated Southwest vegetation province and the acacia-dominated arid shrublands of the Eremaean province. As a result, many flora species are located at the northern or southern limits of their geographical distribution.

The WA Herbarium records show a total of 266 plant species recorded on Dirk Hartog Island. Of these, 43 have been recorded within Lot 304 by the Lantzke (2008) and

Ecosystem Solutions (2020) surveys. Appendix E shows a consolidated flora species list for Lot 304.

2.6.4 Rare and Significant Flora

Flora surveys conducted on Dirk Hartog Island by DBCA in 2005, 2006 and 2007 determined that no flora listed as Declared Rare Flora are known to occur on Dirk Hartog Island. The surveys found several Priority Flora species ranked from Priority 1 to 5.

The NatureMap database search identified five Priority Flora species that have been recorded within 5km of Lot 304 (Appendix D). The EPBC Act Protected Matters Search Tool (Appendix D) did not identify any Threatened Flora species or habitat as occurring or likely to occur within the area. There are no historical records of Declared Rare Flora species on Dirk Hartog Island.

Ecosystem Solutions walked Lot 304 in a systematic manner in 2019 to cover the entire area, focusing on the proposed areas for future development. All potentially suitable habitats within the site were systematically searched for significant flora or vegetation, with specific targets being based on DBCA database records. The targeted survey did not detect any Declared Rare Flora or Priority Flora within the Site.

2.7 Fauna

Dirk Hartog Island and its surrounding waters are home to a wide range of fauna species including:

- 81 species of birds including over 65 migratory species;
- marine mammals including Dugong, dolphins and several whale species;
- over 40 reptile species including four dragons, eight geckos, five legless lizards, fifteen skinks, one goanna, eight front-fanged snakes, one python and one blind snake, as well as several species of sea snakes and the endangered Loggerhead Turtle;
- amphibians including the rare Burrowing Sand Hill Frog;
- many species of crabs; and
- hundreds of fish species.

When first visited by Dirk Hartog in 1616, the island was in pristine condition but it has experienced significant changes to its ecology since that time. The commencement of pastoral grazing in 1869 brought sheep and goats to the island along with cats and mice. Grazing and trampling by stock reduced the food and shelter available for native species. Feral cat predation added to the pressures on native species and made it impossible for some to survive.

Ten species of small mammals and marsupials, and one small bird did not survive the changes to the island's ecology. These include the Shark Bay bandicoot, chuditch, mulgara, dibbler, greater stick-nest rat, desert mouse, Shark Bay mouse, heath mouse, woylie, boodie and the western grasswren.

Since the cessation of pastoralism and the declaration of the island as a National Park in 2009, the habitats of the island have been recovering. Sheep were declared eradicated in June 2016 and goats in November 2017. The feral animal eradication program was completed in October 2018 with eradication of feral cats declared. In 2018 Dirk Hartog Island became the world's largest island to have feral cats, sheep, and goats fully eradicated.

The DBCA began reintroducing native fauna species to Dirk Hartog Island in 2017 under its *Return to* 1616 project. To date thirteen native species have been successfully released on the island including Banded and Rufous Hare-Wallabies, the Shark Bay Bandicoot, Shark Bay Mouse, Woylie, Heath Mouse, Dibbler, Chuditch, Greater Stick-nest Rat, Desert Mouse, Mulgara, Boodie and Western Grasswren.

2.8 Landscape

The southern end of Dirk Hartog Island in the vicinity of Sunday Island Bay presents a landscape of low undulating vegetated sand dunes fronted by low coastal foredunes, low limestone cliffs and sandy beaches.

There are two ocean passages passing Sunday Island Bay that are used depending upon vessel size and tides (Figure 2). The main South Passage is aligned northeast-southwest and is about 2.2km from the site at its closest point. Vessels traversing this passage would have visibility of the site at distances of 4km to 2.5km. The smaller inner passage, usable only by vessels less than 15m not in commercial survey, passes close to the point of Sunday Island Bay also on a northeast-southwest alignment, and gives views of the site at distances of 700m to 3.4km. Figure 7 shows a view of the site from a point 500m offshore in Sunday Island Bay.

The vessels using the passages are mainly privately-owned recreational vessels coming from Denham or Steep Point and commercial or charter vessels coming from Denham or Perth. Due to the strong southerly winds experienced during the summer period from October to March, there is less boat movement around Dirk Hartog Island.

The site is not visible from the main Dirk Hartog Island track from Cape Ransonnet to Cape Inscription. The only views of the site from land will be from closer points along the access track leading to Lot 304.

2.9 Current and Former Land Use

Lot 304 is vacant freehold land zoned Special Use Zone 14 (SU14) under the Shire of Shark Bay Local Planning Scheme No. 4. The objective of SU14 is to provide for eco-tourism development.

Lot 304 was previously part of the Dirk Hartog Island Pastoral Lease, granted in the mid 1860s and used continually for more than a hundred years for pastoral sheep grazing. Parts of the lot were occupied by a hermit in the 1990s and the bay was occupied by a pearling venture for seven years in the early 2000s. In 2009, under an agreement between the lessee and the State government, the pastoral lease was returned to the State and three freehold lots were purchased from the State. Two of these lots were at Sunday Island Bay and one was at Homestead Bay. Lot 304 was purchased for the agreed purpose of ecotourism development as provided for in covenants attached to the land.

There have been no potentially contaminating activities undertaken on the property. There are no existing structures on the land.

2.10 Aboriginal Heritage

Dirk Hartog Island's traditional owners are the Malgana people, who know the island as Wirruwana. Dirk Hartog Island National Park is managed jointly by the DBCA and the traditional owners.

A heritage survey of proposed freehold and leasehold land on Dirk Hartog Island was conducted by consultant anthropologist Roina Williams on behalf of the Yaatji Marpla Barna Maaja Aboriginal Corporation in 2007 and the Sunday Island Bay site was visited during this inspection. The survey found no Aboriginal sites of significance or Native Title claims within 10km of Lot 304.

The owner of Lot 304 has entered a documented and transferrable agreement with the Malgana people in regard to employment and interpretation materials to be erected on site.

2.11 European Heritage

Cape Inscription, at the northern end of Dirk Hartog Island, is the site of the first known European landfall in Western Australia in October 1616 and the site of the first physical evidence of European landing in Australia. Cape Inscription is approximately 80km from Sunday Island Bay. The site is included on the Australian Heritage list of significant locations.

English captain/pirate William Dampier conducted the first known botanical collection of plant species and vegetation samples near Cape Levillain on Dirk Hartog Island in August 1699. That collection is still preserved in England.

The island was part of Western Australia's early pastoral history, being a sheep station from the mid 1800's until 2009, and the location of early pearling operations and the collection of guano. Significant historical sites and relics from this time persist on the Island.

Sunday Island Bay was the location of the first homestead to be built on the island around 1879, for ongoing pastoral activities. The homestead was dismantled and moved to Homestead Bay some years later.

2.12 World Heritage Listing

The Shark Bay World Heritage Property (SBWHP) includes a land area of 7,483km^2 and a sea area of 22,009km^2. Dirk Hartog island has an area of 630km^2, making up 8.4% of the total land area of the SBWHP.

The World Heritage listing for Shark Bay identified all four of the World Heritage listing criteria as having been met for the SBWHP:

- Criterion vii: "Outstanding examples representing the major stages of the earth's evolutionary history" (stromatolites and microbial mats of Hamelin Pool, Hamelin Pool and L'haridon Bight and Holocene deposits).

- Criterion viii: "Outstanding examples representing significant ongoing geological processes, biological evolution and man's interaction with his natural environment" (marine environment unique hydrological structure; extent and diversity of seagrass meadows; northern limit of transition region between temperate and tropical marine environments, resulting in high species diversity; terrestrial botanical province transition zone; isolation of fauna habitats on islands and peninsulae resulting in survival of threatened species; range limits and fauna species richness (100 species of herpetofauna including 9 endemics, 230 species of birds representing 35% of Australia's total species); species evolution illustrated by Rufous Hare-wallaby and Banded Hare-wallaby.

- Criterion ix: "Contain superlative natural phenomena, formations or features" (coastal Scenery of Zuytdorp Cliffs, Dirk Hartog Island, Peron Peninsula, Heirisson and Bellefin Prongs, *Fragum* beaches of L'haridon Bight, inundated birridas and lagoons such as Big Lagoon, strong contrasting colours of the dunes/cliffs, beaches, and adjacent ocean of Peron Peninsula; abundance of marine fauna (dugong, dolphins, sharks, rays, turtles and fish); annual wildflower season display).

- Criterion x: “Contain the most important and significant natural habitats where threatened species of animals or plants of outstanding universal value from the point of view of science and conservation still survive” (five out of Australia’s 26 endangered mammals, 12 threatened reptiles, one threatened frog species, 35 migratory bird species, two threatened terrestrial bird species, dugong (approx. one eighth of the world’s population), Humpback and Southern Right Whales migratory staging post, nesting sites for Loggerhead and Green Turtles.

Correspondence from The World Heritage Committee Chair in July 2020 advised:

> “The concept of developing lot 304 has been progressing for many years now and there would likely be some benefits for the proponent, the Shire of Shark Bay and the local tourism industry in having an agreed basis to progress this proposed development.”

3.0 PROPOSED DEVELOPMENT

3.1 Visitor Activities

Visitors to Lot 304 will have opportunities for visiting historic attractions, island tours, hiking, photography, stargazing, boating (independently or via organised tours), whale watching, snorkelling, scuba diving, swimming and fishing. Visitors will also have the opportunity to observe flora and fauna in their natural state and, with DBCA approval, participate in flora and fauna rehabilitation programs such as the *Return To 1616* program.

3.2 Building Envelopes

The LDP for Lot 304 proposes to establish eight building envelopes, each measuring about 2,300m^2 and each allowing for one to four short-term accommodation units in clusters, reflecting earlier advice from the Shire of Shark Bay's town planning consultant (L. Bushby, October 2020).

The proposed building envelopes cover approximately 1.84ha, which is 16% of the total area of Lot 304 and less than 0.003% of the island. In line with conditions included within LPS No 4, the proposed building envelopes also include areas for effluent disposal, waste management and other ancillary activities.

In formulating the proposed building envelopes, due regard was given to key environmental factors including the protection of significant flora and fauna, coastal hazards, effluent disposal, risk management, existing site conditions, bushfire management, future tracks and paths and the protection of the unique landscape of Dirk Hartog Island.

Apart from essential infrastructure including tracks and paths required to access the building envelopes, the remainder of the lot will remain in its natural state.

3.3 Accommodation units

Each building envelope will be able to contain one to four accommodation units to be used for low-key tourist accommodation, along with staff accommodation and facilities. The total number of accommodation units will be limited by covenant to no more than 33, each accommodating no more than four people, and the total number of people on the site (visitors and staff) at any one time will be limited to no more than one hundred.

Each accommodation unit will have a floor area (not including open verandahs) of no more than 90m^2.

A decision on accommodation design options will be made on the basis of more detailed planning, following approval of the LDP.

3.4 Ancillary Developments

The LDP contains provisions that enable minor ancillary developments (e.g. pathways, lighting, shade structures etc.) outside the identified building envelopes at the discretion of the decision-making authority. In determining a proposal for development outside the building envelopes, consideration will be given to responsive design that minimises impact on the natural topography of the site and its environmental and visual landscape characters.

3.5 Service Areas

Each accommodation cluster and its associated infrastructure will operate independently for the provision of solar/wind power, water and sewerage under the control of a site manager who will coordinate all operations on site.

Each accommodation cluster will include an integrated multi-use store unit for the provision of services. An enclosed area located behind each accommodation unit will allow for storage of waste as required before removal by visitors or staff. The site manager will be responsible for managing any service areas proposed.

3.6 Design Guidelines

Design Guidelines prepared for the LDP (included with the LDP Report) will govern the style of buildings including shapes, heights, materials and colours.

The guidelines will include requirements for accommodation units to be constructed of lightweight materials applying sustainable building principles including low-impact above-ground construction using eco anchors or similar solutions. The guidelines will mandate minimal visual and physical impact to the environment and a requirement that any buildings need to be proportional to the topography and blend with the natural elements of the site while also being complementary within and between each cluster. The design guidelines will form part of the LDP and will be enforceable as such.

3.7 Power Supply

Each accommodation unit cluster will be self-sufficient in its power supply. Power will be provided through a combination of solar panels and small-scale wind turbines, with battery back-up for low generation periods. There will be no hydrocarbon-based backup

generation on the site, which will eliminate generator-induced noise, greenhouse gas emissions and the need for storage of fuels on the site.

3.8 Water Supply

All accommodation units will be equipped with rainwater tanks to capture rainwater for potable use. With an average rainfall of 200mm per year annum in Denham (which is considered to be an underestimate for Dirk Hartog Island), each 90m^2 accommodation unit could collect 18,000 litres per year on average. The rainwater supply will be supplemented where necessary with water transported from the mainland.

Non-potable water for washing and toilet flushing will be transported from the mainland.

3.9 Wastewater Management

Each cluster of accommodation units will be serviced by an Aerobic Treatment Unit (ATU) with nutrient retention ability certified to AS1546:2017 to treat domestic effluent. The treated effluent will be dispersed within each building envelope by means of flatbed leach drains, which will minimise the size and depth of excavation required for their installation.

Based on an effluent generation rate of 140 litres per day of combined wastewater (as per Health Department *Supplement to Regulation 29 and Schedule 9 – Wastewater system loading rates*), a maximum occupancy of four persons per accommodation unit and maximum development of four accommodation units per building envelope, the expected maximum wastewater volume for each building envelope is 2,240 L per day. Given the overall limit of 100 persons able to be accommodated within Lot 304 at any one time, the maximum cumulative daily wastewater volume across Lot 304 is 14,000 L/day.

Based on design loading rates set out in Australian Standard 1547:2012 – *Onsite Domestic Wastewater Management*, the maximum amount of effluent generated by each building envelope could be disposed of by two 10m flatbed leach drains covering 68m^2.

A Site and Soil Evaluation (SSE) undertaken by Land Assessment Pty Ltd in accordance with the Government Sewerage Policy in 2020 was provided to Council in an earlier submission and updated in July 2023. The SSE is attached in Appendix F.

The SSE confirmed that the site has the capability and ample room to support on-site effluent disposal without risk to health or the environment. The SSE identified some areas of low capability for effluent disposal due to the presence of shallow limestone, which have been excluded from building envelopes. The SSE recommended land application areas (LAAs) measuring 560m^2 for each building envelope in accordance

with the Government Sewerage Policy. As noted above, the actual area required for leach drains is expected to be considerably less than this allowance.

3.10 Solid Waste Management

Solid waste management is addressed within the Management Plan (see LDP Report). Visitors staying in the accommodation units will be required to take their solid wastes with them when they leave the island. This will be ensured by advice to visitors on or before arrival, signage at resort entry points, educational material within accommodation units and possibly financial provisions within hire agreements. Solid wastes from staff accommodation will be taken back to the mainland for disposal by the Lot 304 management on a regular basis.

Organic waste (e.g. food scraps) from the accommodation units may be treated by composting or biodigestion within the building envelope.

3.11 Environmentally Hazardous Materials

No bulk fuel or other environmentally hazardous materials will be stored or used on the site.

3.12 Access

Details of future tracks and paths within the site and building envelopes will be provided with future development applications (DA) following approval of the LDP.

Vehicular access to Lot 304 will be via existing unsealed tracks. The main existing track enters Lot 304 at its south-western corner and follows the site's southern boundary before circumnavigating the Lot (Figure 1). No new vehicle tracks will be created outside of the Lot.

Within the Lot, vehicular access to accommodation unit clusters will be by means of unsealed tracks, which will be laid out so as to minimise the extent of vegetation disturbance and the risk of erosion. Passing bays will be strategically located within the southern extent of Asset Protection Zones (APZs) for building envelopes, providing additional separation from vegetation in the event of fire. There will be no vehicular access across the National Park strip between Lot 304 and the foreshore. Temporary access arrangements for construction purposes are addressed in Section 3.14.3.

Vehicle parking spaces will be located behind the accommodation unit clusters in compliance with the Bushfire Management Plan and out of sight from the ocean.

Pedestrian walkways within the site will be co-located with vehicle access ways where possible. Other pedestrian access may be via raised boardwalks to minimise disturbance to vegetation. Pedestrian trampling outside of designated pathways will be minimised by careful positioning of pathways, educational signage and where necessary fencing.

Discussions on pedestrian access across the national park to the foreshore have been held with The Shire, EPA and DBCA. In 2011 the then Deputy Director General of Parks and Conservation at the DBCA, Mr Jim Sharp, advised that 'Pedestrian access from Lot 304 through the national park on an appropriate alignment can be approved and the specific alignment of those pedestrian access routes marked by an appropriate method.' The DBCA's 2011 correspondence is attached in Appendix G.

In correspondence in March 2020 from DBCA (Nick Detchon) to the Shire's planning consultant (Liz Bushby), DBCA advised that it "…supports the development by the proponent of suitable access paths to allow pedestrian access between Lot 304 and the beach and to prevent development of informal walk tracks and associated disturbance to the DHINP." The DBCA's 2020 correspondence is attached in Appendix H.

In its advice on the 2015 development proposal (Appendix A), the EPA recommended that an Access Management Plan for the development be prepared that included:

"• Protocols to minimise impacts to Dirk Hartog Island National Park during construction which could include the use of clear signage, operator information, and (where necessary) temporary fencing or pegging.

- Protocols to minimise impacts to Dirk Hartog Island National Park during operation through appropriate management of visitor access and recreation.

- Monitoring and rehabilitation procedures and protocols for areas within the Dirk Hartog Island National Park that are disturbed as a result of the construction or operation of the proposal, with a particular emphasis on the foreshore area adjacent to the development.

- Procedures, in accordance with the Dirk Hartog Island Biosecurity Implementation Plan, to ensure that the development does not introduce or proliferate non-indigenous terrestrial species to or on Dirk Hartog Island."

The proponent is committed to preparing the Access Management Plan as recommended by the EPA. This will be completed once the LDP is approved and the locations of building envelopes are known. A preliminary draft Foreshore Access Management Plan has been prepared for discussion with DBCA following the approval of the LDP.

3.13 Staging of Development

Within the overall development area identified under the LDP, developments within each building envelope may be undertaken at different times under the terms of separate Development Approvals issued by the Shire of Shark Bay. The development staging will not follow a fixed schedule but will be achieved in practice by the requirement for Development Approval for each building envelope. This staging will have the following benefits:

- It will ensure that impacts on the natural environment, conservation values and special attributes of the island can be considered, reviewed and addressed at any stage of development.

- It will ensure that measures to address visitor numbers can be reviewed and possible impacts addressed prior to the approval of any additional stage of development.

- It will mean that the area of land under disturbance at any one time will be minimised.

- It will allow the adequacy of arrangements for services including power, water and waste disposal to be reviewed and confirmed prior to each additional stage of development.

- It will allow construction methods including supply and transport of materials, site access, design guidelines and waste removal to be modified and improved for each stage in the light of experience in previous stages.

3.14 Construction

3.14.1 Construction Standards

Construction standards for all buildings will be governed by the Design Guidelines (see LDP Report), which reflect the conditions for SU14 imposed by the Shire of Shark Bay Local Planning Scheme No. 4. The Design Guidelines will form part of the approved LDP and will be enforceable under the Scheme.

In general terms, the Design Guidelines incorporate the following principles:

- Future development should “tread lightly on the earth” and have regard to possible physical and visual impacts on the site and its surrounding landscape. Site works to be minimised, with accommodation units to be built on adjustable steel supports secured by Eco Anchors or similar solutions.

- Developments should provide for a consistent architectural design appropriate to the scale, form, colour and texture of the landscape as well as the pastoral heritage of Dirk Hartog Island. The colours of all buildings will be as approved by the Shark Bay World Heritage Consultative Committee.

- Developments should embrace low energy and sustainability principles including provision of solar and/or wind power, high-efficiency effluent disposal and disabled access.

- Developments should minimise bushfire risk including the use of fire-resistant building materials and design to fire refuge standards while minimising the area of land required for Asset Protection Zones.

- Developments should be staged to allow for ongoing review and refinement.

3.14.2 Supply of Materials

Given the poor quality of the tracks in to Steep Point, it is expected that construction materials will be transported to Sunday Island Bay from Denham, Perth or Geraldton by barge. From the barge landing the materials will be transported to the construction site by vehicle via the existing track into the western corner of Lot 304 or via temporary access points crossing the national park to be finalised and agreed with the DBCA (see Section 3.14.3 below).

To limit unnecessary waste being transported to the site, it will be a requirement that where practicable any additional packing will be removed prior to unloading at Dirk Hartog Island.

To minimise the risk of weeds, disease or pests being brought onto or spread within the island, the following protocols will be established:

- No soil or fill will be imported to the island. If mulch or compost is required for landscaping, it will be sourced from an accredited composting facility that complies with Australian Standard AS 4454:*Composts, soil conditioners and mulches.*

- No soil, plant material or fauna will be present in any form or quantity after inspection of building materials and tools and equipment.

- Building materials, tools and equipment will be inspected and if necessary cleaned or treated prior to arrival on the island.

- Accommodation units and other buildings may be pre-manufactured in kit form for easy and quick assembly on site.

- Construction waste remaining will be returned to Denham for disposal at an approved landfill.

These and other provisions will be set out in a Construction Management Plan, which will be prepared and approved before any construction is undertaken. The Construction Management Plan will be reviewed and updated prior to each stage of construction.

3.14.3 Construction Access

Construction materials will be largely transported to the island by barge. From the barge landing the materials will be transported to the site via the existing track that enters at the south-western corner of Lot 304. The project will not require new roads or tracks to access the site.

Subject to agreement by DBCA, temporary vehicle access ways for construction may be created over the foreshore reserve from the beach to the construction site. Such access would be via raised ramps at locations previously located and mapped by DBCA or as amended, and would be subject to final agreement by DBCA following submission of a development application.

Access over the foreshore would be continually monitored in accordance with an Access Management Plan as recommended in 2015 by the EPA. The draft Access Management Plan will be finalised following the confirmation of building envelope locations in the LDP and discussions with DBCA.

The DBCA advised in 2011 (Appendix G) that 'The matter of temporary access at various points from the Shark Bay Marine Park to the southern boundary of Lot 304 will be considered once a formal development proposal is prepared and the need for that access is demonstrated. Indicative locations of temporary access have been identified on the attached plan.'

Any temporary access structures will be removed following the completion of construction, and any temporary disturbance (e.g. from footings) will be rehabilitated.

3.15 Site Management

3.15.1 Construction

A project manager will be appointed to manage all aspects of construction on the site. The manager's responsibilities will include:

- managing construction stages from commencement to handover ensuring any possible/real impacts are identified, addressed and resolved;
- induction of construction personnel;
- monitoring the progress of construction including photographic monitoring to assess and manage possible impacts during construction;

- ensuring any impacts related to construction are resolved promptly;
- ensuring compliance with development approval conditions and environmental commitments; and
- ensuring adherence to biosecurity and waste management protocols.

It is expected that the site manager will be housed in temporary accommodation on site or at Lot 62 Homestead Bay while the project is being constructed.

3.15.2 Operation

An operational site manager and support staff will be housed on site when any short-term accommodation is in operation. The manager and staff will be housed within each approved building envelope. One or more staff trained in fire and emergency procedures will be housed in each accommodation unit cluster whenever the accommodation units are occupied by visitors.

4.0 ENVIRONMENTAL IMPACTS AND MANAGEMENT

4.1 Key Environmental Factors

The EPA's advice on the previous (2015) proposal for seven accommodation units identified several preliminary environmental factors relevant to the proposal including flora and vegetation, terrestrial fauna, inland waters environmental quality, coastal processes and amenity, concluding: '…the overall environmental impact of the proposal is not so significant as to require assessment by the EPA and the subsequent setting of formal conditions by the Minister for Environment under Part IV of the Environmental Protection Act 1986. Accordingly, the EPA has determined not to assess this proposal.'

4.2 Development Footprint

The proposed building envelopes cover approximately 1.84ha, which is approximately 16% of the total area of Lot 304 and less than 0.003% of the island. More than 80% (approx. 9.5ha) of the 11.2985ha Lot 304 will remain undeveloped.

The physical footprint of the proposal will be minimised by measures including:

- maintenance of specific access routes over and around the site;
- clustering of accommodation units within building envelopes;
- implementation of design guidelines governing building materials, colours and locations within building envelopes; and
- closure, relocation and/or rehabilitation of unnecessary tracks.

4.3 Site Population

In compliance with the Bushfire Management Plan a maximum of one hundred people including visitors and staff will be permitted on Lot 304 at any one time. The overall occupancy at times when the accommodation is in use is expected to be about 60%.

A computer booking system administered by the onsite manager will ensure that no more than one hundred visitors and staff are on the lot at any one time.

The Site and Soil Evaluation report prepared by Land Assessment (2023) demonstrates the capability of lot 304 to accommodate effluent disposal from a population of 100 on site without risks to health or the environment.

The beach frontage to Sunday Island Bay is more than one kilometre in length and capable of accommodating visitors accessing accommodation units without undue pressure on the beach or Lot 304 when following access protocols.

Visitors to the site will receive information prior to their arrival regarding requirements and mandatory conditions of occupancy on the site.

4.4 Physical Impacts

4.4.1 Foreshore Protection

Boat trailers will not be permitted on the site. There is no opportunity for launching or retrieval of boats as the site is separated from the foreshore by a strip of National Park land abutting the marine park, both of which are managed jointly by DBCA and the Malgana people.

4.4.2 Access Tracks

Access to the beach from the accommodation units will be confined to designated pedestrian pathways or raised boardwalks located and constructed in agreement with the DBCA. Visitors will be kept to the designated routes by education, signage and where necessary fencing. There will be no vehicular access from the accommodation units to the beach during operation.

Temporary access across the foreshore for the transport of materials may be created during the construction phase, subject to the agreement of the DBCA. These access ways will be formed as raised ramps that minimise disturbance to the landforms and vegetation, as were employed in the development of Lot 305. At the end of construction the temporary ramps will be removed and all disturbances (e.g. from footings) will be rehabilitated.

A maximum of two visitors' vehicles will be permitted at each accommodation unit, with parking located behind or beyond the accommodation units in accordance with the Bushfire Management Plan as approved in a Development Approval.

Internal tracks will be shared spaces for vehicles and pedestrians, with vehicle speeds restricted to 8km/h.

4.4.3 Erosion Management

Wind erosion will be prevented by the minimisation of disturbance to the landforms and vegetation and the prompt rehabilitation of any disturbances following construction. No impervious ground surfaces will be created within the development. All buildings will be equipped with gutters and tanks to capture as much rainwater as possible.

4.4.4 Visitor Impacts

All visitors will receive both a pre-visit briefing via information brochures and internet information and an onsite induction regarding not straying from the authorised paths

within and beyond the development zone as agreed with DBCA. Vehicular access will be limited. Each accommodation unit will provide an information instruction sheet regarding access around and beyond the development.

Pets (except guide dogs and other approved assistance animals), firearms and poisons will be prohibited. Only visitors arriving by 4WD or boat will be able to access the accommodation units.

Waste generated by visitors will be removed by visitors upon departure.

4.4.5 Construction Impacts

Construction impacts will be minimised by measures including:

- the use of pre-manufactured building components transported to the site in knocked-down form for rapid assembly on site;
- minimisation of site works through the use of low-impact building supports such as Eco Anchors that avoid the need for concrete footings or slabs;
- use of existing access tracks and/or DBCA-approved temporary access ways across the foreshore; and
- removal of all construction waste back to the mainland for proper disposal.

4.5 Vegetation and Flora Impacts

4.5.1 Vegetation Impacts and Management

Vegetation disturbance will be limited to those areas required for building footprints, asset protection zones (APZs), vehicular and pedestrian access ways and firebreaks. These are together estimated to total less than 4.8ha, or 42% of the area of Lot 304.

There are no known or listed Threatened or Priority Flora species recorded on the site. The low-impact construction methods combined with the small footprint of the development will ensure minimal impact to the site.

Temporary vegetation disturbances occurring during construction will be rehabilitated following construction.

A Landscape Vegetation Plan will be prepared for the overall site, each building envelope and each asset protection zone to guide vegetation management required to comply with the Bushfire Management Plan.

Vegetation management within asset protection zones will comprise:

- Fine fuels (dead vegetation less than 6mm wide) will be removed from within the APZ.

- Groundcovers under 10cm in height may be retained within the APZ with no restrictions on location.

- Groundcovers 10cm to 50cm high may be retained as long as they are not within 2m of a structure or 3m of any windows or doors.

- Shrubs 50cm to 5m high may be retained within the APZ as long as they are not within 3m of a building and are in clumps of $5m^2$ or less, and are located at least 10m from nearby clumps and any exposed window or door.

4.5.2 Weeds and Disease

Visitors will be provided with biosecurity information before and on arrival regarding the importance of ensuring that they do not bring any type of weed or seeds from the mainland when visiting the site. Additionally, they will be instructed on the necessity to keep to established tracks when moving over the development site and beyond.

4.6 Fauna Impacts

4.6.1 Loss of Habitat

DBCA is currently releasing endangered fauna species onto Dirk Hartog Island as part of the *Return to 1616* program. As these populations grow there may be incursions into Lot 304. Due to the design of the development, there will be little change to the habitats on the site and thus the ability of these species to live within the location. More than half of the site will remain undeveloped with its habitats intact. No management of this impact is considered to be necessary.

4.6.2 Indirect Impacts

Fauna outside of the development area could be potentially affected by indirect impacts including light spill and human disturbance.

The Design Guidelines for the development (see LDP Report) specify that all lighting is to be directed downwards towards the ground and that no light is to be directed towards the ocean or over the site in any direction that could affect marine animals or nocturnal and breeding animals. This will be reflected in detailed plans for the development to the satisfaction of the Shire. The site manager will be responsible to ensure compliance with this specification.

Protocols and access limits for turtle watching at Turtle Bay at the northern end of the island have been established by DBCA. The site manager will ensure that all protocols

for visitor interaction and viewing developed internally and by DBCA are explained to visitors on arrival at the site. Visitors will also be advised of the need to avoid collecting souvenirs such as shells and plants from the island.

4.6.3 Introduced Species

The Dirk Hartog Island Biosecurity Implementation Plan 2014-15 (DHIBIP) prepared for DBCA has been endorsed and will be complied with in any development of Lot 304.

Visitors arriving on the island via the vehicle ferry or private boats have the potential to introduce pest fauna species such as mice, rats and cats. Such introductions could threaten the success of the *Return to 1616* project. Visitors to the Sunday Island Bay development will be advised at the time of booking and on arrival of the need to avoid bringing unwanted passengers with them. The measures taken will at least equal or exceed those applied to persons arriving independently under DBCA camping permits. Further details of biosecurity protection measures are provided in Section 4.12.

4.6.4 Reintroduction of Native Fauna Species

The DBCA began reintroducing native fauna species to Dirk Hartog Island in 2017 following the successful eradication of feral cats from the island, with the pilot release of twelve Rufous Hare-Wallabies and twelve Banded Hare-Wallabies. Since then another 90 Banded and 95 Rufous Hare-Wallabies have been released along with other species formerly native to the island including the Shark Bay Bandicoot, Shark Bay Mouse, Woylie, Heath Mouse, Dibbler, Chuditch, Greater Stick-nest Rat, Desert Mouse, Mulgara, Boodie and Western Grasswren.

DHI Development Pty Ltd fully supports the DBCA's *Return to 1616* program and will cooperate in all practicable ways to support this and ensure that any developments on Lot 304 do not interfere with the reintroduction or establishment of endangered species on the island.

4.7 Water Quality and Quantity

4.7.1 Groundwater Levels

There will be no lowering of the water table at the site by pumping or drainage as no groundwater will be sourced from the site.

4.7.2 Groundwater Quality Protection

There is no area within the development envelopes where the groundwater table is within three meters of the ground surface. Effluent disposal will be carried out by means of secondary treatment systems certified to AS1546:2017, that will ensure a high quality of effluent.

4.8 Visual Impacts

The remote location of the Sunday Island Bay site within an enclosed bay facing southeast and more than 30km from Denham provides minimum opportunity for visual impact to the general community.

Design guidelines will ensure that any development is consistent and in conformity with the local character of the site. The design guidelines specify that accommodation units should blend with the background landscape and be of a scale proportional to the topography.

In accordance with Condition 11 of the Scheme for SU14, a preliminary visual assessment has been undertaken using the development on lot 305 as a reference base for visually assessing impacts of Lot 304. Both Lot 304 and 305 were observed onsite, by helicopter and from a vessel offshore, and a photographic record collected both onsite and aerially by drone to assess the visual aspects of development.

Boats may travel past the southern end of Dirk Hartog Island either through the main South Passage (vessels in survey) or the smaller, more northerly inner passage (vessels less than 15m and not in survey) (Figure 2).

Small boats passing Sunday Island Bay via the inner passage will have sight of the development at distances from about 500m to 3.3km. Larger vessels travelling through South Passage will have sight of the development at distances of about 3.5km to 5km. Given the low profile and sensitive design of the development, it is not expected to be visible to any significant degree beyond 2km. Figure 7 shows a simulated view of the development from a point 500m offshore in Sunday Island Bay.

Due to the topography, the development will be visible from few places on land within 2km of the site. The site is not visible from the main Dirk Hartog Island track. The development will not be visible from the ranger station, private residence or camping areas on the mainland near Shelter Bay.

Measures to minimise the visual impact of the development will include:

- Earthworks such as levelling for construction of accommodation units will be minimised, with buildings being constructed on low-impact supports such as Eco Anchors without the need for slabs or concrete footings.

- Accommodation units will be limited in height and scale as provided in the Design Guidelines, and located within local topographic low points, to minimise their visibility from off site.

- Materials, colours and textures of buildings will be prescribed by the Design Guidelines to minimise visibility and ensure that they blend in with the landscape.

Building colours will be chosen from the Dirk Hartog Colour Palette provided by the Shark Bay World Heritage Advisory Committee.

- Access ways and parking bays will be located in topographic low points where practical and behind the accommodation units.

These and other measures are outlined in the Design Guidelines.

4.9 Bushfire Management

4.9.1 Fire Hazard

There have been no recorded or reported bushfires on Dirk Hartog Island in 151 years of European occupation. This is due to several factors

- As an island, it is not susceptible to fires emanating from neighbours.
- At least 95% of weather conditions are not suitable for wildfire occurrence due to a lack of 'Very High', 'Severe', 'Extreme' or 'Catastrophic' fire danger days.
- Most of the available fuels are not conducive to ignition, due to the presence of heavy salt loading on the vegetation.

Lot 304's location close to the shoreline with ocean protection on three sides and a birrida (dry salt pan) on one side, the absence of spinifex grasslands and the presence of large patches of bare ground further reduce its susceptibility to fire.

Notably, in December 1983 an attempt was made by the then holder of the pastoral lease to burn an area about 3km north of Sandy Point, on the mid east coast of the island. Attempts to light the dry ground litter were unsuccessful. Eventually a fire was started using newspapers as an ignition source. Despite 15-20 knot winds, the fire burnt out within 24 hours after covering less than one acre (0.4ha) of land.

4.9.2 Asset Protection Zones

A Bushfire Management Plan (BMP) has been prepared for the site by Bushfire Safety Consulting (2024) and is attached in Appendix I. The BMP designates asset protection zones (APZs) around each cluster of accommodation units to meet the objectives of State Planning Policy 3.7: *Bushfire* and the *Planning for Bushfire Guidelines* (WAPC, 2024). The APZs shown in the BMP are based on four 90m^2 units plus staff accommodation in each building envelope.

The APZs will provide a 3m wide fuel-free zone around the habitable buildings in each cluster. The total area of APZs, including building envelopes, will be 3.51ha, which is 31% of the area of Lot 304.

The BMP found that there would be limited vegetation management required to maintain the APZs in a low-threat state since the vegetation was already low and sparse. The BMP recommended the following management measures for APZs:

- The APZ would not be entirely cleared of vegetation.
- A three-metre fuel-free zone would be maintained around each building, surfaced with shell grit, crushed limestone, sand or other non-combustible materials.
- Beyond the 3m fuel-free zone, vegetation would be managed in a low-threat state, including removal of dead plants and leaf litter and raking/removal of fine fuels.

4.9.3 Bushfire Refuges

The staff accommodation unit in each cluster will be constructed to a higher standard of fire protection and will function as a refuge in the event of a bushfire emergency. At least one staff member in each cluster of units will be trained in fire and emergency response.

Having refuges located within each cluster of units is considered more practical than having a single, centrally-located refuge for the whole development because:

- it is safer for visitors and staff;
- it enables immediate management of visitors in each cluster by staff who are familiar with those visitors;
- it removes the need for visitors to walk more than 500m in emergency conditions to reach a central refuge, with which they may be unfamiliar;
- it removes the need to provide a single large building sized to accommodate up to 100 people, which would create considerable vegetation and visual impacts including a 50m wide asset protection zone; and
- it removes the need for staff to coordinate visitor movements for eight separate locations.

4.9.4 Other Bushfire Protection Measures

Each accommodation cluster will provide a 32,000 litre water tank for fire fighting. The tanks will be filled with water from the mainland or the ocean.

In the unlikely event of forecast catastrophic fire conditions or when advised by DFES or the Shire of Shark Bay, all visitors and staff in the accommodation would be evacuated to the mainland. Sheltering in the refuges on site would be the option of last resort.

4.10 Coastal and Marine Environment

4.10.1 Storm Surge and Sea Level Rise

State Planning Policy (SPP) 2.6: *State Coastal Planning Policy 2013* sets out recommended development setbacks for protection from storm surge and sea level rise in coastal areas. SPP2.6 recommends a hierarchy of responses to sea level rise:

1. Avoid (locate development outside areas subject to coastal erosion)
2. Retreat (relocate developments outside zones susceptible to erosion)
3. Accommodate (adapt developments to survive erosion)
4. Protect (e.g. harden coastlines to resist erosion).

A report prepared by Damara WA Pty Ltd in 2014 and accepted by the Shire of Shark Bay in 2020 set out measures to protect or accommodate storm surge in extreme weather events and long-term sea level rise. The Damara (2014) report is attached in Appendix B. The report noted:

- The site is set back more than one hundred meters from the high water mark and the lowest point on the site is at least four metres above mean sea level.

- Development will be located inland of the 4.7m AHD contour.

- The long-term pathway for development is to avoid erosion and inundation risk until not viable, then move into managed retreat phase. There is approximately 5,900m^2 of land north of the development envelope within Lot 304, allowing substantial capacity for future retreat.

- The required setback for coastal erosion including predicted sea level rise to the year 2070, calculated according to Schedule 1 of SPP2.6, is 55-70m from the 2m AHD contour. The seaward boundary of Lot 304 is located 60-95m from the 2m AHD contour, outside of the recommended setback.

The strategy recommended for Lot 304 revolves around the ‘Avoid’ and ‘Retreat’ strategies as set out in SPP2.6:

- All development will initially be located outside of the setback zones recommended in SPP2.6.

- Beach access ways will be limited in number and oriented to avoid north-south alignments

- Beach access ways and foredunes will be monitored and maintained to detect and prevent erosion.

- If and when coastal erosion threatens the development, buildings will be relocated further inland within the available area in Lot 304.

- If and when practical opportunities for retreat within Lot 304 have been exhausted, all buildings will be removed and the land will be rehabilitated.

- The 'Accommodate' and 'Protect' strategies identified in the SP2.6 hierarchy will not be employed.

Further details of the proposed coastal management measures are given in Appendix B.

4.10.2 Anchorage and Moorings

There are currently eight existing DBCA-approved moorings in Sunday Island Bay.

The DHIBIP 2014-15 guidelines will be followed regarding private vessels entering the bay for access to the lot. Larger boats driven to the site from Perth, Denham or Steep Point would be able to secure their vessel by anchor (with DBCA approval) or moorings (if available).

4.11 Cyclones

The management of visitor safety during severe events such as cyclones is paramount. Risk management will focus on early evacuation of visitors, to be determined in consultation with DFES, DBCA and the Shire of Shark Bay.

The onsite manager will be responsible to monitor cyclone warnings on ABC radio and to provide visitors with up-to-date information advising protocols to be followed. Accommodation units will be built to cyclone standards. The use of the on-site refuges would the last alternative in the event of a cyclone emergency event. Closure of units and early evacuation, where possible, to a safe location prior to emergency status is the preferred avenue in the case of any forecast emergency event.

4.12 Biosecurity Management

Prevention of the introduction or spread of pest animal (e.g. cats, rats) or plant species is crucial to the protection of the natural environment of Dirk Hartog Island. Possible vectors for introduction of pest species include:

- private boats arriving at the island from the mainland;
- vehicles entering the island via the ferry; and
- packaging and materials delivered to the island including building materials, food supplies and equipment.

The island receives considerable traffic of both boats and vehicles that are not associated with the proposed developments on Lot 304 and are outside of the control of the owners of the Lot. However, to the extent possible the management of the development will ensure that the risks to the biosecurity of the island are minimised in line with the requirements of the Dirk Hartog Island Biosecurity Implementation Plan (DHIBIP), including:

- Weed hygiene measures for vehicles, plant and equipment to ensure any contractors and later visitors to the site are aware of the requirements and have complied with DBCA notifications regarding vehicles brought onto the island.
- Restricting access to the Lot, initially to approved staff and contractors only and later visitors.
- Education of staff, contractors and visitors to raise awareness of weed species and how they can impact environmental values if they are transported to the island.
- In cooperation with DBCA, implementation of appropriate eradication procedures in the event of a weed outbreak or infestation of unwanted species.
- Erection of signage advising contractors, staff and visitors of the necessity to comply with the DHIBIP.
- Provision of relevant weed fact sheets to staff, contractors and visitors so they are aware of the weeds that need to be watched for and eliminated.
- Ensuring that all contractors, staff and visitors are aware of the lot boundaries and areas which they may traverse or occupy when visiting the lot.
- Ensuring that there is no disturbance to vegetation beyond the approved development areas.
- Reporting any sightings of non-indigenous species directly to DBCA.
- Ensuring visitors have either downloaded or received a copy of the DBCA publication “Island Protection.”
- Ensuring no animals including pets, other pests and plants are brought to the island (excepting guide dogs and other approved assistance animals).
- Providing advice and quarantine protocols to visitors enlarging on the necessity that footwear, clothes, packs, and camping gear are free of soil, seeds, insects, spiders, lizards and other animals and pests.
- Monitoring and checking visitor’s vehicles, vessels and any aircraft for non-indigenous species.

- Requiring that any food transported to the site is in clean, sealed plastic or metal containers rather than cardboard.

- Notifying visitors of the necessity to make sure the underside, radiator, tyres, sump, and gearbox guard plates are free of seeds and soil on their vehicle prior to bringing them onto the island.

- Regularly inspecting any management-owned vessels for non-indigenous species and maintaining rodent bait stations on board.

- Following quarantine protocols to ensure that fresh food brought to the island is free of soil, ants, snails or other small pests or animals.

- Checking building supplies and equipment, and ensuring any sand imported to the site comes only from sources with strict soil quarantine.

- Confirm with all visitors that it is mandatory that all waste and rubbish brought to the site must be removed to the mainland when they depart and that it is stored prior to removal in an animal-proof enclosure to be provided.

- Ensuring visitors do not bring firewood onto the island or light fires on the island.

4.13 Heritage Protection

The site has been cleared of Native Title by representatives of the Malgana people and their representative anthropologist/archaeologist during a survey in 2008.

The owner of the land has entered into a transferrable agreement with the Malgana People in regard to employment and on-site information signage in regard to Malgana heritage.

4.14 Management Plan

A Management Plan for the Sunday Island Bay development was prepared in compliance with SU 14 Condition 3(i). The Management Plan deals with all aspects of management on Lot 304 including:

- visitor access;
- servicing;
- maintenance;
- waste disposal/rubbish management;
- effluent disposal;
- service areas;
- transport of construction materials;

- project manager duties;
- onsite resident manager and staff;
- general management duties;
- management responsibilities;
- emergency response;
- vegetation;
- biosecurity;
- visitor numbers;
- foreshore access;
- coastal process management
- fire risk management;
- cyclone risk management;
- staging; and
- monitoring.

4.15 Monitoring

More than 100 photographic monitoring points have been established on Lot 304 since 2015 with a photographic record made at each point looking north, south, east and west. These monitoring points establish a data base that will be used for ongoing assessment and management of impacts to the vegetation and landscape.

Ongoing monitoring will commence at the beginning of construction and will continue at six monthly intervals. The monitoring programme will be reviewed after five years.

Photographic monitoring will assess any physical or visual changes to the vegetation and site in general brought about by any development and/or visitor activity. Any significant variation or adverse transformation in the environmental condition of the site would trigger a review of all operations within the lot.

Water monitoring will be undertaken as follows:

- Ocean water to the front of the eight building envelopes will be sampled at twelve monthly intervals following development and visitor occupation.

- Groundwater used for showers and toilets will be sampled at six monthly intervals.

- Potable water will be sampled every six months to ensure harmful pathogens such as coliform bacteria are not present and that the water is safe for consumption.

The results of ocean and groundwater monitoring will be compared with ANZECC (2000) marine water quality criteria and the results of pre-development monitoring. Any significant breach of the water quality criteria will be reported promptly to the Shire of Shark Bay and contingency actions taken in consultation with the Shire and DBCA.

5.0 CONCLUSION

This Environmental Report demonstrates that development of visitor accommodation on Lot 304 as proposed in the LDP can be undertaken in accordance with the Shire of Shark Bay LPS No. 4 and without any significant adverse impacts on the ecological values and special attributes of Dirk Hartog Island or its surrounding waters.

The LDP provides for development of visitor accommodation that is sympathetic to the natural character of Dirk Hartog Island as required by Condition 3(vi) of Schedule B of the Shire of Shark Bay Local Planning Scheme No. 4. This is achieved by:

- confinement of development to designated building envelopes;
- controls and guidelines on building dimensions, construction materials, methods, styles and colour schemes;
- limitation of staff and visitor numbers;
- provisions for managing solid and liquid wastes;
- control of access to the site by both boats and vehicles;
- provision for fully renewable power supply; and
- biosecurity protocols to minimise the risk of introduction of pests and diseases.

The World Heritage values of Shark Bay and Dirk Hartog Island are integral to the planning of the development. The Local Development Plan proposes a staged development approach under which the experience of each stage will reviewed and incorporated in the planning of subsequent stages. Each stage of development will be subject to separate assessment and approval under the overall framework of the LDP.

6.0 REFERENCES

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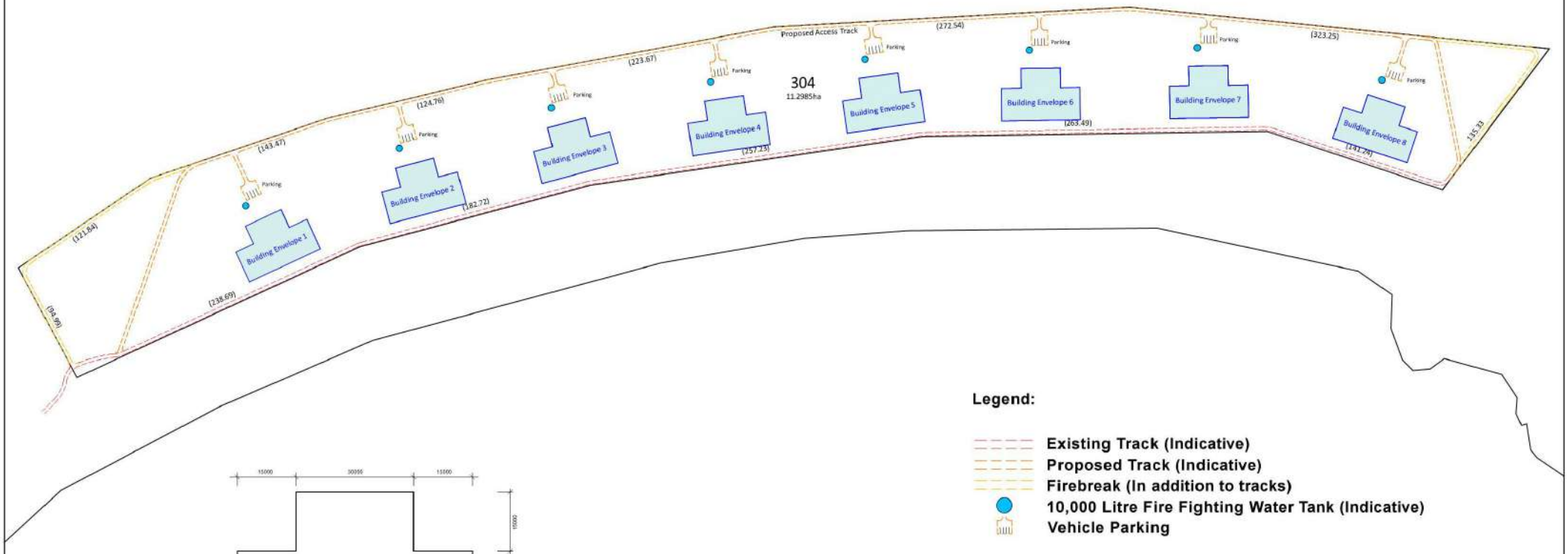
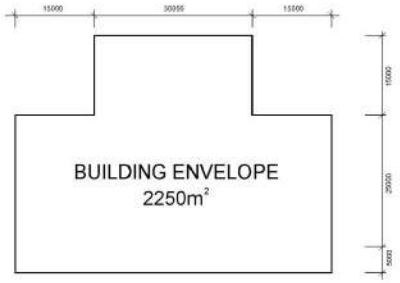
Figures





Scale 1:1000

Legend:

- **Existing Track (Indicative)**
- **Proposed Track (Indicative)**
- **Firebreak (In addition to tracks)**
- **10,000 Litre Fire Fighting Water Tank (Indicative)**
- **Vehicle Parking**

Endorsement Table: This Local Development Plan has been approved by the Shire of Shark Bay Council at its Ordinary Meeting held on..... in accordance with Clause 52(1) of the Planning and Development (Local Planning Schemes) Regulations 2015

Chief Executive Officer..... **Date**.....

LOCAL DEVELOPMENT PLAN

Lot 304 on DP 50257, Dirk Hartog Island

50 0 50 100 200 300m

Source of Information

Site boundaries: Harley Dykstra
Projection: MGA94

Figure 1

NOTE

All areas and dimensions are subject to survey, engineering and detailed design and may change without notice.

Project Lot 304 on DP 50257, Dirk Hartog Island I Scale 1:3000 @ A3 I Date: December 2024

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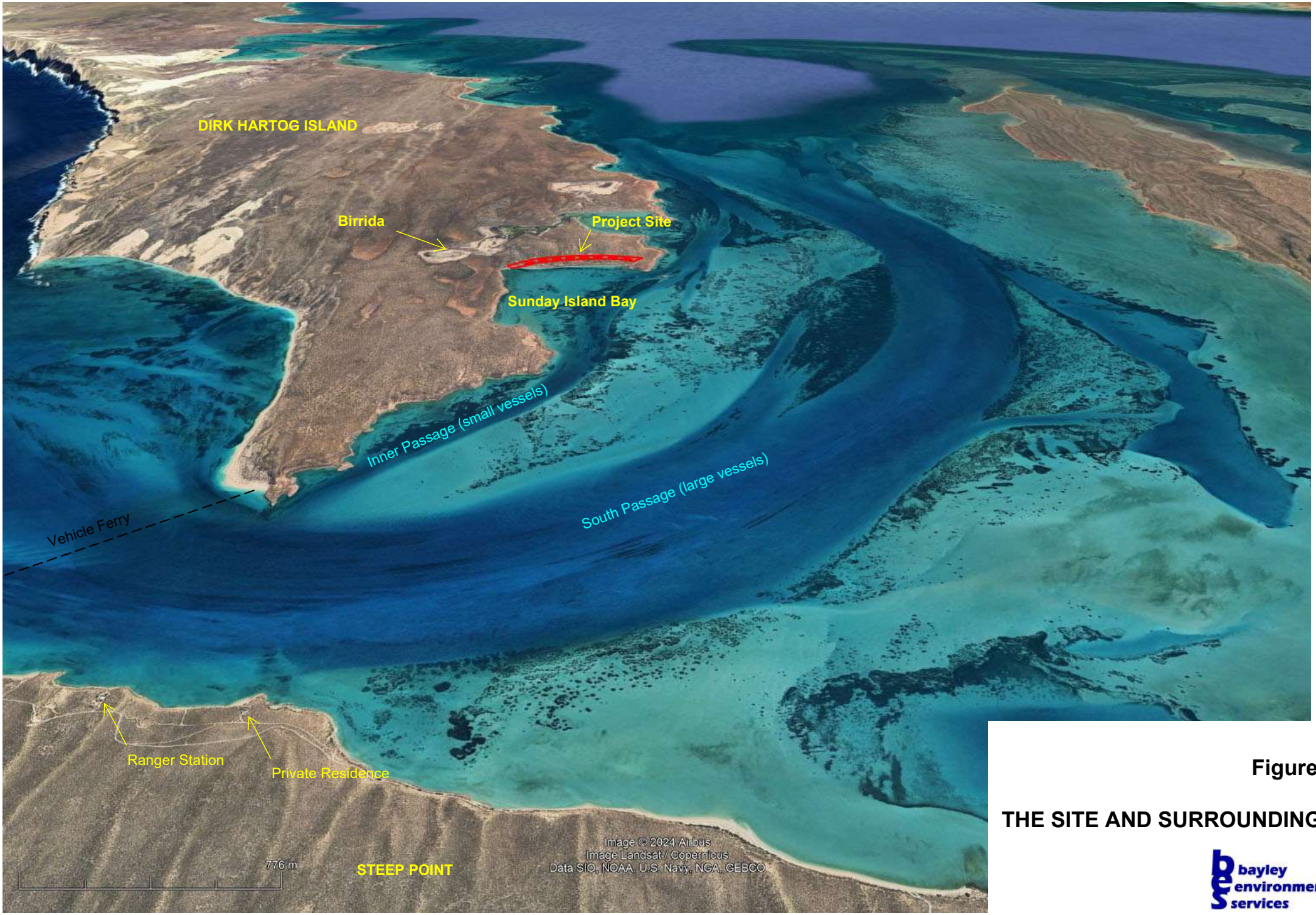
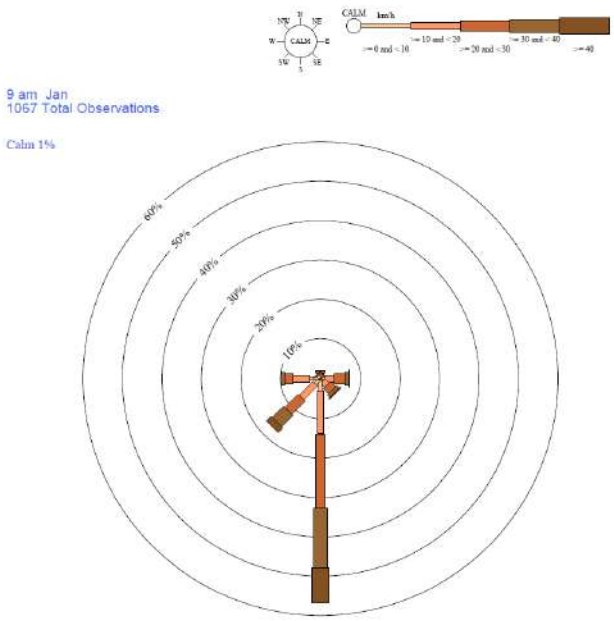
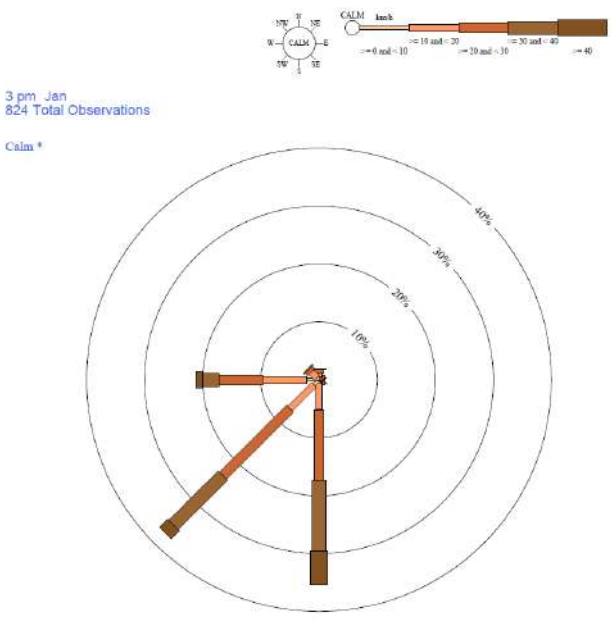


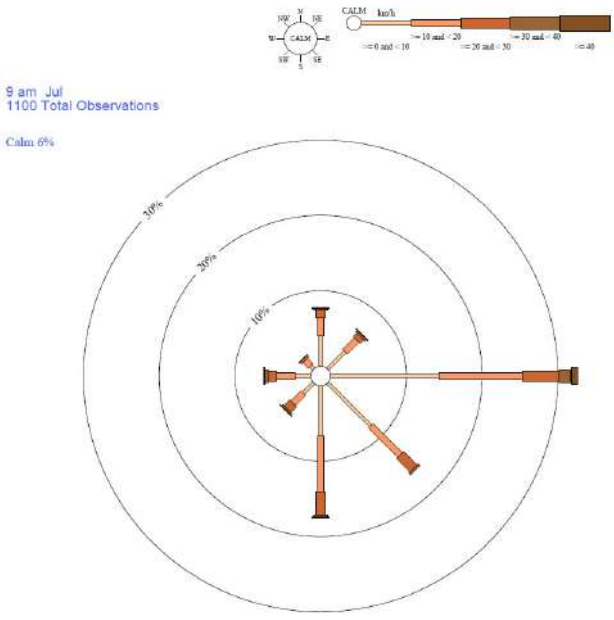
Figure 2

THE SITE AND SURROUNDINGS

bayley environmental services







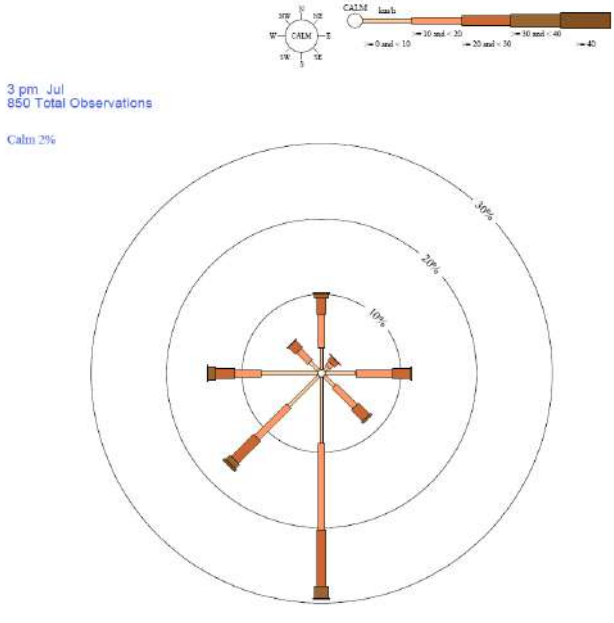


Figure 4

WIND ROSES FOR DENHAM

Source: Bureau of Meteorology (www.bom.gov.au/climate/averages/tables/cw_006044.shtml)

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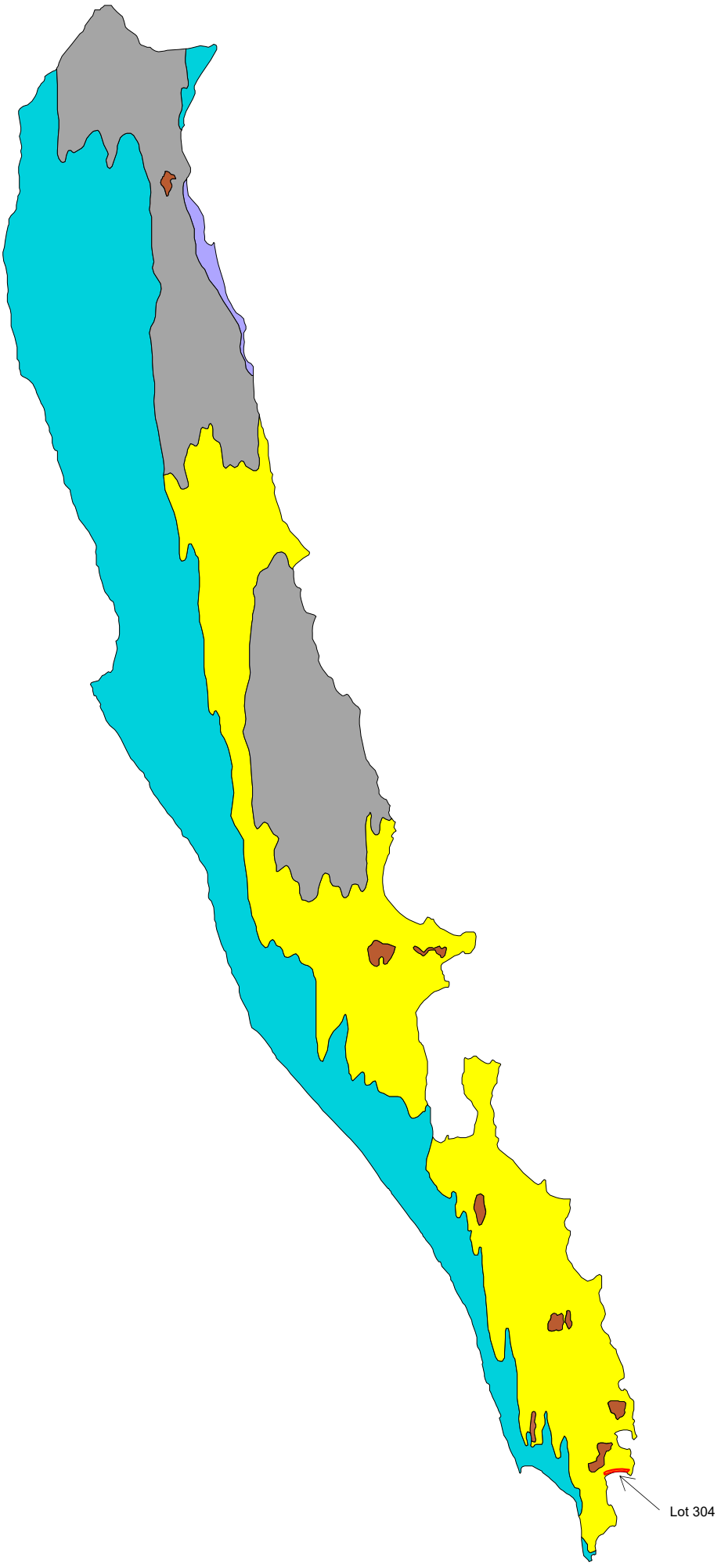

Figure 5

LAND SYSTEMS

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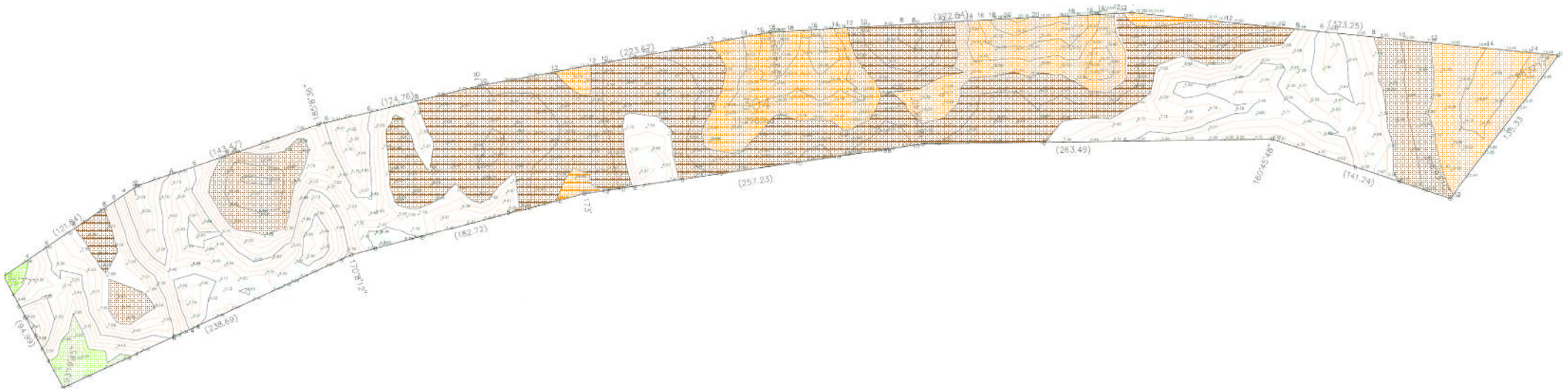

Topographic Units

- **A** >12m AHD
- **B** 8-12m AHD
- **C** 4-8m AHD
- **D** <4m AHD

Figure 6

LOCAL TOPOGRAPHY

0 200 400 Meters

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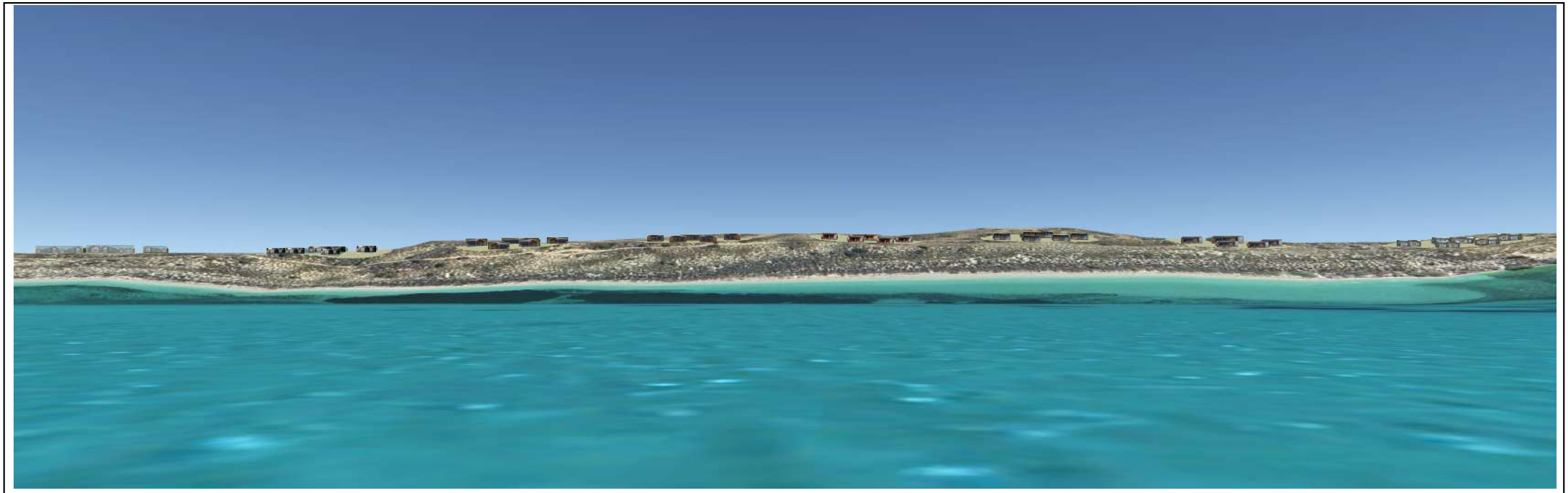

Figure 7

SIMULATED VIEW

bayley environmental services

Appendix A

EPA Advice on 2015 Development Proposal

GOVERNMENT OF
WESTERN AUSTRALIA

Environmental Protection Authority

RECEIVED
7 APR 2015
Shire of Shark Bay

P4281

Chief Executive Officer
Shire of Shark Bay
65 Knight Terrace
DENHAM WA 6537

Our Ref: *CMS15030*
Enquiries: *Leanne Thompson, 6145 0800*
Email: *Leanne.Thompson@epa.wa.gov.au*

NOTICE UNDER SECTION 39A(3)
Environmental Protection Act 1986

PROPOSAL: **Dirk Hartog Island Short Stay Units**
LOCATION: **Lot 304 Sunday Island Bay**
PROPONENT: **Shire of Shark Bay**
DECISION: **Not Assessed: Public Advice Given**

The above proposal has been referred to the Environmental Protection Authority (EPA) for consideration of its potential environmental impact.

This proposal raises a number of environmental issues. However, the overall environmental impact of the proposal is not so significant as to require assessment by the EPA, and the subsequent setting of formal conditions by the Minister for Environment under Part IV of the *Environmental Protection Act 1986*. Accordingly, the EPA has determined not to assess this proposal.

Nevertheless, the EPA has provided the attached advice to the proponent and other relevant authorities on the environmental aspects of the proposal. It is the EPA's expectation that this advice be given serious consideration in the decision making process given the World Heritage values of the site.

The EPA's decision to not assess the proposal is open to appeal. There is a 14-day period, closing 13 April 2015, during which, on payment of the appeal fee, an appellant may ask the Minister to consider directing the EPA to reconsider this decision or conduct a formal assessment.

Level 8, The Atrium, 168 St Georges Terrace, Perth, Western Australia 6000
Telephone 08 6145 0800 Facsimile 08 6145 0895 Email info@epa.wa.gov.au

Locked Bag 10, East Perth WA 6892

www.epa.wa.gov.au

Information on the outcome of the appeals process is available through the Appeals Convenor's website, www.appealsconvenor.wa.gov.au, or by telephoning 6467 5190 after the closing date of appeals.

This advice is provided for your information.

Yours sincerely

Dr Paul Vogel
Chairman

30 March 2015

Encl: Public Advice

PUBLIC ADVICE UNDER SECTION 39A(7)
ENVIRONMENTAL PROTECTION ACT 1986

SHORT STAY UNITS – LOT 304 SUNDAY ISLAND BAY, DIRK HARTOG ISLAND

Summary

Hypermarket Pty Ltd proposes to develop seven short stay units on Lot 304 Sunday Island Bay, Dirk Hartog Island. Approximately 5 per cent of the 11.3 hecatre lot will be developed for this proposal, and Lot 304 is located within the Shark Bay World Heritage Area and adjacent to the Dirk Hartog Island National Park and Shark Bay Marine Park.

The EPA notes that the proponent proposes wind turbines and desalination plants for each unit, however no detail has been provided regarding the layout, design or potential environmental impacts of either wind turbines or desalination plants in this location. The EPA has therefore not assessed or considered these elements of the proposal. The EPA recommends consultation with the Department of Parks and Wildlife (Parks and Wildlife) on these matters.

The proposal was advertised for public comment and the Environmental Protection Authority (EPA) notes that two public comments were received. One requested the proposal be assessed at Public Environmental Review, the other at Assessment on Proponent Information – Category B. Key issues raised by the public included the following:

- lack of adequate quarantine protocols and the risks to the Parks and Wildlife restoration program;
- water and power provision, and rubbish disposal;
- scale of the full development; and
- inadequate flora and vegetation surveys and lack of baseline for adequate ongoing monitoring and management.

The EPA has considered the proposal in accordance with the requirements of the *Environmental Protection Act 1986* (EP Act) and the *Environmental Impact Assessment Administrative Procedures 2012.* In making its decision on whether to assess the proposal, the EPA considered the 10 aspects of the significance test as set out in clause 7 of the *Environmental Impact Assessment Administrative Procedures 2012:*

1. values, sensitivity and quality of the environment which is likely to be impacted;
2. extent (intensity, duration, magnitude and geographic footprint) of the likely impacts;
3. consequence of the likely impacts (or change);
4. resilience of the environment to cope with the impacts or change;
5. cumulative impacts with other projects;
6. level of confidence in the prediction of impacts and the success of proposed mitigation;
7. objects of the Act, polices, guidelines, procedures and standards against which a proposal can be assessed;

8. presence of strategic planning policy framework;
9. presence of other statutory decision-making processes which regulate the mitigation of the potential effects on the environment to meet the EPA's objectives and principles for EIA; and
10. public concern about the likely effects of the proposal, if implemented, on the environment.

The EPA has indentified Flora and Vegetation, Terrestrial Fauna, Inland Waters Environmental Quality, Coastal Processes and Amenity as the preliminary environmental factors relevant to this proposal under Part IV of the EP Act. In considering the potential direct and indirect impacts of the proposal on the preliminary environmental factors, the EPA has had particular regard to:

- the important environmental values but the relatively small geographic footprint and scale of the proposal in context of Dirk Hartog Island; and
- the presence of other statutory processes, including licence requirements under the *Conservation and Land Management Act 1984* and the development approvals by the Shire of Shark Bay.

In summary, although the proposal raises a number of environmental issues, the EPA's objectives for the preliminary environmental factors can be met through the satisfactory implementation of this public advice and through other statutory decision-making processes. As a result, the EPA considers that the likely environmental impacts of the proposal are not so significant as to warrant formal assessment.

1. Preliminary Environmental Factors

The EPA has identified the following preliminary environmental factors relevant to this proposal:

a) Flora and Vegetation;

b) Terrestrial Fauna;

c) Inland Waters Environmental Quality;

d) Coastal Processes; and

e) Amenity.

There were no factors that were determined to be key environmental factors that would require formal assessment under Part IV of the EP Act. The EPA considers that the mitigation of the potential effects on the environment can be regulated by other statutory decision-making processes and through the implementation of this public advice and other best practice measures.

2. Advice and Recommendations regarding Environmental Issues

a. Flora and Vegetation and Terrestrial Fauna

The EPA notes that the proposal will involve vegetation loss due to the construction of the accommodation units, walk and vehicle paths and other associated infrastructure. Lot 304 is within the Edel Vegetation System, which covers

approximately 20,000 ha of Dirk Hartog Island and only approximately five percent of the 11.3 hectare ha lot will be developed as a result of this proposal. The EPA therefore considers that vegetation loss from this proposal is unlikely to have a significant impact on flora and vegetation nor fauna habitat.

However access to Lot 304 requires transiting through the Dirk Hartog Island National Park, both for visitor arrival via the barge at the southern end of the island and via the proposed walkways from the accommodation units to the adjacent beach. Potential impacts to the national park include localised impacts to the areas accessed by visitors, particularly the adjacent foreshore area, during both construction and operation and the introduction of pests through inadequate quarantine practices. Inadequate implementation of biosecurity protocols could put at risk the success of the Dirk Hartog Ecological Restoration Program.

While the EPA notes that the proponent has prepared a Foreshore Management Plan, the EPA recommends that this plan be expanded to an Access Management Plan and address impacts to Dirk Hartog Island National Park resulting from the construction and operation of the proposal. The plan should include, but not be limited to, the following:

- Protocols to minimise impacts to Dirk Hartog Island National Park during construction which could include the use of clear signage, operator information, and (where necessary) temporary fencing or pegging.
- Protocols to minimise impacts to Dirk Hartog Island National Park during operation through appropriate management of visitor access and recreation.
- Monitoring and rehabilitation procedures and protocols for areas within the Dirk Hartog Island National Park that are disturbed as a result of the construction or operation of the proposal, with a particular emphasis on the foreshore area adjacent to the development.
- Procedures, in accordance with the *Dirk Hartog Island Biosecurity Implementation Plan*, to ensure that the development does not introduce or proliferate non-indigenous terrestrial species to or on Dirk Hartog Island.

The EPA also recognises that a licence is required from the Parks and Wildlife for commercial tourism operations in the national park and marine park and that conditions can be placed on this licence to manage and mitigate environmental impacts. The EPA further recognises that Parks and Wildlife may include a condition on this licence that requires compliance with the Access Management Plan, if deemed necessary.

The EPA considers that potential impacts to flora and vegetation and fauna can meet the EPA's objectives through regulation and mitigation of impacts by other regulatory processes and the implementation of this public advice.

b. Inland Waters Environmental Quality

The proponent indicates that each unit would be separately responsible for the provision of sewage and water supply and proposes the following:

- sewage – septic system or incinolet technology (using electric heat to reduce human waste to ash); and

- water – a combination of rainwater tanks, desalination plants and groundwater.

While the EPA notes that a septic system is currently in use at the Dirk Hartog Island Lodge, the use of such systems does not comply with the EPA's principles of *best practice* and *continuous improvement* as identified in Environmental Assessment Guideline 8. The EPA therefore does not support the installation of septic systems and instead recommends that Aerobic Treatment Units (or similar) are installed for on-site effulent disposal.

The EPA recognises that water provisioning on the island will need to rely on multiple sources due to the unreliability of rainfall. The proponent has indicated that groundwater will be sourced from existing wells in Dirk Hartog Island National Park, however only anecdotal information is available regarding the quality and quantity of water within these wells. Although this anecdotal evidence does indicate that sufficient water will be available for the proposal, the EPA recommends that conditions be applied to the proponent as part of any well access agreements. These conditions should require the proponent to provide quarterly water quality data on total dissolved salts and pH, together with usage volumes, to the Department of Water and Parks and Wildlife. The EPA considers this information is important to demonstrate that any future expansion of the tourism development on Lot 304 will not impact the long-term sustainability of the groundwater.

The EPA considers that the proposal, if implemented consistent with this public advice, is not likely to have a significant impact on the environmental factors of inland waters environmental quality.

c. Coastal Processes

The EPA notes that the Department of Planning (DoP) has undertaken a review of the proponent's coastal setbacks report and the Foreshore Management Plan. The DoP has recommended the proponent undertake Coastal Hazard and Risk Management and Adaptation Planning (CHRMAP), consistent with State Planning Policy 2.6, to reduce the coastal hazard risk down to acceptable or tolerable levels. The DoP has also recommended that the proponent to redraft the Foreshore Management Plan to ensure it is consistent with State Planning Policy 2.6.

The EPA recommends that the Shire of Shark Bay impose conditions on the development application consistent with the DoP's recommendations.

The EPA considers that potential impacts to coastal processes can meet the EPA's objectives through regulation and mitigation of impacts by other regulatory processes and the implementation of this public advice.

d. Amenity

The EPA notes that one of the criteria for which the Shark Bay area was listed as World Heritage is the *superlative natural phenomena, formation or features* which includes the coastal scenery of Dirk Hartog Island.

The EPA also notes that Guidance Statement 49 *Assessment of development proposals in the Shark Bay World Heritage Property* (EPA, 2000) requires proponents and decision-making authorities to pay particular attention to the World

Heritage values for which the property was listed to ensure the proposal will not have a significant environmental impact.

While the proponent has committed to using the formal World Heritage colour palette and designing the buildings and infrastructure to blend into the landscape proponent, the EPA believes further minimisation of impact to visal amenity could be achieved. The EPA therefore recommends that prior to approval of the development application that a Visual Impact Assessment is to be undertaken consistent with the *Visual Landscape Planning in Western Australia*, published by the Department of Planning (2007). This Visual Impact Assessment should be undertaken in consultation with Parks and Wildlife.

The EPA also recommends that the Shire of Shark Bay place a condition on the development application which requires the proponent to use the appropriate colour palette for the Shark Bay World Heritage Area.

The EPA considers that the proposal, if implemented consistent with this public advice, is not likely to have a significant impact on the environmental factor of amenity.

Appendix B

Coastal Risk Management Reports (Damara WA Pty Ltd 2014, 2019, 2021)

SUNDAY ISLAND BAY – DIRK HARTOG ISLAND

Coastal Setback Allowances

Damara WA Pty Ltd

November 2014

Report 239-01-Rev0

Document Control

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1. Introduction

The owners of Lot 304 Sunday Island Bay, Dirk Hartog Island are considering the development of 33 individual accommodation units (Figure 1; Figure 2). The proximity of the site to the coast requires consideration of appropriate evaluation of coastal hazards, including inundation and erosion. Damara WA has been commissioned to provide a simple site-specific assessment of these hazards for use in adaptation planning. The lot is located in an area where the State Coastal Planning Policy SPP 2.6 (WAPC 2013) is relevant for setting a coastal reserve and hazard mitigation.

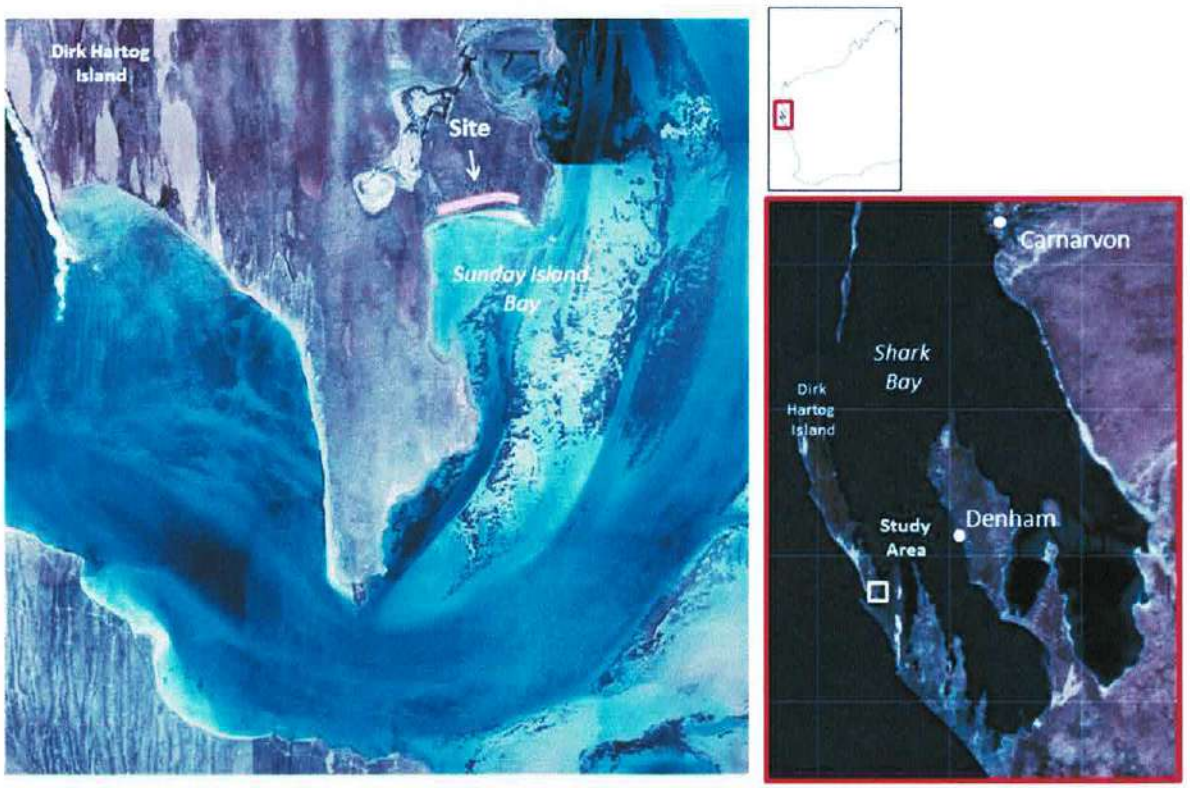


Figure 1: Sunday Island Bay Site (Image: Landgate 2007)

Distances between the coast and the site are relevant to the management of coastal erosion hazard and site elevations are relevant to management of inundation hazard. The site is 90-120m wide and is located between 55m and 210m from the +2m AHD contour, with elevations ranging between+3m AHD and +20m AHD (Figure 2). The proponent is considering 33 individual building envelopes on the site (red on Figure 2), with 22 alternate building envelopes (blue on Figure 2). The most seaward building envelope is 66m landward of the +2m AHD contour at envelope 3, with an alternate location identified 20m further landward. The majority of building envelopes are located landward of the +6m AHD contour, except for six envelopes (building sites 1-5, 8).

This report provides a site-specific assessment of coastal hazards that may be used to support strategies for coastal hazard risk mitigation, in accordance with SPP2.6. A simple assessment using default allowances for coastal setback (Section 3) is followed by a refined assessment (Section 5).

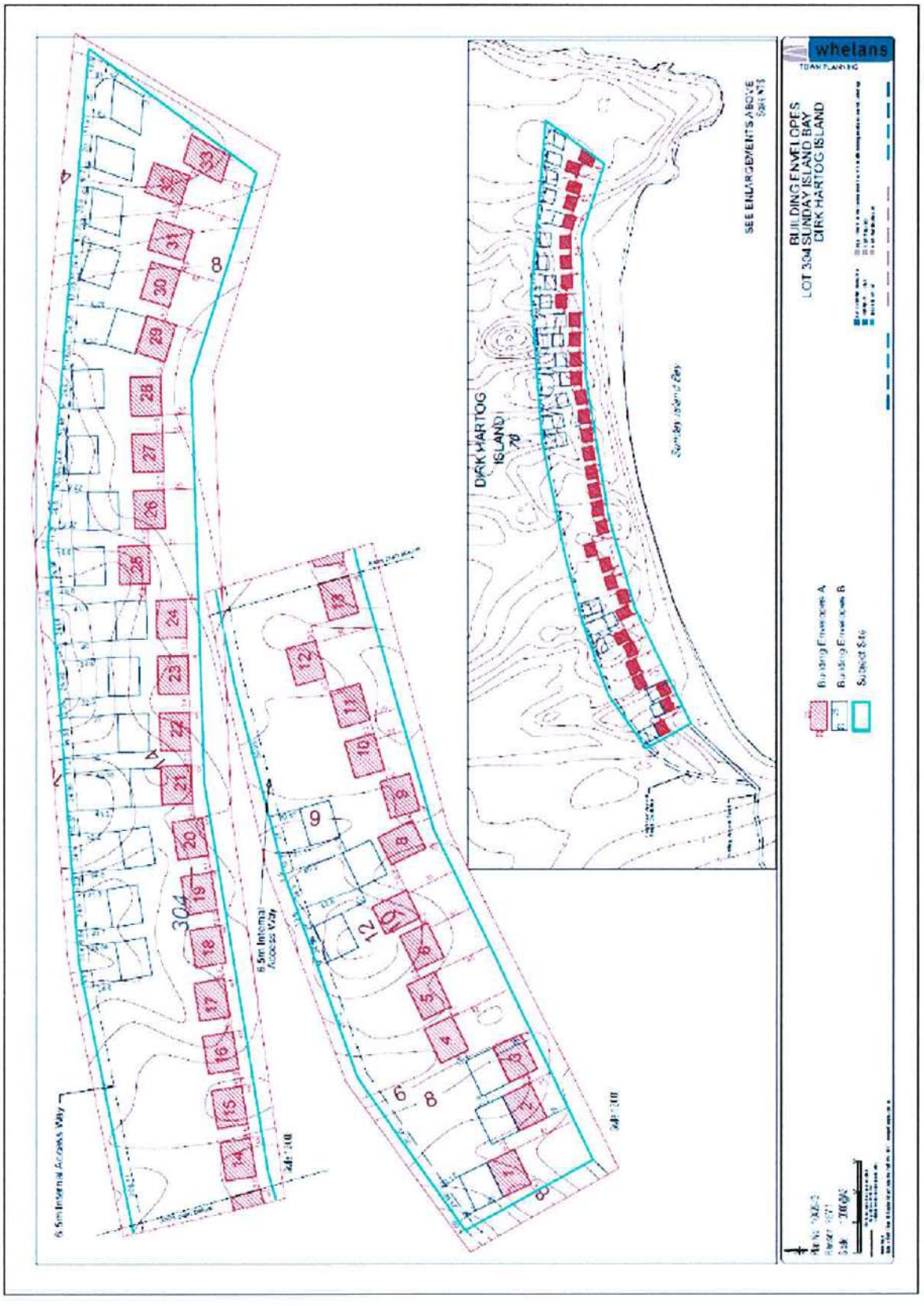


Figure 2: Initial Site Layout

2. Setback Policy

Coastal setbacks have been identified as one of the most effective forms of coastal hazard mitigation on slowly varying coastlines, as the setback provides a buffer against short-term coastal fluctuations. The approach acknowledges the natural tendency for erosion-recovery cycles and aims to avoid expensive coastal protection works.

Guidance for development along the Western Australian coast is provided by relevant 'infrastructure objectives' in the *Coastal Zone Management Policy* (WAPC 2001), including:

- Recognition of the dynamic nature of coastal environments and the consequences for coastal development and use.
- Avoidance or mitigation of the impacts of natural hazards through intelligent siting and design of infrastructure, based on ongoing scientific research.

The recommended approach towards achieving these objectives was outlined in the *State Coastal Planning Policy* SPP No. 2.6 (WAPC 2013), which identified setbacks as a primary technique for the mitigation of coastal hazards. The focus of the policy is coastal hazard assessment, management and adaptation planning. The SPP 2.6 provided guidelines for the assessment of development setbacks and gave a suggested method of assessment for multiple shore types. The shore type most relevant for Sunday Island Bay is discontinuous rocky coasts (Clause 4.6.3 of Schedule One).

SPP2.6 provides a simple technique in Schedule One for the evaluation of setback allowances for physical processes, includes:

- HSD Horizontal Shoreline Datum: active limit of shoreline under storm activity, which for 'Area 2' (WAPC 2013 Figure 1) is the peak steady water level (no runup) for the 100-year recurrence interval storm.
- S1 Acute Erosion Allowance: cross-shore erosion associated with impact of a severe storm sequence, with consideration of longshore erosion.
- S2 Chronic Erosion Allowance: horizontal erosion due to progressive loss of coastal sediment, within 100 years. Projected using aerial photography with 1972 the earliest available at Sunday Island Bay. Calculated as 100 times the historic annual rate of erosion.
- S3 Sea Level Allowance: coastal recession associated with climate change induced sea level rise (Figure 16 of DoT 2010). On a sandy coast this should be 100 times the adopted sea level rise value of 0.9m over a 100-year timeframe or 90 metres.
- Uncertainty: an additional 0.2m per year allowance for uncertainty on sandy coasts.
- S4 Storm Surge Inundation Allowance: peak stead water level plus wave runup for a tropical cyclone storm with a one-in-five hundred probability of being equalled or exceeded in any given year.

A general case for calculation of an allowance for coastal processes is described by SPP 2.6 Schedule One, which is applicable to sandy coasts. This method of calculation is formulaic rather than process-based or landform-based, and in most cases is dominated by S3, with the application of a Bruun ratio of 100:1 to sea level projections (Bruun 1962). The policy allows for consideration of adaptation planning for sites located within the erosion or inundation hazard areas. Adaptation planning requires an understanding of both likely and possible future scenarios, which may be separately assessed using realistic and conservative models for coastal change.

3. Default Assessment of Schedule One

A simple assessment of setbacks for coastal hazards is based on existing datasets, default or assumed values in Schedule One of SPP2.6 (WAPC 2013; Section 2), to determine the feasibility of development on the site. Default values for S1, S2, S3 and uncertainty have been applied (Table 1).

The HSD should represent the active limit of shoreline activity under a storm with a 100-year ARI water level, excluding runup. For adjacent areas of Denham (Wallace & Boreham 1990) and Monkey Mia (MP Rogers & Associates 2004) the 100 year ARI event peak steady water level has been estimated at +2.5m AHD. This value has been used for this simple assessment as it was the only available value for the area. It was estimated through comparison of short water level datasets collected simultaneously at Carnarvon and Denham in the 1980s, noting that data from Tropical Cyclone Herbie (1988) was not captured. This level is based on the assumption that water levels at Denham are 1.3 times larger than at Carnarvon. Refining the analysis of water levels during tropical cyclones may change the HSD value, based on estimates of central pressure, track curvature and speed, radius of maximum winds and coincidence with high tides (Damara WA 2009; Section 5.1).

Table 1: Components of SPP2.6 Schedule One and possible refinements

		Default (m)	Refinement
HSD	Horizontal shoreline datum, limit of shoreline in storm activity	+2.5m AHD (Wallace & Boreham 1990)	Estimate site-specific 100-year inundation peak steady water levels (no runup).
S1	Acute storm response	40	Relatively sheltered area for waves. Estimate local wave forcing and water level conditions, and simulate storm response in the numerical model SBEACH.
S2	Long-term response	20	Split into sections to account for rotation at the bay extents with minimal movement in the centre. The extent is considered in terms of the rock control and is likely to be tending to 0 as it fluctuates around a mean.
S3	Sea-level rise response for 100 years	90	Site does not require 100-year planning timeframe as units are designed for retreat or removal (2070 is 0.4m, or 40m).
Uncertainty	0.2m/year which is 20m over 100 years.	20	Determine if this is necessary on a site-specific assessment. Could be removed based on providing more certainty through landform analysis.
S4	500-yr ARI inundation event. Peak steady water level + runup.	+4m AHD	Estimate site-specific 500-year inundation levels (PSWL + runup). No properties are at an elevation <+4m AHD.
Set-back	HSD + S1 + S2 + S3 + uncertainty	170m from +2.5m AHD	

The allowance for inundation considers a 500-year recurrence interval tropical cyclone water level, including runup and projected sea level rise. A simple estimate of +4m AHD is used to incorporate an additional 0.3m water level compared to the 100-year water level, 0.5m for extra sea level rise and a 0.7m wave runup. This value provides a simple initial estimate to determine extent of site susceptible to inundation hazard.

Using these assumptions and default values, the erosion allowance for a 100-year planning timeframe is 170m horizontal setback from the +2.5m AHD with the inundation allowance defined by the +4m AHD contour (Figure 3). None of the proposed sites would be susceptible to inundation hazard if this assumed S4 value was correct. The majority of the lot is located within the coastal erosion hazard zone using default values for a 100-year time period. Therefore, the site should be managed through a Coastal Hazard Risk and Adaptation Management Plan (CHRMAP), with refined evaluation of coastal change appropriate to assess coastal hazard and risk management measures. Methods for refinement of coastal hazard components are summarised in Table 1.

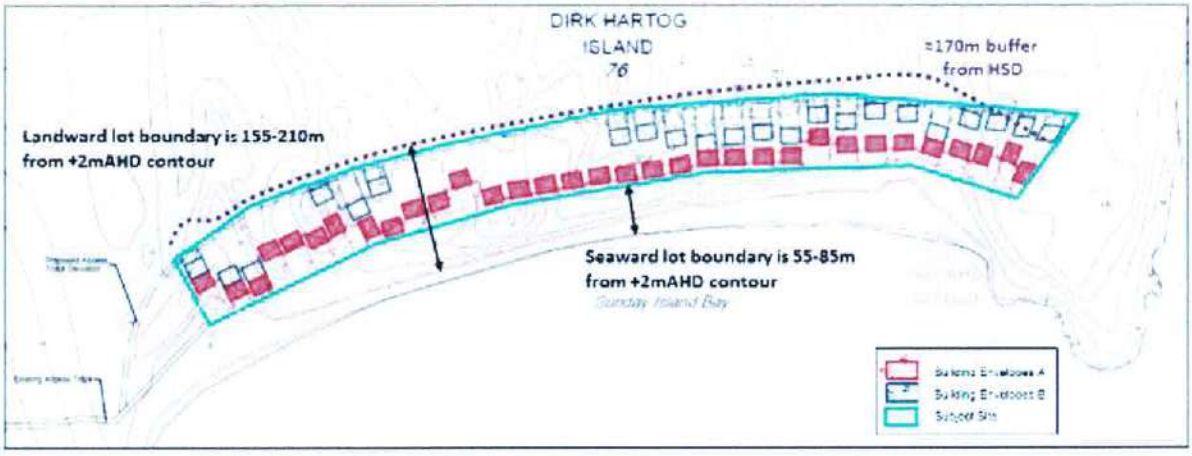
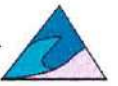


Figure 3: Simple Measure of Distances on Site Layout



4. Site Context

Sunday Island Bay is a south-facing bay on the south-east of Dirk Hartog Island in western Shark Bay (Figure 1; Figure 4). The geomorphology and bathymetry of western Shark Bay and Dirk Hartog Island play a significant role in the coastal dynamics of the area and are important for the definition of coastal setbacks and management of coastal risk. At all scales in western Shark Bay there are controls and feedback between the mobile sedimentary features, older (inherited) landforms and the rock structures. Considerations of erosion hazard require consideration of the coast as a mixture of rock and sand, with control by inherited features.

Limited geologic and geomorphologic information is included for outside the Sunday Island Bay area. Previous reading by the authors has identified information relevant to the wider Shark Bay is available from Logan & Cebulski (1970), Read (1974), Butcher *et al.* (1984), Payne *et al.* (1987), Playford (1990), Richardson *et al.* (2005), Eliot *et al.* (2012) and Gozzard (2012). Dirk Hartog Island is a mixed rock and sand island with a SSE-NNW alignment, forming the western boundary of Shark Bay (Figure 4). Southern Dirk Hartog Island is largely quaternary Tamala limestone with landforms according to the Edel Land System description (Box 1; Figure 5). The material varies from unconsolidated sediments to strongly lithified locally quartzose calcerinite. Longitudinal dunes and dune-like sandy crests are present over limestone ridges, with some supratidal sediment deposits.

Box 1: Edel Land System description (Ed)
(Source: Payne *et al.* 1987)

Undulating sandy plains with occasional dunes, limestone ridges and saline flats supporting low acacia shrublands with some saltbush and heath communities.
Geology: Quaternary Tamala Limestone with minor areas of mixed supra-tidal deposits and calcareous sand.
Geomorphology: Undulating plains of eolian calcareous sands with minor longitudinal dunes, small areas of outcropping limestone and saline plains; no drainage features.
Landforms: Longitudinal dunes and dune-like sandy crests over limestone ridges; relief up to 15 m; soils are light reddish brown calcareous sands.
Restricted limestone plains and stony rises densely mantled with pebbles, cobbles and boulders; soils are red, reddish brown or yellowish brown shallow sand, loamy sand or clayey sands.
Swales and undulating plains sparsely to moderately mantled with limestone gravels; soils are yellowish red or reddish brown sands or loamy sands, calcareous throughout.
Low-lying saline plains, lightly to moderately mantled with limestone pebbles or cobbles; soils are very shallow grey loamy sands with calcareous inclusions.

A bathymetric context for the site is required for predicting wave and water level response during tropical cyclones, interpretation of coastal landforms and estimation of response to oceanographic forcing. From north to south through Shark Bay the bathymetry shallows through Naturaliste Passage to 50m depths in Denham Sound to the 2m depth shallow flats within Blind Strait, with connection seaward through South Passage between Dirk Hartog Island and Steep Point (Figure 4; Figure 6). Denham Sound is connected to Blind Strait and also to Freycinet Reach, which is separated from Blind Strait by Bar Flats Sill. The nearest water level recording station is at Useless Loop, with water levels differing to Sunday Island Bay due to the influence of Bar Flats Sill, the dynamics of Blind Strait and different bay aspect, affecting surge response to winds. Storm surges at Sunday Island Bay are lower than adjacent areas due to aspect, dispersal of surge in Blind Strait and proximity to Freycinet Reach. The site is further sheltered from erosion during tropical cyclones as it is unlikely that high waves would occur with peak storm surge, given the required wind directions.

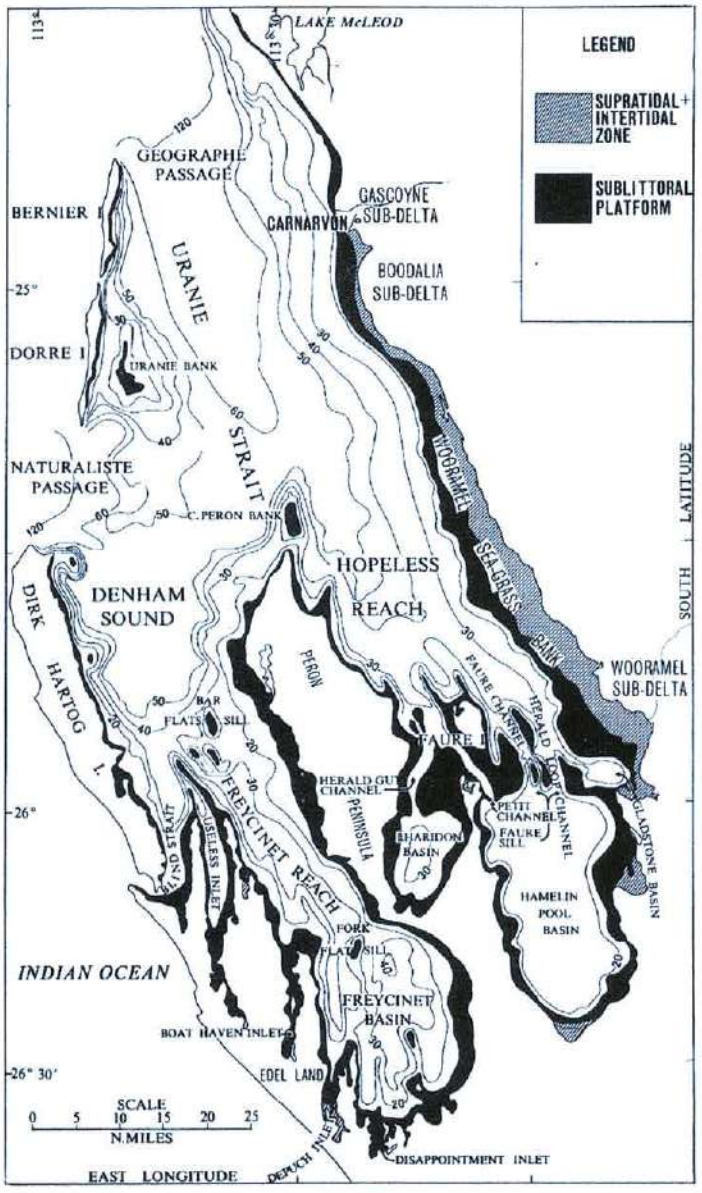


Figure 4: Bathymetry (Logan & Cebulski 1970)

The broader behaviour of the Sunday Island Bay coast has been considered in a wider sediment cell context incorporating the controls of the banks either side of the channel (Figure 7; white dots). At this scale, the longer-term sediment dynamics within Blind Strait and the adjacent banks have been considered. However, for this setback assessment and adaptation planning the discussion is focused on a finer scale sediment cell between the two headlands (Figure 7; yellow dots). The coast is topographically controlled on a broad scale by the peninsulas, islands, broader bathymetric structure and the sand flats within Blind Strait; and on a local scale by rock features either side of the bay, foredunes, relict longitudinal dunes, local bathymetry including terraces and platforms, and subtidal rock outcrops (Figure 7; Figure 8).

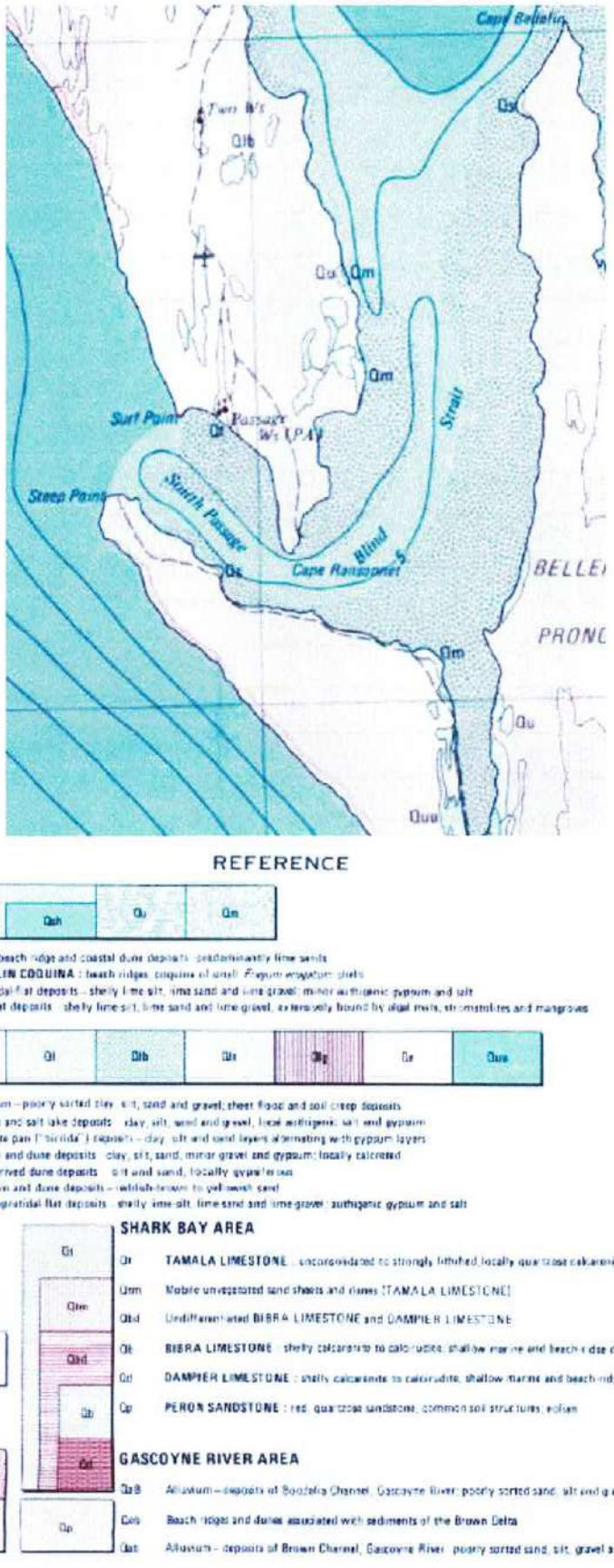


Figure 5: Site Geology (Butcher *et al.* 1984)

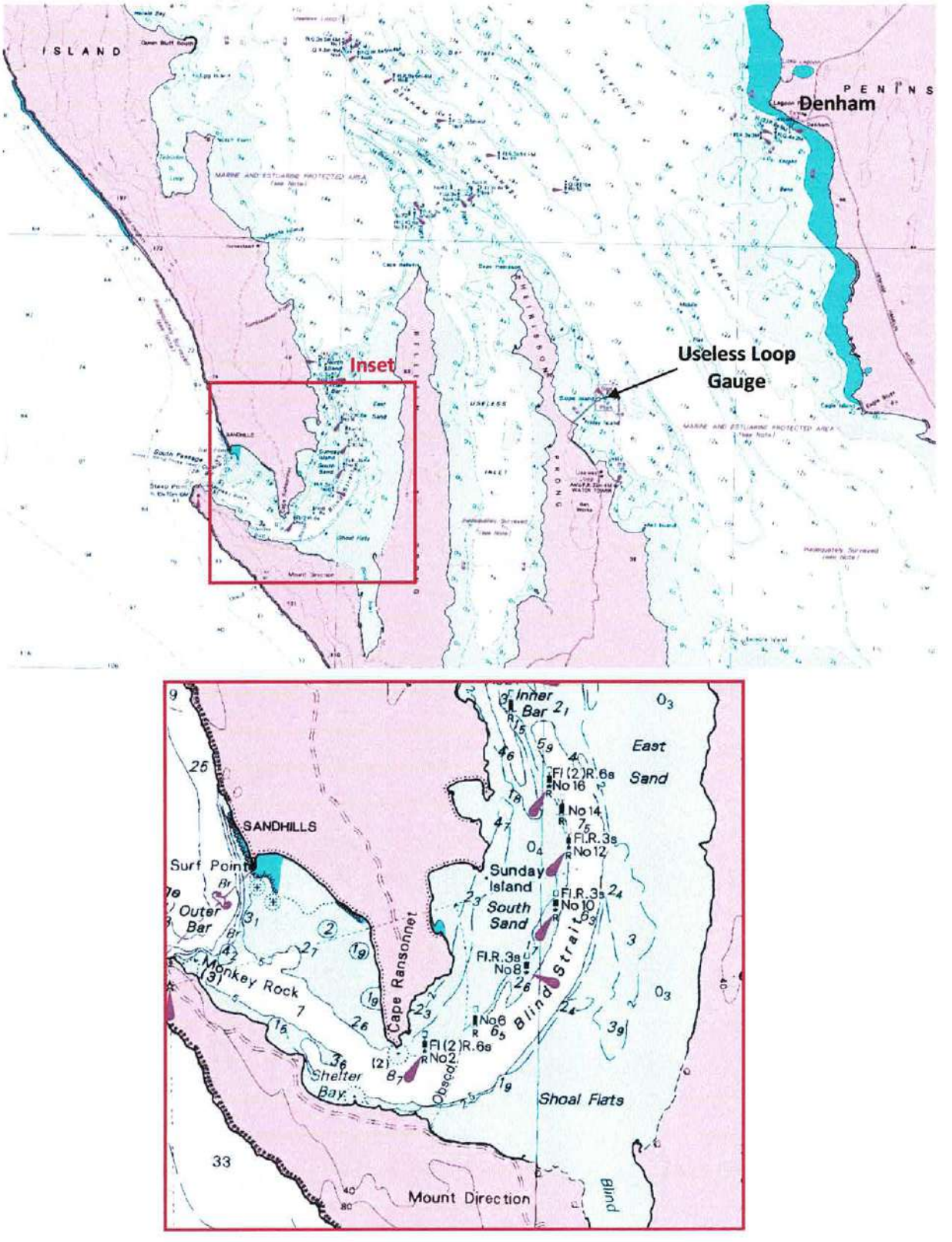


Figure 6: Broad-Scale Bathymetry
(RAN Hydrographic Office Chart 749 Shark Bay South Western Sheet 1993)

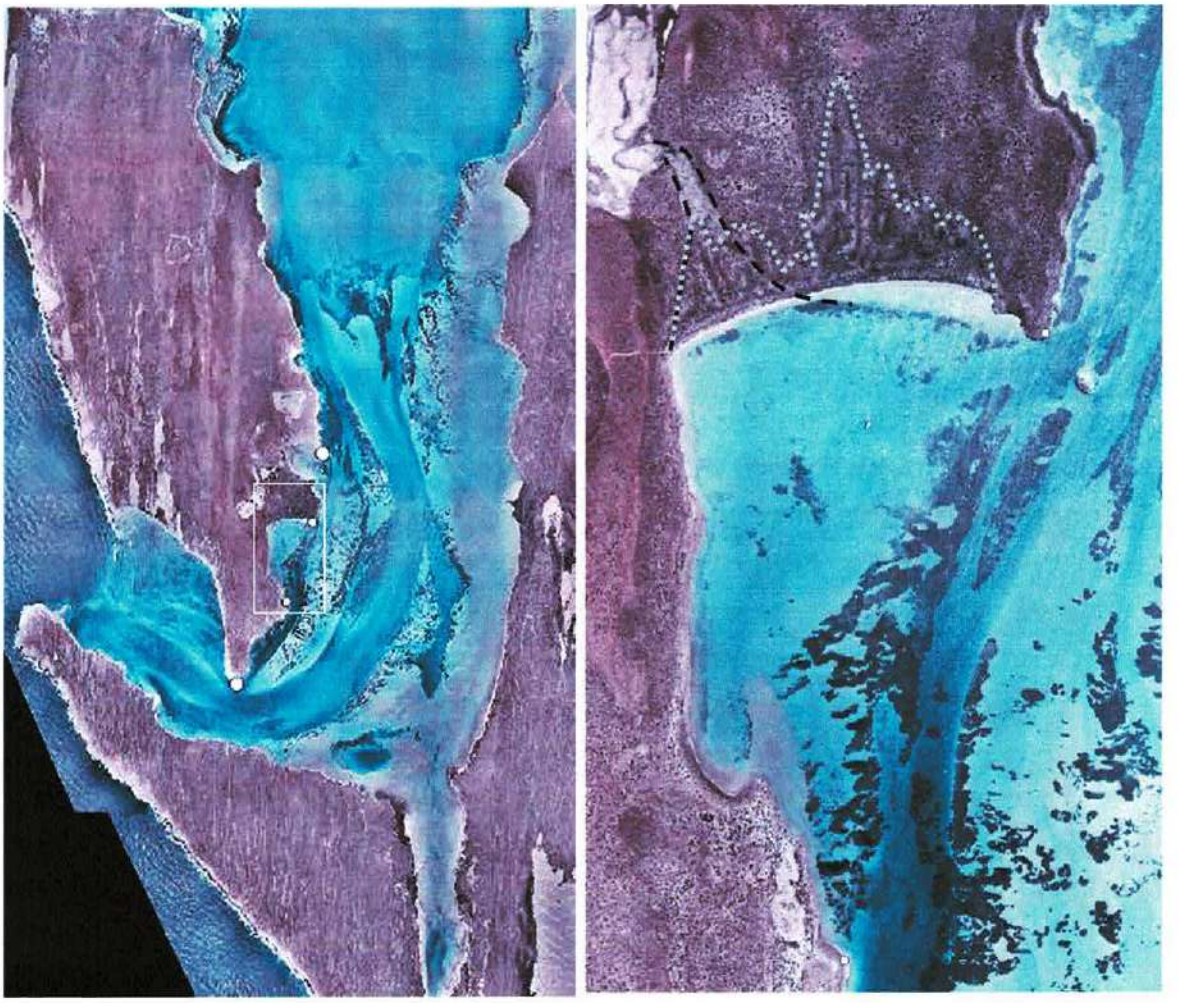


Figure 7: Focal Sediment Cells for Investigation (Source: Landgate 2002)
Broader cell between white dots for longer time-scales and focal cell for investigation in yellow dots. The right image shows relict channel (black line) connected to terrace and with flood tide shoal in the lagoon. Longitudinal dunes (grey dotted line) subsequently activated and shifted sediment landward.

Interpretation of landforms suggests a traditional approach to predicting coastal response to sea level rise may not apply at this site. There is a disconnection from the onshore landforms to the dynamics of the channel and adjacent banks in Blind Strait. Coastal response to sea level rise may incorporate sediment movement onto the banks adjacent to the channel, changing levels on the terrace, beach rotation and potential accretion in longitudinal dunes. . In a previous time period sediment was moved onshore demonstrated by infill of the relict channel connected to the terrace, with a flood tide delta within the inlet (Figure 7); with subsequent movement of material onshore via the longitudinal dunes. It is anticipated these changes would have occurred during the previous sea level highstand (around 2,000 years ago). The existing longitudinal dunes presently restrict the capacity for coastal retreat at the site, with historic movement only occurring in the foredune plain to seaward (Figure 8; Figure 9).

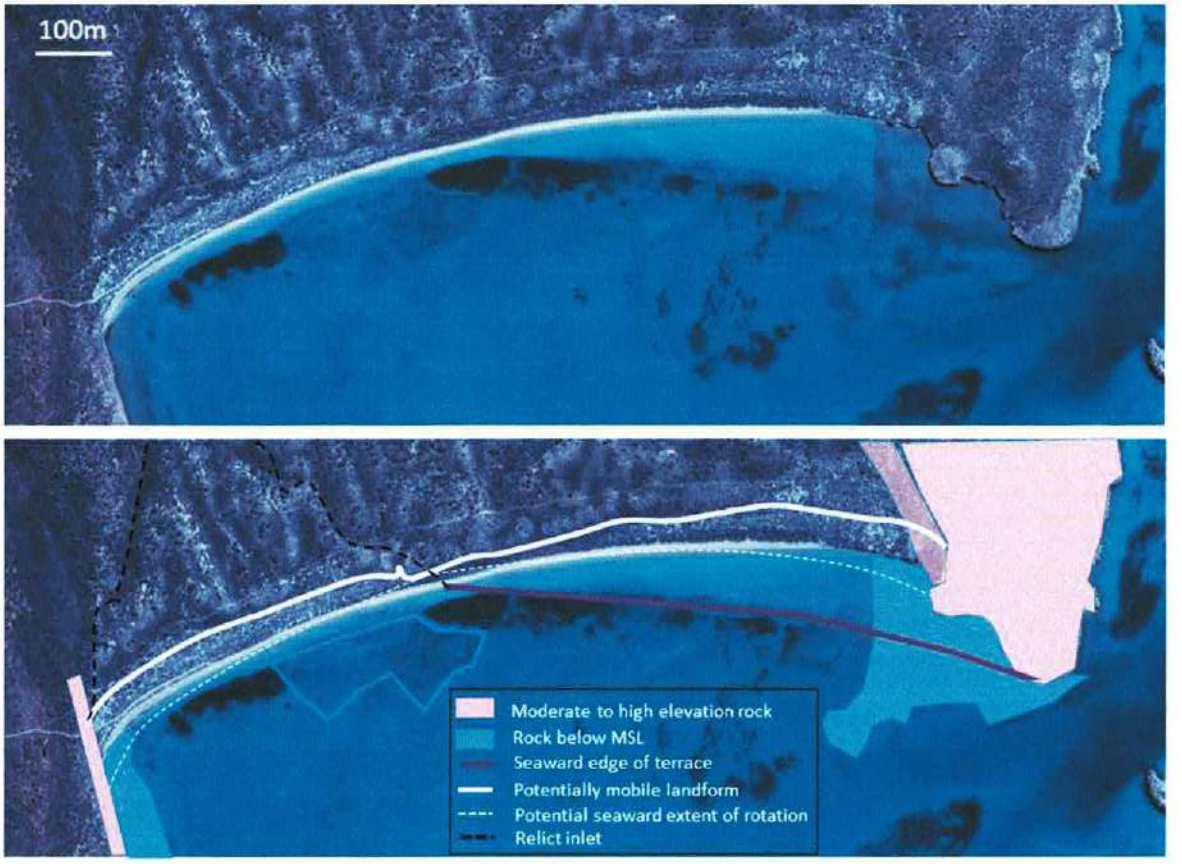


Figure 8: Rock and Terrace Controls (Image: Google Earth 2013)
Potentially mobile foredunes are located seaward of the older longitudinal dunes (see Figure 7).

Figure 9: Site Photo of Eastern Headland
Lower foredunes are located seaward of older dune features, constrained by rock ridges

Contemporary coastal response, excluding projected sea level rise, is likely to be restricted to erosion and rotation within the existing foredune plain, as demonstrated by the white lines in Figure 8. This is hypothesised due to the reworked nature of the foredune plains seaward of the longitudinal dunes; and the controls provided by the rock headlands, rock below mean sea level and the terrace. If a sequence of erosive storm events were to occur, causing wholescale cross-shore retreat, it may result in minor reworking of the longitudinal dunes to landward. Post-event recovery would see the foredune plain reform (in a different configuration) due to sediment storage on the terrace and local sediment production.

Landforms also support the assumption that inundation hazard is less significant in Sunday Island Bay than north facing coasts within Denham Sound and Freycinet Reach. This is because there are no distinct landforms formed by overwash within the bay.

5. Revised Schedule One for Adaptive Hazard Assessment

The components of Schedule One of SPP2.6 have been revised from default setback allowances, to provide a more locally-relevant assessment of coastal change that may support adaptive decision-making. Several key assumptions were required to compensate for data limitations.

5.1. STORM EVENT (HSD, S1 AND S4)

Locally relevant assessments of the HSD, acute storm allowance (S1) and inundation allowance (S4) require consideration of a tropical cyclone event and the associated extreme waves and water levels. The evaluation of extreme water levels for Sunday Island Bay has used information developed for *Selection of Design Cyclones for Coastal Development Approval Assessments* (Damara WA 2009) regarding tropical cyclone intensity, scale and coincidence with tidal conditions. This analysis suggests characteristics for 'direct hit' design storms, coincident with a tidal level of Mean Higher High Water, which is 1.0m CD[1] (RAN Hydrographic Office Chart 749).

Table 2: Characteristics of 'Direct Hit' Design Storms

Design Storm Recurrence	>100 yr ARI	>500 yr ARI
Central Pressure	955 hPa	933 hPa
Radius of Maximum Winds	38 km	70 km
Peak Wind Speed	157 km/h	185 km/h
Maximum Pressure Surge	0.6m	0.8m
'Critical Speed' Pressure Surge	1.2m	1.6m
Pressure Surge @ Rmax	0.15m	0.3m
'Open Coast' Max Surge	2.9m	4.2m

The high 'open coast' maximum surges are significantly reduced by characteristics of the Sunday Island Bay site, particularly its aspect on the southeast side of Dirk Hartog Island, the influence of Blind Strait to disperse surge and the site's position relative to Freycinet Reach (Figure 4; Figure 6). The influence of these factors has been evaluated relative to three different surge scenarios, including a northerly storm directed down Freycinet Reach, or westerly storms which either peak on the east side of Denham Sound, or the western side of Dirk Hartog Island (Table 3).

Local factors affecting the surge suggest that there is relatively little between the three scenarios. However, they also indicate that the damped surge response is comparable to both the 'critical speed' pressure surge, based on Proudman Resonance and the historically observed shelf waves generated by TC Glynis and TC Hazel (Fandry *et al.* 1984). For the purpose of adaptive hazard assessment, the recommended surge levels are +1.5m for 100-year ARI (westerly event) and +2.6m for 500-year ARI (northerly event) (Table 3).

Recommended peak water levels are to add the design surge to MHWS (+1m CD), plus a 0.4m allowance for sea level rise for the short-term and 0.9m allowance for the longer-term (Table 4). Site capacity should facilitate adaption to a sea level rise of 0.9m.

[1] The conversion between Chart Datum (CD) and Australian Height Datum (AHD) is provided by DoT. Useless Loop CD is equal to Lowest Astronomical Tide (LAT) which corresponds to -0.755m AHD. Carnarvon CD is equal to LAT which corresponds to -0.956m AHD.

Table 3: Evaluation of Local Storm Surge Scenarios

Scenario	Northerly Event	Westerly Event – A	Westerly Event – B
Peak Surge Location	Freycinet Reach	Denham	Dirk Hartog Island
Coast Shape Factor	2.0	1.0	1.0
Required Fetch	140 km	70 km	Rmax
500yr Peak Surge	5.5m	3.8m	4.2m
100yr Peak Surge	2.8m	2.4m	2.9m
SIB Position	60 km	33km	60% of Blind Strait
SIB Factor (wind setup)	0.43	0.47	0.40
500yr SIB Surge	2.6m	2.1m	2.2m
100yr SIB Surge	1.3m	1.3m	1.5m

Table 4: Water Levels associated with a Tropical Cyclone Event

		100-yr ARI		500-yr ARI	
		m CD	m AHD	m CD	m AHD
Required Capacity	Short-term	2.9	2.1	4.0	3.2
	Long-term	3.4	2.6	4.5	3.7

5.1.1. Horizontal Shoreline Datum (HSD)

Using this information, the HSD is +2.1m AHD representative of the 100-yr ARI water level with a 0.4m vertical sea level rise component and no wave runup. This is represented by the +2m AHD contour on the available topographic contours, with the horizontal discrepancy of the 0.1m vertical difference likely to be in the same order as the accuracy of the contours themselves.

This value is 0.5m lower elevation than the estimate included in Section 3.

5.1.2. Inundation Allowance (S4 + SLR)

The allowance for inundation is the sum of the present risk of storm surge inundation (S4) and the predicted extent of sea level rise. The potential for dune breaching was not considered at this site because the dunes do not demonstrate a decrease in elevation to landward, and therefore exceed 100m^3 cross-section area. The long-term 500-yr ARI value of +3.7m AHD in Table 4 represents the peak steady water level plus predicted extent of sea level rise (0.9m), but excludes wave run-up.

Wave run-up is estimated using analytical formulae (Mase 1989) and standard values due to the limited datasets available. Wave run-up formulae on beaches require input information on beach slope, wave height and wave period. Wave conditions have been estimated using a local wind hindcast across the effective fetch (Figure 10), giving conservative significant wave heights (H_s) of 2.1m and wave periods (T_p) of 3.2s. These values are conservative as they were generated using a 100-year ARI wind of 72.6 ms^{-1} extracted from AS1170.2 for region D (p.13, Section 3, Regional Winds) including a 1.1 factor of safety multiplier (Standards Australia 2002). For comparison, the highest wind speed recorded at Denham station was 20.1 ms^{-1} for the period 1988 to 2010 (Bureau of Meteorology datasets), suggesting the design wind used significantly exceeds the highest measured wind speed.

Design wave conditions for the site were assessed using a fetch-limited wave hindcast (USACE 1984), using the design wind from AS1170.2. Effective fetches along the critical directions for extreme wind-wave generation was determined based on the directional distribution of extreme winds and according to methods described in FWERI (2005) which takes into account the shape of the terraces and flats along the fetch within Blind Strait (Figure 10). As wind-wave generation is also dependent on water depth, depths along the effective fetch have been characterised using available bathymetric information (RAN Chart 749), with an allowance for elevated water levels during the design conditions. For the purpose of wave hindcasting, it has been assumed that elevated water levels and extreme waves occur at the same time, which is unlikely to occur at Sunday Island Bay.

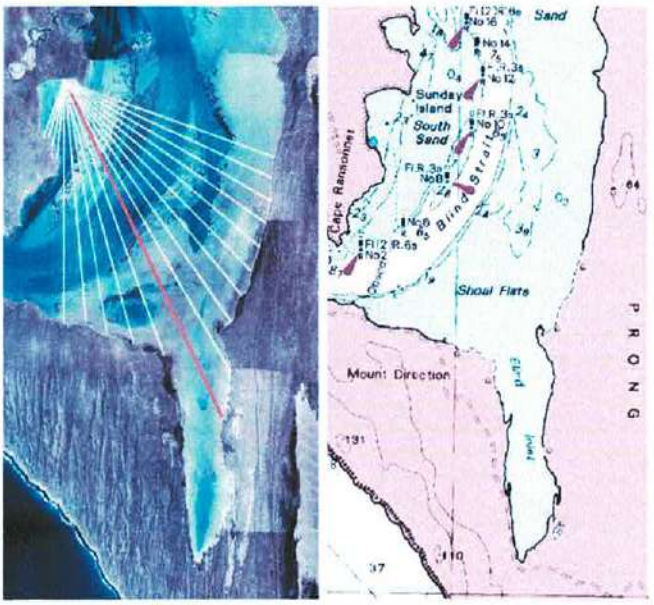


Figure 10: Determining the Effective Fetch for Sunday Island Bay

The calculated wave height and wave period were converted to a wave run-up (R) on a beach using the formulae by Mase (1989) as included in the *Coastal Engineering Manual* (USACE 2006; Part II-4). Run-up is the maximum elevation of wave uprush above still-water level. This is calculated using the three formulae below with offshore wave conditions represented by the subscript 0, and it is assumed the beach slope (tan β) is 1:20. The run-up calculated is the run-up exceeded by 2 percent of the run-up crests ($R_{2\%}$). For this site the run-up is estimated as 0.95m, which is included in calculations of S4 as 1m.

$$\frac{R_{2\%}}{H_o} = 1.86\ \xi_o^{0.71}$$

$$\xi_o = \tan\beta\ (H_o/L_o)^{-1/2}$$

$$L_o = g\ T^2/(2\pi)$$

The S4 allowance for inundation hazard is +4.7 mAHD, calculated as a sum of the 500-yr ARI peak steady water level (+2.8m AHD), sea level rise component (0.9m) and wave run-up (1.0m). This value is 0.7m higher elevation than the estimate included in Section 3.

5.1.3. Acute Erosion (S1)

Setback allowance for storm erosion is based on calculating maximum cross-shore storm erosion with consideration of the maximum longshore storm erosion. A high allowance for cross-shore storm erosion is not anticipated due to the relative sheltering from high surges and a restricted fetch length for wind-wave generation (Section 4). Sheltering from large surge events is further confirmed by an absence of overwash features, as compared to north facing bays on eastern Dirk Hartog Island.

Cross-shore erosion has been determined using the SBEACH numerical sediment transport model (Larson & Kraus 1989). The S1 allowance is the maximum distance landward of the HSD, at which the SBEACH model predicted erosion to occur. A beach profile (Figure 11) was extrapolated from the topographic contours and bathymetry (RAN Chart 749), which was artificially extrapolated beyond the terrace to allow the SBEACH model to converge. The model was run for a synthetic storm condition that was a combination of the 500-year water level and 100-year wind and wave conditions. A storm of constant wave height, wave period and water level (+2.1m, 3.2s, +3.2m AHD) was run for 6 hours to model extreme storm erosion for an event that could not occur in reality. The 6 hours is several times longer than a typical storm peak to satisfy the requirement to model three successive storms. The S1 allowance for setback is a highly conservative measure using this storm. The maximum cross-shore retreat would be more accurately represented by 7-15m for the most significant storm event, with 15m selected for use in adaptation planning (Figure 12).

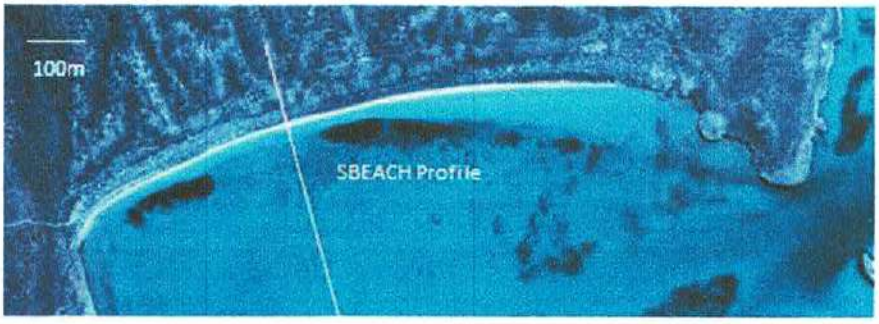


Figure 11: Selected profile for use in SBEACH Modelling

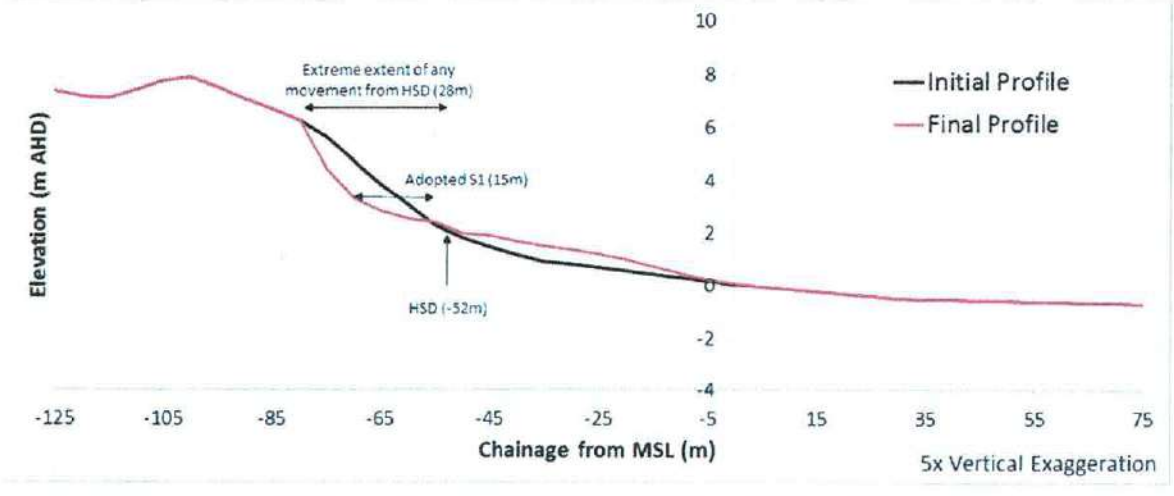


Figure 12: SBEACH Output for Artificial Extreme Event

This synthetic event could never occur due to the impossibility of the coincidence of high waves and high surge at the site from a tropical cyclone.

The longshore response to a storm would cause apparent beach rotation within the bay. The magnitude of this longshore response is not included in the S1 allowance as it is incorporated within the S2 allowance below through consideration of potential landform response.

5.2. CHRONIC EROSION (S2)

The allowance for historic shoreline movement trends is recommended to be based on the review of available shoreline records, preferably at five-yearly intervals. The earliest aerial photograph available from Landgate was 1972, with no detailed historic bathymetry available for comparison.

The traditional approach for determining the S2 setback allowance is based on analysis of vegetation line movements over the time period of available aerial photography. Vegetation lines are a proxy for coastal profile change and therefore should be interpreted with care (Camfield & Morang 1996; Boak & Turner 2005). In many approaches it depends on the length of the photographic record, condition of the first vegetation line from the most recent extreme storm and on the time of year of the aerial photography. The time of the year of aerial photography within a semi-enclosed bay may not capture the seasonal fluctuations in beach position. It was considered that vegetation line mapping for this site may be unnecessary given the small changes observed, with most changes observed in beach width which is dependent on the water level at the time of the photography.

Long-term shoreline change was interpreted from four aerial photographs including the most recent (2013) and earliest (1972-georectified), as well as two other years where orthophotographs were available (2002, 2007) with further visual checks of GoogleEarth historic imagery (Figure 13). This analysis suggested a relatively stable coast, with variation in vegetation line and beach width at the eastern extent of the site, to a total of 6m across the time-period. The total beach width has reduced by approximately 3-4m, with losses of 12m beach width at the eastern extent of the bay.

Some of the recent rotation observed in the bay may be attributed to a local surge of ~30cm associated with a strong La Niña from 2009-2013 (Figure 14). The inter-annual relationship between mean sea level and climate fluctuations is suggested by a strong correlation between annual average water level and SOI - the Southern Oscillation Index (Pattiaratchi & Buchan 1991; Figure 14). The SOI is determined by the barometric pressure difference between Darwin and Hawaii, and has been demonstrated as a reasonable indicator of El Niño or La Niña climatic conditions. The sea level relationship to SOI indicated by Figure 14 occurs along the entire Western Australian coast (Pariwono *et al.* 1986; Pattiaratchi & Buchan 1991; Feng *et al.* 2004). High mean sea levels in Shark Bay also occur due to thermal expansion of warmer water which accumulates within the bay. The response in Shark Bay to higher sea surface temperatures is larger than in south-west WA. Beach recovery is anticipated as the SOI returns to El Niño conditions and lower sea surface temperatures. Sediment on the terrace can be migrated onshore during lower mean sea level conditions.

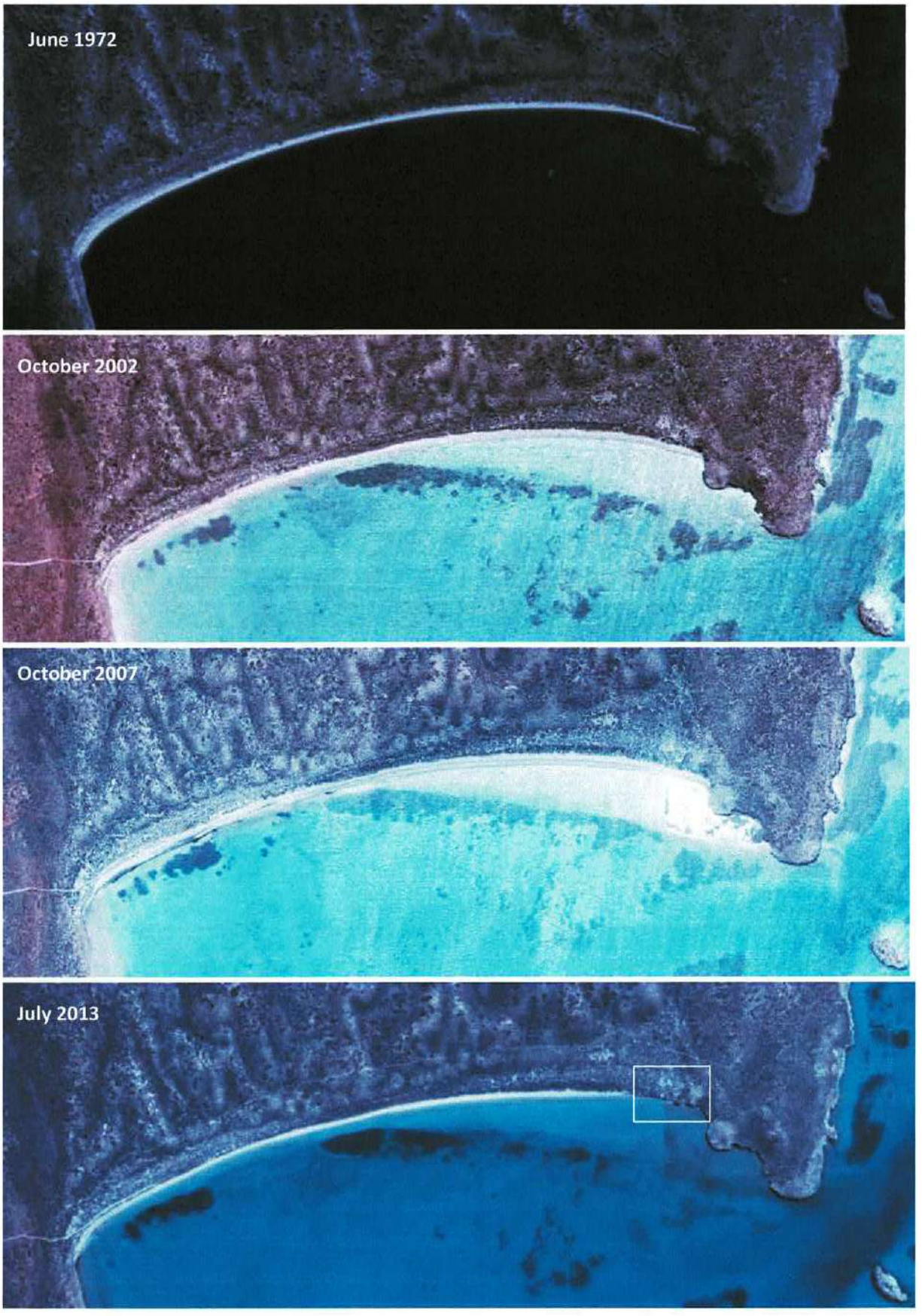


Figure 13: Historic Aerial Imagery 1972-2013 (Sources: Landgate and GoogleEarth)

The S2 allowance is recommended as 100 times the historic annual rate of erosion. The only section of the bay with any historic rate of erosion is the eastern section of the bay shown in a yellow box in Figure 13. The total erosion in this area of the vegetation line is <6m in 41 years. Using the traditional assumption the allowance for S2 should be 0m for the majority of the bay with 14.6m in the eastern extent (100 x 6m/41 years). It is likely a significant proportion of this change is attributed to changing climate conditions associated with higher water levels and altered wind patterns due to the la Niña and warmer sea surface temperatures in Shark Bay.

The landward limit of rotation is constrained by rock controls, the terrace and higher dunes to landward (Figure 8).

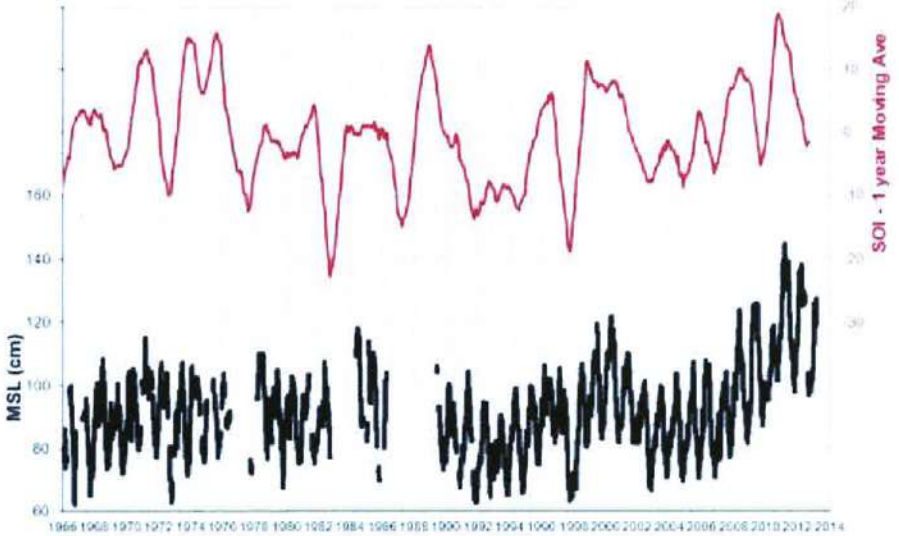


Figure 14: Mean Sea Level for Carnarvon and Southern Oscillation Index (SOI)

5.3. RESPONSE TO SEA LEVEL RISE (S3)

Setback allowance for erosion caused by future sea level rise on a sandy coast is recommended as 100 times the adopted sea level rise value 0.9m over a 100-year timeframe or 90 metres. The 0.9m sea level rise is recognised as toward the upper limit of IPCC projections (Department of Transport 2010). SPP2.6 recommends further increasing the allowance where obstacles may reduce updrift longshore sediment transport. This increase is not required for Sunday Island Bay as the interaction of the beach with the terrace and sediment exchange across the South Sand area would provide sufficient sediment supply.

The Bruun ratio is the basis for the 100:1 response to projected sea level rise (Bruun 1962, 1988). This is based on an unconstrained sandy beach in cross-shore equilibrium exposed to regular wave action, with direct connection between offshore and onshore to allow a consistent coastal response. Landward and upward movement of an exponential-shaped profile is assumed to balance erosion of the beach and dune with infilling of the deeper section, down to the limit of wave action, termed the depth of closure. All eroded sediment is assumed to be transported offshore. This results in a simple formula, which has the form $\Delta X = S * W_* / (h_c + B)$, where ΔX is the horizontal recession, h_C is the depth of closure (<4.5m at this site), B is the berm height, W_* is the width from most landward extent of change to the closure depth and S is the sea level rise. The sum of the depth of closure and the berm height is termed the active height. Typically W_* divided by active height is in the order of

50-100, which results in common application of the further simplified formula $\Delta X = 100\ S$. The model relies upon a balance of seaward sediment transport during storm events against landward transport under ambient conditions. An equivalent Bruun model at the site is 65:1 based on depth of closure of -4.5m[2], berm height attributed as +2m AHD (HSD) and width of active zone from the HSD to the first channel of 480m.

The Bruun conceptual model has reduced validity in Shark Bay, where the presence of lithified former shorelines provides considerable control on coastal response to changing environmental conditions. At Sunday Island Bay the coast is perched upon a rock platform, constrained between two rock shorelines, adjacent to a broad terrace and is disconnected to traditional offshore features. The sandbanks and the low energy beach terraces are characteristic of non-equilibrium conditions, although the previously presence of seagrass beds suggests change is gradual. The underlying rock, and higher elevation rock at the bay extents, limits the extent of retreat that can occur with losses distributed across the bay and the terrace. Coasts with segmented structures, with a flat seabed in front of a steeper beach face, typically respond geometrically (Komar *et al.* 1995) to increased water levels and waves by raising the beach berm level and landward movement of the beach face. This gives small ratios of coastal response to sea level change, often in the order of 30:1 or less. This is particularly relevant to Sunday Island Bay with a likely ongoing sediment supply from seagrass banks, eroding Tamala limestone and from transport along the banks.

The beach will respond through rotation and retreat of low-elevation landforms. It is anticipated that in periods of rapid sea level rise, such as the 30cm surge that has occurred between 2008 and 2012 (Figure 14), sediment will be eroded from the beachface and distributed on the terrace.

As noted above, the S3 allowance is likely to represent a conservative estimate of both the magnitude of sea level rise and the relative coastal response to such change. Applying realistic estimates of these factors, the response to sea level rise may be as little as 26m by 2100, although if higher values of these factors occur, then 26m erosion could occur by 2055. In order to provide a minimal time frame of >50 years before the need for adaptation may be possible, then a 40m setback allowance is recommended, based upon a 0.4m sea level rise (by 2070) and 100:1 ratio for coastal response (Figure 15, Table 5). It is proposed to provide further adaptive capacity to subsequent sea level rise and erosion by designing the buildings for ease of relocation, and definition of alternative building envelopes further landward. Relocation of buildings would be based upon coastal retreat to a trigger level, as specified in Section 5.5.

Table 5: Coastal Response to Sea Level Rise

Time Frame	Sea Level Rise	Response Ratio	Coastal Retreat	Likelihood
2070	0.2m	65:1	13m	High
2070	0.4m	65:1	26m	Moderate
2070	0.4m	100:1	40m	Low
2100	0.4m	65:1	26m	High
2100	0.9m	65:1	58m	Moderate
2100	0.9m	100:1	90m	Low

[2] Using Hallermeier (1981) with extreme wind speeds >100 year ARI, which would generate a wave height greater than that exceeded for 12 hours in any one year, and therefore a larger closure depth than reality.

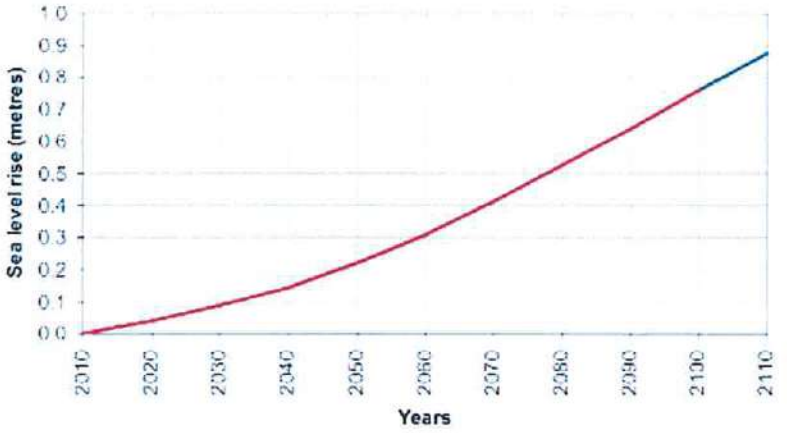


Figure 15: Sea Level Rise Allowance Time Series (Source: DoT 2010)

It is possible increased sediment mobilisation under an increased sea level, in combination with dune destabilisation, could result in activation of longitudinal dunes on the site (Figure 7). There are numerous examples of these dunes on Dirk Hartog Island and in Shark Bay. Any beach access should avoid a north-south alignment to avoid activating these dunes.

5.4. UNCERTAINTY

An allowance for uncertainty is recommended as 0.2m/yr, or 20m total, to be added to the other erosion allowances when developing a setback (WAPC 2013). However, because the focus for this section is to obtain an accurate predictor for adaptation planning, this allowance has been neglected. Reasons for doing so include the rock control at the site, evidence of landform behaviour, the sheltered location from combined high surge and wave conditions, as well as fetch restricted conditions for wave forcing (Sections 4 and 5.1). A minimum setback to the landward extent of the landforms exhibiting rotation behaviour accounts for uncertainty.

5.5. REVISED ALLOWANCES FOR EROSION AND INUNDATION

A formulaic application of Schedule One in SPP2.6 with S1 allowance of 15m and projected sea level rise to 2070 would produce erosion hazard setbacks to 2070 of 55 to 70m from the HSD of +2.0m AHD, with local higher setback at the western extent to the +4.7m AHD for inundation hazards (Table 6; Figure 16; Figure 17). The areas potentially susceptible to inundation hazard have been inferred from interpolation of the 2m contours of +4m AHD and +6m AHD (Figure 16). One envelope should be moved to avoid being located within the erosion or inundation hazard lines according to this policy (Figure 17). No sites are located in an erosion hazard area, with Sites 2, 3 and 4 requiring confirmation that they are outside the inundation hazard area. Site 4 requires a new alternate envelope to be developed if it is located at an elevation less than +4.7m AHD.

The setback allowance to 2110 would be 105 to 120m from the +2.0m AHD contour using S1 of 15m. This zone is used as the basis for considering any required adaptation sequencing in a CHRMAP.

This approach does not use the existing landform information to determine setback. A revised approach incorporating landforms with a buffer is therefore considered.

Table 6: Revised Components of SPP2.6 Schedule One

		Value	Notes
HSD	Horizontal shoreline datum, active limit of shoreline under storm activity	+2.0m AHD	The +2m AHD contour has been used in lieu of the +2.1m AHD due to the limitations of the survey data at 2m intervals. Representative of highest storm added to MHWS, but excluding local wave runup.
S1	Acute storm response	15m	Conservative estimate of wave heights and periods using strong winds. Unlikely high waves and water levels would occur coincidentally.
S2	Long-term response	0m centre and west. 15m for the E	Relatively stable foreshore. The bay was separated into separate sections to account for rotation with minimal movement at the centre. Greatest rotation could occur at the eastern extent as the control point for rotation occurs closer to the west of the bay and due to higher exposure.
S3	Sea-level rise response for 55-years (2070)	40m	2070 level of sea level rise of 0.4m. If mean sea level shift occurs more rapidly due to sea level rise the trigger for landward retreat may occur sooner.
Uncert-ainty	Uncertainty allowance of 0.2m/year.	0	Selected as 0 because of the sheltered location of the bay, rock and terrace control, as well as the evidence of landforms controlling historic coastal movement.
S4	500-yr ARI inundation event	+4.7m AHD	Site-specific analysis of 500-year water level, plus sea level rise component of 0.9m and wave run-up of 1m.
Setback for erosion to 2070	HSD + S1 + S2 + S3 + uncertainty	55-70m from +2.0m AHD	Consideration to be included of locations where the inundation allowance (S4) is landward of the setback for erosion. A minimum setback is also applied to the landward extent of landforms exhibiting rotation.

Figure 16: Inundation Hazard of +4.7m AHD Inferred from 2m Contours

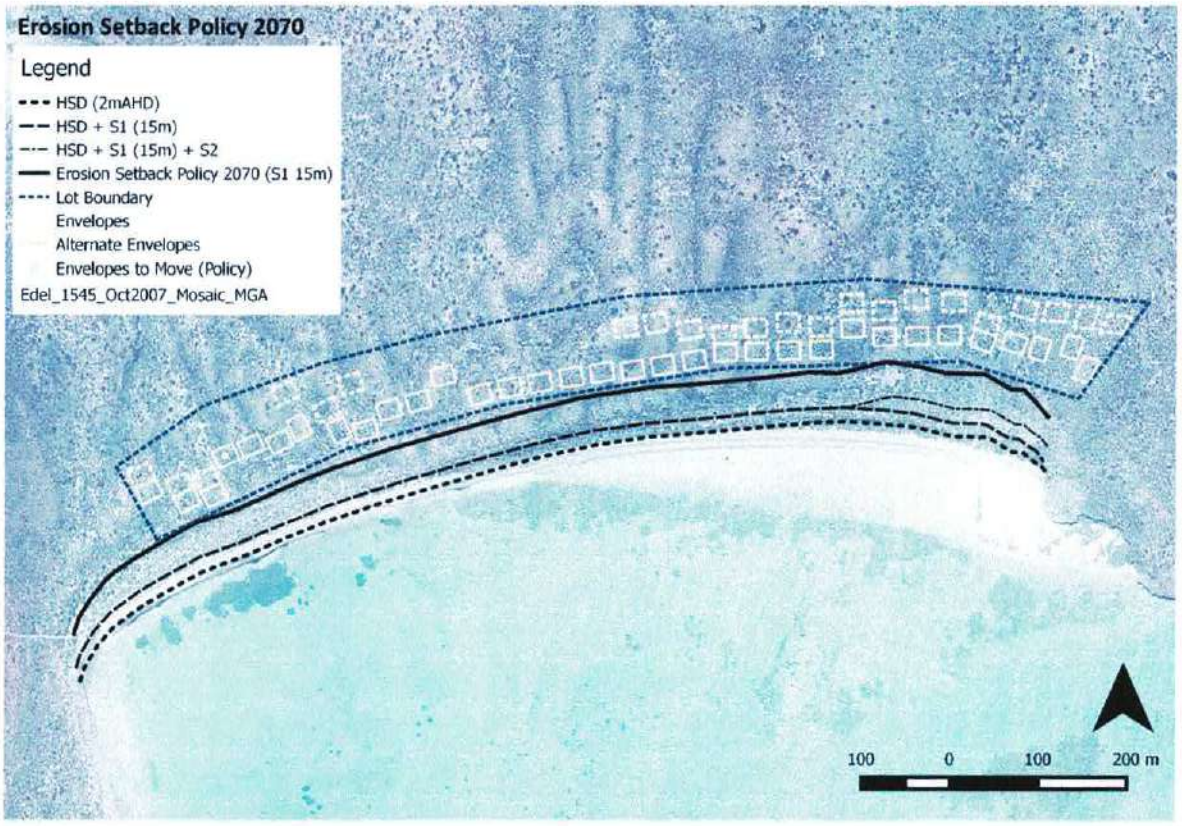


Figure 17: Erosion Setback According to Policy to 2070
Site envelopes within the erosion or inundation setback to 2070 are marked with a yellow dot

The further conditional setback allowance proposed to ensure the unstable landforms associated with coastal rotation and retreat with changes in metocean forcing and climate are included. The unstable landforms are incorporated as the most landward of the (Figure 18):

- Sum of S1 and S2 allowances (varies from 15m to 30m) from HSD (black dashed lines).
- Limit of unstable landforms (blue line).

The limit of unstable landforms is the most landward of the two lines using an S1 of 15m. This reduces the need for the uncertainty parameter as the 40m S3 component is essentially an uncertainty allowance for coastal response to sea level rise. The 40m is added to the most landward extent of anticipated change to produce a landform based erosion setback to 2070 (Figure 19). It is recommended 10 of the envelopes should be moved to avoid being located within the erosion or hazard inundation lines according to this landform approach (Figure 17). Sites 2, 3, 8, 9 18, 19, 20, 23 and 24 already had alternate envelopes selected, with site 4 requiring a new alternate envelope to be developed. Lastly, the alternate envelope for site 3 will also require moving as it is located within the erosion hazard limit.

Following SPP 2.6 (WAPC 2013), the implications of uncertainty in setbacks have been assessed in Section 6, considering the Avoid-Retreat-Accommodate-Protect hierarchy.

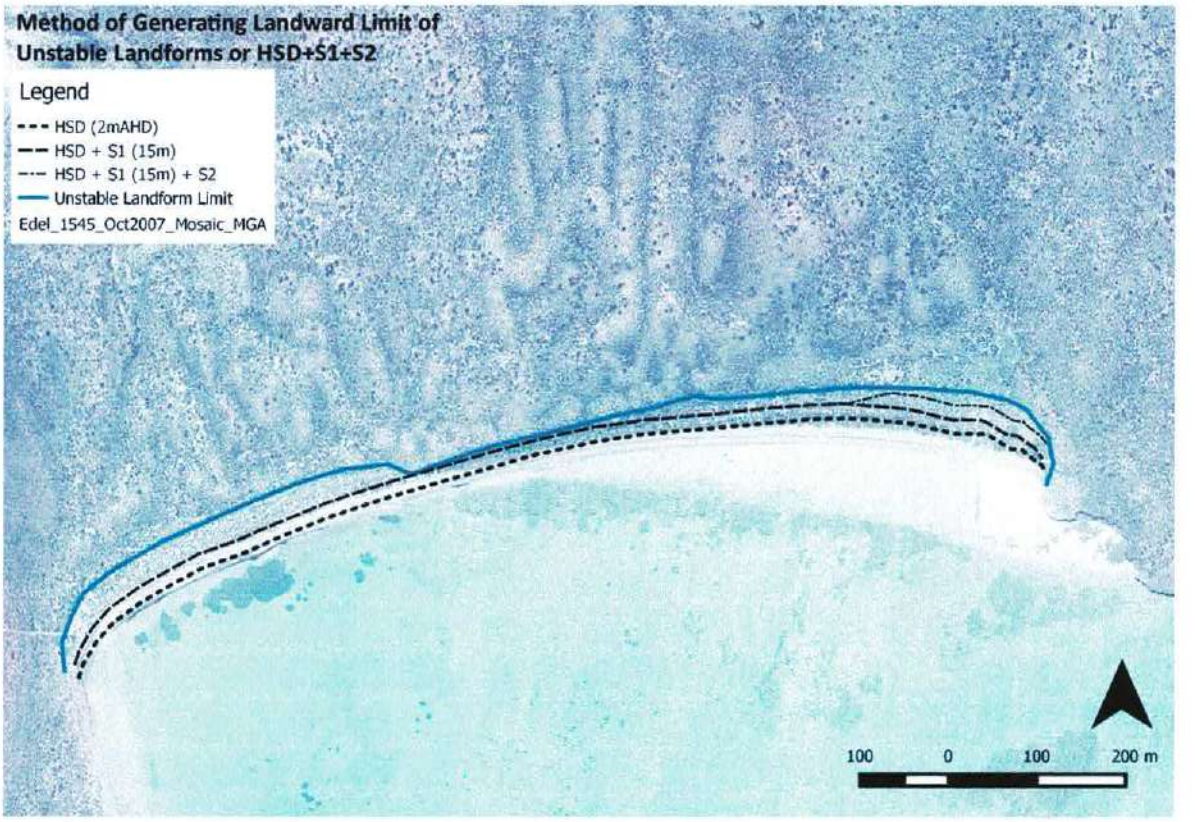


Figure 18: Method of Generating Landward Limit of Landforms or HSD+S1+S2

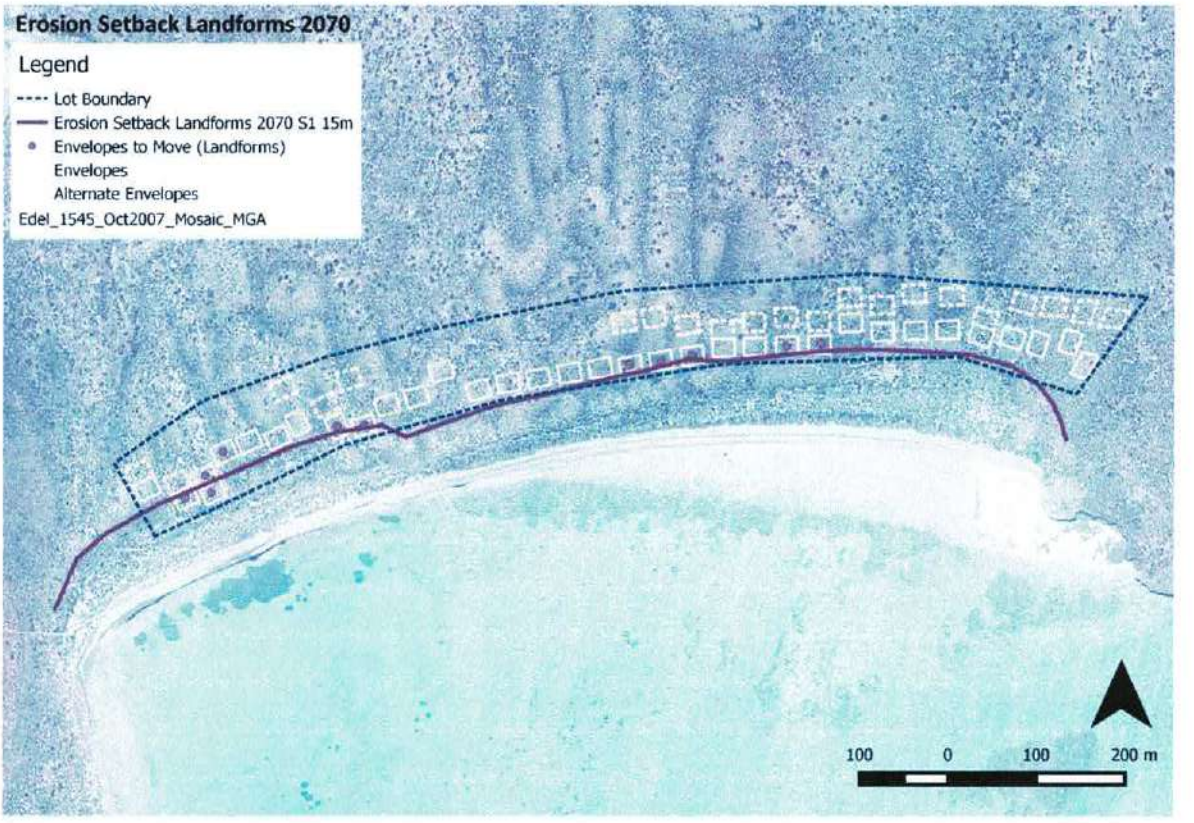


Figure 19: Recommended Erosion Setback Based on Landforms to 2070

6. Recommendations

A major part of Lot 304 freehold area is located seaward of a demarcation line derived from Schedule One of SPP 2.6 (WAPC 2013). This line distinguishes between areas that may be considered wholly avoiding coastal hazard over the next 100 years (landward of the line) and those areas that may possibly be affected by coastal hazards (seaward of the line). The Schedule One calculation is a simple method, with limited consideration of coastal processes, and therefore indicates allowances for a conservative coastal setback, rather than an estimate of anticipated coastal response. Development seaward of the demarcation line is not prohibited, but SPP 2.6 recommends that such developments be managed through a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP), which acknowledges the potential risk and identifies pathways for their management.

Guidelines for the application of a CHRMAP have been developed by the Department of Planning, which indicate the need to distinguish between likely and possible coastal hazard outcomes. Further, SPP 2.6 acknowledges the constraints of applying setback allowances derived from projected sea level rise to existing freehold land. To this end, the policy allows consideration of adaptation to sea level rise as a variation to the general case. A preferential hierarchy is defined, following the sequence of *Avoid-Retreat-Accommodate-Protect*.

Evaluation of possible coastal hazards corresponding to the Schedule One setback allowance indicates that the site effectively avoids coastal hazards to 2070 (Figure 17). Due to the narrow nature of the Lot 304 freehold area, it is not possible to wholly *Avoid* coastal hazard to 2110, without purchasing additional land area. Instead, the proposed approach is to *Avoid* moderate or high likelihood hazards, and mitigate low likelihood hazard through *Planned Retreat*.

The strategy of *Planned Retreat* requires an estimate of the time frame or conditions under which the retreat would be required, which therefore should consider the difference between best estimates of coastal change and the conservative estimate developed through application of SPP 2.6 Schedule One.

Based upon realistic estimates of coastal change due to sea level rise, a setback of 71m from the +2m AHD contour acts to *Avoid* coastal hazards with high or moderate likelihood to beyond 2110. This corresponds to 56m of coastal retreat and 15m buffer for storm erosion.

Under higher scenarios of sea level rise and coastal response, 56m of coastal retreat could occur by 2084. However, evaluation of retreat practicalities of would need to occur prior to this, including recognition of the likely effectiveness of building relocation. The recommended trigger for this evaluation is coastal retreat of 41m, which gives allowance for two severe storm sequences, and is not projected to occur until 2070 under high response scenarios.

Any beach access should avoid a north-south alignment to avoid activating any dunes.

Modify Layout

It is recommended the layout be modified according to the erosion and inundation hazard assessment. If the landform erosion setback allowance to 2070 was incorporated the site layout should be altered by:

- Moving sites 2, 8, 9, 18, 19, 20, 23 and 24 to the alternate envelope already mapped.
- Creating a new alternate envelope for site 3 that is further landward of the landform-based erosion hazard line to 2070.
- Either moving site 4 further landward or confirming the elevations are >5m AHD at that location.

This is a total of 10 site envelopes that require moving.

This is dependent on acceptance of 1) the landform approach; 2) neglecting the uncertainty allowance; and 2) apply a sea level rise component only to 2070 (40m rather than 90m). Triggers for coastal retreat are included in the text above as part of a CHRMAP approach.

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Your Ref: Sunday Island Bay CRMP
Our Ref: 281.02

19 December 2019

Geoff Wardle
PO Box 107
North Fremantle WA 6159

Dear Geoff,

COASTAL RISK MANAGEMENT LOT 304 SUNDAY ISLAND BAY, DIRK HARTOG ISLAND

This letter extends from previous documents:

- The Damara WA (2014) report describing recommended coastal setback allowances for the Lot (*Sunday Island Bay – Dirk Hartog Island, Coastal Setback Allowances*);
- Shire of Shark Bay review comments for the development application (26 March 2015). This includes commentary by the Department of Planning that default setback allowances should be used; and
- The previous Damara WA (2015) letter report (*Reduced development scope for Lot 304 Sunday Island Bay, Dirk Hartog Island*).
- The previous Damara WA (2018) 2018 letter report (*Coastal Risk Management Lot 304 Sunday Island Bay, Dirk Hartog Island*) – superseded by this document.

A Coastal Risk Management Plan (CRMP) should refer to the management of hazards and impacts from coastal processes, which may directly or indirectly interface with cyclone impact management. Cyclone Information Procedures have been prepared separately by DHI Developments (2018). This letter addresses two separate elements: (1) recommended content for erosion risk management; and (2) recommended content for inundation risk management.

Advice is provided with relation to 33 building envelopes, with their layout shown in Figure 1. Within these 33 envelopes the number of visitor accommodation units will not exceed 33, with each unit not exceeding 90m^2. The envelope size ranges from 680m^2 (32) to 9,417m^2 (combined 1-4); allowing capacity for retreat within all envelopes. This information differs from the layout previously shown in plans assessed by Damara WA.

The seaward extent of Lot 304 boundary is located 60m-95m from the +2m AHD contour, with an additional 11m buffer for management of bushfire risk. This is located landward of the setback for erosion processes calculated according to Schedule One of SPP2.6 (WAPC 2013) to 2070 (Figure 2). This is calculated as 55m to 70m from the +2m AHD contour. It should be noted that the coastal erosion hazard setback line to 2070 has been recalculated in this report from a revised +2m AHD contour using the same techniques outlined in previous Damara (2014) reports. This positions the line further seaward than of the Lot boundary. The revised assessment also uses an updated dataset for the Lot 304 boundary.

1) Erosion Risk Management Plan

Erosion risk management considers potential risks and pathways for their management. A preferential hierarchy is defined according to SPP2.6 (WAPC 2013) following the sequence of Avoid-Retreat-Accommodate-Protect. Due to the narrow width of Lot 304 it is not possible to use SPP 2.6

schedule one with a time scale of 2110 to *Avoid* hazard. However, due to the geologically controlled nature of Sunday Island Bay, it is likely that coastal response to projected sea level rise will be lower than a 100:1 ratio. Consequently, the adopted strategy is to *Avoid* present day erosion hazard to buildings and undertake *Managed Retreat* following sustained coastal recession. *Protect* will not be pursued at this location (Damara WA 2014).

The adopted coastal management strategy determines that the land between the buildings and the coast may be occasionally subject to short-term storm erosion, potentially affecting beach access and the stability of the coastal dune vegetation. Therefore erosion risk management is focused on beach access and dune management, with a longer-term consideration of managed retreat. This includes:

a) Monitoring and maintenance of beach access and coastal dunes while the buildings are in their present location; and
b) Implementation of managed retreat of the buildings.

Dune management measures in (a) may be undertaken to delay the requirement for retreat (b). Two triggers for monitoring and management actions as part of this CRMP are 50m and 40m existing buffers to buildings. A 40m and 50m distance shore perpendicular should be mapped and defined from a benchmark on the seaward side of the unit when each visitor accommodation unit is constructed. These locations, along with ongoing monitoring and management information, should be collated and stored by the co-owners of Lot 304 Sunday Island Bay (at present Geoff Wardle).

Repair of damage to buildings will be undertaken by individual building co-owners. Individual building owners will repair any damage to power supply, water supply and effluent disposal connections within the building envelope (not located within inundation hazard zone). Any damage to water supply, provided via polypipe from two wells 12km away, will be repaired by the co-owners of Lot 304 Sunday Island Bay.

1a) Monitoring and Management of Dunes and Beach Access

Major elements for managing potential erosion impacts are management of coastal dune stability and beach access. Monitoring and maintenance requirements are summarised in Table 2. These actions will be undertaken locally until relocation of individual buildings is required. Triggers and implementation of managed retreat for the buildings is described in Section 2b below.

Sunday Island Bay is a relatively stable coast, with most contemporary variation occurring at the eastern extent of the site for the period 1972-2013. Existing foredunes seaward of Lot 304 exhibit older erosion-recovery cycles from rotation within Sunday Island Bay, with longitudinal dunes to landward indicating the limit of most of the contemporary coastal variability (Damara WA 2014).

Dune management involves reducing the likelihood of foredune deflation or formation of dune blowouts. These forms of dune instability increase inundation hazard, may cause coastal instability or expose individual buildings to smothering by mobile sand sheets. The threat of foredune deflation is reduced if foredune growth is encouraged, the rate of recovery after storm events is enhanced and if beach access is carefully managed. The likelihood of dune blowouts is reduced if north-south aligned access paths are avoided, the number of access paths are minimised and revegetation of any destabilised areas is undertaken. Dune management actions are presented for co-owners to consider as possible measures to delay the triggering of managed retreat of buildings.

Beach access management is integral to effective foredune management, as pedestrian and vehicle tracks can disturb vegetation, create furrows that enhance the risk of foredune deflation and can provide pathways for north-south blowouts to form. It is suggested that no more than five access paths are created between the buildings and the beach (Figure 3), avoiding north-south alignment,

with beach access pathways identified and marked. It is possible the 11m bushfire risk management buffer could provide a track to connect the five access paths. Information should be included in each of the buildings to explain the importance of avoiding the creation of new paths, with greater importance as the number of buildings increases across the Lot.

A programmed inspection should be undertaken each year following the cyclone season (April-May) when there is the greatest potential for an extreme erosion event (Table 1). The intensity and type of monitoring is dependent on the distance of buildings to front of the foredune field . The inspection will identify dune and access management actions (Table 2). Indicators to trigger management actions include beach access scarping, foredune scarping, dune deflation, formation of a blowout or formation of new beach access tracks. It should be noted that some vegetation loss across the broader foredune system can occur without being a major problem.

Table 1: Levels of Dune Monitoring

Monitoring Level	Foredune Condition	Monitoring Framework
Level 1 (informal)	>50m width to building	Annual inspection (April-May). Evaluation of dune width using aerial imagery (±10m) every 3-5 years or after major storm, noting the patterns of rotation of the foredune. Photo monitoring of dune condition following the Department of Transport brochure for photographic monitoring (Transport 2012)
Level 2 (formal)	40-50m to building	Twice annual inspection (April-May & August-September) Measure of dune width (±5m) from dune toe to buildings every 1-3 years or after major storm, noting the patterns of rotation of the foredune. Photo monitoring of dune condition
Level 3 (active)	<40m to building	Post-storm inspection Annual measure of dune width in proximity of buildings[1], noting the patterns of rotation of the foredune. Photo monitoring of dune condition

Notes:

1) The measurement of dune width to buildings in level 3 is used to trigger when relocation of buildings should occur.

Comparison of monitoring against indicator levels is used to guide when management actions could be undertaken to promote dune recovery (Table 2). Information on revegetation approaches and species is outlined in Chapter 9 of the *Coastal Planning and Management Manual* (WAPC 2003). However, as availability of plants at Sunday Island Bay likely to be a constraint for undertaking revegetation, increased use of natural recolonisation is required, with a greater focus on surface stabilisation. Surface stabilisation could include jute matting, mulching, brushing and surface sprays. Watering of foredune plants may be beneficial during initial establishment of vegetation, but likely to be constrained at Sunday Island Bay[1].

It is proposed that the co-owners of Lot 304 Sunday Island Bay will maintain photographs in a digital folder with dates to be able to track foreshore response. Any dune management undertaken will be recorded in a management schedule spreadsheet with photographs of actions stored in a digital folder with dates. These records can be provided yearly to the Shire of Shark Bay to ensure safe storage and accessibility.

[1] In future, collection and reuse of grey water may be a possible source of water for supporting revegetation.

Approval from the Department of Biodiversity, Conservation and Attractions (DBCA) is required for temporary structures and access, as well as permanent structures and access. Pre-approval for this beach access and dune management plan should be discussed with DBCA on a regular basis.

Table 2: Trigger and Management Considerations for Lot 304 Beach Access and Dunes [1,2,3]

	Level 1 Trigger when >50m distance to buildings	Level 1 Management	Level 2 Trigger when 40-50m distance to buildings	Level 2 Management
Beach access (avoid N-S alignment as shown in Figure 3)[4,5]	Scarp in access location of >0.5m vertically.	Rework/regrade, with local dune / slope stabilisation adjacent, including matting (or mulching/surface sprays) and revegetation (if feasible).	~5m overall dune retreat and scarping of path >1m vertically	Local cutting back of the broader path and dune, with treatment of the face (ie regrade, matting, revegetate).
Foredune scarping	Scarping sustained with >5m of dune retreat (not from rotation) and recovery not occurring.	Encourage recovery, including jute matting (or mulching/surface sprays) and revegetation (if feasible).	Scarping sustained with >5m of dune retreat (not from beach rotation) with limited recovery in 12 months, and buffer to buildings <50m.	Possible action: Installation of sand fencing along the beach, to direct and encourage dune growth. This requires a trial to determine effectiveness. This includes subsequent revegetation efforts.
Dune deflation	Dune deflation identified.	Monitor deflation progress.	Dune deflation identified and progressive dune retreat occurring.	Revegetate to raise dune crest (fencing could also be considered)
Formation of blowout	Blowout identified.	Monitor blowout progress. If growth >2m landward per year use sand fencing to help build dunes.	Blowout identified.	Close blowout and place matting to enhance revegetation.
Additional beach access tracks formed	Beach access tracks identified	Install track barrier with signage and ensure information is provided in all buildings regarding staying on original tracks. Revegetate tracks if reduced access not improving stability.	Beach access tracks identified	Revegetate. Sign alternate paths. Install barrier to restrict pedestrians.[6]

Notes:

1) Maintenance works on Lot 304 are to be undertaken by the co-owners of the property (administered through a co-owners agreement and a committee appointed by the owners). Beach access track maintenance will be required.
2) Maintenance actions are intended to have minimal need for structures, relying on regrading, slope stabilisation and revegetation where possible. Efforts such as brushing and renourishment has not been included due to expense and availability.
3) If the co-owners committee determines not to undertake dune management actions (track maintenance actions are required), it is likely the trigger for managed retreat of the buildings will occur sooner. Co-owners to determine appropriate actions to manage the erosion risk and may determine to accept managed retreat to occur sooner without undertaking extension dune management actions.
4) Local relocation or closure of beach access may be required if sustained rotation or dune blowout formation occurs. If a beach access is closed it should be rehabilitated with regrading, revegetation and stability matting, with ongoing maintenance required.
5) A maximum of five access paths between the buildings and the beach should be present at any one time, avoiding N-S alignment.
6) Walkway are considered too expensive for the number of people likely to use it.

1b) Implementation of Managed Retreat

The strategy of *Planned Retreat* will be pursued for the buildings on Lot 304 as outlined in Section 6 of Damara WA (2014), with no *Protection* works to be undertaken. It is intended that evaluation of the practicalities of retreat of individual buildings would be triggered when the distance from the buildings is 40m, to ensure a plan is in place before the remaining buffer is only twice the allowance for two storms (30m, based on twice the S1=15m allowance). The distance of 40m will be identified during the third level of monitoring (Table 1). Preparation of this plan would include the effectiveness of building relocation, where buildings could be relocated and will depend on the number of building sites developed when the trigger is reached.

In practical terms construction towards the landward side of the building envelopes is encouraged, (above +4.7m AHD) to maximise the time until retreat is required. This is particularly relevant for envelopes 1-4 and 7, which are located in an area of lower dunes (Damara WA 2014 Figure 19). At present, the building envelopes are 7 to 100 times the size of each visitor accommodation unit (90 m^2) and only 33 accommodation units are permitted across all envelopes. This allows opportunity for building relocation, in the event of severe ongoing erosion. There is enough capacity to relocate buildings either alongshore or further landward depending on the coastal change sequence and provided the minimum elevation of +4.7m AHD (+4.2m AHD acceptable to Shire) is achieved. A detailed managed retreat plan will be submitted to the Shire of Shark Bay within 6 months of the 40m remaining buffer trigger being identified for approval. Managed retreat may be undertaken for small groups of buildings while still maintaining other buildings with buffer >40m.

Each co-owner of Lot 304 will be responsible for removal of their buildings, rehabilitation and revegetation of sites where their buildings were previously located.

In the process of identifying the location of the visitor accommodation units within each envelope, it is recommended that retreat pathways are identified for each building, ensuring allocated land is not available for subsequent building development.

It is noted that the Western Australian Planning Commission (WAPC 2017) have released Planned or Managed Retreat Guidelines. These guidelines have been prepared to determine when land needs to be returned to the public realm. The triggers are:

1) Most landward part of the Horizontal Shoreline Datum (HSD, +2m AHD at this location) is within the current risk of storm erosion (SPP2.6 Schedule One 4.4.1 (S1 Erosion)). At this site it is modelled as 15m, with default of 40m.
2) When a public road is no longer available or able to provide legal access to the property.
3) When water, sewage or electricity to the lot is no longer available.

The only relevant trigger at this remote location is Trigger 1, the distance of 15m. Due to the remote location and allowance for adequate lead times to undertake managed retreat, a trigger of 30m is recommended, twice the modelled storm allowance of 15m. Planning for retreat will commence when there is <40m existing buffer to buildings. Any land rehabilitated following managed retreat will not be ceded to the Shire and will require ongoing management by the co-owners of Lot 304.

2) Inundation Risk Management

Inundation risk management is focused on the strategy of *Avoiding* inundation hazard through the definition of building envelopes in areas outside of +4.7m AHD (Damara WA 2014, 2015; Figure 2). It is understood the Shire will accept a minimum finished floor level of +4.2m AHD.

Regards,

Tanya Stul and Matt Eliot
Damara WA
8/19 Wotan St
Innaloo WA 6019

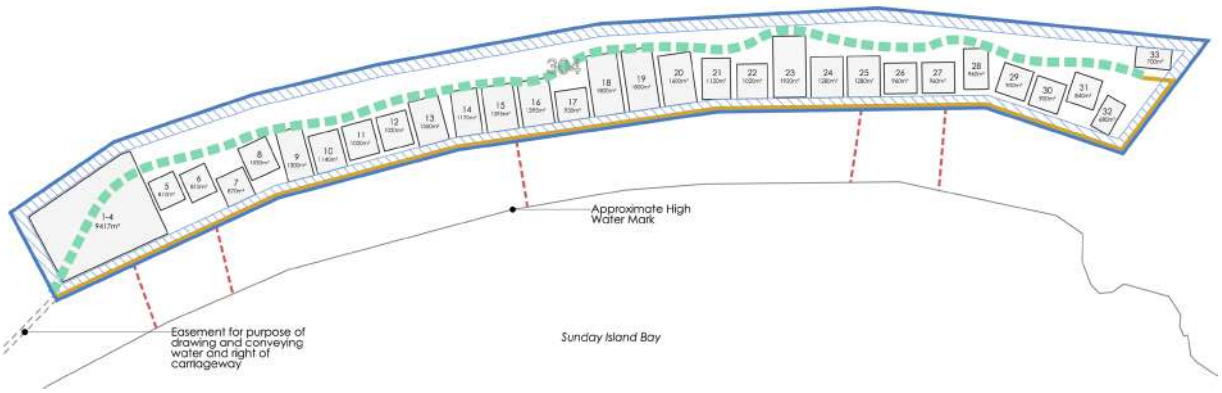

Figure 1: Layout for 33 Envelopes

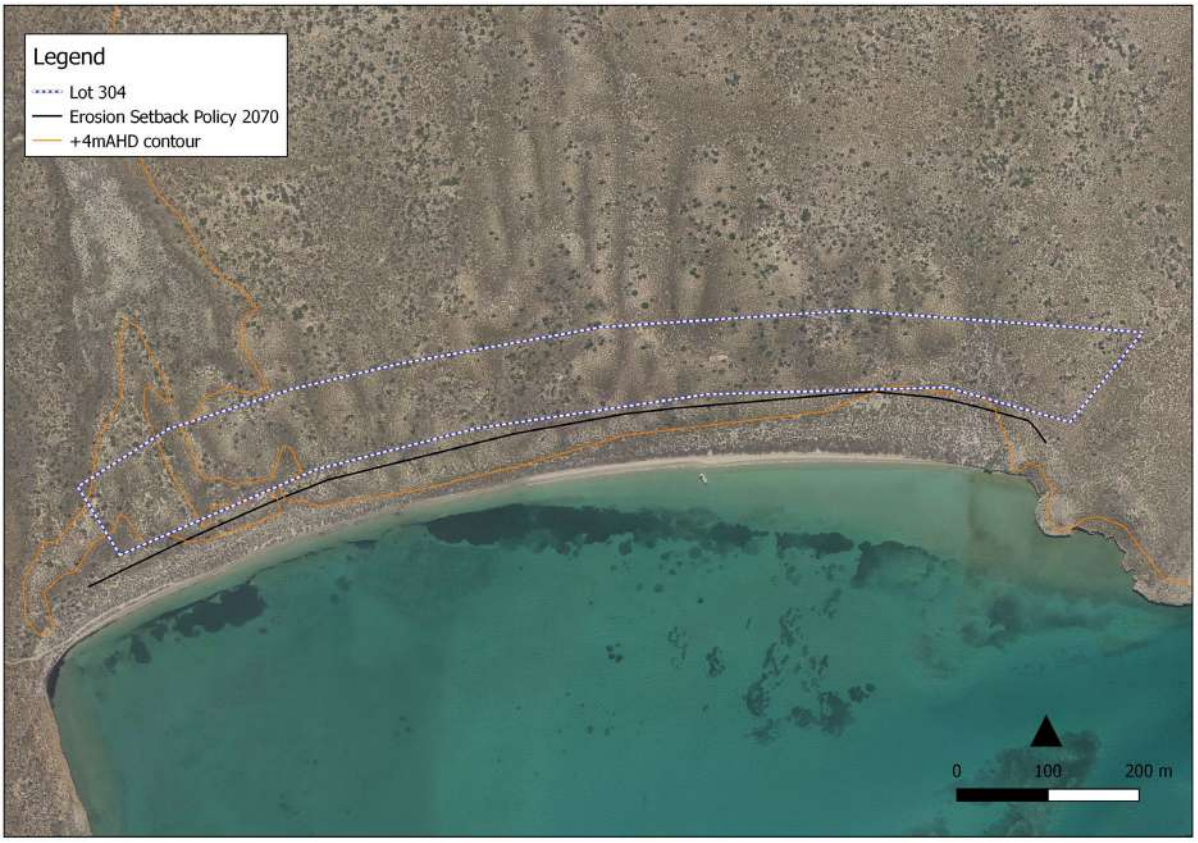

Figure 2: Setback for erosion processes to 2070 (Schedule One SPP2.6 [WAPC 2013]) in relation to Lot 304 boundary

Note: The location of this line has altered, using revised HSD (+2m AHD) information from Damara WA (2014, 2018). The setback distances of 55m-70m are the same as calculated in Damara (2014). The alignment of the Lot boundary has also altered compared to Damara (2014).

Figure 3: Possible location of beach access to Lot 304 (Source: DEC)

Your Ref: Sunday Island Bay CRMP
Our Ref: 281.03

16 December 2021

Geoff Wardle
PO Box 107
North Fremantle WA 6159

Dear Geoff,

COASTAL RISK MANAGEMENT LOT 304 SUNDAY ISLAND BAY, DIRK HARTOG ISLAND

This letter outlines a recommended approach to coastal risk management for Lot 304 Sunday Island Bay, on Dirk Hartog Island. Recommendations are based on a technical assessment of setback allowances [1], comments from the Shire of Shark Bay [2], consideration of implications for a reduced development scope [3] and comments on the Local Development Plan by Department of Planning, Lands and Heritage [4].

This letter supersedes previous advice regarding coastal risk management for the site [5], following amendment to the proposed Lot structure and occupancy.

A Coastal Risk Management Plan (CRMP) addresses management of hazards and impacts from coastal processes, which interfaces with cyclone impact management. This letter addresses two separate elements: (1) recommended content for erosion risk management; and (2) recommended content for inundation risk management. Cyclone Impact Management Procedures prepared separately by DHI Developments (2018) should be considered in conjunction with this advice.

Advice is provided regarding 5 proposed buildings within a single development envelope, with layout shown in Figure 1. Within the development envelope of 4,000m^2, individual building areas will not exceed 90m^2 (i.e. buildings will occupy approximately 11% of the envelope). There is approximately 5,900m^2 area north of the development envelope within Lot 304, allowing substantial capacity for future retreat. This layout differs from development plans previously assessed (Damara WA 2014, 2015).

The seaward extent of Lot 304 boundary is located 60m-95m from the +2m AHD contour, with an additional 11m buffer for management of bushfire risk. This is located landward of the setback for erosion processes calculated according to Schedule One of SPP2.6 (WAPC 2013) to 2070 (Figure 2). This is calculated as 55m to 70m from the +2m AHD contour. It should be noted that the coastal erosion hazard setback line to 2070 has been remapped in this report using a revised +2m AHD contour and updated Lot 304 boundary, otherwise following the same techniques outlined in initial coastal setback establishment (Damara 2014). This positions the recommended 20270 setback line seaward of the Lot boundary (i.e. the Lot is outside the 2070 hazard zone).

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[1] Damara WA Pty Ltd. (2014) *Sunday Island Bay – Dirk Hartog Island, Coastal Setback Allowances.* Report 239-01-Rev0.

[2] Shire of Shark Bay. (26 March 2015) *Proposed Short Stay Accommodation Units – Request Additional Information – Lot 304 Sunday Island Bay, Dirk Hartog Island*. P4281/O-CR-14530. Letter from Paul Anderson.

[3] Damara WA Pty Ltd. (2015) *Reduced Development Scope for Lot 304 Sunday Island Bay, Dirk Hartog Island*. Letter 239.01.

[4] Department of Planning, Lands and Heritage. (3 July 2020) *Lot 304 Sunday Island Bay, Dirk Hartog Island – Local Development Plan*. Email from Charlotte Lavictoire.

[5] Damara WA Pty Ltd. (2018) *Coastal Risk Management Lot 304 Sunday Island Bay, Dirk Hartog Island*. Letter 281.01.

1) Erosion Risk Management Plan

Erosion risk management considers potential risks and pathways for their management. A preferential risk mitigation hierarchy is defined in SPP2.6 as the sequence of Avoid- Retreat-Accommodate-Protect (WAPC 2013). Due to the narrow width of Lot 304 it is not possible to *Avoid* hazard for a planning timeframe of 2010 when estimating hazard with SPP 2.6 schedule one. However, due to the geologically controlled nature of Sunday Island Bay, it is likely that coastal response to projected sea level rise will be lower than a 100:1 ratio. Consequently, the recommended strategy is to *Avoid* present day erosion hazard to buildings and undertake *Managed Retreat* following sustained coastal recession. It is not recommended to use *Accommodate* or *Protect* interventions at this location (Damara WA 2014).

The adopted coastal management strategy determines that land between the buildings and the coast may be occasionally subject to short-term storm erosion, potentially affecting beach access and stability of coastal dune vegetation. Consequently, present-day erosion risk management is focused on beach access and dune management, with longer-term consideration of managed retreat. This includes:

a) Monitoring and maintenance of beach access and coastal dunes while the buildings are in their present location.
b) Implementation of managed retreat of the buildings once sustained erosion has been identified.
c) Removal of buildings, rehabilitation of the land area and relinquishment to the Shire once practical opportunities for retreat within the Lot boundary have been reached.

Dune management measures in (a) may be undertaken to delay the requirement for retreat (b) or relinquishment (c). Triggers for monitoring and management actions in this CRMP are 50m, 40m and 30m buffers to buildings. When each building is constructed, a 40m and 50m distance (shore perpendicular) should be mapped, defined from a benchmark on the seaward side of the building. These locations, along with ongoing monitoring and management information, should be collated and stored by the onsite manager, on behalf of building owners within Lot 304 Sunday Island Bay.

Repair of damage to buildings will be undertaken by individual building co-owners. The onsite manager for Lot 304 Sunday Island Bay will repair damage to power supply, water supply and effluent disposal connections within the building envelope (not located within inundation hazard zone). Any damage to water supply, provided via poly-pipe from two wells 12km away, will be repaired by the on-site manager.

1a) Monitoring and Management of Dunes and Beach Access

The main elements for managing potential erosion impacts are management of coastal dune stability and beach access. Monitoring and maintenance requirements are summarised in Table 2. These actions will be undertaken locally until relocation of individual buildings is required. Triggers and implementation of managed retreat for buildings is described in Section 2b.

Sunday Island Bay has a relatively stable coast, with most contemporary variation (over 1972-2013) occurring at the eastern extent of the site. Existing foredunes seaward of Lot 304 exhibit older erosion-recovery cycles from rotation within Sunday Island Bay, with longitudinal dunes to landward indicating the limit of most of the contemporary coastal variability (Damara WA 2014).

Dune management involves reducing the likelihood of foredune deflation or formation of dune blowouts. These types of dune instability increase inundation hazard, may contribute to coastal erosion, or expose individual buildings to smothering by mobile sand sheets. The threat of foredune deflation is reduced if foredune growth is encouraged, the rate of recovery after storm events is enhanced and if beach access is carefully managed. The likelihood of dune blowouts is reduced if north-south aligned access paths are avoided, the number of access paths are minimised and revegetation of any destabilised areas is undertaken. Dune management actions are presented for Lot owners to consider as possible measures to delay managed retreat being triggered.

Beach access management is integral to effective foredune management, as pedestrian and vehicle tracks can disturb vegetation, create furrows that enhance the risk of foredune deflation and can provide pathways for north-south blowouts to form. It is suggested that no more than two access paths are created between the buildings and the beach (Figure 3), avoiding north-south alignment, with beach access pathways identified and marked. It is possible the 11m bushfire risk management buffer could provide a track to connect access paths. Information should be included in each building to explain the importance of avoiding creation of new paths.

Cyclone season (December to March) provides the greatest potential for an extreme erosion event. A programmed inspection should be undertaken each year after cyclone season (i.e. in April or May). The intensity and type of monitoring is dependent on the distance of buildings to front of the foredune field (Table 1). Inspection will identify dune and access management actions (Table 2). Indicators to trigger management actions include beach access scarping, foredune scarping, dune deflation, formation of a blowout or formation of new beach access tracks. It should be noted that some vegetation loss across the broader foredune area can occur without creating dune instability.

Table 1: Levels of Dune Monitoring

Monitoring Level	Foredune Condition	Monitoring Framework
Level 1 (informal)	>50m width to building	Annual inspection (April-May). Evaluation of dune width using aerial imagery (±10m) every 3-5 years or after major storm, noting the patterns of rotation of the foredune. Photographic monitoring of dune condition to following Department of Transport (2012) method
Level 2 (formal)	40-50m to building	Twice annual inspection (April-May & August-September) Measure of dune width (±5m) from dune toe to buildings every 1-3 years or after major storm, noting the patterns of rotation of the foredune. Photographic monitoring of dune condition
Level 3 (active)	<40m to building	Post-storm inspection Annual measure of dune width in proximity of buildings [a], noting the patterns of rotation of the foredune. Photo monitoring of dune condition

Notes:

a) Level 3 measurement of dune width to buildings triggers when building relocation should occur.

Comparison of monitoring against indicator levels is used to guide when management actions could be undertaken to promote dune recovery (Table 2). Information on revegetation approaches and species is outlined in Chapter 9 of the *Coastal Planning and Management Manual* (WAPC 2003). However, as availability of plants at Sunday Island Bay likely constrain revegetation, increased use of natural recolonisation is appropriate, with greater focus on surface stabilisation. Stabilisation methods may include jute matting, mulching, brushing or surface sprays. Watering of foredune plants is noted as highly beneficial during initial establishment of vegetation, but likely to be constrained at Sunday Island Bay [1].

It is proposed the onsite manager, on behalf of the owners of Lot 304 Sunday Island Bay, will maintain photographs in a digital folder with clearly recorded dates to track foreshore response. Dune management actions will be recorded in a management schedule spreadsheet with photographs of actions stored in a digital folder with dates. These records can be provided yearly to the Shire of Shark Bay to ensure safe storage and accessibility.

[1] Future collection and reuse of grey water may be a possible source of water to support revegetation.

Approval from the Department of Biodiversity, Conservation and Attractions (DBCA) is required for temporary structures and access, as well as permanent structures and access. Pre-approval for beach access and dune management activities should be discussed with DBCA on a regular basis.

Table 2: Trigger and Management Considerations for Lot 304 Beach Access and Dunes [1,2,3]

	Level 1 Trigger when >50m distance to buildings	**Level 1 Management**	**Level 2 Trigger when 40-50m distance to buildings**	**Level 2 Management**
Beach access (avoid N-S alignment as shown in Figure 3) [4,5]	Scarp in access location of >0.5m vertically.	Rework/regrade, with local dune / slope stabilisation adjacent, including matting (or mulching/surface sprays) and revegetation (if feasible).	~5m overall dune retreat and scarping of path >1m vertically	Local cutting back of the broader path and dune, with treatment of the face (ie regrade, matting, revegetate).
Foredune scarping	Scarping sustained with >5m of dune retreat (not from rotation) and recovery not occurring.	Encourage recovery, including jute matting (or mulching / surface sprays) and revegetation (if feasible).	Scarping sustained with >5m of dune retreat (not from beach rotation) with limited recovery in 12 months, and buffer to buildings <50m.	Possible action: Installation of sand fencing along the beach, to direct and encourage dune growth. This requires a trial to determine effectiveness. This includes subsequent revegetation efforts.
Dune deflation	Dune deflation identified.	Monitor deflation progress.	Dune deflation identified and progressive dune retreat occurring.	Revegetate to raise dune crest (fencing could also be considered)
Formation of blowout	Blowout identified.	Monitor blowout progress. If growth >2m landward per year use sand fencing to help build dunes.	Blowout identified.	Close blowout and place matting to enhance revegetation.
Additional beach access tracks formed	Beach access tracks identified.	Install track barrier with signage and ensure information is provided in all buildings regarding staying on original tracks. Revegetate tracks if reduced access not improving stability.	Beach access tracks identified	Revegetate. Sign alternate paths. Install barrier to restrict pedestrians.[6]

Notes:

1) Maintenance works on Lot 304 are to be undertaken by the onsite manager, on behalf of owners of Lot 304 Sunday Island Bay. Beach access track maintenance will be required.
2) Maintenance actions are intended to have minimal need for structures, relying on regrading, slope stabilisation and revegetation where possible. Efforts such as brushing and renourishment has not been included due to expense and availability.
3) If the owners do not undertake dune management actions (track maintenance actions are required), it is likely the trigger for managed retreat of the buildings will occur sooner. The onsite manager shall determine appropriate actions to manage the erosion risk and may determine to accept managed retreat to occur sooner without undertaking extension dune management actions.
4) Local relocation or closure of beach access may be required if sustained rotation or dune blowout formation occurs. If a beach access is closed it should be rehabilitated with regrading, revegetation and stability matting, with ongoing maintenance required.
5) A maximum of two access paths between the buildings and the beach should be present at any one time, avoiding N-S alignment.
6) Walkway are considered too expensive for the number of people likely to use it.

1b) Implementation of Managed Retreat

The strategy of *Managed Retreat* will be pursued for the buildings on Lot 304 as outlined in Section 6 of Damara WA (2014), with no *Protection* works to be undertaken. It is intended that evaluation of the practicality of retreat for individual buildings would be triggered when the distance from the buildings is 40m, to ensure a plan is in place before the remaining buffer is only twice the allowance for two storms (30m, based on twice the S1=15m allowance). The distance of 40m will be identified during the third level of monitoring (Table 1). Preparation of this plan would include the effectiveness of building relocation, where buildings could be relocated and will depend on the number of building sites developed when the trigger is reached.

In practical terms, initial construction towards the landward side of the development envelope is encouraged, (above +4.7m AHD) to maximise the time until retreat is required. This is particularly relevant in areas of lower dunes (Figure 19 in Damara WA 2014). At present, proposed building areas are approximately 11% of the area of the development envelope, with additional area to landward within the boundary of Lot 304. This allows opportunity for building relocation, in the event of severe ongoing erosion. There is enough capacity to relocate buildings either alongshore or further landward depending on the coastal change sequence and provided the minimum elevation of +4.7m AHD (+4.2m AHD acceptable to Shire) is achieved. A detailed managed retreat plan will be submitted to the Shire of Shark Bay for approval within 6 months of the 40m buffer trigger being identified. Managed retreat may be undertaken for individual buildings while other buildings have buffer width >40m.

The onsite manager for Lot 304 Sunday Island Bay will be responsible for managing removal of buildings, rehabilitation, and revegetation of sites where buildings were previously located.

In the process of identifying location of buildings within the development envelope, it is recommended that retreat pathways are identified for each building, ensuring allocated land is not available for subsequent building development.

It is noted that the Western Australian Planning Commission have released Planned or Managed Retreat Guidelines (WAPC 2017). These guidelines have been prepared to determine when land needs to be returned to the public realm. Triggers are:

1) Most landward part of the Horizontal Shoreline Datum (HSD, +2m AHD at this location) is within the current risk of storm erosion (SPP2.6 Schedule One 4.4.1: S1 Erosion). At this site it is modelled as 15m, with a default figure of 40m.
2) When a public road is no longer available or able to provide legal access to the property.
3) When water, sewage or electricity to the lot is no longer available.

The only relevant trigger at this remote location is Trigger 1, the distance of 15m. Due to the remote location and allowance for adequate lead times to undertake managed retreat, a trigger of 30m is recommended, twice the modelled storm allowance of 15m. Planning for retreat will commence when there is <40m existing buffer to buildings. Land rehabilitated following managed retreat will not be ceded to the Shire and will require ongoing management by the owners of Lot 304.

Following DPLH recommendations, and in keeping with long-term potential for coastal vulnerability, relinquishment of the site to the Shire shall occur if progressive erosion demonstrates the impracticality of continuing to apply a strategy of managed retreat. This shall be defined when there is no opportunity for retreat of buildings within the Lot boundary that does not provide more than 40m buffer distance from the Horizontal Shoreline Datum (+2mAHD contour).

Under conditions of relinquishment, the development shall be removed, and land area shall be rehabilitated to the specifications and satisfaction of the Shire (equivalent to pre-development condition), at the landowners cost. Land shall be relinquished to the Shire for no cost.

Initial development approval shall be limited to a period of not more than 50 years from the date of approval, at which point the approval will lapse and:

- Owners of Lot 304 may apply for extension of the development life, based upon documented rates of coastal change; OR
- The development shall be removed, and land area shall be rehabilitated to the specifications and satisfaction of the Shire Shire (equivalent to pre-development condition), at the landowners cost. Land shall be relinquished to the Shire for no cost.

2) Inundation Risk Management

Inundation risk management is focused on the strategy of *Avoiding* inundation hazard through the definition of building envelopes in areas outside of +4.7m AHD (Figure 2 from Damara WA 2014, 2015). It is understood the Shire will accept a minimum finished floor level of +4.2m AHD.

Kind Regards,

Dr Matt Eliot
Principal Coastal Engineer
Damara WA
5/19 Wotan St
Innaloo WA 6019

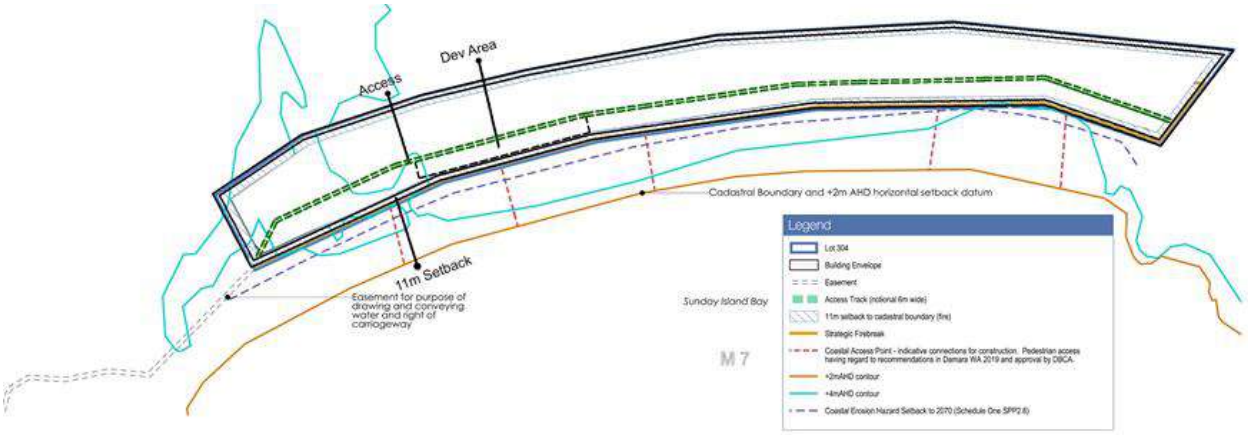

Figure 1: Proposed Development Area Relative to Lot 304

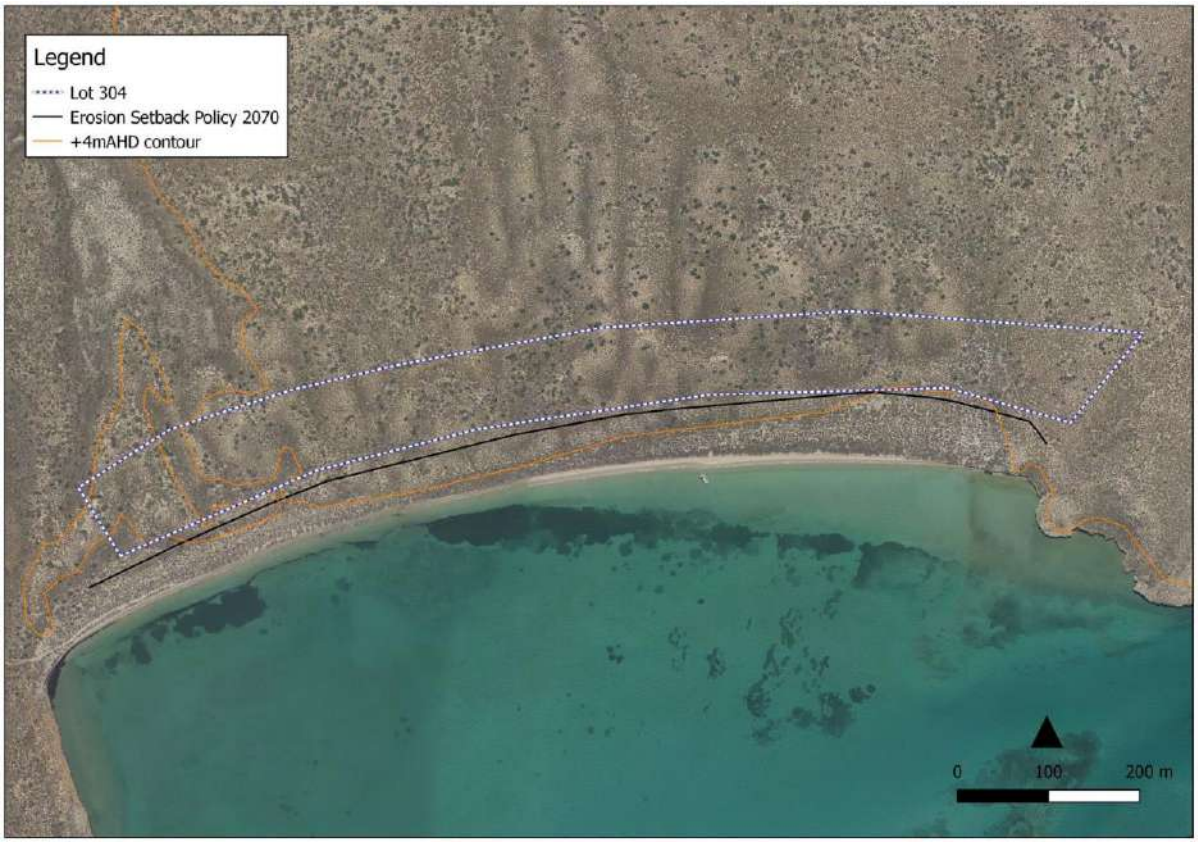

Figure 2: Setback for erosion processes to 2070 relative to Lot 304 boundary
Based on SPP2.6 schedule one (WAPC 2013)

Note: Location of this line has changed from Damara WA (2014, 2018), with revised contour information and updated Lot boundary. Setback distances of 55m-70m are the same as calculated in Damara (2014), relative to a revised HSD of +2mAHD.

Figure 3: Possible location of beach access to Lot 304 (Source: DEC)

gwa04410@bigpond.net.au

From: matt.eliot <matt.eliot@damarawa.com>
Sent: Monday, 17 April 2023 12:52 PM
To: gwa04410@bigpond.net.au
Subject: RE: Sunday Island Bay

Hi Geoff,

To the extent that we are aware, we consider the Sunday Island Bay CRMP dated 16 December 2021, supported by previous reporting, should remain relevant for use. In particular, the adaptive management framework is considered suitable for any coastal change likely to have occurred in the subsequent period.

Setbacks will apply relative to the original baseline positions. Prior to on-ground development, management triggers should be checked and any appropriate modifications to development conditions should be applied subsequently. It is understood that management triggers have not presently been reached, and the 'present layout' outlined in Sunday Island Bay CRMP (dated 16 December 2021) remains valid.

Kind regards,
Matt Eliot

Dr Matt Eliot
https://mjeliot1.wixsite.com/coastal-learning
Principal Coastal Engineer | Adjunct Researcher
Damara WA Pty Ltd | UWA Oceans Graduate School

From: gwa04410@bigpond.net.au <gwa04410@bigpond.net.au>
Sent: Monday, April 17, 2023 12:23 PM
To: matt.eliot <matt.eliot@damarawa.com>
Subject: Sunday Island Bay

Hi Matt

Hope all is well with you

We have been moving slowly forward!!

The Shire of Shark Bay independent Town Planning adviser Allerding & Associates have requested confirmation that your reports in regard to Sunday Island Bay - meet current Government Policy.

As far as we are aware there has been no changes in this regard and would appreciate if you could provide an email confirmation

Thanks
Regards
Geoff

Your Ref: Sunday Island Bay CRMP
Our Ref: 281.04

7 August 2024

Geoff Wardle
PO Box 107
North Fremantle WA 6159

Dear Geoff,

RE: COASTAL RISK MANAGEMENT LOT 304 SUNDAY ISLAND BAY, DIRK HARTOG ISLAND

This letter confirms relevance of previously developed documentation for coastal management associated with the proposed development of Lot 304 Sunday Island Bay, Dirk Hartog Island. Specifically:

- Observed coastal change is largely consistent with coastal process allowances derived in 2014.
- The proposed development layout (May 2024) is compatible with the recommended coastal management approach.

OBSERVED COASTAL CHANGE

Since initial evaluation of the coastal processes allowance, Digital Earth Australia's Coastlines database has been developed, which provides an approximation of the annual mean shoreline position (a 'detected shoreline'), based on interrogation of satellite imagery from 1988-2022. It is noted that this technique has different sensitivities compared to using vegetation lines to measure coastal change.

Detected shorelines are illustrated spatially by Figure 1. These show relatively small changes, with a general pattern of progressive beach narrowing, greater at either end of Sunday Island Bay.

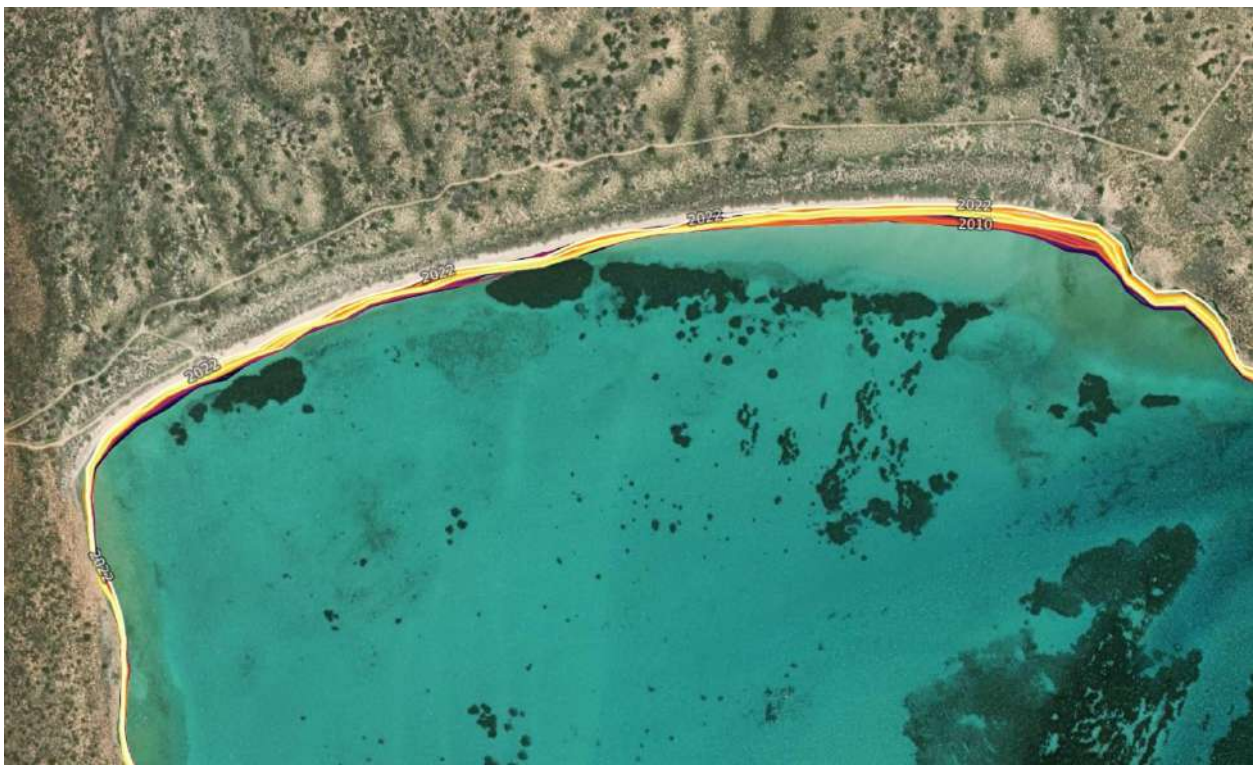

Figure 1: Detected Shorelines 1988-2022

Oldest (1988) in navy blue, newest (2022) in white

Time series of detected shorelines (Figure 2) illustrate several characteristics, that have direct parallels in the interpretation of aerial imagery for the coastal processes assessment:

- The centre of the bay has experienced negligible change (+/- 4m) with retreat over 2020-2022
- Beach narrowing of around 7m occurred at the western end of the bay over 1988-1998, but subsequently behaviour matches the centre of the beach.
- There is exaggerated change, and a pattern of long-term beach narrowing at the eastern end of the beach. The detected shorelines were closer to shore during high mean sea level phases in 1999-2000, 2008, 2011-2013 and 2020-2022, corresponding to La Nina conditions.

It is noted that impact of TC Mangga in May 2020 produced severe conditions, including an estimated 0.9m storm surge recorded at Carnarvon.

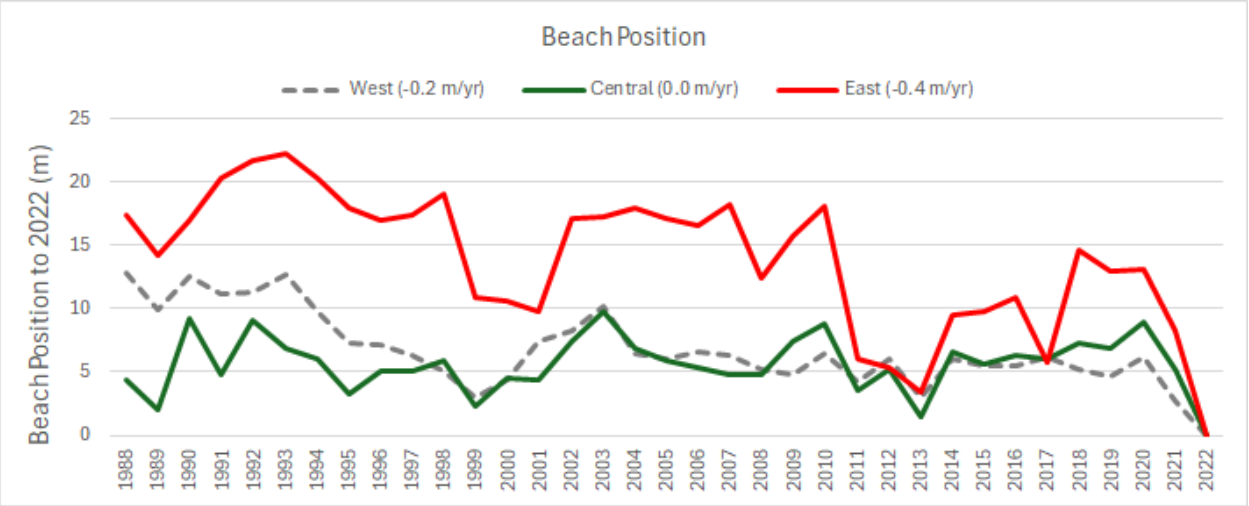

Figure 2: Detected Shoreline Time Series

Overall, the detected shorelines show similar behaviour to previously assessed vegetation lines, with the most marked change occurring towards the eastern end of the bay. Vegetation line change (-0.15m/y at the eastern end) is smaller than corresponding detected shoreline variation (-0.4m/y).

Detected shorelines tend to be subject to greater variability than vegetation lines, including erosion-recovery cycles following severe events. Consequently, when considering effects of TC Mangga and La Nina conditions, the detected shoreline rate of change likely provides an exaggerated basis for projection of future coastal change (allowance S2 Schedule One of Policy SPP2.6). However, the implication for the coastal process allowance estimates by 2070 is S2 = 22m, rather than S2 = 15m, which was used in Damara WA (2014). Although it is not recommended to use the detected shoreline rate of change, the additional distance of 7m would be largely catered for by lot boundary being generally landward of the coastal processes allowance line for 2070. For the eastern end of the bay, this difference is 0-41m, typically 16m (Figure 3). Under the CRMP, the overall implication, if coastal retreat is faster than projected, would be managed retreat at an earlier date.

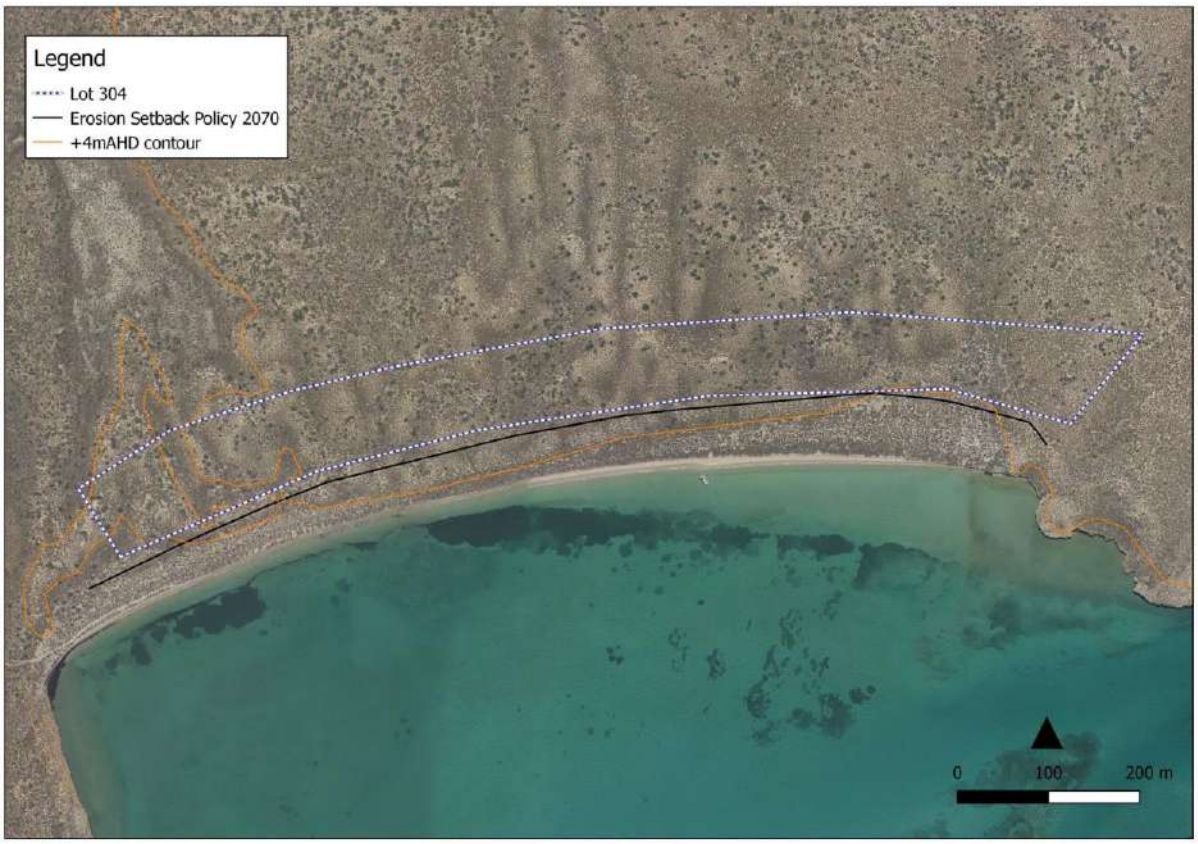

Figure 3: Allowance for Erosion to 2070 relative to Lot 304 boundary
Based on SPP2.6 schedule one (WAPC 2013)

Note: Location of the erosion allowance was revised in Damara (2021) following initial evaluation in Damara (2014), due to revised contour information and updated Lot boundary. Erosion allowance distances of 55m-70m are the same as calculated in Damara (2014), relative to a revised HSD of +2mAHD.

COASTAL MANAGEMENT APPROACH

Existing documentation for coastal management of Lot 304 Sunday Island Bay includes:

1. Damara WA (2014) *Sunday Island Bay – Dirk Hartog Island. Coastal Setback Allowances*. Report 239-01.
   This document provided guidance regarding the initial development layout, with a subsequent note (Damara WA 2015, Letter 239.01) confirming layout modifications were consistent with the assessed allowances.
2. DHI Developments (2018) Cyclone Information Procedures
3. Damara WA (2021) *Coastal Risk Management Plan*. Letter Report 281.03.
   Information to support a CRMP was provided in August 2018 to outline management of erosion and inundation hazards. Two updates were provided to the original work, incorporating beach access, a new topographic survey, and information following from DPLH new guidance regarding managed retreat.

Revision of the proposed development layout has been undertaken (Figure 4), which includes definition of eight building envelopes, and an access track, which doubles as a firebreak, around most of the perimeter of the Lot boundary. Buildings are located landward from the Lot Boundary, by more than 20m.

Revision of the coastal processes horizontal setback datum (from Damara 2021) indicated that erosion allowance for 2070 is seaward of the Lot boundary. As proposed development remains inside the Lot boundary, this is consistent with the main objective of the CRMP to define a position which is expected to be outside coastal hazards until 2070. Consequently, the proposed development layout (May 2024) is compatible with the recommended coastal management approach.

A second element of the CRMP coastal management framework, which stipulates transition from dune management to managed retreat under conditions of advanced coastal retreat, should be acknowledged in further design development for buildings proposed in Lot 304. Buildings should be designed to ensure ease of relocation or removal.

Kind Regards,

Dr Matt Eliot
Principal Coastal Engineer
Damara WA
2/19 Wotan St
Innaloo WA 6019

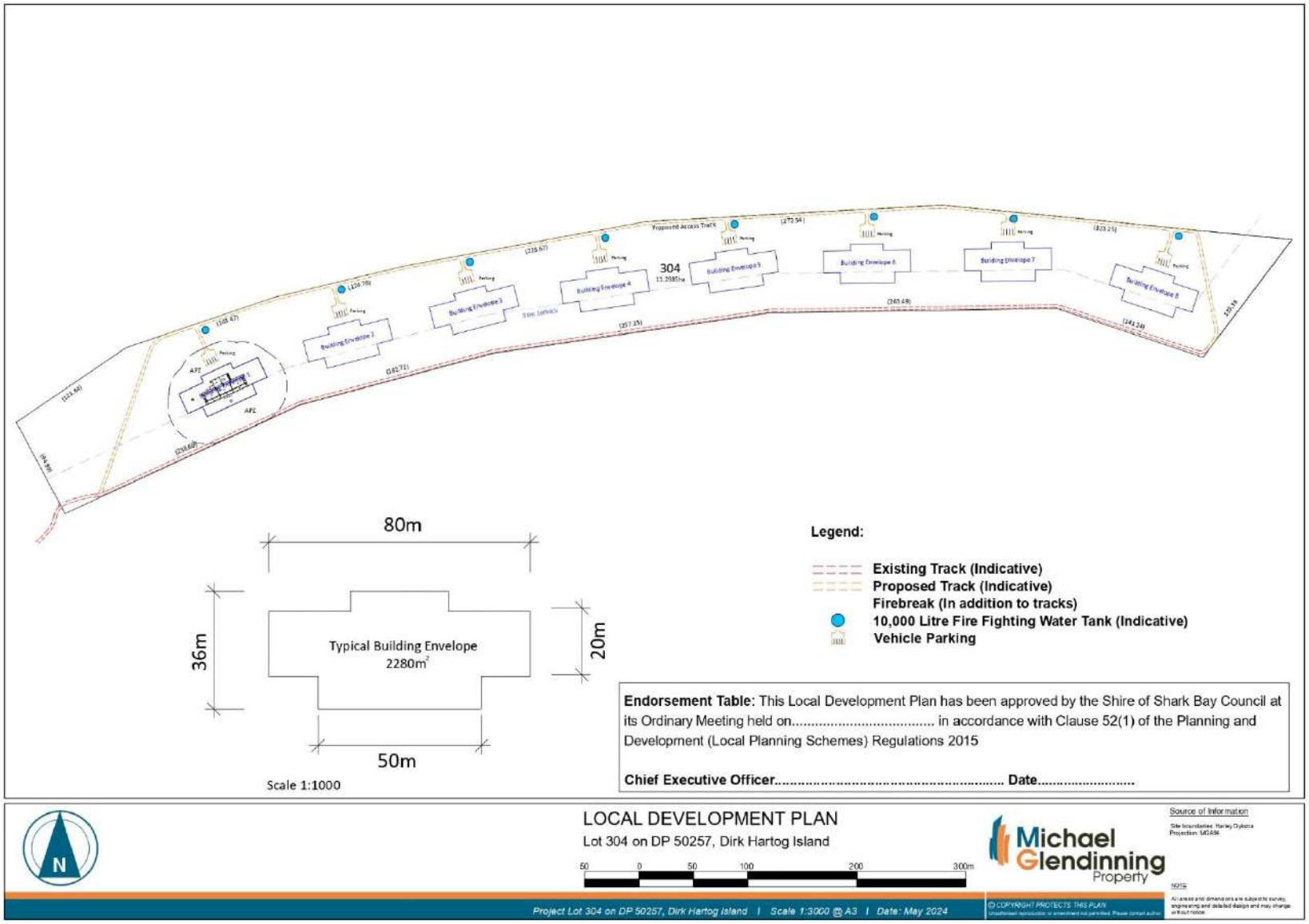

Figure 4: Proposed Development Area Relative to Lot 304

Appendix C

Flora Report
(Lantzke, 2008)

4 Ailsa St
Wembley Downs
WA 6019

22/8/08

Dear Geoff.

Herewith my species lists for the plants collected from the Sunday Island Bay site (SIB), and the North End site (N). Accompanying them are the pressed plants.

In the case of the SIB plants there are 3 sets; one for the Island's records, and 2 for submission to CALM. The reason for 2 sets is that in my experience, the Herbarium, who would confirm or correct my assignments, kept one set for their records, and returned the other, suitably notated..

In the case of the N plants, there are only 2 sets of some of the pressed plants.. This is because a number of these plants developed mould during transport, and no herbarium will even want plants from this batch in the door. However provided you recognise the need to keep the pressed ones in a box, in a dry environment, you should be able to keep these pressed specimens for your own reference.

You will note that with these small plant sample, collected in only one seaso, it was not possible to make a definitive identification. Hence the mounted specimens; a botanist with more experience of NW plants should be able to fill in any gaps.

With regard to the site's plants a second point I think I should make, even tho' you have probably recognised it; is the problem of weeds. On the two DHI sites I found only 2 introduced weed species :- Couch grass and one of the thistle varieties, (and I contrast that wjth the team of volunteers at Trigg Beach. Every year they weed out and dispose of piles of environmentally unwanted, and potentially flammable weeds.). The exotics have come in 2 ways:- careless shippers, and visitors, who didn't take precautions; and"immigrant" bringing their pet plants from "home". I suggest you incorporate some sort of covenant in your management plans to minimise these. Otherwise the environment will very rapidly degrade irreversibly.

The double gees are bad, especially as they can germinate many years (2 7 yr) after growth but, without transport (animal hooves; car tyres; people, (esp wearing soft soled footwear) they should not reach your sites.

Yours sincerely

Ian Lantzke

Ian Lantzke B.Sc(Hons)., Ph.D., Dip.Ed. (UWA)
(Hon. Associate, Centre for Ecosystem Management. ECU.)

DIRK HARTOG ISLAND

Plants of the SUNDAY ISLAND BAY site.

Vegetation of the site was collected on 17/7/08 and 19/7/08. The site is a strip of near coastal land, roughly parallel to the beach, and lies along two sets of orthogonal dunes. The principal set are parallel to the coast; the secondary set are at right angles, and superficial to the main set, but influence plant densities. Plant cover on ridge tops was about 50%, whereas in the shallow gullies it was about 80+%. A similar effect was noted for distance from the ocean. The same plant species were observed in similar locations at all parts of the site. There was no visible difference between the plants on the site, and those on similar, adjacent sites.

The soil was sand throughout, slightly darker and more consolidated further from the beach.

In all, 49 samples were collected from this site, and 35 plant species identified. Pressed specimens were prepared of all, except one very distinctive specie:-

(Calandrinia polyandra).

DIRK HARTOG ISLAND

Plants of the SUNDAY ISLAND BAY site,

Plant species, and their collection numbers are tabulated below in alphabetic order. (Collection numbers are included for reference).

No attempt was made to evaluate absolute or relative species numbers, preferential habitat, or associations.

SPECIES NAME	Collection Number
Acacia coriacea (subsp. coriacea)	13
Acacia ligulata	21, 122
? Acacia sp(1).	6
? Acacia sp(2.	18
Acanthocarpus preissei	15, 3
Acanthocarpus sp. probably robustus	11
Austrostipa elegantissima	25
Bossiaea spinescens	4
Calandrinia polyandra	113
Chenopodium cristate	22, 106
Coastal succulent	34
Cynodon dactylon	123
Danthonia sp.	30
Dicrastis sp. (?white flower)	23
Diplolaena grandiflora	10, 102
?Eragrostis sp.	116
Eremophila glabra (red flowering)	28, 116
?Eriochne sp.	112
Euphorbia sharkoensis	16. 110
Exocarpus aphyllus	27
Frankinia pauciflora (?var pauciflora)	9, 18, 111
Nitraria scholberi	36
Pimelia microcephala	32, 108, 118
Pittosporum phylliraeoides	33
Rhagodia sp.	35
Scaevola ?anchusifolia	102
Scaevola ?crassifolia	14
Scaevola tomentosa	8, 5
Sporobolus mitchellii	101
Succulent sp	29, 115
Swainsonia longicarinata	7
Thryptomene baeckeacea	109
Zygophyllum fruticulosum	19, 23, 31, 107

References Consulted

"The Western Australian Flora. A Descriptive Catalogue." Paczkowska.G. and Chapman.A., Wildflower Society of WA; West Australian Herbarium, CALM, Botanic Gardens & Parks Authority. PERTH, 2000.

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Appendix D

Flora Significance Report (Ecosystem Solutions, 2020)

ecosystem solutions
PO Box 685
DUNSBOROUGH WA 6281
Ph: +61 8 9759 1960
Fax: +61 8 9759 1920
Mobile: 0427 591 960
info@ecosystemsolutions.com.au
www.ecosystemsolutions.com.au

Flora Significance Assessment

Lot 304 Sunday Island Bay, Dirk Hartog Island

20 May 2020

Prepared for:
DHI Developments Pty Ltd

Limitations Statement

This report has been prepared for DHI Developments Pty Ltd and remains the property of Ecosystem Solutions. No express or implied warranties are made by Ecosystem Solutions Pty Ltd regarding the findings and data contained in this report. No new research or field studies were conducted other than those specifically outlined in this report. All the information details included in this report are based upon the research provided and obtained at the time Ecosystem Solutions Pty Ltd conducted its analysis.

In undertaking this work the authors have made every effort to ensure the accuracy of the information used. Any conclusions drawn, or recommendations made in the report are done in good faith and the consultants take no responsibility for how this information and the report are used subsequently by others.

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Document Control

DHI Developments Pty Ltd

Lot 304 Sunday Island Bay, Dirk Hartog Island

Version	Revision	Purpose	Author	Reviewer	Submitted Form	Date
Report	Rev A	Initial Report	KP	GM	Electronic (email)	19/11/2019
Report	Rev B	Update LDP	DC	GM	Electronic (email)	20/05/2020

Filename: z:\projects\19771 lot 304, sunday bay, dirk hartog island bmp beep flora\reports\structure plan lot 304 sunday island bay flora significance assessment report rev b.docx

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1 Introduction

Ecosystem Solutions Pty Ltd were contracted by DHI Developments Pty Ltd to survey Lot 304 Sunday Island Bay, Dirk Hartog Island (hereafter called the "Site") within the Shire of Shark Bay, to document the presence and distribution of flora as part of the application for a proposed Local Development Plan.

The flora elements specifically targeted includes Threatened and Priority species and Threatened or Priority Ecological Communities. The flora assessment was limited to observing the species present during the time of the surveys.

2 Site Details

The Site is located to the south east of Dirk Hartog Island, approximately 40 km to the south west of Denham. The Site is approximately 11 ha in size, within the Shire of Shark Bay (Figure 1). A Local Development Plan has been prepared, which includes 33 development envelopes that can include up to 33 Visitor Accommodation Units.

The Site is currently vacant land, consisting of naturally occurring coastal vegetation. The Site peaks at approximately 20 m AHD (Australian Height Datum), with the dunes undulating down to 5m AHD within the Site.

The surrounding area consists of extensive areas of remnant vegetation within the Dirk Hartog National Park, with the ocean directly to the south and east of the Site.

Local Development Plan Provisions

This Local Development Plan (LDP) has been prepared in accordance with Part 6 Schedule 2 of the Deemed Provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

Lot 304 Sunday Island Bay is zoned Special Use No. 14 (SU14) under the Shire of Shark Bay Local Planning Scheme No. 4 and specific conditions apply to any future development. The objectives of the SU14 zone is to provide for ecotourism development. The LDP should be read with the relevant technical documents and management plans referred to in the LDP provisions.

The following provisions apply to guide development.

1 BUILDING ENVELOPES

1.1 Development shall be contained within the building envelopes as shown on the LDP, unless approved by the local government.

1.2 All ancillary development including water tanks, car parking, servicing infrastructure, outbuildings and effluent disposal systems are to be sited having regard for the following:
- Outbuildings are encouraged to be located so as to not obstruct the coastal aspect or views from habitable development and to minimise the visual impact as viewed from the ocean side of Lot 304;
- Soil suitability/capability for effluent disposal (refer LDP provision 7.1);
- Minimising removal of remnant vegetation;
- Bushfire management;
- Coastal hazard risks (refer to Coastal Risk Management Plan Notes); and
- Any other practical considerations such as topography.

1.3 The local government may require an updated flora report or vegetation information for any clearing outside of a building envelope.

1.4 Where there is a conflict between the number of envelopes shown on the LDP and any written LDP provision, the written provision shall prevail.

2 SITING AND SETBACK REQUIREMENTS

2.1 All buildings and structures shall be setback a minimum of:
(a) 11 metres from the Lot 304 cadastral boundaries in compliance with any Bushfire Management Plan and / or BAL assessment approved by the local government; or
(b) In accordance with the Asset Protection Zone setbacks to classified vegetation specified in any Bushfire Management Plan and / or BAL Assessment approved by the local government.

2.2 No building envelopes fall within the coastal erosion hazard setback line to 2070, as illustrated on the LDP, but will require coastal risk management (refer to Coastal Risk Management Plan Notes)

2.3 Buildings shall be setback a minimum of 2 metres from access routes.

3 BUSHFIRE MANAGEMENT

3.1 Proposed development shall demonstrate compliance with any Bushfire Management Plan and / or BAL Assessment approved by the local government.

3.2 The developer(s) / landowner(s) shall be responsible for the implementation and management of any Bushfire Management Plan and / or BAL Assessment approved by the local government so as to ensure that development is able to occur in the intended manner. All BAL ratings identified in the Bushfire Management Plan are indicative and are required to be verified at the time of construction of individual buildings to ensure appropriate setbacks identified have been achieved.

3.3 Vegetation (existing or proposed) and Asset Protection Zones in Lot 304 shall be managed and maintained as 'low threat vegetation' in accordance with any Bushfire Management Plan and / or BAL Assessment approved by the local government.

3.4 The strategic firebreak will allow people to access the periphery of Lot 304 and provide access to the foreshore.

4 BUILT FORM

4.1 Design Guidelines have been prepared and form part of this LDP. Development is to have regard to and address the Design Guidelines.

5 BUILDING HEIGHT

5.1 Inundation hazard is to be managed through avoidance, with minimum floor levels for habitable development to be not less than 4.2mAHD. Non-habitable development with finished floor levels less than 4.2mAHD may be considered by the local government for ancillary development that is detached from habitable development and can be easily relocated (refer to Coastal Rek Management Plan Notes).

5.2 New buildings and outbuildings to be low scale consistent with the Scheme. The local government may require a Visual Impact Assessment in accordance with condition 11 of the SU14 zone.

5.3 Buildings raised more than 1.0m above the minimum floor level, and/or buildings proposed as two-storeys may be approved by the local government where it can be demonstrated that the bulk and scale of the building takes into account topography, natural landscape and coastal amenity of the location.

6 VEGETATION AND LANDSCAPING

6.1 No introduced non-native species shall be planted on the lot. Revegetation shall not occur in conflict with the recommendations of any Bushfire Management Plan approved by the local government. The landowner(s) shall be guided by the Dirk Hartog Biosecurity Implementation Plan 2015.

7 SERVICE INFRASTRUCTURE

7.1 Development application(s) to provide details of effluent disposal in accordance with the Government Sewerage Policy 2019 and having regard to the Site and Soil Assessment Evaluation for Lot 304 Sunday Island Bay.

7.2 Development application(s) shall demonstrate servicing of building envelopes and development thereon with water supply (potable and firefighting 10,000L tanks) and electricity (including generation), to the satisfaction of the local government.

8 MANAGEMENT

8.1 Temporary sea containers and structures associated with construction may be in place for a maximum period of 12-months, or longer period approved by the local government, and thereafter removed from the island at the developer(s) / landowner(s) cost.

8.2 A management plan has been prepared and forms part of this LDP.

9 ADVICE NOTES

a. Regarding section 1 building envelopes, Lot 304 is subject to covenants to the benefit of the Minister of Lands and should be referred to by proponents. In particular the covenants provide details in relation to (amongst other things):
- The number of "visitor accommodation units" that may be built or placed on the land, and the floor area of each "visitor accommodation unit"; and
- The "staff accommodation" and the ratio of staff-to-guests and floor area per staff personnel being housed.

b. Regarding section 1 building envelopes, the number of building envelopes shown on the LDP is nominal and not all of the building envelopes may be able to be built on. The number of building envelopes depicted on this LDP may be amended, subject to approval by the local government.

c. Regarding section 3 Bushfire Management, Lot 304 is in a designated bushfire prone area. Landowners will educate and inform all guests of the increased risks associated with bushfire when staying on a remote tourism/ holiday accommodation development.

Location Plan

Legend

- Lot 304
- Building Envelope
- Easement
- Access Track (notional 6m wide)
- 11m setback to cadastral boundary (fire)
- Strategic Firebreak
- Coastal Access Point - Indicative connections for construction. Pedestrian access having regard to recommendations in Damara WA 2019 and approval by DBCA.
- +2mAHD contour
- +4mAHD contour
- Coastal Erosion Hazard Setback to 2070 (Schedule One SPP2.6)

Coastal Risk Management Plan

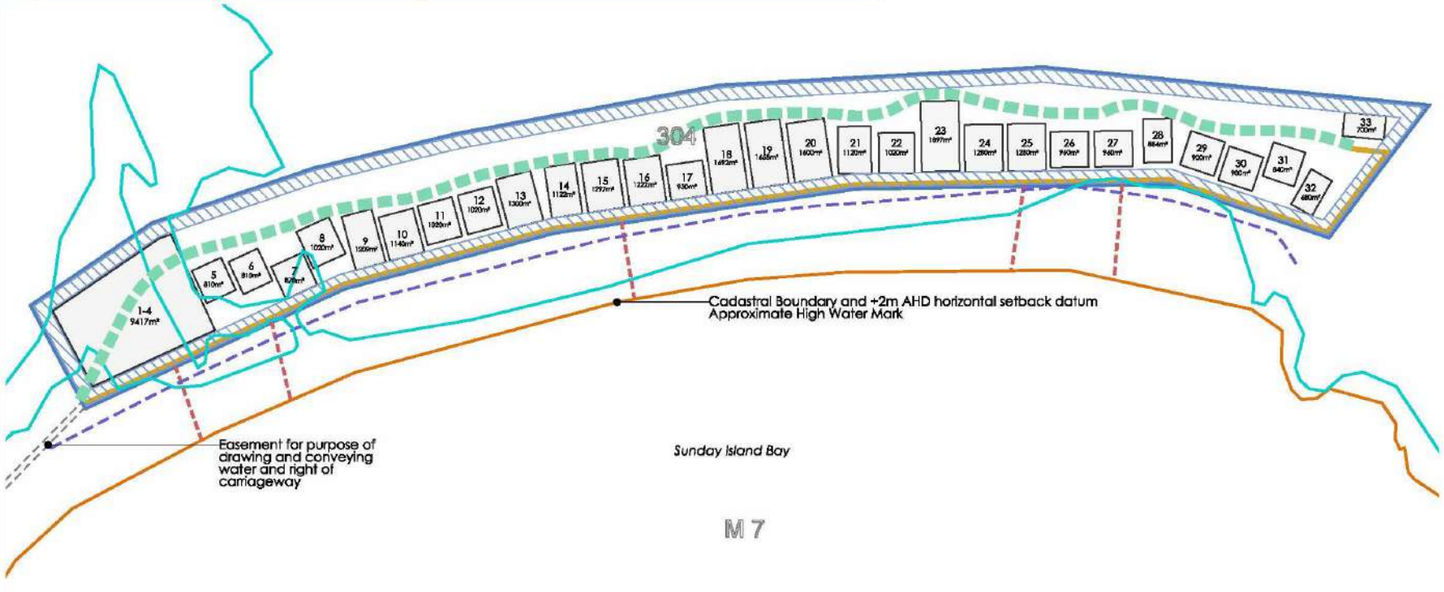
1. Inundation risk is managed through avoidance, with all buildings on land >+4.2mAHD.
2. Erosion risk management is focused on beach access and dune management, with a longer-term consideration of managed retreat. Erosion risk management should follow the monitoring and management outlined in the revised Coastal Risk Management Plan (CRMP) (Damara 2019).
3. Beach access and dune management: Triggers for management action when there is >50m existing buffer to buildings include:
   (a) scarps >0.5m vertically in the beach access paths;
   (b) foredune scarping sustained with <5m of dune retreat;
   (c) dune deflation identified;
   (d) blowout formation;
   (e) additional beach tracks formed.
   Relevant management actions should be undertaken as outlined in Table 2 of CRMP including additional triggers for when 40-50m buffer remains.
4. Managed retreat: strategy of planned retreat should follow Section 1b of CRMP. A detailed management retreat plan will be submitted to the local government within six (6) months of the trigger of 40m remaining buffer between the +2mAHD contour, and buildings. Managed retreat may be planned for small groups of buildings while others are maintained with a >40m buffer. Retreat should be undertaken when remaining buffer is 20m. Each co-owner of Lot 304 will be responsible for building removal, rehabilitation and revegetation of the site where buildings are relocated. Any land rehabilitated following managed retreat shall not conflict with a Bushfire Management Plan and will not be ceded to the local government, and will require ongoing management.

Endorsement Table

This Local Development Plan has been approved by the Shire of Shark Bay Council at it's Ordinary Meeting held on the _____ in accordance with Clause 52(1) of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

Chief Executive Officer: _____

Date: _____



LOCAL DEVELOPMENT PLAN
Lot 304 Sunday Island Bay, Dirk Hartog Island
A DHI Developments Pty Ltd Project

s: 1:4000@A3
d: 18 May 2020
p: 19/061/003M

Taylor Burrell Barnett Town Planning and Design
Level 7, 160 St Georges Terrace, Perth WA 6000
e: admin@tbbplanning.com.au
p: (08) 9226 4276

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Figure 1 Proposed Local Development Plan for Lot 304 Sunday Island Bay, Dirk Hartog Island

3 Flora and Vegetation

3.1 Desktop Analysis

3.1.1 Landscape, Soils and Vegetation

Soil-Landscape systems are areas with recurring patterns of landforms, soils and vegetation and are used by the Department of Agriculture to maintain a consistent approach to land resource surveys.

The Site is located within the Shark Bay Soil-Landscape Zone which consists of partly dissected calcrete-duricrusted plateau, undulating limestone plains, undulating sandplain and coastal dunes (Figure 2). These soils are further classified as soil systems (DPIRD, 2019).

The Edel System represents the soils of the Site, these are undulating sandy plains with occasional dunes, limestone rises and saline flats supporting acacia shrublands with some saltbush and heath communities (DPIRD, 2019).

The vegetation mapping available is of original natural vegetation presumed to have existed prior to European settlement in Western Australia. The major sources of data is at 1:250,000 scale and is based on the published and unpublished mapping of J.S. Beard. The following vegetation type has been identified within the Site:

- Spinifex complexes (41) - Hummock grassland with scattered low trees over dwarf shrubs or mixed short grass and spinifex mixed species, Triodia spp.

3.1.2 Threatened and Priority Flora

Extracts from the Department of Biodiversity, Conservation and Attractions (DBCA) NatureMap Database over a 50 km radius of the site (Appendix A) and the Commonwealth Environmental Protection and Biodiversity Conservation (EPBC) Protected Matters Search Tool over the same distance (Appendix B) were obtained to determine if records of any rare or threatened flora are known within the boundary or in vicinity of the Site. A preliminary reconnaissance survey of the results of the desktop study was conducted, consistent with a Reconnaissance Survey Flora and Vegetation Survey (EPA, 2016).

Species of flora and fauna are protected as defined in Appendix C, with it being determined that their populations are restricted geographically or threatened by local processes. DBCA recognizes these threats of extinction and consequently applies regulations towards population and species protection. Protected species are gazetted under the *Biodiversity Conservation Act (2016)* and therefore it is an offence to "take" or damage rare flora without Ministerial approval. The act defines "to take" as "… to gather, pick, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means" (Government of Western Australia, 2010).

Appendix C presents the definitions for conservation codes under the *Biodiversity Conservation Act (2016)* which was previously the *Wildlife Conservation Act 1950*.

3.1.3 Threatened and Priority Ecological Communities

An ecological community is a naturally occurring biological assemblage that occurs in a particular habitat. A Threatened Ecological Community (TEC) is one which is found to fit into one of the following categories: Presumed Totally Destroyed; Critically Endangered; Endangered, or Vulnerable.

Possible TECs that do not meet survey criteria are added to the Department of Parks and Wildlife's Priority Ecological Community Lists, under Priority 1, 2 and 3. These are ranked in order of priority for survey and/or the definition of the community and evaluation of its conservation status.

3.2 Targeted Survey

The site survey was undertaken on the 4th and 5th September by Gary McMahon (B.Sc. M. Env. Mgmt., C.EnvP, FB62000143).

The Site was walked in a systematic manner to cover the entire area, focusing on the proposed areas of disturbance. Vegetation structure and composition were noted and the main species in each of the strata were identified and recorded through relevés (Appendix D). The locations of the relevés recorded across the site are shown in Figure 2 below, with the data sheets in Appendix D. All potentially suitable habitats within the Site were systematically searched for significant flora or

vegetation, with specific targets being based on the Department of Biodiversity Conservation and Attractions database records.

3.3 Results

3.3.1 Species

The NatureMap Database (DBCA – Appendix A) identified five Priority species that have been recorded within 5 km of the Site (Table 1). The Protected Matters Search Tool (PMST, DoEE – Appendix B) did not identify any Threatened flora species or species habitat as occurring or likely to occur within the area. There are no historical records of Declared Rare Flora species on Dirk Hartog Island (NatureMap Database, accessed 29 October 2019).

Table 1: Conservation Significant Flora Likely to Occur Within 5 km of the Site (NatureMap)

SPECIES	LIFEFORM	HABITAT	DCBA CONSERVATION CODE	EPBC ACT STATUS
Lepidium biplicatum	Shrub	Coastal regions	P3	N/A
Lepidium puberulum	Herb	Sandy soils	P4	N/A
Melaleuca huegelii subsp. *pristicensis*	Shrub or tree	Sand	P3	N/A
Triodia bromoides	Tussock forming perennial	Red, grey and calcareous sand. Dunes, sandplains, stony rises.	P4	N/A
Triodia plurinervata	Tussock forming perennial	Red to orange-brown sand, limestone, sandy loam. Sand dunes and steppes, often coastal areas, drainage basins, salt lakes.	P3	N/A

The targeted survey did not detect any Declared Rare Flora or Priority listed flora within the Site.

3.3.2 Vegetation Communities

Overall the vegetation within the site is relatively consistent in both species and structure, with densities varying depending on slight topographical variances (note these are not significant and more described as small gulleys or depressions within the coastal areas). Revele data (Appendix D) can be aggregated to describe the vegetation (described according to Keighery, 1994, adapted Muir (1977) and Aplin (1979), Table 2 below) as:

Scattered shrubs of *Acacia ligulata*, over Open Heath in some areas of *Diplolaena grandiflora* and *Acacia ligulata*, over Low Closed Heath of *Thryptomene dampieri*, *Frankenia pauciflora*, *Acacia ligulata*, *Atriplex bunburyana* and *Atriplex vesicaria*. Other common species included *Senecio pinnatifolius*, *Acanthocarpus preissii* and *Spinifex longifolius* as well as numerous Poaceae weed species (Introduced Grasses).

While the Beard's classification structure description is vague and at a higher scale, the above description is consistent with that described broadly by Beard (i.e. Spinifex complexes (41))

Table 2: Structural Classification of Vegetation (Keighery 1994, Adapted from Muir 1977 and Aplin, 1979)

Stratum	**Canopy Cover**				
	70%-100%	**30%-70%**	**10%-30%**	**2%-10%**	**<2%**
Trees > 30m	Tall Closed Forest	Tall Open Forest	Tall Woodland	Tall Open Woodland	Scattered Tall Trees
Trees 10-30m	Closed Forest	Open Forest	Woodland	Open Woodland	Scattered Trees
Trees < 10m	Low Closed Forest	Low Open Forest	Low Woodland	Low Open Woodland	Scattered Low Trees
Shrubs >2m	Tall Closed Scrub	Tall Open Scrub	Tall Shrubland	Tall Open Shrubland	Scattered Tall Shrubs
Shrubs 1-2m	Closed Heath	Open Heath	Shrubland	Open Shrubland	Scattered Shrubs
Shrubs <1m	Low Closed Heath	Low Open Heath	Low Shrubland	Low Open Shrubland	Scattered Low Shrubs
Hummock Grasses	Closed Hummock Grassland	Mid-Dense Hummock Grasslands	Hummock Grassland	Open Hummock Grassland	Scattered Hummock Grassland
Grasses, Sedges & Herbs	Closed Tussock Grassland/ Sedgeland/ Herbland	Tussock Grassland/ Sedgeland/ Herbland	Open Tussock Grassland/ Sedgeland/ Herbland	Very Open Tussock Grassland/ Sedgeland/ Herbland	Scattered Tussock Grassland/ Sedgeland/ Herbland

3.3.3 Vegetation Condition

Utilising the scale of condition developed by Keighery (1994, Table 3), the areas of vegetation were classed as Good as there are signs of significant alteration to the vegetation structure and densities due to extensive evidence of past grazing. The basic vegetation structure remains and there is the ability for it to regenerate. The areas of tracks have been ranked as Completely Degraded.

Table 3: Keighery Condition Scale (Keighery 1994)

Category	Description
Pristine	Pristine or nearly so, no obvious signs of destruction.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. For example, damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle track.
Very Good	Vegetation structure altered, No obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate to it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration, but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation in no longer intact and the area is completely or almost completely without native species. These areas are often described as “parkland cleared” with the flora composing weed or crop species with isolated native trees or shrubs.

Location details: Lot 403 Sunday Island Bay, Dirk Hartog
Project: 19771
Assessment date: 04/09/2019 & 05/09/2019
Prepared by: K Paterson

Relevé Locations

0 25 50 100 150 Meters

N

Legend

- The Site
- Proposed Development Envelopes
- Relevé

ecosystem solutions
www.ecosystemsolutions.com.au
(08) 9759 1960

Figure 2 Relevé Locations at Lot 304 Sunday Island Bay, Dirk Hartog Island

4 Survey Constraints

The targeted survey was conducted across two days, with the Site was traversed by foot in a systematic way to cover the entire area.

There are constraints in monitoring flora which include some annual species that do not appear every season, with the survey limited to identifying only those flora that are present during the survey times.

5 Significance

Under the EPBC Act, an action that has, will have, or is likely to have, a significant impact on a matter of national environmental significance, requires approval from the Minister. A significant impact is defined as an impact which is important or of consequence, having regard for its context or intensity (Commonwealth of Australia, 2009).

Matters of environmental significance are:

- Listed threatened species and ecological communities
- Migratory species protected under international agreements
- Ramsar wetlands of international importance
- The Commonwealth marine environment
- World Heritage properties
- National Heritage places
- Great Barrier Reef Marine Park, and
- Nuclear actions.

For this development, there are no identified matters of environmental significance. There is a minimal potential for impact on conservation significant flora species due to their absence from the Site and proposed areas of impact required for this development.

6 Summary and Recommendations

Based on the results of the analysis of Site, the following conclusions and recommendations are made.

- There were no Declared Rare Flora or Priority listed flora observed in the Site.

Given there were no signs of any Declared Rare Flora within the Site, and no historical records of Declared Rare Flora on Dirk Hartog Island, a referral under the EPBC Act is not considered to be required as any proposed actions are unlikely to significantly impact upon any threatened flora species.

7 References (not all cited)

Aplin, T.E.H. 1977 The Flora. *Environment and Science*. (Ed. B.J. O'Brien) (University of Western Australia Press, Perth).

Environmental Protection Authority (2016). Technical Guidance: Flora and Vegetation Surveys *for Environmental Impact Assessment in Western Australia*. EPA December 2016.

Keighery, B. J. (1994). *Bushland Plant Survey: A guide to plant community survey for the community*. Wildflower Society of Western Australia (Inc.), Nedlands.

Appendix A NatureMap Extract

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 20/05/2020

Kingdom Plantae
Conservation Status Conservation Taxon (T, X, IA, S, P1-P5)
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 113° 13' 43" E,26° 07' 15" S
Buffer 40km

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1.	14112	*Abutilon sp. Hamelin (A.M. Ashby 2196)*		P2	
2.	14114	*Abutilon sp. Quobba (H. Demarz 3858)*		P2	
3.	13077	*Acacia sclerosperma subsp. glaucescens*		P3	
4.	1207	*Acanthocarpus parviflorus*		P3	
5.	1210	*Acanthocarpus rupestris*		P2	
6.	7830	*Angianthus microcephalus (Small-headed Angianthus)*		P2	
7.	6948	*Anthocercis intricata*		P3	
8.	19520	*Boronia crenulata subsp. Shark Bay (G. Cockerton 5187)*		P1	
9.	30232	*Bossiaea calcicola*		P3	
10.	48659	*Calandrinia sp. Edel Land (F. Obbens FO 01/17)*		P2	
11.	18359	*Carpobrotus sp. Thevenard Island (M. White 050)*		P3	
12.	12616	*Chthonocephalus muelleranus*		P2	
13.	18132	*Dicrastylis sp. Denham (M. Lewis 42/92)*		P1	Y
14.	14196	*Eremophila cuneata*		P1	
15.	17151	*Eremophila splendens*		P1	Y
16.	2083	*Grevillea rogersoniana (Rogersons' Grevillea)*		P3	
17.	19192	*Grevillea sp. Shark Bay (N.H. Speck 24/09/1953)*		P1	Y
18.	3020	*Lepidium biplicatum*		P3	
19.	3043	*Lepidium puberulum*		P4	
20.	13270	*Melaleuca huegelii subsp. pristicensis*		P3	
21.	5945	*Melaleuca oldfieldii*		P2	
22.	12639	*Olearia occidentalissima*		P2	
23.	4677	*Phyllanthus fuernrohrii (Sand Sponge)*		P3	
24.	17208	*Physopsis chrysophylla*		P3	
25.	2692	*Ptilotus alexandri*		P2	
26.	18111	*Spergularia nesophila*		P3	
27.	14241	*Stenanthemum divaricatum*		P3	
28.	44701	*Tiryptomene repens*		P2	Y
29.	17885	*Triodia bromoides*		P4	
30.	694	*Triodia plurinervata*		P3	
31.	12417	*Verticordia dichroma var. syntoma*		P3	

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Appendix B EPBC Act Protected Matters Report

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

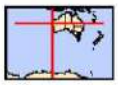
Report created: 20/05/20 13:33:47

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 50.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	1
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	41
Listed Migratory Species:	60

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	87
Whales and Other Cetaceans:	24
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	4
Regional Forest Agreements:	None
Invasive Species:	10
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Status
Shark Bay, Western Australia	WA	Declared property

National Heritage Properties [Resource Information]

Name	State	Status
Natural		
Shark Bay, Western Australia	WA	Listed place

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside the Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

Name
EEZ and Territorial Sea

Marine Regions [Resource Information]

If you are planning to undertake action in an area in or close to the Commonwealth Marine Area, and a marine bioregional plan has been prepared for the Commonwealth Marine Area in that area, the marine bioregional plan may inform your decision as to whether to refer your proposed action under the EPBC Act.

Name
North-west

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Malurus leucopterus leucopterus White-winged Fairy-wren (Dirk Hartog Island), Dirk Hartog Black-and-White Fairy-wren [26004]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta cauta Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Mammals		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat likely to occur within area
Bettongia lesueur lesueur Burrowing Bettong (Shark Bay), Boodie [66659]	Vulnerable	Translocated population

Name	Status	Type of Presence
		known to occur within area
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat known to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Leporillus conditor Wopilkara, Greater Stick-nest Rat [137]	Vulnerable	Translocated population known to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Translocated population known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Plants		
Eucalyptus beardiana Beard's Mallee [18933]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Sharks		
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Onychoprion anaethetus Bridled Tern [82845]		Breeding known to occur within area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Dugong dugon Dugong [28]		Breeding known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Isurus paucus Longfin Mako [82947]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat known to occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species habitat known to occur within area
Thalasseus bergii Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area
Larus novaehollandiae Silver Gull [810]		Breeding known to occur within area
Larus pacificus Pacific Gull [811]		Breeding known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species habitat known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Puffinus pacificus Wedge-tailed Shearwater [1027]		Breeding known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Sterna anaethetus Bridled Tern [814]		Breeding known to occur within area
Sterna bengalensis Lesser Crested Tern [815]		Breeding known to occur within area
Sterna bergii Crested Tern [816]		Breeding known to occur within area
Sterna caspia Caspian Tern [59467]		Breeding known to occur within area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Sterna fuscata Sooty Tern [794]		Breeding known to occur within area
Sterna nereis Fairy Tern [796]		Breeding known to occur within area

Name	Threatened	Type of Presence
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Species or species habitat known to occur within area
Fish		
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Mammals		
Dugong dugon Dugong [28]		Breeding known to occur within area
Reptiles		
Aipysurus laevis Olive Seasnake [1120]		Species or species habitat may occur within area
Aipysurus pooleorum Shark Bay Seasnake [66061]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area
Disteira major Olive-headed Seasnake [1124]		Species or species habitat may occur within area
Emydocephalus annulatus Turtle-headed Seasnake [1125]		Species or species habitat may occur within area
Ephalophis greyi North-western Mangrove Seasnake [1127]		Species or species habitat may occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat likely to occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Feresa attenuata Pygmy Killer Whale [61]		Species or species habitat may occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia simus Dwarf Sperm Whale [58]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Peponocephala electra Melon-headed Whale [47]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area

Name	Status	Type of Presence
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Stenella coeruleoalba Striped Dolphin, Euphrosyne Dolphin [52]		Species or species habitat may occur within area
Stenella longirostris Long-snouted Spinner Dolphin [29]		Species or species habitat may occur within area
Steno bredanensis Rough-toothed Dolphin [30]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Dirk Hartog Island	WA
Francois Peron	WA
Freycinet, Double Islands etc	WA
Unnamed WA26400	WA

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Shark Bay East	WA

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-26.12083 113.22861

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix C Conservation Codes for Western Australian Flora and Fauna (DBCA, Jan 2018)

CONSERVATION CODE	CATEGORY
Threatened species (T)	Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under Section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act). ***Threated fauna*** is that subset of 'Specially Protected Fauna' listed under Schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna. ***Threatened flora*** is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threated Flora. The Assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below
Critically endangered species (CR)	Threatened species considered to be *"facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the criteria set out in the ministerial guidelines"*. Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.
Endangered species (EN)	Threatened species considered to be *"facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines"*. Listed as endangered under Section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

CONSERVATION CODE	CATEGORY
Vulnerable species (VU)	Threatened species considered to *be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines"*. Listed as endangered under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.
Extinct species (EX)	Species where *"there is no reasonable doubt that the last member of the species has died"*, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.
Extinct in the wild species (EW)	Species that *"is known only to survive in cultivation, captivity or as a naturalised population well outside its part range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form"*, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threated fauna or flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
Specially protected species	Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection. Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

CONSERVATION CODE	CATEGORY
Migratory species (MI)	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (Section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and the Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements of treaties, excluding species that are listed as Threated species. Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.
Species of special conservation interest (conservation dependent fauna) (CD)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.
Other specially protected species (OS)	Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CONSERVATION CODE	CATEGORY
Priority species (P)	Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Assessment of Priority codes in based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.
Priority 1 - Poorly-known species	Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases, or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
Priority 2 - Poorly-known species	Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from know threatening processes. Such species are in urgent need of further survey.

CONSERVATION CODE	CATEGORY
Priority 3 - Poorly-known species	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
Priority 4 - Rare, Near Threatened and other species in need of monitoring	(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Appendix D Relevé Field Sheets

STRUCTURAL VEGETATION, FLORA – Relevé										SITE_ID: R01
Date: 04/09/2019	GPS:	7	2	2	8	3	2	.7	E	Structural comm. type
	7	1	0	9	0	5	8	.7	N	*Acacia ligulata scattered shrubs*
Recorder: GM	Photo no. + direction: Figure 1 below									
Location: Sunday Island Bay DE 17										

Condition: Pristine Excellent Very Good **Good** Degraded Completely Degraded		
Aspect: N NE E SE **S** SW W NW	**Slope:** Flat Gentle **Mod** Steep	
Geology: Gran Lat **Lime** Other	**Rock:** **0** <2 2-10 10-20 20-50 >50	
Soil Colour: Grey Dark Brown Light Brown Orange/Brown Red/Brown **White** Yellow	**Soil Type:** C CL CLS CS L LS **S** SCL SL SP ZCL ZL ZS	
Litter (% cover & depth): **80% 2cm**	**Bare Ground (% cover):** **30 – 40%**	
Hydrology: **Good drain** Poor drain Wet all year Seas wet winter/spring	**Topographic position:** Upland Wetland Rock Outcrop Drainage Depression Creekline Riparian Bank Gully Plain Slope Lower **Slope Middle** Slope Upper Valley Flat	

Layer	Height (m)	Cover	Plant Species (Dominant 3 first)
Tree (T2)	10-30	NA	
Tree (T3)	< 10	NA	
Shrub (S1)	> 2	NA	
Shrub (S2)	1-2	<2%	*Acacia ligulata*
Shrub (S3)	0-1	>70%	*Thryptomene dampieri, Calandrinia polyandra, Senecio pinnatifolius*
Sedge/Rush (VR)		NA	
Herb (H)		NA	
Grass (G)		<2	*Poaceae* sp.
Other (climbers) (C)			

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% VV <2% E <5% Emergent * = Introduced

Surrounding plants: *Acanthocarpus preissii*

STRUCTURAL VEGETATION, FLORA – Relevé										SITE_ID: R02
Date: 04/09/2019	GPS:	7	2	3	0	3	9	.1	E	Structural comm. type
	7	1	0	9	0	8	0	.9	N	*Acacia ligulata*, *Thryptomene* dampieri & *Scaevola crassifolia low closed heath*
Recorder: GM	Photo no. + direction: Figure 2 below									
Location:										

Condition: Pristine Excellent **Very Good** Good Degraded Completely Degraded		
Aspect: N NE E SE **S** SW W NW	**Slope:** Flat Gentle **Mod** Steep	
Geology: Gran Lat **Lime** Other	**Rock:** **0** <2 2-10 10-20 20-50 >50	
Soil Colour: Grey Dark Brown Light Brown Orange/Brown Red/Brown **White** Yellow	**Soil Type:** C CL CLS CS L LS **S** SCL SL SP ZCL ZL ZS	
Litter (% cover & depth): 10% - 1cm	**Bare Ground (% cover): 20%**	
Hydrology: **Good drain** Poor drain Wet all year Seas wet winter/spring	**Topographic position:** Upland Wetland Rock Outcrop Drainage Depression Creekline Riparian Bank Gully Plain Slope Lower **Slope Middle** Slope Upper Valley Flat	

Layer	Height (m)	Cover	Plant Species (Dominant 3 first)
Tree (T2)	10-30	NA	
Tree (T3)	< 10	NA	
Shrub (S1)	> 2	NA	
Shrub (S2)	1-2	NA	
Shrub (S3)	0-1	>70%	*Acacia ligulata, Thryptomene dampieri, Scaevola crassifolia*
Sedge/Rush (VR)		NA	
Herb (H)		<2	*Senecio pinnatifolius*
Grass (G)		<2	*Poaceae* sp., *Spinifex longifolius*
Other (climbers) (C)			

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% VV <2% E <5% Emergent * = Introduced

Surrounding plants: *Diplolaena grandiflora, Acanthocarpus preissii, Alyxia buxifolia, Frankenia pauciflora, Crassula colorata*

Figure 3 Relevé 1

Figure 4 Relevé 2

STRUCTURAL VEGETATION, FLORA – Relevé										SITE_ID: R03
Date: 05/09/2019	GPS:	7	2	3	3	4	8	.96	E	Structural comm. type
	7	1	0	9	0	5	1	.64	N	
Recorder: GM	Photo no. + direction: Figure 5 below									*Acacia ligulata scattered shrubs*
Location:										

Condition: Pristine Excellent Very Good **Good** Degraded Completely Degraded	
Aspect: N NE E SE S **SW** **W** NW	**Slope:** Flat Gentle **Mod** Steep
Geology: Gran Lat **Lime** Other	**Rock:** **0** <2 2-10 10-20 20-50 >50
Soil Colour: Grey Dark Brown Light Brown Orange/Brown Red/Brown **White** Yellow	**Soil Type:** C CL CLS CS L LS **S** SCL SL SP ZCL ZL ZS
Litter (% cover & depth): 2cm	**Bare Ground (% cover): 20%**
Hydrology: **Good drain** Poor drain Wet all year Seas wet winter/spring	**Topographic position:** Upland Wetland Rock Outcrop Drainage Depression Creekline Riparian Bank Gully Plain Slope Lower **Slope Middle** Slope Upper Valley Flat

Layer	Height (m)	Cover	Plant Species (Dominant 3 first)
Tree (T2)	10-30	NA	
Tree (T3)	< 10	NA	
Shrub (S1)	> 2	NA	
Shrub (S2)	1-2	<2	*Acacia ligulata*
Shrub (S3)	0-1	>70%	*Thryptomene dampieri, Frankenia pauciflora, Atriplex bunburyana, Atriplex vesicaria, Swainsona* sp.
Sedge/Rush (VR)		NA	
Herb (H)			*Senecio pinnatifolius, Pembertonia latisquamea, Acanthocarpus preissii*
Grass (G)		NA	
Other (climbers) (C)		NA	

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% VV <2% E <5% Emergent * = Introduced

Surrounding plants:

STRUCTURAL VEGETATION, FLORA – Relevé										SITE_ID: R04
Date: 05/09/2019	GPS:	7	2	2	6	2	3	.7	E	Structural comm. type
	7	1	0	8	9	9	9	.8	N	*Diplolaena grandiflora and Acacia ligulata open heath*
Recorder: GM	Photo no. + direction: Figure 6 below									
Location:										

Condition: Pristine Excellent Very Good **Good** Degraded Completely Degraded	
Aspect: N NE E SE S **SW** W NW	**Slope:** Flat Gentle **Mod** Steep
Geology: Gran Lat **Lime** Other	**Rock:** **0** <2 2-10 10-20 20-50 >50
Soil Colour: Grey Dark Brown Light Brown Orange/Brown Red/Brown **White** Yellow	**Soil Type:** C CL CLS CS L LS **S** SCL SL SP ZCL ZL ZS
Litter (% cover & depth): **80%**	**Bare Ground (% cover):** **20%**
Hydrology: **Good drain** Poor drain Wet all year Seas wet winter/spring	**Topographic position:** Upland Wetland Rock Outcrop Drainage Depression Creekline Riparian Bank Gully Plain Slope Lower **Slope Middle** Slope Upper Valley Flat

Layer	Height (m)	Cover	Plant Species (Dominant 3 first)
Tree (T2)	10-30	NA	
Tree (T3)	< 10	NA	
Shrub (S1)	> 2	NA	
Shrub (S2)	1-2	30 – 70	*Diplolaena grandiflora, Acacia ligulata*
Shrub (S3)	0-1	30 – 70	*Scaevola* sp., *Diplolaena grandiflora, Atriplex vesicaria, Atriplex bunburyana, Thryptomene dampieri, Frankenia pauciflora*
Sedge/Rush (VR)		NA	
Herb (H)		2 – 10	*Senecio pinnatifolius, Acanthocarpus preissii, Spinifex longifolius*
Grass (G)		NA	
Other (climbers) (C)		NA	

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% VV <2% E <5% Emergent * = Introduced

Surrounding plants:

Figure 5 Relevé 3

Figure 6 Relevé 4

STRUCTURAL VEGETATION, FLORA – Relevé										SITE_ID: R05
Date: 05/09/2019	**GPS:**	7	2	2	3	3	8	.0	**E**	**Structural comm. type**
	7	**1**	**0**	**8**	**8**	**9**	**7**	**.4**	**N**	
Recorder: GM	**Photo no. + direction: Figure 7 below**									*Acacia ligulata scattered shrubs.*
Location:										

Condition: Pristine Excellent Very Good **Good** Degraded Completely Degraded	
Aspect: N NE E SE **S** SW W NW	**Slope:** Flat **Gentle** Mod Steep
Geology: Gran Lat **Lime** Other	**Rock: 0** <2 2-10 10-20 20-50 >50
Soil Colour: Grey Dark Brown Light Brown Orange/Brown Red/Brown **White** Yellow	**Soil Type:** C CL CLS CS L LS **S** SCL SL SP ZCL ZL ZS
Litter (% cover & depth): 90 – 95%	**Bare Ground (% cover): 5%**
Hydrology: Good drain Poor drain Wet all year Seas wet winter/spring	**Topographic position:** Upland Wetland Rock Outcrop Drainage Depression Creekline Riparian Bank **Gully** Plain Slope Lower Slope Middle Slope Upper Valley Flat

Layer	**Height (m)**	**Cover**	**Plant Species (Dominant 3 first)**
Tree (T2)	10-30	NA	
Tree (T3)	< 10	NA	
Shrub (S1)	> 2	NA	
Shrub (S2)	1-2	<2	*Acacia ligulata*
Shrub (S3)	0-1	>70%	*Frankenia pauciflora, Atriplex bunburyana*
Sedge/Rush (VR)		NA	
Herb (H)		NA	
Grass (G)		<2	*Poaceae* sp.
Other (climbers) (C)			

Cover Codes: D >70% M 30-70% S 10-30% V 2-10% VV <2% E <5% Emergent * = Introduced

Surrounding plants: *Pembertonia latisquamea, *Hypochaeris* sp., Thistle sp.

Figure 7 Relevé 5

Appendix E

Consolidated Flora List

LOT 304 DIRK HARTOG ISLAND
CONSOLIDATED FLORA SPECIES LIST
(Sources: Lantzke, 2008; Ecosystem Solutions, 2020)

Acacia coriacea subsp. coriacea
Acacia ligulata
Acacia sp(1)
Acacia sp(2)
Acanthocarpus preissii
Acanthocarpus ?robustus
Alyxia buxifolia
Atriplex bunburyana
Atriplex vesicaria
Austrostipa elegantissima
Bossiaea spinescens
Calandrinia polyandra
Calandrinia polyandra
Chenopodium cristate
?Coastal succulent
Crassula colorata
*Cynodon dactylon
Danthonia sp.
Dicrastis sp. (white flower)
Diplolaena grandiflora
?Eragrostis sp.
Eremophila glabra (red flowering)
?Eriochne sp.
Euphorbia sharkoensis
Exocarpus aphyllus
Frankenia pauciflora
*Hypochaeris sp.
Nitraria scholberi
Pembertonia latisquamea
Pimelea microcephala
Pittosporum phylliraeoides
Poaceae sp.
Rhagodia sp.
Scaevola crassifolia
Scaevola sp
Senecio pinnatifolius
Spinifex longifolius
Swainsona longicarinata
Swainsona sp.
*Thistle sp.
Thryptomene baeckeacea
Thryptomene dampieri
Zygophyllum fruticulosum

(* = weed species)

Appendix F

Site and Soil Evaluation (Wells, 2023)

SITE AND SOIL EVALUATION
(On-Site Effluent Disposal)
Lot 304 Sunday Island Bay
Dirk Hartog Island.

Prepared for

DHI Developments Pty Ltd

for submission to

Shire of Shark Bay

by

Martin Wells,

former Principal Consultant

Land Assessment Pty Ltd

31 July 2023
Update of:
LA Report No 2020
16 October 2020

LAND ASSESSMENT PTY LTD
P.O. Box 117 SUBIACO, WA 6008
Phone: 041 7900 724
Email: landass@iinet.net.au

PREFACE

This report is an updated version of the Site and Soil Evaluation of Lot 304 Dirk Hartog Island undertaken by myself as principal consultant of Land Assessment Pty Ltd in 2020. The update is necessary in response to the following changes in the proponent's development proposal since 2020:

- Building envelopes have been reduced to 8,
- The area of each building envelope is now approx. 2,300 m^2 ,
- The chalets are in clusters of 3-5 within the building envelopes,
- There can be no more than 33 chalets in total within Lot 304,
- Each chalet can only have 4 persons,
- The total number of visitors and staff permitted on site is 100, and
- The building envelopes are at least 36m from the front boundary of Lot 304 and 100 m from the marine highwater mark.

The changes are reflected in this updated report.

Martin Wells
(now retired)
former Principal Consultant
Land Assessment Pty Ltd

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A Plan Showing Proposed Building Envelopes
B Wastewater System Loading Rates
C AS 1547 Recommended Design Loading Rates for Trenches
D Site Data and Photographs
E Fuji Clean Brochure
F Approved Leach Drains (with infiltrative areas)
G Schedule 2 from Government Sewerage Policy

1.0 PROJECT DEFINITION

1.1 Background and Objective.

A plan showing proposed building envelopes has been prepared for Lot 304 Sunday Island Bay by planners Michael Glendenning Property on behalf of DHI Developments Pty Ltd (Attachment A).

The proposal is for an eco-tourism leisure development ultimately comprised of 33 short-stay accommodation units. The accommodation units are to be established during a staged development period.

At the initial stage, eight building envelopes of approximately 2300 m^2 have been located on the attached plan. Up to five accommodation units (chalets) are ultimately proposed be located within each envelope, with no more than a total of 33 chalets across the total site (Lot 304). Each of the eight building envelopes are planned to contain a single Aerobic Treatment Unit for the on-site management of sewage.

In response to submission of an earlier draft Local Development Plan (LDP) the Shire of Shark Bay have advised, among other matters, that a 'Site and Soil Evaluation' (SSE) was required in accordance with the Government Sewerage Policy (State Government of Western Australia 2019).

The objective of this updated report is to further address the SSE requirement. It is to determine the capability of Lot 304 to accommodate systems for on-site effluent disposal without endangering public health or the environment. This in the context of the total proposed updated development, that is, with eight building envelopes ultimately containing up to 5 chalets each, subject to an overall total of 33 chalets for Lot 304.

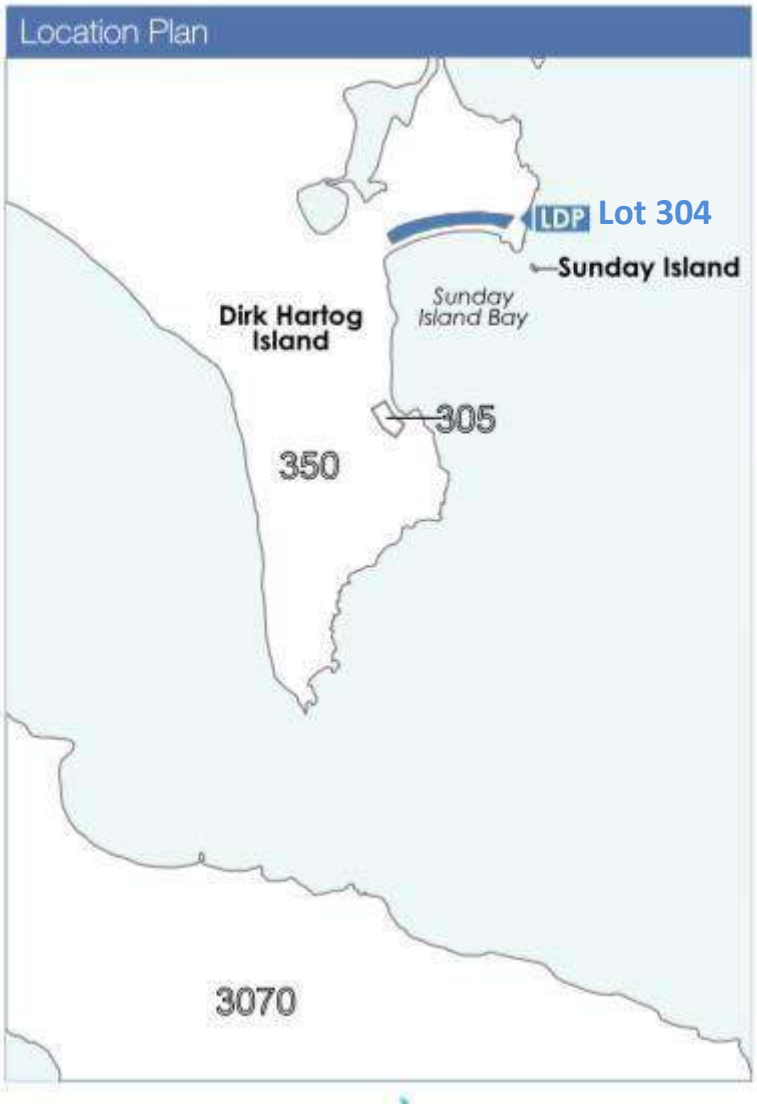
Furthermore, the proponent advises that chalets will be limited to a maximum occupancy of 4 persons, and with a total of only 100 persons (visitors and staff) accommodated within Lot 304 at any one time.

1.2 Location

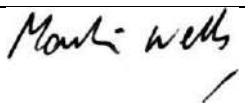
The subject land, Lot 304 Sunday Island Bay, is located on the southeast coast of Dirk Hartog Island within the Shire of Shark Bay. It is approximately 35 km in a straight line from Denham.

Lot 304 is an isolated 11.295 ha area of freehold land within the edge of the Dirk Island National Park and the adjacent Shark Bay Marine Park. It occurs within the boundary of the Shark Bay World Heritage Area.

Access to Dirk Hartog Island is via either a private boat (approximately 35 km trip from Denham), a commercial barge service from near Steep Point, or by light aircraft charter. Once on the island, a high clearance four-wheel drive vehicle is required to access Lot 304.

	 **FIGURE 1: LOCATION OF LOT 304**
1.3 Local Planning Context	Shire of Shark Bay (LPS No 4) Special Use Zone SU14 The objective of SU14 is to provide for eco-tourism development. A Local Development Plan is required, and no subdivision is permitted.
1.4 Proposed Treatment and Disposal Systems	A single Aerobic Treatment Unit (with nutrient retention ability) for each of the eight building envelopes – and with each of these ATU's servicing up to 5 chalets. Subsequent on-site disposal of secondary treated effluent within each building envelope to be via leach drains.

1.5 Expected Wastewater Volumes	The Department of Health's factsheet *Supplement to Regulation 29 and Schedule 9 – Wastewater system loading rates* (Attachment B) provides predicted human waste loading rates for various land use types. For ecotourism accommodation facilities, the expected wastewater volume (blackwater and grey water combined) is 140 L per person per day. Based on the proponent's update of information provided within the earlier *Sunday Island Bay Environmental Report* (Hypermarket Pty Ltd 2014) the 33 accommodation units (chalets) are to be short-stay facilities with each able to accommodate a maximum of four persons, but subject to an over-riding limit of 100 persons (visitors and staff) permitted within Lot 304 at any point in time. Based on maximum occupancy (4 persons per chalet) the expected maximum wastewater volume for each chalet is 560 L per day (i.e. 4 x 140 = 560) and hence the maximum wastewater volume for any individual building envelope (with up to 5 chalets) is 2,800 L per day. Given the over-riding limit of 100 persons able to be accommodated within Lot 304 at any one time, the maximum cumulative daily wastewater volume across Lot 304 is 14,000 L/day (140 L/day X 100 persons). It should be noted that, in contrast to standard residential premises, the accommodation units (chalets) are not occupied all year round.
1.6 Intended Water Supply	The proponent advises that water for the operation of the short-term accommodation units (chalets) is to be provided from a combination of • Rainwater – harvested from each unit's roof runoff, • Water carted to the site, and • Groundwater – pumped from existing wells at either 'West Wells', or 'Two Wells' with both sites located some kilometers away from Lot 304. If necessary, the use of brackish (non-potable) groundwater for toilet flushing is not considered a constraint for the functioning of Aerobic Treatment Units.

2.0 SITE EVALUATOR DETAILS (as at date of original 2020 report)	
Name & Company	Martin Wells Land Assessment Pty Ltd ABN: 30 759 556 427
Qualifications & Experience	B Agric Sc (1st hons) 30 years Soil Survey and Land Evaluation - including; Eight years with the former Department of Agriculture developing land capability assessment systems and undertaking land resource surveys (including coastal areas within the nearby Shire of Carnarvon), and Twenty-two years as an independent consultant focusing on environmental impacts of land development requiring on-site effluent disposal. This includes consulting to the Parks and Wildlife section of DBCA for development of sewage management options for tourism facilities within various WA coastal parks and reserves. (Wedge Is and Grey within Shire of Dandaragan, William Bay NP within Shire of Denmark, and Lucky Bay within Shire of Esperance).
Contact Details	Unit 5, 27 York St SUBIACO WA 6008 P.O. Box 117 SUBIACO WA 6008 Mob: 041 7900 724 landass@iinet.net.au www.landassessment.com.au
Disclaimer	This report has been prepared for DHI Developments Pty Ltd and remains the property of Land Assessment Pty Ltd. It has been prepared to address the requirements of the *Government Sewerage Policy* (Government of Western Australia 2019) for a Site and Soil Evaluation in general accordance with the *Australian Standard AS/NZS 1547:2012* and with consideration of the stage of the development proposal in the planning process. The report is based on this consultant's research and field investigation (March 2020), as well as information extracted from the client's environmental report (Hypermarket Pty Ltd 2014) and subsequent updates. Any conclusions orrecommendations in the report are made in good faith and no responsibility is taken for how information in the report is subsequently used by others.
Signature	

3.0 PROJECT AREA OVERVIEW	
3.1 Geology	Playford et al (2013) describe the geology of Dirk Hartog Island as consisting of sand dunes of Holocene to late Pleistocene age overlying Pleistocene eolian limestone (Tamala limestone). The Tamala Limestone forms precipitous cliffs up to 150 m high on the west coast of the island, and discontinuous cliffs and headlands up to 30 m high on the east coast. The sand dunes which mantle the Tamala Limestone in the vicinity of Sunday Island Bay are part of the Carrarang Sand system which typically consists of pale coloured, weakly lithified, calcareous sands. The sands form into various types of dunes including parabolics (long and scoop shaped) that are common on Dirk Hartog Island as well as much of the Edel Land Peninsula on the mainland to the south.
3.2 Land Systems	A land system is 'an area or group of areas throughout which there is a recurring pattern of topography, soils and vegetation'. *An Inventory and Condition Survey of Rangelands in the Carnarvon Basin* (Payne et al 1978) provides mapping of land systems, which includes Dirk Hartog Island, and is at a publication scale of 1:250,000. with the Edel and Coast land systems The broad-scale mapping by Payne et al (1978) shows Lot 304 as part of the Edel land system which is described as '*Undulating sandy plains with occasional dunes, limestone rises and saline flats; low acacia shrublands with some saltbush and heath communities.'* With the benefit of more detailed aerial photography and site-specific observations, Lot 304 is considered here to be more correctly described as part of the Coast land system which also shown by Payne et al (1978) as occurring extensively over the island. Coast land system is described as '*Strongly developed coastal dunes with narrow swales, limestone plains, wave-cut platforms and beaches, supporting diverse tall and low shrublands*.'
3.3 Topography	Figures 2a and 2b overleaf show Lot 304 as an elongated strip of undulating dune terrain parallel to, and starting approximately 75 m inland from, the coastal highwater mark. Gentle gradients (less than 10%) occur on upland crests and within swales, while gradients on the dune side-slopes are predominantly moderate (10 – 15%) with minor areas extending to 20 – 25%. Detailed 0.5 m contour interval mapping of Lot 304 by surveyors Harley Dykstra (not included here) show the elevation ranges from a low point of 2.4 m AHD in the southwestern corner, to a high point of 20.5 m AHD along the northern boundary.

Topography - continued

FIGURE 2A: TOPOGRAPHY (with 2 m contour intervals)

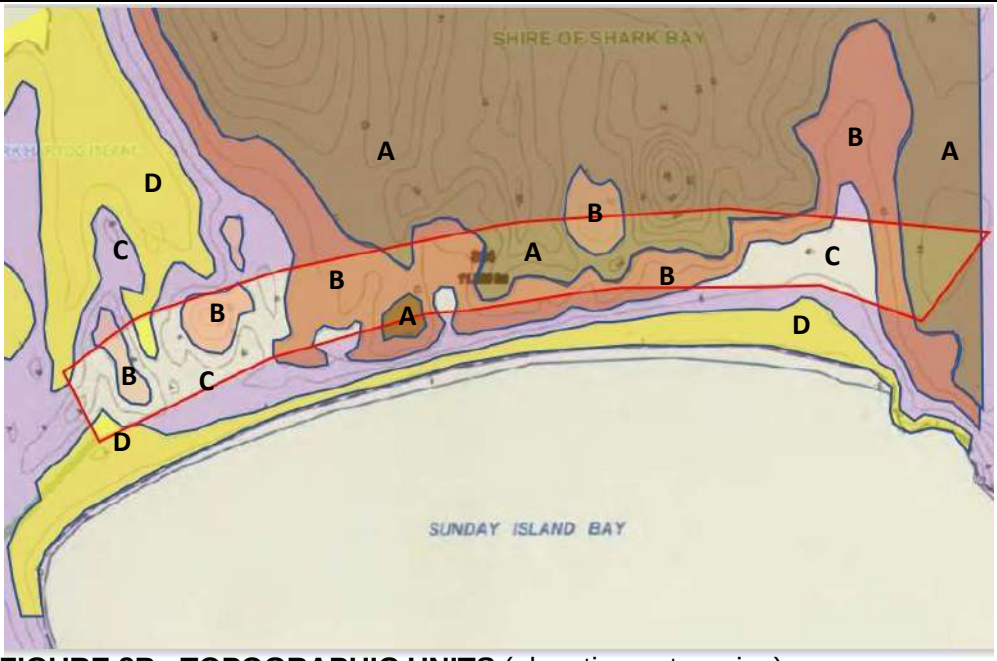


FIGURE 2B: TOPOGRAPHIC UNITS (elevation categories).

Topographic unit A: 12 m AHD and higher

Topographic unit B: 8 - 12 m AHD

Topographic unit C: 4 – 8 m AHD

Topographic unit D: less than 4 m AHD

3.4 Vegetation

Vegetation across Lot 304 is described by Ecosystem Solutions (2019) as: '*Scattered shrubs of Acacia ligulata, over Open Heath in some areas of Diplolaeana grandiflora and Acacia ligulata, over Low Closed Heath of Thryptomene baeckeacea, Frankenia pauciflora, Acacia ligulata, Atriplex bunburyana and Atriplex vesicaria'.*

3.5 Hydrology and Marine Setback	Lot 304 is internally draining with no surface runoff. This is the result of low annual rainfall, a high annual pan evaporation rate, and a surface cover of highly permeable sand. There are no watercourses or wetlands, and the land is not within a Public Drinking Water Supply Area (PWDSA). Figure 3 overleaf shows the position of Lot 304 and its proposed building envelopes relative to the marine high-water mark. The Government Sewerage Policy (GSP) does not identify a specific setback distance for sewage management systems from the marine environment. It does however nominate a 100 m setback for a 'significant wetland' which could apply to the marine reserve. The GSP also defers to the Department of Biodiversity, Conservation and Attractions (DBCA) for site- specific advice within areas such as the Shark Bay Marine Park where it has management responsibility.
3.6 Ground-water	There are no existing bores or wells within Lot 304, or in proximity. The *Sunday Island Bay Environmental Report* (Hypermarket Pty Ltd 2014) provides anecdotal evidence that '*based on the depth of existing wells on the east coast of Dirk Hartog Island the groundwater is between 10 m and 25 m below the proposed building and infrastructure sites* (within Lot 304)'. Based on the topography, the permeability of sand-dunes, and the underlying Tamala Limestone, downward percolating rainwater could conceivably travel as temporarily perched groundwater towards the marine environment. Whether or not any effluent from ATU systems within the building envelopes ultimately reaches the marine environment would be influenced by the highwater setback distance, and possibly also by evapotranspiration within the intervening vegetated foreshore.
3.7 Required Conditions	The general site conditions required for on-site sewage management under the Government Sewerage policy (GSP) and the existing Health Regulations, are summarized in Table 1. Lot 304 is occurring within the Shark Bay World Heritage Area and a designated 'sewage sensitive area' (www.espatial.dplh.wa.gov.au). There is therefore an expectation that environmental standards of the highest order should be applied (Shark Bay World Heritage Committee 2020). In response to an earlier development proposal for Lot 304 the Environmental ProtectionAuthority advised that septic (primary treatment) systems do not comply'best practice' principles. It therefore recommended Aerobic Treatment Units (or similar, secondary treatment systems) be installed for on-site sewage management on Dirk Hartog Island (EPA 2015).

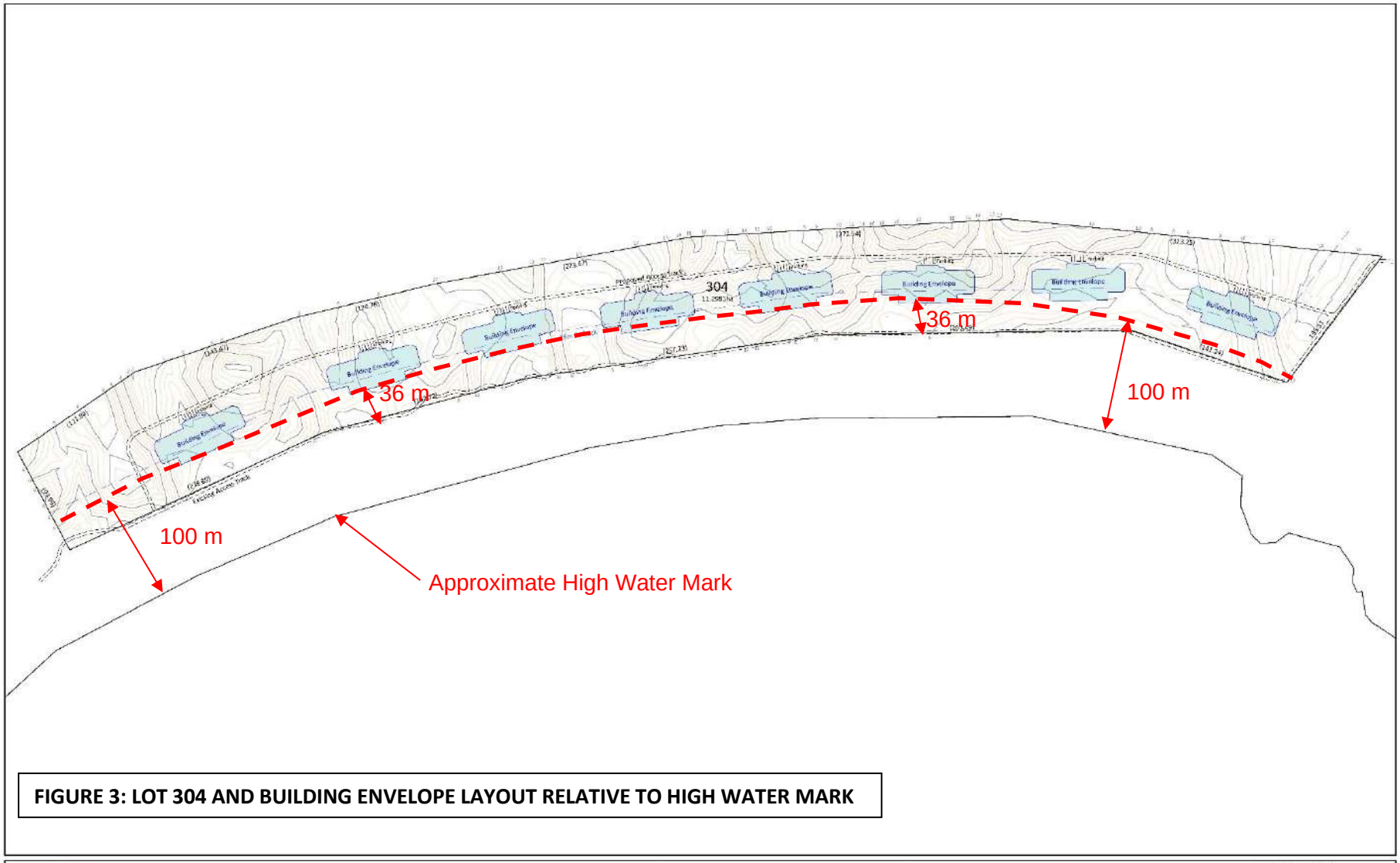


FIGURE 3: LOT 304 AND BUILDING ENVELOPE LAYOUT RELATIVE TO HIGH WATER MARK

Table 1: General Site Requirements for On-Site Sewage Disposal

Site Feature	Minimum Requirement in Sewage Sensitive Areas
Separation from groundwater	For sands, the discharge point of the on-site sewage system (land application area) should be at least 1.5 meters above the highest groundwater level. Where a nutrient retentive secondary treatment system is used, at least 0.6 m.
Site drainage	Land is not to be subject to inundation or flooding at probability greater than once in 10 years
Setback from marine environment	The GSP does not specifically address setbacks from the marine environment although it requires 100 m from any 'significant wetland'. The policy enables smaller setbacks to be considered where a proponent can demonstrate to responsible authorities (in this case, the Department of Biodiversity, Conservation and Attractions), that reduced setbacks will not have a significant impact on the (marine) environment. The GSP also states that *in seeking a reduced setback, it is likely that secondary treatment systems with nutrient removal will be required.* The Draft Country Sewerage Policy (released in 2002, amended 2003), although superseded by the GSP, specifically addressed the marine setback as follows; <u>Conventional septic systems (primary treatment)</u>: 100 m where soil type has a phosphorous retention index (PRI) < 5, and 30 m if soil type has a PRI > 5. <u>Alternative Systems (secondary treatment) with ability to remove phosphate</u>: • 30 m regardless of soil type / PRI **<u>Note</u>: In addressing proximity of sewage management systems to the marine environment in a World Heritage Area, it is assumed here that DBCA advice would be consistent with that of the EPA (2005) in requiring secondary treatment systems (ATUs) and a 100 m setback**.
Setback from watercourses	100 m from a waterway.
Setback from bores used for drinking water purposes.	"Effluent or liquid wastes will not be discharged into the ground at a distance less than 30 m from any well, stream or underground source of water intended for consumption by humans" (Health Regulations - No 49).
Land application area and maintenance.	Each lot (building envelope in this case, each with a single ATU system servicing up to five chalets) to be of sufficient size to accommodate development and an unencumbered land application area determined in accordance with Schedule 2 of the policy (this requires consideration of soil category, and hydraulic load). The land application area should be kept free of any temporary or permanent structures. It should not be built on or paved in a manner which precludes reasonable access, and not be subject to vehicular traffic or regular foot traffic.
Gradient	Where slope exceeds one in five (1:5 or 20%), the land application area should be engineered to prevent run-off.
Setback from buildings etc.	1.8 m from buildings, boundaries, and treatment apparatus.
Lot sizes	A 'case by case assessment' for strata lot for an approved grouped dwelling or commercial development, owned and operated by a single person or entity.
Type of treatment system	Secondary treatment systems with nutrient removal will generally be required in sewage sensitive areas. In remote areas, the availability of maintenance personnel is to be considered.

4.0 EVALUATION OF LOT 304 AND ITS SOILS

4.1 Method

Nineteen soil observation sites were strategically located within, or in the vicinity of Lot 304 after consideration of;

- the range in topographic units within Lot 304 (Figure 2b),
- the nature of terrain adjacent to Lot 304, and
- the nature of intervening terrain between Lot 304 and the beach.

The locations of soil observation sites are shown in Figure 4, along with rationale for their positioning.

At most sites (within sand dunes on Lot 304) a shallow pit was excavated to approximately 50 cm depth using a shovel. Observation and sampling of the deeper subsoil was achieved using a fluted metal probe sledge-hammered in to approximately 150 cm depth.

Observation and sampling of the sandy soils beyond 150 cm depth could not be achieved in the absence of a backhoe (or similar machine) and their extraction by an extended hand auger was thwarted by their loose consistency.

The uniformly dry sandy soils were described in-situ in terms of landform position, soil texture, colour, depth and calcareousness. Samples were taken for determination of pH and salinity (Electrical Conductivity) using a combined pH and conductivity meter (Eutech PCTestr 35).

All of the current eight building envelopes occur above 7 m AHD and hence at a significant elevation above the underlying Tamala limestone. Given this, and the homogeneous nature of the sandy soils, samples at 150 cm depth are considered sufficiently representative of the subsoil into which any on-site disposal of treated effluent would occur.

Ten subsoil samples were taken and delivered to the CSBP Soil and Plant Analysis Laboratory in Perth for determination of soil phosphorus retention ability (PRI) as well as additional pH and salinity (EC) measurements. The samples were representative of the range of receiving environments (topographic units) for land application of effluent within Lot 304.

The sandy soils were classified in accordance with the 'Soil Group' nomenclature(Schoknecht and Pathan 2013) of the Department of Primary Industries and Regional Development (DPIRD). Indicative subsoil permeability was determined for each site based on soil texture within the nominal depth for leach drains or subsoil irrigation (approx. 20 – 80 cm) as per Table L1 of the Australian Standards for *On-site Domestic Wastewater Management* (AS 1547 - refer Attachment C).

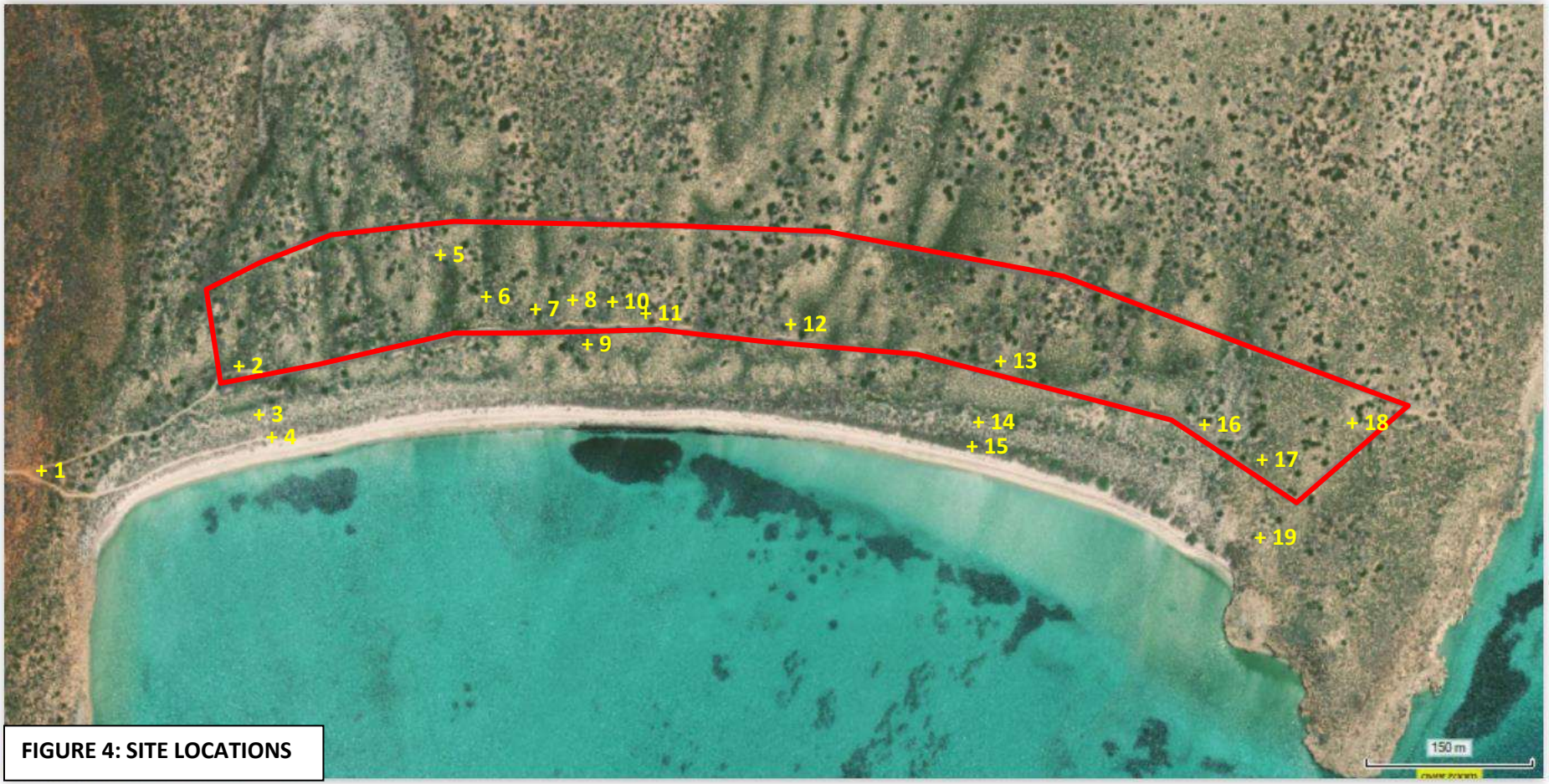


FIGURE 4: SITE LOCATIONS

Site 1: to the west of Lot 304 within markedly different terrain (shallow limestone, and typical of Edel rather than Coast land system). **Site 2**: within lowest area of Lot 304 (a lowland swale - topographic unit D). **Sites 3 - 4**: outside Lot 304 as part of a transect to the beach. **Sites 5 - 8, 10 -13, 16 - 17**: within, or in proximity to, the proposed eight building envelopes (topographic units B and C). **Site 9**: outside Lot 304 (an upland swale within topographic unit C). **Sites 14 -15**: outside Lot 304 as part of a transect to the beach. **Site 18**: within Lot 304 to encompass a representative area of topographic unit A. **Site 19**: outside Lot 304 within markedly different terrain (shallow limestone associated with coastal headland).

4.2 Results	Attachment D provides a collation of the site data (field and laboratory) and photographs. Table 2 provides an interpreted summary for each of the four topographic units shown in Figure 2b. Topographic units A, B and C shown in Figure 2b encompass most of Lot 304 with elevated undulating parabolic dunes that are roughly aligned inland and perpendicular to the coast. The soils here are consistently deep, rapidly drained, pale calcareous sands but with slightly darker variants within upland swales or depressions. Sampling and analysis of the soils in these units show they most commonly have a 'moderate' PRI (phosphorus retention index) indicating a modest ability to filter and retain nutrients from effluent. Beyond the southern boundary of Lot 304 the foredunes and secondary dunes aligned parallel to the beach contain sands with a very low PRI (i.e. limited ability to filter and retain nutrients). Topographic unit D represents a small area of lower-lying swale (depression) within the southwestern portion of Lot 304. The soil profile here, at site 2 (Attachment D, photo 3) shows a typical slightly darker calcareous sand for a swale up to 60 cm depth, then a buried weathering layer (strong brown sand) over rock (presumed limestone). Groundwater, or evidence of any long-term persistence of a perched water-table, was not encountered within any of the observed sites. This includes site 2 at the lowest portion of Lot 304 (Topographic unit D). The buried rock / limestone layer observed at site 2 could however potentially impede downward percolation of rainwater (or effluent) for short periods. As this underlying rock layer is likely to extend towards the coast it could conceivably provide a pathway for movement of effluent towards the marine environment. The potential for this scenario should however be considered in the context of the level of treatment (secondary, with nutrient removal) for the effluent and the potential for its interception via plant uptake and evapotranspiration within the intervening vegetated foreshore terrain between Lot 304 and the beach.

TABLE 2: SUMMARY OF SOIL CONDITIONS FOR TOPOGRAPHIC UNITS

Topo Unit (elevation range)	Soil	Perm-eability	pH	Salinity	Soil PRI (no of samples)	Ground water (highest)
A (> 12 m AHD)	Calc deep sand	> 3 m/day	Moderately Alkaline	Non-saline	-	> 2 m depth
B (8-12 m)	Calc deep sand	> 3 m/day	Moderately to Strongly Alkaline	Slightly or Non-saline	Moderate (3) to Low (1)	> 2 m depth
C (4-8 m)	Calc deep sand	> 3 m/day	Moderately Alkaline	Slightly or Non-saline	Moderate (1)	> 2 m depth
D (< 4m)	Calc shallow sand over l'stone	> 3 m/day until limestone.	Moderately to Strongly Alkaline	Moderate to Highly saline	Moderate (1)	Possibly perched at 80 cm depth for short periods.
Outside Lot 304 towards beach - 2° dune	Calc deep sand	> 3 m/day	Moderately to Strongly Alkaline	Slightly or Non-saline	Very low (1)-	-
Outside Lot 304 towards beach – incipient 1° dune.	Calc deep sand	> 3 m/day until saturated zone or limestone	Moderately Alkaline	Variable - Highly saline to non-saline	Very low (2)	-

4.3 Land Capability Assessment

The topographic units shown in Figure 2b provide an appropriate geomorphic framework for land capability assessment.

'Land capability' is a term referring to the ability of land to support a proposed change in use with minimal risk of degradation to soil and water resources. A general method for land capability assessment is described by van Gool et al (2005), and Wells and King (1989). A five-class system (from very high to very low capability) is used to express the degree of fit between land use requirements and the inherent environmental conditions of the subject land.

The general requirements for the proposed use, 'on-site sewage management' within Lot 304 are outlined in Table 1. Figure 5 presents the results of a consideration of those requirements against the conditions within each of the four topographic units.

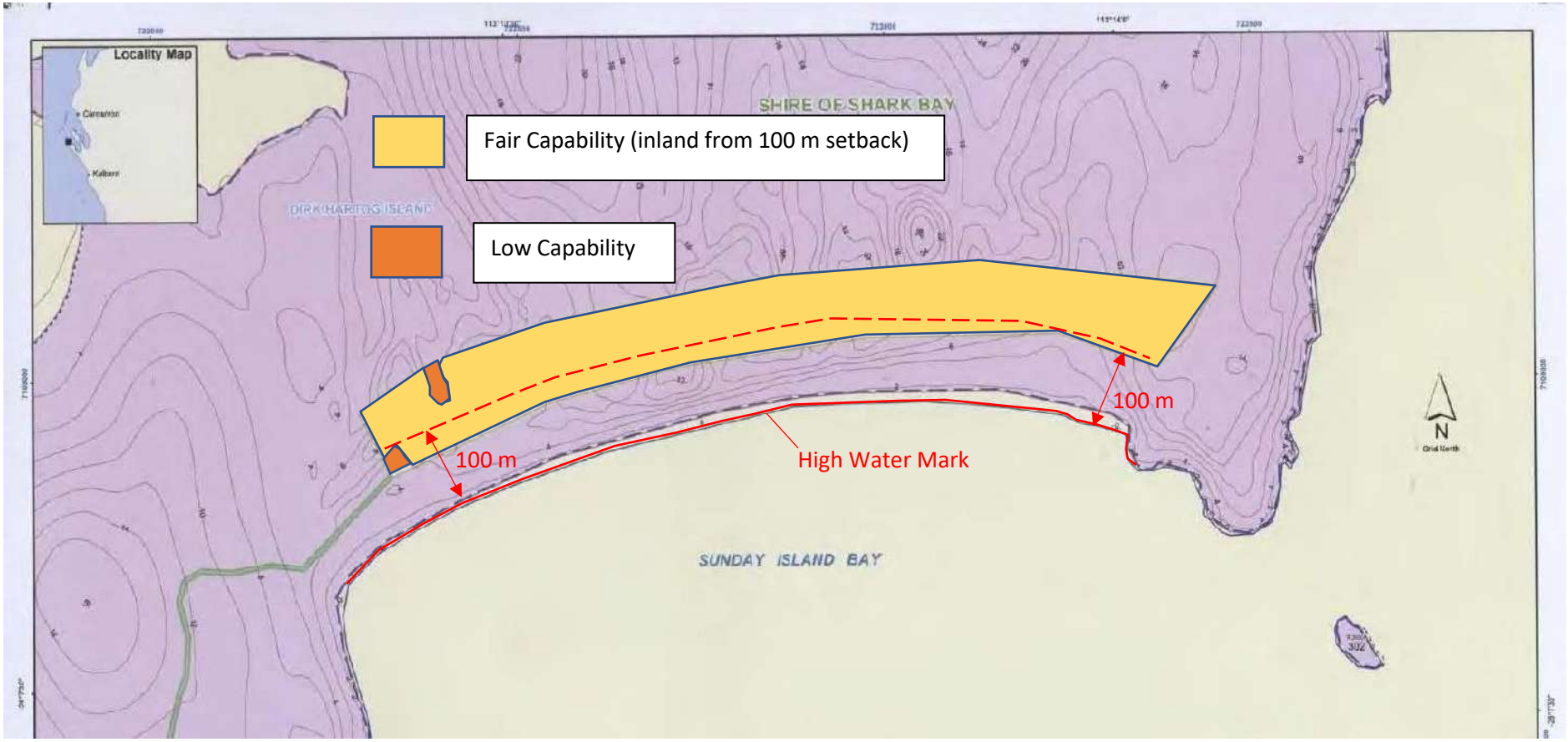


FIGURE 5: LAND CAPABILITY FOR ON-SITE EFFLUENT DISPOSAL

4.3 Land Capability Assessment - continued

The capability assessment results in Figure 5 are further outlined as follows;

Topographic Units A, B and C

1. These areas dominate Lot 304 and have an inherently 'Fair' (class 3) capability to support on-site sewage disposal.

2. They are subject to moderate limitations relating to the modest ability of the rapidly drained sandy soils to retain nutrients and to purify effluent of microbial contaminants.

3. Any risk to public health or the environment posed by these limitations could be addressed by;

- *Adopting the EPA recommendation for use of Health Department approved secondary treatment systems (also known as Aerobic Treatment Units, ATUs) for all accommodation units, and*

- *Ensuring any land application areas (e.g. leach drains) for disposal of effluent arising from the ATUs are located at a distance of greater than 100 m from the marine environment (see Figures 3 and 5).*

Topographic Unit D

1. This unit occurs in only a small portion of Lot 304 and has an inherently 'Low' (class 4) capability to support on-site sewage disposal.

2. This limited area is subject to significant limitations relating to the presence of an underlying rock/ limestone layer at less than 1 m depth. In the event of a very high rainfall event, or a high hydraulic effluent loading, this restrictive layer has the potential to cause subsoil waterlogging and create a possible horizontal transport pathway for effluent to reach the marine environment.

4. Any risk to public health or the environment posed by this limitation could be addressed by;

- *Avoidance of low-lying Topographic unit D for any form of effluent disposal.*

5.0 OTHER CONSIDERATIONS

5.1 Benefits and Drawbacks of ATUs.

In recognition of the importance of protecting environmental values within the Shark Bay World Heritage Area, and in response to Environmental Protection Authority advice (EPA 2015), the proponent has committed to the use of secondary treatment systems (ATUs) for sewage management at each of the 33 proposed accommodation units.

ATUs are electrically driven units involving aeration as an integral part of the treatment process followed by clarification to achieve secondary treatment of sewage / wastewater. The clarified effluent can then be disinfected by chlorination (a requirement if the effluent is to be subsequently applied to land surface by irrigation).

After treatment, the liquid effluent from an ATU can be directed to an irrigation area (surface or subsurface) or to leach drains for on-site disposal. (Note: The latter is considered desirable within Lot 304 due to lower maintenance input and ease of installation).

Any ATU system for use in Western Australia requires the approval of the Department of Health and a list of approved systems is available online at https:/ww2.health.wa.gov.au.

The proponent has identified a preference for a Fuji Clean wastewater treatment system and that manufacturer's ACE 3000 model is currently listed as a WA Health Department approved system.

Benefits of ATUs

- ATUs typically produce effluent of a higher quality* with lower BOD, lower suspended solid levels, and much lower faecal coliform levels compared to the effluent produced by septic tanks.

* Attachment E contains a brochure for the Fuji Clean ACE 3000 model which includes statements on output effluent quality.

Drawbacks of ATUs

- ATUs are more complex and expensive than conventional septic tank systems.

- ATUs rely on constant aeration and require a continuous source of power and regular maintenance.

	- ATUs must be serviced by an authorised service person on a regular basis (usually quarterly) as per the conditions of product approval issued by the Department of Health. The above factors can pose challenges for the use of ATUs in remote areas. Although not specifically addressed in this report other sewage management options for remote areas, particularly where protection of environmental values is paramount, include; • Waterless composting toilets, • Incinerating toilets, and • Sealed vault systems The latter are commonly used for commercial scale / public use facilities and consist of a non- flush toilet with a sealed container to receive the waste until it can be pumped out (or replaced whole) and transported to a licensed disposal facility. It should be noted that all of these options require an additional system for the treatment and disposal of greywater (i.e. water from kitchen and bathroom sinks, showers and washing machines).
5.2 Determining Land Application Areas	A land application area (LAA) is the designated area of land within a building envelope where the effluent from a treatment system is applied into or onto the ground. Land-application systems fall into two broad categories: • Soil absorption systems (e.g. leach drains – or absorption trenches or mounds as referred to in AS 1547). • Irrigation systems (e.g. covered surface drip irrigation, shallow subsurface irrigation, or above ground spray irrigation). Leach drains are considered preferable within Lot 304 due to their lower maintenance input and ease of installation. Determining an indicative size of the land application areas for accommodation units is necessary to demonstrate the ability of proposed building envelopes to physically accommodate systems for on-site sewage management. The plan in Attachment A shows eight building envelopes of 2300 m^2 size. Each envelope needs to accommodate the land application area from a single ATU system serving a cluster of up to five chalets.

Schedule 2 of the Government Sewerage Policy outlines a method for determining an indicative land application area for each accommodation unit (chalet). It involves estimating the hydraulic load (L/day) and multiplying this by a conversion factor that has been determined from the Australian Standardsdocument *AS/NZS 1547 On-site domestic wastewater management*.

Hydraulic Load

Hydraulic load is determined from the occupancy rate (persons) x design loading rate (L/person/day).

As described in section 1.5 of this report the Department of Health's factsheet *Supplement to Regulation 29 and Schedule 9 – Wastewater system loading rates* (Attachment B) provides design loading rates. For ecotourism accommodation facilities this is 140 L per person per day.

Based on maximum occupancy rate (4 persons per chalet) the expected hydraulic load (total wastewater volume) for each chalet is 560 L per day (i.e. 4 x 140 = 560). With up to 5 chalets being serviced by a single ATU, the maximum hydraulic load within each of the building envelopes is 2,800 L per day.

Conversion Factor

Table 2 within Schedule 2 of the Government Sewerage Policy shows the applicable conversion factor is 0.2. That is, for secondary treatment systems within sands.

Indicative Land Application Area

In accordance with the method in Schedule 2 the indicative / minimum* required land application area for each building envelope is;

hydraulic load (2,800 L/day) X conversion factor (0.2) = 560 m^2

* In practice the actual land application area will be influenced by factors such as the type of disposal system (irrigation or leach drains), the type of leach drain (and hence the specified infiltrative area per m length), spacings between drains, and building setback requirements. System designers and Installers will take these factors into consideration and size the area in accordance with Regulation 49 of theHealth Regulations (1974).

Ability of Building Envelopes to Accommodate LAAs

Given the 2,300 m^2 size of each building envelope, the minimum required land application area of 560 m^2 can be accommodated.

5.3 Cumulative Impacts	The potential cumulative impact of onsite effluent disposal to the waters of the marine reserve cannot be quantified here. This is because the existing pre-development hydraulic load from rainfall ultimately reaching the local marine environment via Lot 304 is unknown (if any, given the low rainfall and high evaporation). It is speculated that the underlying limestone layer encountered at site 2 within the lowest portion of Lot 304 could be part of a more extensive rock platform beneath the dunes. The limestone rock could conceivably act as a 'perched groundwater' pathway towards the marine environment. Based on the topography, and the permeable sand-dunes being underlain by Tamala Limestone, downward percolating effluent from the ATU land application area in each building envelope could become temporarily perched groundwater and potentially travel towards the marine environment. The potential for any effluent (treated to a secondary level) to ultimately reach the marine environment will be primarily determined by the 100 m setback distance for building envelopes from the highwater mark. Another factor is vegetative evapotranspiration within the intervening terrain. The proposed maximum allowable occupancy of 100 persons, means the post-development cumulative hydraulic load is estimated to be 14,000 spread across the 11.295 ha area of Lot 304. Key factors influencing how much of this hydraulic load reaches the marine environment and the potential cumulative impact of the attendant nutrients and other pollutants, are; • The type of treatment system used • The setback distance from the marine environment, and • The density of development Type of treatment system Aerobic Treatment Units (ATUs) are proposed, and systems accredited by the Department of Health must produce effluent of a secondary treatment standard. This means less than 20 mg/L BOD, 30 mg/L of Total Suspended Solids, and 10 cfu/100 mL of E coli. The proponent's suggested secondary treatment system for each of the eight building envelopes within Lot 304 is a FujiClean ACE 3000 (Attachment E). This system meets Health Department standards and is approved for use with WA. It has sufficient capacity to meet the hydraulic load of 2,800 L/day from the maximum 5 chalets clustered within each building envelope.

Setback distance

Figure 3 shows the location of the proposed building envelopes within Lot 304 relative to the edge of the marine environment (high watermark).

A 100 m setback distance is depicted. This is generally the minimum setback applied to the positioning of primary treatment systems from a waterbody. A lesser setback of 30 m is generally applied for secondary treatment systems (ATUs) however given the particularly significant environment (World Heritage Area status), the greater setback distance has been applied. This provides a greater opportunity for vegetation within the intervening strip of land to reduce the hydraulic load* through evapotranspiration.

*assuming a significant flow gradient in this direction

Density of development

The proposed development of Lot 304 is for an eco-tourism facility of up to 33 accommodation units clustered within eight building envelopes. (Attachment A). In accordance with the Shire of Shark Bay Local Planning Scheme (Special Use Zone SU14) the land cannot be subdivided.

Each cluster of accommodation units (chalets) within the eight building envelopes is proposed to operate independently but no subdivision is proposed.

For unsewered residential developments the Government Sewerage Policy (GSP) regards lot size as a critical risk factor for on-site sewage disposal with progressively smaller lot sizes increasing the nutrient and non-nutrient contaminant loads per unit area. Explanatory Notes accompanying the GSP (Government of Western Australia 2019,b) state;

'The policy sets a one hectare minimum lot size in sewage sensitive areas primarily to manage the cumulative impacts on the environment and water resources.' and

'The minimum (1 ha) *lot size requirement in sewage sensitive areas are consistent with … State Planning Policy 2.1 (Peel Harvey coastal catchment) of a maximum of one sewage disposal unit per hectare for rural residential development'.*

	The proposal for Lot 304 is not a form of subdivision or residential development, however it will put in place 8 on-site sewage management systems within the 11.295 ha of Lot 304. Each of these systems will service up to 5 chalets clustered within a building envelope. The GSP considers that the risks associated with on-site sewage disposal systems for unsewered survey strata and strata lots can be effectively managed without prescribing a minimum lot size based on consideration of maximum hydraulic loads, identification of land application areas, and the applicant's ability to demonstrate the site is capable of accommodating on-site sewage disposal in accordance with the requirements contained in the policy. The GSP Explanatory Notes further state; *'The risks can be further reduced through ensuring on-site systems are owned and operated by a single person/entity to provide the service, and … maintenance programs acceptable to the local government should be in place, particularly where secondary treatment is proposed.'* and *'For non-residential, commercial or industrial planning proposals in sewage sensitive areas, lot size will be assessed on a case by case basis. This is because nutrient loads will vary according to the proposed use'* (and type of sewage treatment system).

6.0 CONCLUSIONS

6.1 Capability of Land to Accommodate Sewage Disposal	The capability of Lot 304 to accommodate on-site effluent disposal has been demonstrated by; • All of the eight proposed building envelopes being able to meet the Government Sewerage Policy's general site requirements for sewage sensitive areas as outlined here in Table 1 (subject to the use of secondary treatment systems), and • For all of the directly affected land area, a 'Fair capability' rating being determined for on-site effluent disposal using the assessment system of the Department of Primary Industries and Regional Development (van Gool et al 2005), and • Determination of a required 560 m^2 minimum land application area that can be accommodated within each of 2,300 m^2 building envelopes.
6.2 Proposed Type of System	In combination with an extensive 100 m marine setback distance, the proposed use of a secondary treatment system with nutrient retention capability within all building envelopes will significantly reduce any risk of on-site effluent disposal endangering public health or the environment. The proponent's preferred FujiClean ACE 3000 advanced wastewater treatment system is an example of a secondary treatment system approved for use in Western Australia.
6.3 Density of Development	The proposed development creates clusters of up to 5 chalets within each of eight proposed building envelopes, and an overall maximum of 33 individual chalets. With a single sewage management system (ATU) in each building envelope, this is equivalent to 1.4 systems per hectare across the 11.295 ha area of Lot 304. Although these sewage management systems need to be of larger capacity than those most commonly used for individual residential dwellings, the following mitigating factors should be considered: • The sewage management systems are to service groups of short-stay accommodation units (chalets). • The units are expected to be used only between February and October (0.6 of year) with up to 60% occupancy across Lot 304 at any one time. (Hypermarket Pty Ltd 2014). • Controls will be placed on the development making use of secondary treatment systems mandatory, with maintenance of those systems collectively managed by a single person/ entity.

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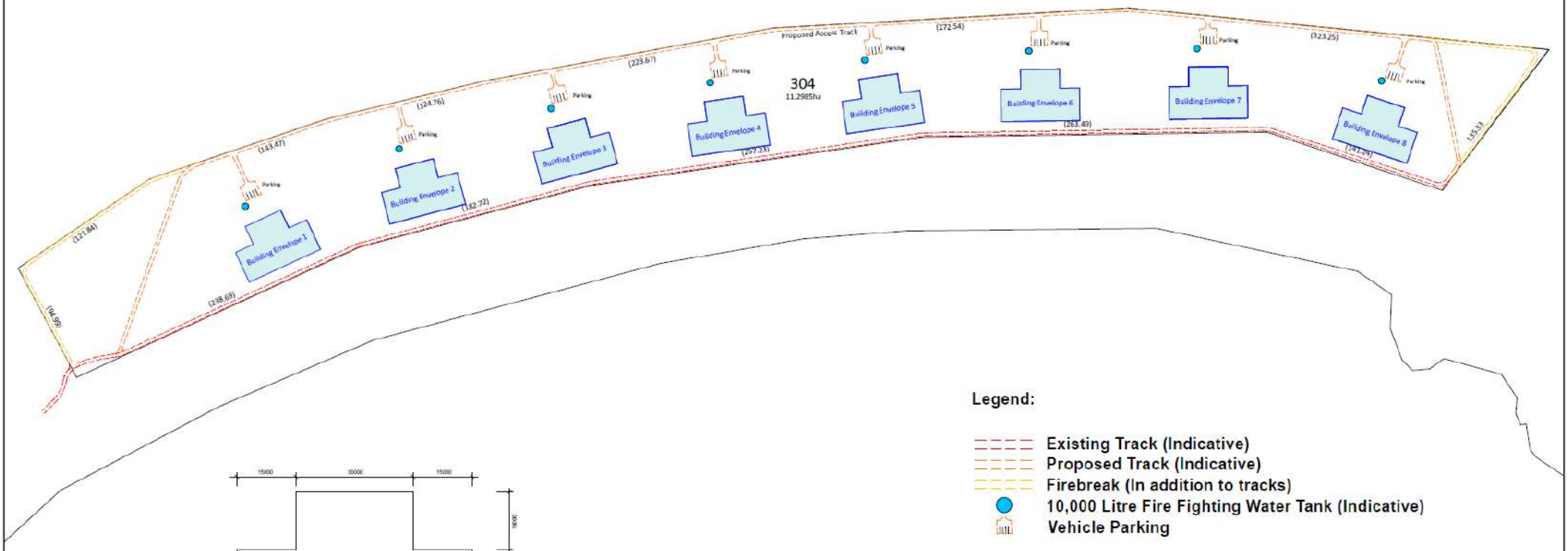
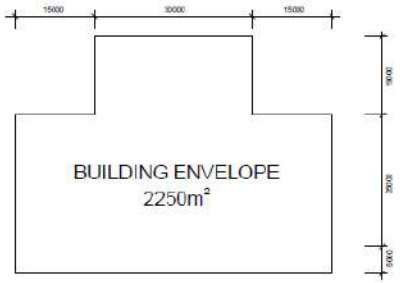
ATTACHMENT A

PLAN SHOWING PROPOSED BUILDING ENVELOPES

Source: Michael Glendinning Property 2023.





Scale 1:1000

Legend:

- Existing Track (Indicative)
- Proposed Track (Indicative)
- Firebreak (In addition to tracks)
- 10,000 Litre Fire Fighting Water Tank (Indicative)
- Vehicle Parking

Endorsement Table: This Local Development Plan has been approved by the Shire of Shark Bay Council at its Ordinary Meeting held on..... in accordance with Clause 52(1) of the Planning and Development (Local Planning Schemes) Regulations 2015

Chief Executive Officer..... **Date**.....

LOCAL DEVELOPMENT PLAN

Lot 304 on DP 50257, Dirk Hartog Island

50 0 50 100 200 300m

Michael Glendinning Property

Source of Information

Site boundaries: Harley Dykstra
Projection: MGA94

NOTE

All areas and dimensions are subject to survey, engineering and detailed design and may change without notice.

Project Lot 304 on DP 50257, Dirk Hartog Island | Scale 1:3000 @ A3 | Date: December 2024

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ATTACHMENT B

WASTEWATER SYSTEM LOADING RATES

Source: Department of Health (2015) *Supplement to Regulation 29 and Schedule 9 – Wastewater system loading rates*, November 2015.

Government of **Western Australia**
Department of **Health**

Supplement to Regulation 29 and Schedule 9 - Wastewater system loading rates

This factsheet is designed to be read in conjunction with Regulation 29 and Schedule 9 of the *Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974 (Regulations)*.

This supplement does not cover every possible application and system designers are asked to contact the Water Team of the Environmental Health Directorate
for further information if a particular use premises type is not listed in this factsheet.

The following table forms the Department of Health WA's assessment criteria for systems assessed under the Regulations.

Residential premises

The sizing of residential premises hydraulic loading is based on Schedule 9 of the Regulations. For residential premises with 6 or more bedrooms, the hydraulic loading will be sized basing on the expected occupancy rate and the design flow rate of 150L/person/day.

Table 1: Hydraulic loading rates for residential premises

Type of residential premises	Number of bedrooms	Volume of wastewater (L/day)
Standard residential dwelling	2 or less	564
	3	761
	4-5	829
	6 or more	150L/day Local government to determine the expected occupancy rate.
Ancillary accommodation sharing a common system with the main residential dwelling	The combined hydraulic loading is based on the ***total combined number of bedrooms*** (ancillary dwelling PLUS main residential dwelling) and sized as a "Standard residential dwelling" (as above). Example: • 3 bedroom main dwelling ***PLUS*** 2 bedroom ancillary accommodation = 5 bedroom system (829L/day) • 4 bedroom main dwelling ***PLUS*** 2 bedroom ancillary accommodation = 6 bedroom system (150L/person/day)	
Aged home accommodation	2 or less	564
	3	761
	4-5	829
	Developments with communal system	Hydraulic calculation basing on actual occupancies can be permitted if local government planning approval sets occupancy limits for the entire development. 150L/person/day

Please note that the sizing of septic tanks must still be done in accordance with Regulation 28 of the Regulations and the sizing method is different from what is prescribed in Table 1.

Non-residential premises

The wastewater system loading rates prescribed in Regulation 29 are limited to a number of broad applications. The purpose of this fact sheet is to provide designers of wastewater and associated disposal systems with a more comprehensive list of equivalent premises and uses. The figures below are to be read in conjunction with Regulation 29(1) and are based on an 8 hour day.

Table 2: Human waste hydraulic loading rates

Type of premises (Regulation 29)	Equivalent Use	Combined Flow (L/person/day)
Hotel	Minesite accomodation camp units	180
Motel		140
School (boarding)		140
School (day)	Child care centre (6 hours contact time)	45
Public Building (Frequent use)	Bakery sit in customers (per sitting) Café sit in customers (per sitting) Place of worship (with cooking and catering facilities) Health centre staff (non-showering) Minesite office facilities Offices (non-showering staff) Restaurants sit in customers (per sitting) Winery sit in customers – Café and food catering facilities (per sitting)	30
Public Building (Infrequent use)	Airport (Non-staff) Place of worship (with no cooking facilities) Community hall Hardware stores Health centre patients (non-showering) Library Petrol station customers	10
Caravan Parks	3 persons / caravan park bay	140
	2 persons / tent site	140
	Park homes / chalets / Standard short-stay holiday houses 2 or less bedrooms/dwelling 3 bedrooms/dwelling 4 or more bedrooms/dwelling	564/dwelling 761/dwelling 829/dwelling
	Large short-stay holiday houses (>6 persons) / Eco-tourism accommodation facilities	140
Swimming Pool		15
Drive-in theatres	2 persons per car	10
Factories & shops (an 8 hour day)	Bakery Staff Café staff Caravan park staff member (not living onsite Gym (with showers) Health centre patients (using shower facilities) Office staff (using shower facilities) Restaurant staff Warehouse staff Workshop staff	70
Construction camps (temporary)		45
Clubs	Men's shed	15

Clubs (licensed)		35

There are other types of wastewater generating activities that are not specified by Regulation 29. Under these circumstances the following will apply:

Table 3: Commercial / industrial waste hydraulic loading rates

Wastewater Source	Examples	Activity	Total Flow (L/day)
Food premises / food production	Cafés, Restaurants, Bakeries and the like.	Wastewater generated from cooking and food production operations (eg. takeaway food preparation, offsite catering food preparation, equipment and floor wash down) - excludes personal hygiene and loading for sit in customers.	Refer to Note 1
Commercial waste streams	Winery Brewery Abattoir	Bottle rinsing Wash down Processing	System must be separate and not combined with any human waste stream. Refer to Note 1
Non-human waste systems	Washdown bays Carwash Dog kennels Horse stables	Washdown	

Note:
1) System owner to propose wastewater / liquid waste hydraulic loading. Hydraulic loading must be based on peak flow events. The following controls will be implemented:

- Metering of wastewater / liquid waste volumes produced
- System owner to ensure the maximum capacity of the system is not exceeded

More information

Environmental Health Directorate
Department of Health
PO Box 8172
PERTH BUSINESS CENTRE WA 6849
Telephone: (08) 9222 2000
Fax: (08) 9388 4910

Last reviewed: 16-10-2019

Produced by
Public Health

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ATTACHMENT C

AS 1547 Recommended Design Loading Rates for Trenches

Source: Standards Australia and Standards New Zealand (2012) *AS/NZS 1547: 2012 - On-site Domestic Wastewater Management*.

TABLE L1
RECOMMENDED DESIGN LOADING RATES FOR TRENCHES AND BEDS

Soil category	Soil texture	Structure	Indicative permeability (K_{sat})(m/d)	Design loading rate (DLR) (mm/d)			
				Trenches and beds			ETA/ETS beds and trenches
				Primary treated effluent		Secondary treated effluent	
				Conservative rate	Maximum rate		
1	Gravels and sands	Structureless (massive)	> 3.0	20 (see Note 1)	35 (see Note 1)	50 (see Note 1)	(see Note 4)
2	Sandy loams	Weakly structured	> 3.0	20 (see Note 1)	30 (see Note 1)	50 (see Note 1)	
		Massive	1.4 – 3.0	15	25	50	
3	Loams	High/ moderate structured	1.5 – 3.0	15	25	50	
		Weakly structured or massive	0.5 – 1.5	10	15	30	
4	Clay loams	High/ moderate structured	0.5 – 1.5	10	15	30	12
		Weakly structured	0.12 – 0.5	6	10	20	8
		Massive	0.06 – 0.12	4	5	10	5
5	Light clays	Strongly structured	0.12 – 0.5	5	8	12	8
		Moderately structured	0.06 – 0.12	(see Notes 2 & 3)	5	10	5 (see Notes 2, 3, & 5)
		Weakly structured or massive	< 0.06			8	
6	Medium to heavy clays	Strongly structured	0.06 – 0.5				
		Moderately structured	< 0.06				
		Weakly structured or massive	< 0.06				

NOTES:
1 The treatment capacity of the soil and not the hydraulic capacity of the soil or the growth of the clogging layer govern the effluent loading rate in Category 1 and weakly structured Category 2 soils. Land application systems in these soils require design by a suitably qualified and experienced person, and distribution techniques to help achieve even distribution of effluent over the full design surface (see L6.2 and Figure L4 for recommended discharge method by discharge control trench). These soils have low nutrient retention capacities, often allowing accession of nutrients to groundwater.
2 To enable use of such soils for on-site wastewater land application systems, special design requirements and distribution techniques or soil modification procedures will be necessary. For any system designed for these soils, the effluent absorption rate shall be based upon soil permeability testing. Specialist soils advice and special design techniques will be required for clay dominated soils having dispersive (sodic) or shrink/swell behaviour. Such soils shall be treated as Category 6 soils. In most situations, the design will need to rely on more processes than just absorption by the soil.
3 If K_{sat} < 0.06 m/d, a full water balance for the land application can be used to calculate trench/bed size (see Appendix Q).
4 ETA/ETS systems are not normally used on soil Categories 1 to 3.
5 For Category 6 soils ETA/ETS systems are suitable only for use with secondary treated effluent.

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ATTACHMENT D

SITE DATA AND PHOTOGRAPHS

TABLE D: SITE RESULTS SUMMARY

Site No	Building Envelope (BE) No	Sample depth (cm)	Lab Sample No	Topographic Unit (landform)	Site elevation (approx)	Soil Group[1]	Soil texture	Indicative Permeability[2]	Soil colour (moist)[3]	Soil acidity/alkalinity (pHw)[4]	Soil salinity (Conductivity EC 1:5 in dS/m)[5]	Soil PRI (measure of nutrient retention ability)[6]
1	-	0 – 5	-	**Outside and west of Lot 304** (gentle slope with abundant limestone)	5 m AHD	Calcareous stony soil	Sand	> 3 m / day then restricted at 5 cm by underlying limestone	Reddish brown (5YR4/4)	Moderately alkaline: 8.3	Moderately saline: 0.290	-
2	-	40 – 50 (subsoil)	1	**D** (< 4 m AHD) lowland swale – lowest part of Lot 304	2.5 m AHD	Calcareous shallow sand (just)	Sand	> 3 m / day	Brown (10YR4/3)	Moderately alkaline: 8.8	Moderately saline: 0.290	Moderate: 9.4
"	-	70 - 80 (buried soil over l'stone	2	" "			Sand	> 3 m / day then possibly restricted at 80 cm by underlying limestone	Strong brown (7.5YR5/6)	Strongly alkaline: 9.6	Highly saline: 0.829	Moderate: 16.7
3	-	40 - 50	3	**Outside and south of Lot 304** and BE 1. Undulating 2- 5 % secondary 2^{o} dunes parallel to beach)	3 m AHD	Calc sand	Sand	> 3 m / day	Light brownish grey (10YR6/2)	Moderately alkaline: 9.0	Non-saline: 0.140	Very low: 1.7

Site No	Building Envelope (BE) No	Sample depth (cm)	Lab Sample No	Topographic Unit (landform)	Site elevation (approx)	Soil Group[1]	Soil texture	Indicative Permeability[2]	Soil colour (moist)[3]	Soil acidity/alkalinity (pHw)[4]	Soil salinity (Conductivity EC 1:5 in dS/m)[5]	Soil PRI (measure of nutrient retention ability)[6]
4	-	40 - 50	4	**Outside and south of Lot 304** and BE 1 (gradient 3% incipient foredune parallel to beach)	1.5 m AHD	Calc sand	Sand	> 3 m / day	Light brownish grey (10YR6/2)	Strongly alkaline: 9.4	Non-saline: 0.083	Very low: 1.3
5	Between BE 1 and 2	10 -20	-	**C** (4-8 m AHD) dune side-slope 8%	6 m AHD	Calc deep sand	Sand	> 3 m / day	Brown (10YR5/3)	Moderately alkaline: 8.7	Non-saline: 0.107	-
"	**"**	140 -150	-	" "			Sand	> 3 m / day	Light brownish grey (10YR6/2)	Moderately alkaline: 8.3	Non-saline: 0.140	-
6	W edge of BE 2	10 -20	-	**C** (4-8 m AHD)	7 m AHD	Calc deep sand	Sand	> 3 m / day	Brown (10YR5/3)	Moderately alkaline: 8.3	Moderately saline: 0.378	-
"	**"**	140 -150	-	" "			Sand	> 3 m / day	Pale brown (10YR6/3)	Moderately alkaline: 8.2	Slightly saline: 0.231	-
7	S edge of BE 2	140 -150	6	**B** (8-12 m AHD)	9 m AHD	Calc deep sand	Sand	> 3 m / day	Pale brown (10YR6/3)	Moderately alkaline: 8.5	Non-saline: 0.086	Moderate: 6.4

Site No	Building Envelope (BE) No	Sample depth (cm)	Lab Sample No	Topographic Unit (landform)	Site elevation (approx)	Soil Group[1]	Soil texture	Indicative Permeability[2]	Soil colour (moist)[3]	Soil acidity/alkalinity (pHw)[4]	Soil salinity (Conductivity EC 1:5 in dS/m)[5]	Soil PRI (measure of nutrient retention ability)[6]
8	E edge of BE 2	10 -20	-	**B** (8-12 m AHD) 3 – 4% undulating upper dune surface	9 m AHD	Calc deep sand	Sand	> 3 m / day	Greyish brown (10YR5/2)	Moderately alkaline: 8.4	Severely saline: 1.344	-
"	"	140 -150	-	" "			Sand	> 3 m / day	Brown (10YR5/3)	Moderately alkaline: 8.9	Moderately saline: 0.424	-
9	-	10 -20	-	**Outside and south of Lot 304** and BE 12 (lowest point of upland swale)	7 m AHD	Calc deep sand	Sand	> 3 m / day	Brown (10YR5/3)	Moderately alkaline: 9.0	Slightly saline: 0.207	-
"	-	140 -150	-	" "			Sand	> 3 m / day	Brown (10YR5/3)	Moderately alkaline: 8.7	Non-saline: 0.125	Moderate: 10.4
10	W edge of BE 3	10 -20	-	**B** (8-12 m AHD) middle of upland swale	8.5 m AHD	Calc deep sand	Sand	> 3 m / day	Brown (10YR5/3)	Moderately alkaline: 8.8	Highly saline: 0.875	-
"	"	140 -150	-	" "			Sand	> 3 m / day	Pale brown (10YR6/3)	Strongly alkaline: 9.1	Slightly saline: 0.173	-
11	S edge of BE 3	10 -20	-	**B** (8-12 m AHD) 3- 4 % upper slope	11.5 m AHD	Calc deep sand	Sand	> 3 m / day	Brown (10YR5/3)	Moderately alkaline: 8.7	Highly saline: 1.095	-

Site No	Building Envelope (BE) No	Sample depth (cm)	Lab Sample No	Topographic Unit (landform)	Site elevation (approx)	Soil Group[1]	Soil texture	Indicative Permeability[2]	Soil colour (moist)[3]	Soil acidity/alkalinity (pHw)[4]	Soil salinity (Conductivity EC 1:5 in dS/m)[5]	Soil PRI (measure of nutrient retention ability)[6]
"	"	140 -150	-	" "			Sand	> 3 m / day	Pale brown (10YR6/3)	Strongly alkaline: 9.1	Slightly saline: 0.227	-
12	Near S edge of BE 4	10 -20	-	**B** (8-12 m AHD)	11.5 m AHD	Calc deep sand	Sand	> 3 m / day	Brown (10YR5/3)	Moderately alkaline: 8.8	Highly saline: 0.610	-
"	**"**	140 -150	7	" "			Sand	> 3 m / day	Greyish brown (10YR5/2)	Moderately alkaline: 8.7	Non-saline: 0.132	Low: 3.2
13	Near S edge of BE 6	140 -150	8	**B** (8-12 m AHD) 4% gradient	8.5 m AHD	Calc deep sand	Sand	> 3 m / day	Pale brown (10YR6/3)	Moderately alkaline: 8.8	Slightly saline: 0.201	Moderate: 7.0
14	-	40-50	-	**Outside and south of Lot 304** and BE 23 (2^{o} dune parallel to beach)	3 m AHD	Calc sand	Sand	> 3 m / day	Light brownish grey (10YR6/2)	Strongly alkaline: 9.2	Slightly saline: 0.148	-
15	-	40-50	-	**Outside and south of Lot 304** and BE 23 (incipient primary foredune parallel to beach)	2 m AHD	Calc sand	Sand	> 3 m / day	Light grey (10YR7/1)	Moderately alkaline: 9.0	Highly saline: 0.761	-

Site No	Building Envelope (BE) No	Sample depth (cm)	Lab Sample No	Topographic Unit (landform)	Site elevation (approx)	Soil Group[1]	Soil texture	Indicative Permeability[2]	Soil colour (moist)[3]	Soil acidity/alkalinity (pHw)[4]	Soil salinity (Conductivity EC 1:5 in dS/m)[5]	Soil PRI (measure of nutrient retention ability)[6]
16	Between BE 7 and 8	140 -150	9	**C** (4-8 m AHD) gently sloping 4 % inland part of 2^{o} dune	6 m AHD	Calc deep sand	Sand	> 3 m / day	Greyish brown (10YR5/2)	Moderately alkaline: 9.0	Non-saline: 0.075	Very low: 1.7
17	BE 8	140 -150	10	**B** (8-12 m AHD) 14% gradient	9.5 m AHD	Calc deep sand	Sand	> 3 m / day	Pale brown (10YR6/3)	Moderately alkaline: 8.5	Non-saline: 0.095	Moderate: 13.8
18	-	100-110	-	**A** (> 12 m AHD) upland dune crest inland from headland	15 m AHD	Calc deep sand	Sand	> 3 m / day	Very pale brown (10YR7/3)	Moderately alkaline: 8.5	Non-saline: 0.192	-
19	-	0 - 5	-	**Outside and south east of Lot 304** and BE 32 (gentle slope with abundant limestone – leading to headland)	-	Calcareous stony soil	Sand	> 3 m / day then immediately restricted by underlying limestone	Light yellowish brown (10YR6/4)	Moderately alkaline: 8.9	Slightly saline: 0.236	-

Footnotes to table

1. WA Soil Group (Schoknecht and Pathan 2013).

2. Indicative permeability as per ANZS 1547 Table L1 (Attachment X).

3. Soil Colour notation (Munsell 1954).

4. pH in 1:5 distilled water, with categories as per DPIRD's *Land Evaluation Standards for Land Resource Mapping* (van Gool et al 2005). Moderately alkaline: 8.0 – 9.0, Strongly alkaline: > 9.0.

5. Conductivity in 1:5 distilled water, with categories for sands as per DPIRD's *Land Evaluation Standards* (van Gool et al 2005). Non-saline: 0 – 0.14, Slightly saline: 0.15 – 0.28, Moderately saline: 0.29 – 0.57, Highly saline: 0.58 – 1.14, Severely saline: 1.15 – 2.28, Extremely saline: > 2.28 dS/m.

6. Phosphorus retention index, with categories as per DPIRD's *Land Evaluation Standards for Land Resource Mapping* (van Gool et al 2005). Very low: < 2, Low: 2 – 5, Moderate: 5 – 20, Moderately high: 20 – 100, High: > 100. See overleaf for raw data.

Analysis Results

CSBP Soil and Plant Laboratory

73114
Land Assessment Pty Ltd

		Lab No	PYS20046	PYS20047	PYS20048	PYS20049	PYS20050	PYS20051	PYS20052	PYS20053
		Name	1	2	3	4	5	6	7	8
		Code	02/04/20	02/04/20	02/04/20	02/04/20	02/04/20	02/04/20	02/04/20	02/04/20
		Customer	Land Assessment Pty Ltd	Land Assessment Pty Ltd	Land Assessment Pty Ltd	Land Assessment Pty Ltd	Land Assessment Pty Ltd	Land Assessment Pty Ltd	Land Assessment Pty Ltd	Land Assessment Pty Ltd
		Depth	0-10	0-10	0-10	0-10	0-10	0-10	0-10	0-10
Conductivity	dS/m		0.355	0.829	0.140	0.083	0.125	0.086	0.132	0.201
pH Level (CaCl2)			7.8	8.4	7.8	8.3	7.3	7.2	7.5	7.5
pH Level (H2O)			8.8	9.6	9.0	9.4	8.7	8.5	8.7	8.8
Phosphorus Retention Index			9.4	16.7	1.7	1.3	10.4	6.4	3.2	7.0

CSBP Lab. Extract Value.

Analysis Results

CSBP Soil and Plant Laboratory

	Lab No	PYS20054	PYS20055
	Name	9	10
	Code	02/04/20	02/04/20
	Customer	Land Assessment Pty Ltd	Land Assessment Pty Ltd
	Depth	0-10	0-10
Conductivity	dS/m	0.075	0.095
pH Level (CaCl2)		7.6	7.3
pH Level (H2O)		9.0	8.5
Phosphorus Retention Index		1.7	13.8

CSBP Lab. Extract Value.

SUNDAY ISLAND BAY PHOTOGRAPHS

Photo 1: **View towards Lot 304 from near SITE 1**

Photo 2: **SITE 2 in lowest portion of Lot 304.**

Photo 3: **SITE 2 soil is a shallow (< 80 cm) calcareous sand over a buried limestone weathering surface.**

Photo 4: **Intervening 66 m of land between Lot 304 and water. Secondary dunes & incipient foredune.**

Photo 5: **SITE 3 - *Scaevola crassifolia* is a characteristic coloniser of the secondary dunes.**

Photo 6: **SITE 4 -*Spinifex longifolius* dominates the narrow incipient foredune next to the beach.**

SUNDAY ISLAND BAY
PHOTOGRAPHS

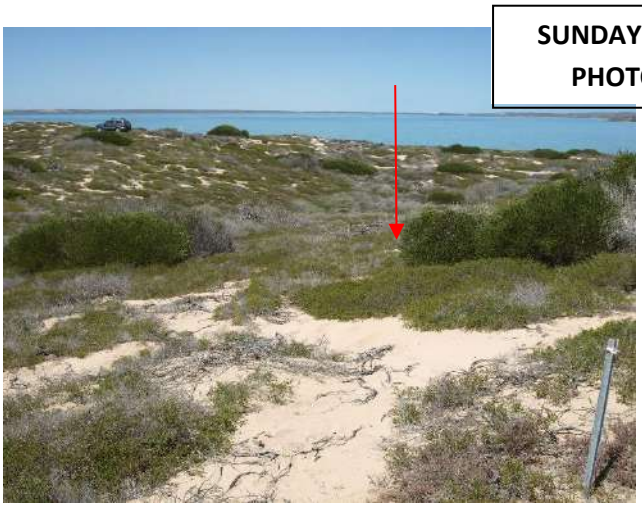

Photo 7: **SITE 5 (arrowed) – between BE 1 and 2.**

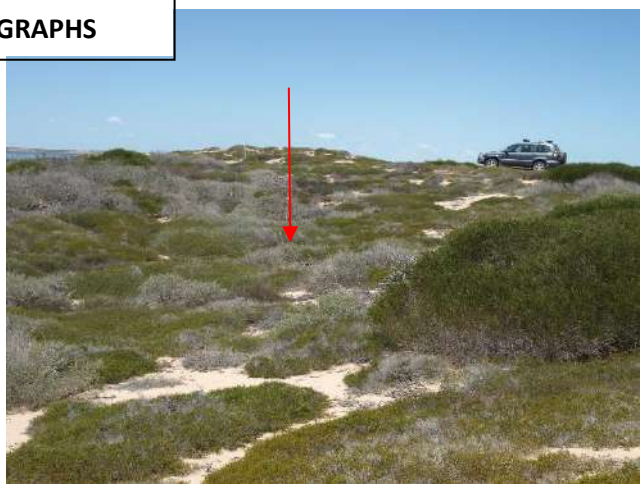

Photo 8: **SITE 6 (arrowed) - W edge of BE 2.**

Photo 9: **SITE 7 (arrowed) - S edge of BE 2.**

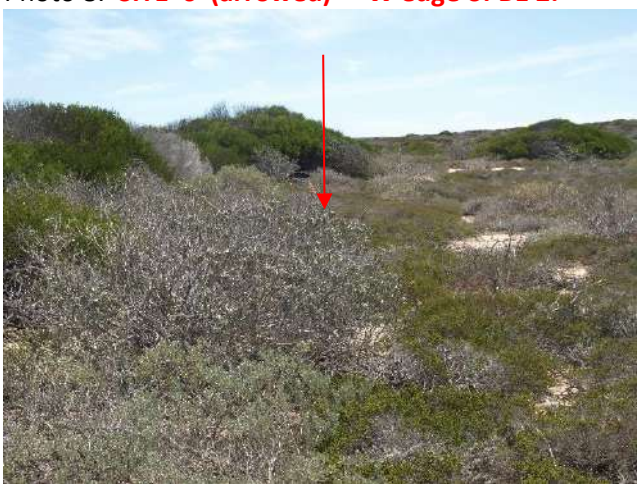

Photo 10: **SITE 8 (arrowed)- E edge of BE 2.**

Photo 11: **SITE 9 – outside Lot 304, the lowest point of an elongated swale SW of BE3.**

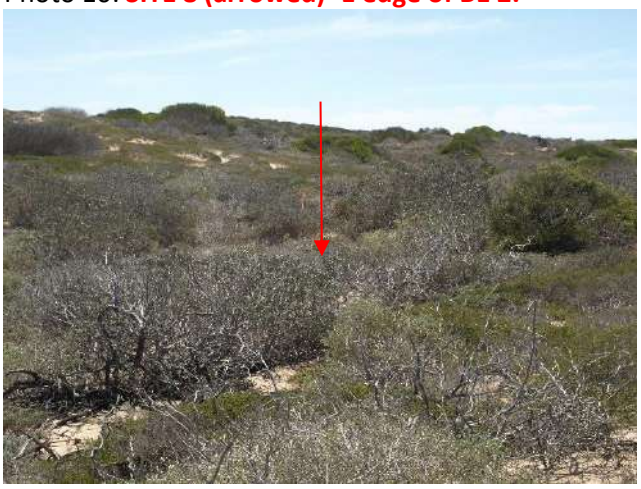

Photo 12: **SITE 10 (arrowed)- W edge of BE 3.**

SUNDAY ISLAND BAY PHOTOGRAPHS

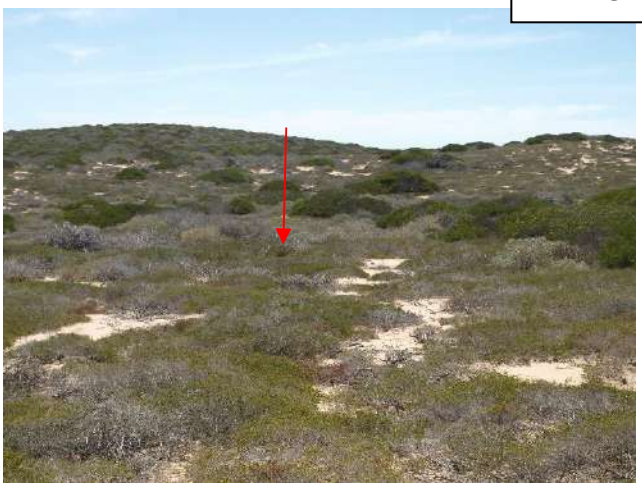

Photo 13: **SITE 11 (arrowed) - S edge of BE 3.**

Photo 14: **SITE 12 (arrowed) - Near S edge of BE 4.**

Photo 15: **View westwards of parabolic dunes from just upslope of building envelope BE 4.**

Photo 16: **SITE 13 (arrowed) near S edge of BE 6.**

Photo 17: **View southwards from SITE 13 - building envelope BE 6. Intervening 72 m of land between Lot304 and water. Sloping edge of parabolic dune in foreground, then 2° dune and incipient foredune.**

Photo 18: **SITE 14 -- *Scaevola crassifolia* is common in the hummocky secondary dunes in front of building envelope BE 6.**

SUNDAY ISLAND BAY PHOTOGRAPHS

Photo 19: **SITE 15 -*Spinifex longifolius* dominates incipient foredune in front of building envelope BE 6**

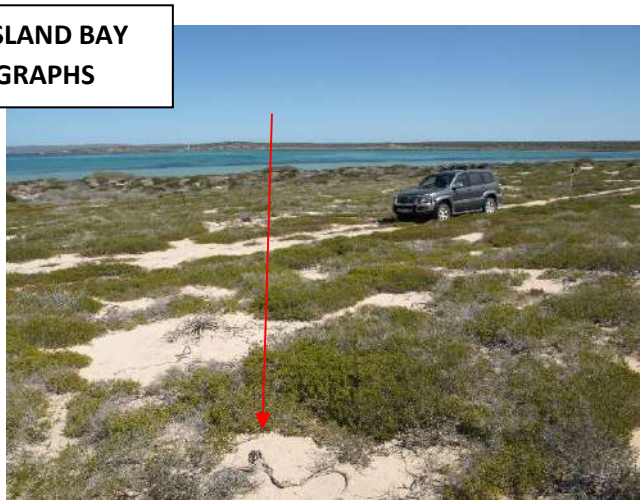

Photo 20: **SITE 16 (arrowed) - Between BE 7 and 8 within windblown inland extension of the 2° dune.**

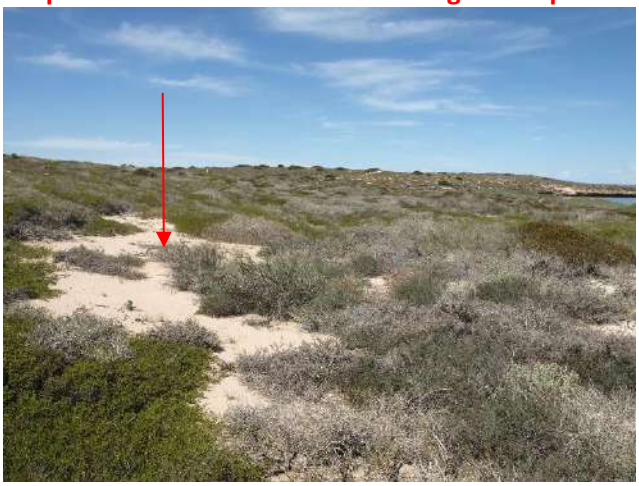

Photo 21: **SITE 17 (arrowed) - building envelope BE8**

Photo 22: **SITE 18 (arrowed)- north east of BE 8.**

Photo 23: **View westwards from near Site 18. Track is the seaward edge of Lot 304.**

Photo 24: **SITE 19 (arrowed)- South of the eastern end of Lot 304. Very shallow calcareous stony soil overlimestone (caprock).**

ATTACHMENT E

FUJICLEAN BROCHURE

Source: Standards Australia and Standards New Zealand (2012) *AS/NZS 1547: 2012 - On-site Domestic Wastewater Management*.

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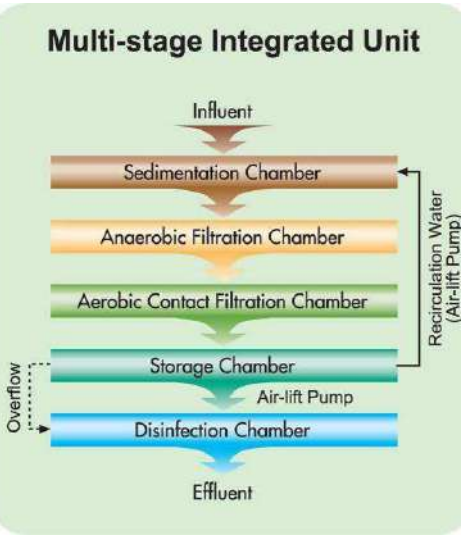
ADVANCED. ✓

COMPACT. ✓

EFFICIENT. ✓

Advanced Secondary Effluent Quality
<10 Mg/L BOD_5
< 10 Mg/L Suspended solids
3000 LPD
20 EP @150 LPD



Compact and Efficient

This Advanced, Compact, and Efficient unit has been specifically designed using leading Japanese engineering technologies to achieve maximum operational efficiency. The ACE3000 is a whole household treatment plant.
Due to its light weight and compact design allowing for 3000 L per 24 hours, the Fuji Clean ACE system is extremely easy to transport and install. Overall weight of 550 KG makes for an easier delivery and installation.

Commercial Adaptability

The ACE system can easily be customised according to site requirements. The ACE systems can be installed easily at various types of sites (not only domestic) which are not connected to municipal sewage supply; including mining sites, caravan parks, resorts, remote islands, service stations, schools, tourist cabins, community housing and other similar projects producing up to 3000 LPD of influent.

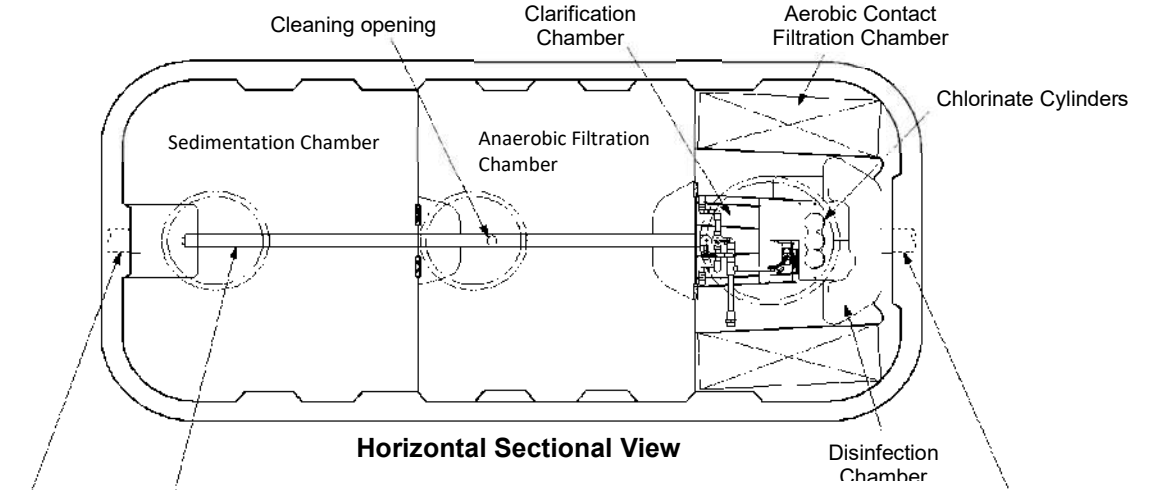
Fuji Clean Australia PTY LTD

With over 60 years of experience, Fuji Clean is one of the world's leading manufacturers of high efficiency wastewater treatment systems with over 2 million systems (both domestic and commercial) installed around the world.

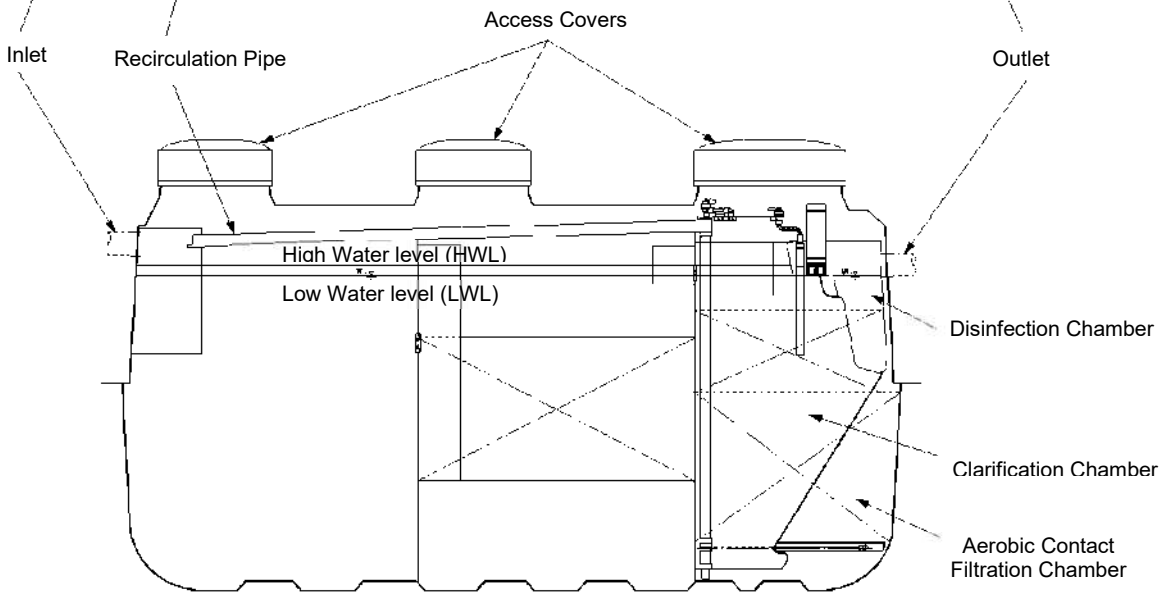
SPECIFICATIONS ACE3000

Volume (L)		Dimensions (mm)	
Sedimentation Chamber	3,169	Max. Width	1,840
Anaerobic Filtration Chamber	3,177	Max. Length	3,880
Aerobic Contact Filtration Chamber	1,431	Max. Height	2,215
Clarification Chamber	703	Max. Height (with 150mmH risers)	2,365
Disinfection Chamber	44	Max. Height (with 300mmH risers)	2,515
Total Volume	8,524	Inlet Invert	500
Weight (kg)	550	Inlet Invert (with 150mmH /300mmH risers)	650 / 800
		Outlet Invert	600
		Outlet Invert (with 150mmH /300mmH risers)	750 / 900
			Dia. 100
			Dia. 100

Pump out chamber with emergency effluent storage required. Not shown here. 2000 ltrs.



Horizontal Sectional View



Vertical Sectional View

Fuji Clean Australia

With over 60 years of experience, Fuji Clean is one of the world's leading manufacturers of high efficiency wastewater treatment systems with over 2 million systems (both domestic and commercial) installed around the world.

FujiClean
Wastewater Treatment Systems

SOLAR AND POWER USAGE

FujiClean ACE 3000 – Domestic / Commercial AWTS

The FujiClean ACE 3000 AWTS is 100% compatible with homes using a stand-alone solar power system. For the system to operate correctly it requires:

- A stable and continuous connection to a 10 amp 240V AC +/- 5% maximum and a frequency of 50Hz.
- A suitable inverter is to be used.

NOTE: Must allow for the ACE3000 energy requirements.

- The power supply to have sufficient capacity to run all components without the voltage supply dropping when the load is applied.
- A contingency plan if the house experiences long periods without power.

NOTE: like any AWTS, prolonged periods without power will cause the bacteria to die off and result in system failure.

A standard 20 person household uses an average of 2500 L to 3000 L per day (24 hrs)

FujiSub 4520 submersible pump with 20m head has a flowrate of 45L/min.

An average pump cycle for the FujiClean ACE 3000 is 20 minutes. Therefore with average loading, the FujiSub 4520 will activate and cycle 2-3 times per day for 20 minutes. Used for subsurface irrigation disposal. Averages may differ per household

FujiSub 756 submersible pump with 8m head has a flowrate of 25L/min.

An average pump cycle for the FujiClean ACE 3000 is 36 minutes. Therefore with average loading, the FujiSub 756 will activate and cycle 2-3 times per day. Used for surface irrigation disposal. Averages may differ per household

MAC 200RII Air Blower runs 24 hours/day and provides 200L of aeration per minute.

Electrical Component	Startup Amps	Run Wattage / Amps	Daily Usage max
MKII Treatment Monitor Unit	3 W	3 W	24 hours
MAC200 RII Air Blower	Less than 1 A	140 Watts | 0.53 A	24 hours
FujiSub 756 Submersible Pump	Less than 3.0 amps	550 watts | 2.1 A	2 hours
FujiSub 4520 Submersible Pump	Less than 5.5 amps instant	800 watts | 3.2 A	1.2 hours
FujiSub 5025 Submersible Pump 50 LPM at a 25 mtr head	Less than 7.0 amps	1000 watts| 4.0 A	1.0 hours

NOTE: Only one type of submersible pump is required. If you require any further information on the FujiClean ACE 3000 energy requirements please contact FujiClean Australia Head Office on 1300 733 619 or info@fujiclean.com.au

FujiClean
Wastewater Treatment Systems

ATTACHMENT F

APPROVED LEACH DRAINS
(with infiltrative areas)

Source: Department of Health website https: ww2.health.wa.gov.au

Accessed April 2 2020

Government of Western Australia
Department of Health

Approved leach drains

The Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulation 1974 (external site) requires leach drains to be approved by the Chief Health Officer.

The following tables details the specifications of concrete leach drains (Table 1) and non-concrete leach drains (Table 2) approved for use in Western Australia for the onsite disposal of wastewater.

Table 1: Approved concrete leach drains

Manufacturer	Phone	Infiltrative area (m^2/m)	Module length (m)
Altham Plumbing Contractors	91911561	1.94	0.9
Avon Septics and Backhoe Hire	95742543	1.91	1.5
B.Co Rural		1.535	1
Bunbury Cement Products	97914344	1.91	1.335
Bunbury Modular Brick	97254566	1.48	1.5
Busselton Cement Products (aka WA Septics)	0403208621	1.82	1.8
		1.48	Varies
C & BJs Concrete Supplies	97331008	2.06	1.86
Collie Steel Supplies	97343535	2	1.5
Concrete Products Esperance	90711271	1.59	1.52
Concrete World Esperance	90711058	1.686	1.5
Cuballing Concrete and Contractors	98836333	1.65	1.8
Dalwallinu Concrete Works	96611264	1.51	1.2
Denmark Concrete PL	98482920	1.43	2.0
Dongara Concrete Services	99271096	1.43	1.5
Galvin Concrete & Sheetmetal	93022175	1.58	1.2
GNC Quality Precast	99233705	2.02	1.2
Hester Concrete Products		1.45	1.4
Hills Concrete Products (Northam)	0427225876	1.58	1.2
Hockley's Denmark Plumbing Service (aka. Denmark Concrete Constructions)	98481210	1.36	1.5
Jandakot Cement Works	94179372	1.44	1.2
Kimberley Septics	91935440	1.33	1
Kondinin Concrete Products	98891031	1.82	1

LAB Concrete Products	97541111	1.81	1.2
Maddington Concrete Products	94591053	1.8	1.2
Manjimup Concrete Manufacturers	97771666	1.72	1.2
Midland Cement Products	94490200	1.49	1.2
MJB Industries	97970999	1.4	1.5
Moora Concrete Works	96511174	1.8	1.2
Mundaring Concrete	92951566	1.9	1.2
Naval Base Concrete	94393933	1.65	1
PN & ER Newman's Quality Concrete Products	98422040	1.82	1.2
Regal Precast Concrete Products	92493322	1.78	1.21
Thompson Building Industries	98838188	1.975	1.5
Toodyay Septics & Backhoe Hire	95744177	1.94	2.35
UDUC Concrete Products	97293301	1.74	2.4
Vanmaris Concrete Products	97555110	1.6	2
		1.7	1
WANT Plumbing	0428354009	1.71	1.21
Wheatbelt Concrete Products	92746988	1.68	1.2
		1.45	2.4
		1.67	3
Winchester Industries	96521967	1.82	1.5
Yuella Fabrications	99801339	1.73	1
ZTD	0411326740	1.48	1.2
			1.5
			2.4

Table 2: Approved non-concrete leach drains

Manufacturer	Model	Infiltrative area (m^2/m)	Module length (m)
ADS Pipe PL 0432 184 470	Stormtech	2.0	0.864
All Drainage Systems PL Plumbtec Plumbing Supplies: 9455 1444 Tech Plumbing: 9274 1540 Reece PL: 9328 5765	ADM Drain	1.19	0.356
Atlantis Corporation PL (02) 94178344	Flotank Atlantis	1.3	0.685
	Flatbed	2.6	2.4
Ausdrain (02) 9810 8335	Ausdrain EnviroModule2	1.3	0.6
Elmich Australia PL			

(02) 9648 2073 **WA Distributor:** Geofabrics Australasia PL: (03) 8586 9199	Versitank	1.62	0.5
Everhard Industries PL EF Hodge & Co 9328 6644	#230	0.89	1.5
	#350	1.15	1.5
	#410	1.28	1.5
Filtrex Innovative Wastewater Solutions (08) 9726 0118	Filtrex Leach Drain Cage	0.9	1.2
	Filtrex Leach Drain Cage MK2	1.5	0.8
Geofabrics Australasia PL (03) 8586 9199	Megatank	1.4	0.75
Global Synthetics PL 9459 4300	Protank	1.29	0.72
Graf Plastics Australia 9437 4949	Graf Sicker Tunnel 300L	1.52	1.16
Novaplas PL 6250 3000	Drainwell DW1592	1.28	0.755
	Drainwell DW2592	1.635	0.4
Rainsmart Solutions PL DS Agencies 6143 6565	Rainsmart L	1.28	0.72
	Rainsmart W	1.6	0.4
	DS Angencies Flatbed	2.4	0.5
Reln Plastics PL Galvin Engineering Pty Ltd 9249 5900	Jumbo	1.31	1.517
	Large	1.23	1.517
	Standard	0.92	1.517
Sentry Holdings PL (08) 9244 1456 OR 0409 519 259	Tunnelwell Arch System	2.53	2.05

Length of leach drains required

To determine the length of leach drains required, use the following formula:

Soil Type	Residential dwelling bedrooms			Commercial
	2 or less	3	4 or more	
Primary Treated Effluent (Septic Tanks)				
Sand	18.8 ÷ IA	25.4 ÷ IA	27.6 ÷ IA	Hydraulic loading (L/day) ÷ 30 ÷ IA
Loams and gravels	28.2 ÷ IA	38.1 ÷ IA	41.5 ÷ IA	Hydraulic loading (L/day) ÷ 20 ÷ IA
Other	To be calculated basing on infiltration rates recommended in AS/NZS 1547			
Secondary Treated Effluent (Aerobic Treatment Units / Wastewater Treatment Plants)				
Sand / Gravel / Loam	Hydraulic loading (L/day) ÷ 50 ÷ IA			
Clay Loam	Hydraulic loading (L/day) ÷ 30 ÷ IA			

Light Clay	Hydraulic loading (L/day) ÷ 12 ÷ IA

IA = Infiltrative area of drain

More information

Environmental Health Directorate
Department of Health
Telephone: 9222 2000
Email: ehinfo@health.wa.gov.au

Last reviewed: 05-02-2020

Produced by
Public Health

© WA Department of Health 2020

ATTACHMENT G

SCHEDULE 2 from GOVERNMENT SEWERAGE POLICY

Source: Government of Western Australia (2019, a)

Government Sewerage Policy

SCHEDULE 2:
Site requirements for on-site sewage systems

1 Minimum lot sizes for residential development in heavy soils

Table 1: Minimum lot sizes for residential development serviced by on-site sewage disposal in heavy soils located outside public drinking water source areas and sewage sensitive areas outside of Perth Metropolitan and Peel Region Scheme Areas.

Soil category[5]	Soil texture	Minimum lot sizes m² (R-code)[6]	
		Primary treatment	Secondary treatment
4	Clay loams	2,000 (R5)	1,000 (R10)
5	Light clays	4,000 (R2.5)	1,000 (R10)
6	Medium to heavy clay	Special design requirements and distribution techniques or soil modification procedures will be necessary. Refer to Table L1 of AZ/NZS 1547 for more details.	2,000 (R5)
-	Rock	Special design requirements and distribution techniques or soil modification procedures will be necessary.	

Refer to section 5.2 for minimum lot sizes in public drinking water source areas and sewage sensitive areas.

[5] Soil categories, extrapolated from Table 5.1 AS/NZS 1547, are to be determined by undertaking a site and soil evaluation (SSE) as per *AS/NZS 1547 On-site domestic wastewater management*.

[6] Minimum lot sizes are based upon area required to accommodate dwelling, primary on-site sewage system, land application areas and associated setback distances.

2 Determination of land application area (m²)

The size of the land application area should be determined in accordance with the conversion factors prescribed in Table 2 and *AS/NZS 1547 On-site domestic wastewater management* as follows:

1. Estimate hydraulic load (L/day):
   - occupancy rate (persons) x design loading rate (L/person/day)
2. Calculate land application area (m²):
   - hydraulic load (L/day) x conversion factor from Table 2

Table 2: Conversion factors to calculate the minimum required land application area for subdivision/ development (conversion factors are determined using a hydraulic load of 1 L/day.

Soil category	Soil texture	Conversion factors	
		Primary treatment	Secondary treatment
1	Gravels and sands	0.377	0.2
2	Sandy loams	0.377	0.2
3	Loams	0.477	0.25
4	Clay loams	0.689	0.286
5	Light clays	1.284	0.333
6	Medium to heavy clays	Special design requirements and distribution techniques or soil modification procedures will be necessary	0.5

3 Land application areas for single houses

Table 3: Land application areas for a single house (occupancy of 6 persons in a 5 bedroom house)

Soil category	Soil texture	Land application area (m^2) [7]	
		Primary treatment (includes area required for setbacks)	Secondary treatment (excludes setbacks)
1	Gravels and sands	339	180
2	Sandy loams	339	180
3	Loams	429	225
4	Clay loams	620	257
5	Light clays	1,156	300
6	Medium to heavy clays	Special design	450

This table may be used to inform residential subdivision applications. It is based upon Table 2. Different sized areas may be required at development or building stage in response to anticipated hydraulic load.

A sample calculation for determining the land application area for a primary treatment system in Soil Categories 1 and 2 is provided in the Explanatory Notes.

[7] The land application area has been determined using design loading rates for trenches and beds, extrapolated from Table L1 *AZ/NZS 1547 On-site domestic wastewater management*. Calculations used a hydraulic loading of 900litres/day, which is based on the occupancy of 6 persons in a 5 bedroom house and a sewage design flow of 150L/person/day. Values for primary treatment include setback distances. Note that values for secondary treatment exclude setback distances, which will vary depending on the system used.

4 General site features for on-site sewage disposal

Table 4: General site features for on-site sewage disposal

Site feature	Minimum requirement
Separation from groundwater – outside public drinking water source areas and sewage sensitive areas **(The minimum requirements for public drinking water source areas and sewage sensitive areas are found at Section 5.2 of this policy)**	Where land is not within a public drinking water source area or a sewage sensitive area[8], the discharge point of the on-site sewage system should be located the following distances above the highest groundwater level: • for loams and heavy soils, at least 0.6 metres • for gravels, at least one metre • for sands, at least 1.5 metres. Where a nutrient retentive secondary treatment system is used, at least 0.6 metres.
Land application area	A land application area should be provided for all development in accordance with tables 2 and 3 of this schedule for the disposal of sewage.
	The land application area excludes the area restricted to the distribution of treated sewage only and should be kept free of any temporary or permanent structures.
	Activities within the land application area shall not interfere with the function of the current and future land application system and people should avoid potential contact with effluent residues. Unless allowed for in the design, the land application area) should: • not be built on or paved in a manner which precludes reasonable access; • not be subject to vehicular traffic (other than a pedestrian-controlled lawnmower); • not be subject to regular foot traffic such as pathways and clothes line areas; and • should be kept in a manner which enables servicing and maintenance of the disposal system.
Gradient of the land application area	Where slope exceeds one in five (1:5), the land application area should be engineered to prevent run-off from the land application area. Surface contours should be provided on the site plan.
Location of land application area within building envelope	Local government may approve the location of land application areas outside building envelopes where proposed location meets requirements outlined above.

[8] The minimum separation distances for sewage sensitive areas and public drinking water source areas are provided in Section 5.2 of this policy.

Appendix G

DBCA Correspondence 2011

Appendix 6 DBCA Letter re access

Government of Western Australia
Department of Environment and Conservation

Your ref:
Our ref:
Enquiries: Mr J Sharp
Phone: 9442 0325
Fax: 9386 7112
Email: sharon.bell@dec.wa.gov.au

Mr Geoff Wardle
PO Box 107
NORTH FREMANTLE WA 6159

Dear Geoff

SUNDAY ISLAND BAY LOT 304 AND OTHER MATTERS

I am writing in response to your letter of 3 December 2010 and subsequent email dated 2 March 2011 regarding access to Lot 304 at Sunday Island Bay. I have also provided information regarding access to the leasehold block at Cape Levillain which has been discussed previously.

The department's Shark Bay District Manager, Brett Fitzgerald has briefed me regarding the site visit that he undertook with yourself, Recreation and Landscape Coordinator, Tracy Churchill and Peter Berryman at Sunday Island Bay on 15 February 2011.

To confirm the outcomes of that meeting with regard to access to Lot 304;

1. A proposal to provide a new road access through Dirk Hartog Island National Park from the existing Sunday Island Bay access track to the south-western corner of Lot 304, as per the attached plan, has been submitted to the Conservation Commission of Western Australia for consideration. The Commission considered the proposal on 14 March 2011. The track will be of a simple standard similar to the existing Sunday Island Bay track, ie a single lane track established on the existing substrate without any addition of bulk raw materials such as gravel.

2. The matter of temporary access at various points from the Shark Bay Marine Park to the southern boundary of Lot 304 will be considered once a formal development proposal is prepared and the need for that access is demonstrated. Indicative locations of temporary access have been identified on the attached plan. Formal approval for temporary access will be contingent on these indicative alignments being marked in the field and agreement on a method of protection for the vegetation and landforms to be crossed by that temporary access from vehicle traction impact. The temporary 'bridging structures' would need to be constructed to prevent permanent damage to vegetation and ground surfaces and will need to be removed after the transport of construction materials for a specified phase of development is completed.

3. Pedestrian access from Lot 304 through the national park on an appropriate alignment can be approved and the specific alignment of those pedestrian access routes marked by an appropriate method. Pedestrian access would include access from the eastern end of Lot 304 to the proposed jetty discussed by you with the department previously. As confirmed in your letter of 3 December, boardwalk facilities would only be constructed on Lot 304 and end at the freehold boundary.

4. A formal proposal for a jetty structure would need to be provided for consideration by the department and endorsement by the Marine Parks and Reserves Authority.

5. Access to the leasehold block near Cape Levillain will need to be confirmed onground. Brett Fitzgerald has confirmed that the access from the existing track to the east of the leasehold block to the north western corner of the leasehold block would appear to be the most sensible approximate location of that access track. Section 3.65 of the lease agreement states; *"The lessee must establish and maintain a track from the Leased Premises to the track through the National Pak between Sammy's Well and Turtle Bay Beach, at the lessee's expense. The location and condition of the access track is to the Lessor's specifications."* Departmental staff will mark the alignment of that track and provide a map of the alignment and the specification of the track condition for your reference.

I will write to you again once the Conservation Commission has advised the department of the outcome of their recent meeting regarding the proposal put forward for permanent road access to Lot 304.

Yours sincerely

Jim Sharp
DEPUTY DIRECTOR GENERAL PARKS AND CONSERVATION

16 March 2011

Att

Appendix H

DBCA Advice 2020

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

PARKS AND WILDLIFE SERVICE

Your ref:
Our ref: PRS45588
Enquiries: Steve Nicholson
Phone: 08 99482226
Email: steve.nicholson@dbca.wa.gov.au

Mr Paul Anderson
Chief Executive Officer
Shire of Shark Bay
PO Box 126
DENHAM WA 6537

Dear Mr Anderson

LOCAL DEVELOPMENT PLAN – LOT 304 SUNDAY ISLAND BAY, DIRK HARTOG ISLAND

Thank you for your email of 28 May inviting comments on the Local Development Plan (LDP) for Lot 304 Sunday Island Bay on Dirk Hartog Island.

The Department of Biodiversity, Conservation and Attractions (DBCA) is of the view that overall the LDP does not adequately address the planning issues for Lot 304 and surrounding areas, including the Shire of Shark Bay Local Planning Scheme No. 4 (LPS4) and Restrictive Covenant conditions that apply to Lot 304.

COMPLIANCE WITH RESTRICTIVE COVENANT

- DBCA notes that Lot 304 is subject to a number of restrictive covenants, including that *"the land may only be used for low impact eco-tourism"*.
- The restrictive covenant defines low impact as *"low impact on the environment having regard to the number of tourists visiting the Land and the facilities and other services provided for their use"*.
- In the context of the scale and density of the development, DBCA is not satisfied that that the LDP demonstrates compliance with the covenant.

BIOSECURITY MEASURES

- The restrictive covenant for Lot 304 requires that any development "*fully comply with any quarantine management plan of any Governmental Agency relating to Dirk Hartog Island*".
- LPS4 conditions require that the LDP include information on how biosecurity measures to mitigate the risks of feral animal incursions and disease impacts to the Dirk Hartog Island National Park (DHINP) will be achieved.
- The biosecurity plan included with the LDP appears to be largely copied from DBCA's Biosecurity Plan for Dirk Hartog Island and does not clearly state the measures that will be taken on Lot 304 to achieve biosecurity requirements.

VISUAL IMPACTS

- The LDP does not clearly demonstrate that the proposed development will have an acceptable visual impact on the surrounding landscape, consistent with requirements of the Shire of Shark Bay LPS4 or with World Heritage values.
- The LDP and Attachment D 'Design Guidelines' do not provide sufficient building design detail to demonstrate this has been adequately considered and addressed.
- In March 2015, in relation to a previous development proposal for Lot 304, the Environmental Protection Agency (EPA) recommended; *"Prior to approval of the*

development application that a Visual Impact Assessment is to be undertaken consistent with the Visual Landscape Planning in Western Australia, published by the Department of Planning (2007). This Visual Impact Assessment should be undertaken in consultation with Parks and Wildlife". DBCA considers that this advice is equally relevant to the current proposal for Lot 304 and that the LDP should meet this recommendation.

CONSISTENCY WITH PREVIOUS EPA ADVICE

- The March 2015 EPA advice recommended the proponent expand the existing Foreshore Management Plan to an Access Management Plan, to address impacts to DHINP from construction and operation of the proposal. The EPA recommendations included:
  - Protocols to minimise impacts to DHINP during construction
  - Protocols to minimise impacts to DHINP during operation through appropriate management of visitor access and recreation
  - Monitoring and rehabilitation procedures and protocols for areas within DHINP that are disturbed as a result of the construction operation of the proposal, with a particular emphasis on the foreshore area adjacent to the development.
- The LDP and attached Foreshore Management Plan do not adequately address these recommendations.

PEDESTRIAN ACCESS THROUGH DHINP

- DBCA recognises that there will be pedestrian access through the DHINP foreshore to enable access from the Lot to the beach.
- DBCA has previously provided detailed advice to the proponent's consultant (email 3 March 2020) concerning development of pedestrian access pathways. This advice included that proposed pedestrian access details be included in the Local Development Plan. The advice has not been addressed in the LDP and supporting documents, and they do not provide sufficient detail regarding proposed pedestrian access.
- The statement in the Foreshore Management Plan that "DPaW (DBCA) have agreed that long term pedestrian access to the beach front (nearshore) over the fore shore will be negotiated with DPaW (DBCA) prior to human occupation following or during the completion of any proposed development" is incorrect.

VEHICLE ACCESS THROUGH DHINP

- The Foreshore Management Plan attached to the LDP states that *"The only vehicles proposed to operate within the lot are Polaris style vehicles of 2,4 or 6 seat capacity. DPaW (now DBCA) has supported approval for the operation of these low impact vehicles within the National Park subject to DoT approval."* This statement is incorrect. The advice provided by DBCA concerning an earlier development plan (2 February 2015) states: *"The proposal to discourage guests from travelling to the island by private vehicle is supported. DoT advice on the use of Polaris vehicles is pending".*
- The Foreshore Management Plan states: *"Apart from agreed access over the foreshore via agreed and approved vehicle access routes there will be no permanent access over the vegetated foreshore area for vehicles apart from the agreed access track to the west of the lot."* The intent of this statement is unclear. DBCA will not support ongoing vehicle access over the foreshore through DHINP to Lot 304. Visitor vehicle access will only be permitted on the existing vehicle track.

FORESHORE MANAGEMENT

- The Foreshore Management Plan provided as an attachment to the LDP does not adequately address how threats to the DHINP will be managed. For example, the Foreshore Management Plan outlines that the proponent intends to develop pedestrian access paths/raised boardwalks, physical barriers for pedestrians and

shade shelter structures within the DHINP foreshore, however no specifications or design guidelines for these structures are provided.

DESALINISATION

- The LDP proposes desalination systems to provide fresh water but does not describe how desalination will take place or what infrastructure will be required. Potential impacts from desalinisation infrastructure, such as piping, and brine outlets to the Shark Bay Marine Park and/or Dirk Hartog Island National Park are not identified.
- The proponent has not consulted with DBCA regarding water extraction from the Shark Bay Marine Park or the disposal of bitterns into the Marine park.

ATTACHMENTS NOT REFERRED TO IN THE LDP

- The LDP document does not clearly refer to the attachments as comprising part of the LDP. The LDP should refer to relevant attachments as forming part of the LDP.

Should you have any queries regarding this advice, please contact Steve Nicholson, Shark Bay District Manager, on 9948 2226 or steve.nichoson@dbca.wa.gov.au.

Yours sincerely

Nigel Sercombe
REGIONAL MANAGER
Midwest Region

13 July 2020

Appendix I

Bushfire Management Plan
(Bushfire Safety Consulting, 2024)

Bushfire management plan/Statement addressing the Bushfire Protection Criteria coversheet

Site address: Sunday Island Bay, Dirk Hartog Island

Site visit: Yes ☑ No ☐

Date of site visit (if applicable): Day 10th Month September Year 2024

Report author or reviewer: Rohan Carboon (BPAD 23160)

WA BPAD accreditation level (please circle):

Not accredited ☐ Level 1 BAL assessor ☐ Level 2 practitioner ☐ Level 3 practitioner ☑

If accredited please provide the following.

BPAD accreditation number: 23160 Accreditation expiry: Month January Year 2025

Bushfire management plan version number: 2.0

Bushfire management plan date: Day 16 Month December Year 2024

Client/business name: DHID Pty Ltd

	Yes	No
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?	✔	
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the bushfire protection criteria elements)?	✔	

Is the proposal any of the following (see SPP 3.7 for definitions)?	Yes	No
Unavoidable development (in BAL-40 or BAL-FZ)		✔
Strategic planning proposal (including rezoning applications)		✔
High risk land-use		✔
Vulnerable land-use	✔	

None of the above ☑

Note: Only if one (or more) of the above answers in the tables is yes should the decision maker (e.g. local government or the WAPC) refer the proposal to DFES for comment.

Why has it been given one of the above listed classifications (E.g. Considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?

Remote eco-tourism development and accommodation cabins trigger BEP. method 2 BAL assessment to determine on-site shelter exposures and some outcome based approaches proposed to reflect lack of access compliance at this world Heritage remote location.

The information provided within this bushfire management plan to the best of my knowledge is true and correct:

Signature of report author or reviewer

Date 16/12/2024

Bushfire Management Plan

Local Development Plan Application

Lot 304 Sunday Island Bay , Dirk Hartog Island

SHIRE OF SHARK BAY

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Prepared For:
DHID Pty Ltd
16 December 2024
Version 2.0

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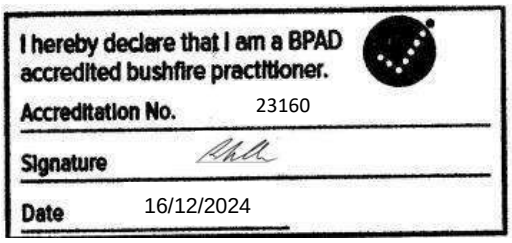
Document Information

Prepared for:	DHID Pty Ltd
Project Name:	Local Development Plan Application
Address:	Lot 304 Sunday Island Bay, Dirk Hartog Island
Prepared by:	Rohan Carboon
	Bushfire Safety Consulting Pty Ltd



Document Control

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V1	Draft for Review	Rohan Carboon (Level 3 - BPAD 32160)	2/12/2024
V2	Final for submission	Rohan Carboon (Level 3 - BPAD 32160)	16/12/2024

Front cover photo: Site Layout

Bushfire Safety Consulting Pty Ltd
PO Box 84
STONEVILLE WA 6081

Tel: 0429 949 262
Email: hello@bushfiresafetyconsulting.com.au
Web: www.bushfiresafetyconsulting.com.au

Disclaimer:

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EXECUTIVE SUMMARY

This Bushfire Management Plan (BMP) and Bushfire Emergency Plan (BEP) has been prepared to support the Local Development Plan Application by DHI Development Pty Ltd who are the majority owner of the subject land at Lot 304 Sunday Island Bay, Dirk Hartog Island.

Sunday Island Bay is located at the southern end of Dirk Hartog Island. The island is remote and unique and the World Heritage values of Shark Bay and Dirk Hartog Island are integral to the planning of the development. The island is foremost a National Park and visitors enjoy visiting and having remote experiences as a wilderness eco-destination. In a State Government tourism assessment, it is described as having a future where 'the island becomes a world leading nature-based adventure tourism destination rich in heritage, cultural, terrestrial, aquatic and social enterprises…'

The island's transition from pastoral lease to national park in 2009 resulted in the creation of five freehold / leasehold lots. Lot 304 is one of the five lots and presents significant potential to expand the island's short stay accommodation capacity. Consistent with the remote location and unique experiences sought after by visitors, access to and from the island is limited to:

- the island landing barge that uses Cape Ransonnet, 3.7 km south of the site on the main track
- boat transfer from Dirk Hartog island Lodge 16 km north on the main track to Denham
- light aircraft transfer from island airstrip, 17km north on the main access track; and
- the island landing barge from Sunday Island Bay beach

The tracks on the island are natural surface and are suitable for all weather access for 4WD vehicles.

The Shire of Shark Bay Local Planning Scheme No.4 designates Lot 304 as Special Use Zone 14 (SU14). The objective of this land use is to provide for ecotourism development and the Scheme lists a number of discretionary uses that may be approved by Council in this zone. These discretionary uses include tourism developments, camping grounds and holiday accommodation. Schedule B in the LPS prescribes that a Local Development Plan (LDP) is required prior to a Development Application for the site.

The Shire's LPS No.4 regarding Special Use Zone SU14 for development on lot 304 states (in part) a number of conditions. Condition 3 states that "prior to the commencement of development of Lot 304, a Local Development Plan shall be prepared in accordance with Part 6 of the Planning and Development (Local Planning Schemes) Regulations 2015 and address the following:

Condition 3 (iv) Bushfire management in accordance with relevant state planning policy.

This BMP responds to this condition by assessing this LDP Application against the State Planning Policy 3.7 Bushfire (SPP 3.7) and the associated Planning for Bushfire Guidelines (2024).

The proposed LDP includes eight building envelopes with indicative clusters of accommodation units and staff accommodation. Each cluster is proposed to accommodate an "on-site bushfire shelter inside the staff accommodation building. The Indicative Development assessed in this proposal demonstrates how the site might be developed, but the final development will be confirmed at Development Application stage and this BMP will be updated to ensure compliance with SPP 3.7 and the Guidelines.

This BMP supersedes the previously submitted report (Version 1.1) prepared by Smith Bushfire Consultants Pty Ltd dated 29 January, 2024. This assessment also responds to feedback provided to the Shire of Shark Bay (the Shire) by the Department of Fire and Emergency Services (DFES) on 26

March 2024 and also responds to feedback provided by the Shire to the proponent with correspondence dated 21 February, 2024.

The proposed indicative development complies with the definition of "vulnerable land use" in the *State Planning Policy 3.7: Bushfire (SPP 3.7)*, Policy Clause 7.4 and therefore triggers a Bushfire Management Plan and a Bushfire Emergency Plan for staff and visitors. The maximum number of staff and visitors to the site is proposed not to exceed 100. The proposed vulnerable land use is supported by a Bushfire Emergency Plan developed consistent with the guidelines and templates. It is a crucial component of the overall bushfire planning at the site and identifies that the primar4y action to take during a bushfire is to initially shelter-in-place and evacuate when it is safe to do so. It is a living document that will be updated during the DA stage and annually when the facility is completed.

The site is located in the designated Bushfire Prone Area 2 however a broader landscape assessment as outlined in Appendix A of the Guidelines was not undertaken as the State Planning Policy 3.7 Bushfire and the Planning for Bushfire Guidelines states in Section 3 for Tourism Land Uses: The broader landscape assessment is not required for tourism land uses, recognising that many are remote and nature-based.

It was considered appropriate to undertake a Bushfire Hazard Level assessment according to methodology in Appendix A of the Guidelines to provide a broader perspective on the ability of a bushfire to impact and run through the site. The assessment of a 2km radius around the site determined that over 50% of that assessment area is ocean or inlet vegetation dominated by succulent samphire plants. Of the remaining vegetated land, the landscape is covered in Class C shrubland and low shrubland vegetation only. The vegetation is wind pruned and rarely exceeds 1 metres in height. The bushfire hazard level assessment confirmed the site is exposed to a moderate hazard level form the north and west, but has minimal exposure to long fire runs from the east and south. The site is not exposed to extreme bushfire hazard levels.

The focused assessment of the 150 metres surrounding the site, determined the low shrubland vegetation rarely exceed 0.5 metres in height, is exposed to strong prevailing southerly winds, is severely wind pruned and maintained at low levels and the vegetation is not all connected. The distribution of dead and live fine fuels in the vegetation is not all connected due to the gaps of mineral earth and sand between the clumps of low shrubs.

The comprehensive assessment of effective slope assessed fire runs into the site from 47 potential fire runs and looked at individual slopes that surround each cluster of buildings outside of potential Asset Protection Zone. Over 100 short and long fire runs were assessed around the site and building clusters. This combined with the vegetation classifications resulted in a detailed analysis of the Asset Protection Zone (APZ) requirements around the on-site shelter buildings and each accommodation unit.

The APZ dimensions and future management of fine fuels results in an exposure of less than 29kW/m2 (ie. BAL-29) for all units and less than 10kW/m2 for each on-site shelter using a flame temperate of 1200K and Fire Danger Indice of 100. The site will be pre-emptively evacuated of visitors prior to days exceeding FDI 100, hence exposure of people to risk above this level is mitigated as no visitors are on site. The on-site shelters will be designed and constructed in accordance with the Building Code of Australia and ABCB Design and Construction of Community Bushfire Refuges Handbook (2014). The design will be undertaken by a suitably qualified fire engineer with fire risk assessment expertise, accredited with Engineers Australia at DA stage.

There are no public roads on the island, only National Park tracks and there is no fire suppression agency based permanently on the island. The proposal for a remote development considers the unique elements and constraints and when constructed will provide the safest location for any person on the island to shelter, with the most dedicated source of water for fire fighting and property defense by staff. Additional equipment will include a slip-on fire unit on the back of a 4WD ute that will be located at the site during the fire season.

The proposed indicative development achieves all the acceptable solutions and provides outcomes based approaches suitable to mitigate risk in this unique isolated location consistent with an eco-development in this isolated World Heritage environment. The proposal for building envelopes achieves the intent of the Planning for Bushfire Guidelines and SPP 3.7 and will be updated at Development Application (DA) stage when firmer plans are lodged for the final development at the next stage in planning approval.

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Appendix 3: Vehicular Access Technical Requirements
Appendix 4: Water Supply Standards
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1 PROPOSAL DETAILS

This Bushfire Management Plan (BMP) has been developed to support the Local Development Plan Application by DHI Development Pty Ltd who are the majority owner of the subject land at Lot 304 Sunday Island Bay, Dirk Hartog Island. This BMP supersedes the previously submitted report (Version 1.1) prepared by Smith Bushfire Consultants Pty Ltd dated 29 January, 2024. This assessment also responds to feedback provided to the Shire of Shark Bay (the Shire) by the Department of Fire and Emergency Services (DFES) on 26 March 2024 and also responds to feedback provided by the Shire to the proponent with correspondence dated 21 February, 2024.

This BMP has been developed under the State Planning Policy 3.7 Bushfire (2024) and the Planning for Bushfire Guidelines (2024).

The proposed LDP includes eight building envelopes with indicative clusters of accommodation units and staff accommodation. Each cluster is proposed to accommodate an "on-site bushfire shelter inside the staff accommodation building. The Indicative Development (Figure 1) shows how the site might be developed, but the proposed development will be confirmed at Development Application stage and this BMP will be updated to ensure compliance with SPP 3.7 and the Guidelines.

Additional to this BMP, the proposed LDP submission is supported by a number of reports including:

1. A Management Plan that addresses visitor access, servicing, maintenance, waste disposal, effluent disposal, service areas, rubbish management and the transport of construction material.
2. Design Guidelines that establish a range of parameters to be addressed in designing any future accommodation development to ensure it meets required conditions including high architectural quality, be designed to be low scale and sympathetic to the location and unique character of the surrounding area.
3. An Environmental Report that examines the potential environmental impacts and sets out management measures to avoid or ameliorate those impacts.

The site is located at Sunday Island Bay, which is at the southern end of Dirk Hartog Island. The island is Western Australias largest and most western island, it lies approximately 31 kilometres west of Denham across Denham Sound and is 2 kilometres north of Shelter Bay near Steep Point. The Island landing Barge transfers 4WD vehicles and trailers and takes approximately 15 minutes to cross South Passage to Cape Ransonnet at the southern end of the island (Figure 2).

1.1 BACKGROUND

The 2023 report commissioned by the Department of Biodiversity Conservation and Attractions (DBCA) titled "Dirk Hartog Island - Recreation and Tourism Opportunities Analysis" identified an increase in interest of the island and strong visitation numbers to coastal tourism destinations and the island's ecological restoration project. Drivers of future growth in visitation to the island include development of ecotourism accommodation on freehold land and additional recreation and tourism infrastructure within the National Park, it is home to a unique growing sanctuary (ie. the return to 1616 Ecological Project). The island is foremost a National Park, visitors enjoy the island as a remote, wilderness eco-destination. The islands vision based on stakeholder views and feedback captured in

the analysis include 'the island becoming a world leading nature-based adventure tourism destination rich in heritage, cultural, terrestrial, aquatic and social enterprises…'

The island's transition from pastoral lease to national park in 2009 resulted in five freehold / leasehold lots. The lots present significant potential to expand the island's short stay accommodation capacity. Lot 304 is a freehold title comprising 11.2985ha of land on the southern coast facing south across Sunday Island Bay. The other major tourism development on the island is Lot 62 which contains the homestead and other accommodation buildings and is being run as an accommodation eco-tourism resort by Keiran Wardle and family. Kieran manages all the island accommodation bookings including the national park campgrounds, the island landing barge and offers tours for people all over the island and surrounding ocean based environments.

The total number of staff and tourists will not exceed 100 to comply with acceptable solutions in the guidelines and the location of the building envelopes has been thoroughly considered against a whole range of key environmental considerations, such as minimising impact, effluent disposal, visual impact, topography and risk management. The island vehicle barge can access Sunday Island beach if required.

Location details:	Lot 304 on DP 50257 Dirk Hartog Island
Assessment date:	August, 2024
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

FIGURE 1
INDICATIVE DEVELOPMENT

0 50 100 150m

SCALE 1:3800 @ A3
DATE: NOVEMBER 2024

NORTH

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- 20m x 6m WIDE PASSING BAYS
- INTERNAL LOOP DRIVEWAY
- STAFF ACCOMMODATION AND COMMUNITY BUSHFIRE REFUGE
- SHORT TERM ACCOMMODATION UNITS
- 50,000 LITRE DEDICATED WATER TANK

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PO BOX 84 STONEVILLE WA 6081
Mbl: 0429 949 262
www.bushfiresafetyconsulting.com.au

Location details:	Lot 304 on DP 50257 Dirk Hartog Island
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Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

FIGURE 2
LOCATION PLAN

0 0.5 1 2 3 4km
SCALE 1:60,000 @ A3
DATE: SEPTEMBER 2024

NORTH

SOURCE OF PHOTOGRAPHY: LANDGATE

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1.2 Planning and Policy Framework

1.2.1 Shire of Shark Bay Local Planning Scheme

The Shire of Shark Bay Local Planning Scheme No.4 sets out the Shire's planning aims and under the Scheme, Lot 304 is designated as Special Use Zone 14 (SU14). The objective of this land use is to provide for ecotourism development and the Scheme lists a number of discretionary uses that may be approved by Council in this zone. These discretionary uses include tourism developments, camping grounds and holiday accommodation.

Schedule B in the LPS prescribes that a Local Development Plan (LDP) is required prior to a Development Application for the site.

The Shire's LPS No.4 regarding Special Use Zone SU14 for development on lot 304 states (in part) a number of conditions. Condition 3 states that "prior to the commencement of development of Lot 304, a Local Development Plan shall be prepared in accordance with Part 6 of the Planning and Development (Local Planning Schemes) Regulations 2015 and address the following:

Condition 3 (iv) Bushfire management in accordance with relevant state planning policy.

This BMP responds to this condition by assessing this LDP Application against the State Planning Policy 3.7 Bushfire (SPP 3.7) and the associated Planning for Bushfire Guidelines (2024).

1.2.2 Application of SPP 3.7

The *State Planning Policy No. 3.7: Bushfire (SPP 3.7)* The policy intent is to implement effective, risk-based land use planning and development to manage and/or mitigate risk to people, property and infrastructure to an acceptable level.

The policy contains objectives and policy outcomes and measures as well as reference to the Bushfire Protection Criteria as outlined in the Planning for Bushfire Guidelines (WAPC 2024) (the Guidelines). The policy applies to this Local Development Plan Application because the site is located in a designated bushfire prone area on the WA Map of Bushfire Prone Areas (Figure 3).

SPP3.7 and the Planning for Bushfire Guidelines provides the foundation for land use planning to address bushfire risk management in Western Australia.

The following policy measures will need to comply with SPP 3.7:

Table 1. Policy measures

Policy Measure 7.1	The Geneal measures ensure bushfire is considered at the earliest possible stage in the planning process and all subsequent stages. A Bushfire Management Plan should be developed in accordance with the Guidelines and include the following - an assessment of environmental, biodiversity and conservation values, - a Bushfire Hazard Level assessment and BAL Contour Map, - an identification of issues and an assessment against the bushfire protection criteria.
Policy Measure 7.4	Policy measure 7.4 (Vulnerable land uses) applies due to the number of people accommodated and the likely evacuation challenges. It is not a vulnerable land use due to any specific group of people who may visit who could be less physically or mentally able to respond to a bushfire event. A Bushfire Evacuation Plan (BEP) has been developed to respond to this requirement, however it will be further detailed at Development Application stage when more details are known about the proposed development and staffing requirements. The BEP considers bushfire emergency procedures, options for evacuation and detailed assessment for on-site shelters and appropriate exposure levels and triggers for pre-emptive closure.
Policy Measure 7.5	Due to the remote nature of this site, its access issues and unique transport arrangements to get to and from the area, all acceptable solutions cannot be accommodated. Where they can be, they are applied, however where they cannot be applied other outcomes based approaches are proposed if they apply.

1.2.3 Planning for Bushfire Guidelines (2024)

The Planning for Bushfire Guidelines (2024) provides the criteria and acceptable solutions that are assessed and accommodated within this BMP. The Planning for Bushfire Guidelines (2024) is intended to inform and guide decision makers, referral authorities and proponents to achieve acceptable bushfire protection outcomes, including expectations at the different stages of planning. Section 8 of the guidelines outlines all the considerations and Bushfire Protection Criteria for Vulnerable Tourism land uses that are applicable for this application.

This stage in planning is supported by this BMP, however at Development Application stage further details will be provided in a BMP and BEP consistent with SPP 3.7 and the Guidelines to support the final site layout and design of the development.

1.2.4 Covenants

Lot 304 is subject to both restrictive covenants to the benefit of the West Australian Minister of Lands and a positive covenant registered upon the title for the transport of water along a registered easement

Location details:	Lot 304 on DP 50257 Dirk Hartog Island
Assessment date:	August, 2024
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Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

FIGURE 3
BUSHFIRE PRONE AREAS

0 200 400 600 800m

SCALE 1:20,000 @ A3
DATE: NOVEMBER 2024

NORTH

LEGEND:
- SUBJECT LAND
- ASSESSMENT AREA (2km) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- BUSHFIRE PRONE AREAS

SOURCE OF PHOTOGRAPHY: LANDGATE

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Mbl: 0429 949 262
www.bushfiresafetyconsulting.com.au

2 ENVIRONMENTAL AND CULTURAL CONSIDERATIONS

Dirk Hartog Island is located within the Shark Bay World Heritage Property (SBWHP). The world heritage values recognised by UNESCO include: the rich marine life including a large population of dugongs, the seagrass beds and stromatolites. Dirk Hartog Island is famous for the 'return to 1616' project, which is one of Australias most successful restoration projects.

Since the early 2000's, sheep, goats and feral cats have been removed from the island and a number of unique and threatened mammal species have been re-introduced. The ecological restoration project began in 2012 with the aim of restoring the islands ecology to a condition more closely resembling 1616. All visitors are requested to drive slowly and minimise driving between dusk and dawn to reduce the chance of vehicle impacts.

As part of this LDP application, Bayley Environmental Services has undertaken and Environmental Report assessment and developed a report. A summary of the environmental and cultural considerations in that report include:

- A number of flora surveys have been undertaken on Dirk Hartog Island by DBCA in 2005, 2006 and 2007 and no flora listed as Declared Rare Flora are known to occur on the island.
- The surveys found several priority flora species ranked from Priority 1 to 5
- The Naturebase database search identified five Priority flora Species that have been recorded within 5km of Lot 304
- The EPBC Act Protected Matters Search Tool did not identify any Threatened flora species or habitat as occurring or likely to occur within the area
- The islands traditional owners are the Malgana people who know the island as Wirruwana and the island is jointly managed by DBCA and traditional owners. In 2007, a heritage survey was conducted by an anthropologist on behalf of the Yaalti Marpla Barna Maaja Corporation. The Sunday Island Bay area was visited during this survey and there were no Aboriginal sites of significance or native Title claims within 10km of Lot 304.

The Environment Report concludes "the development of visitor accommodation on Lot 304 as proposed in the LDP can be undertaken in accordance with the Shire of Shark Bay LSP No. 4 and without any significant adverse impacts on the ecological and special attributes of Dirk Hartog island or its surrounding waters"

2.1 Native Vegetation – Modification and Clearing

The development has been designed so that buildings are constructed together in clusters that results in concentrated areas of impact. Asset protection zones are shared between buildings and the smallest area possible is disturbed. Works required inside the APZs include: removing dead fine fuels, pruning shrubs to create horizontal and vertical gaps. Roots will be maintained so they stabilise the sensitive soils to minimise erosion. All tracks will be designed so they minimise visual; and physical impacts and are sensitive to the existing vegetation and prevailing winds.

2.2 Revegetation/ Landscape Plans

There are no revegetation plans for the site. The siting of the buildings, carparking, driveways and walking paths will work with local site constraints to ensure minimal impact.

All vegetation modification to achieve the APZ will be established using minimal impact techniques to reduce flammable fine fuels , but retain the root structure of plants to avoid potentially creating erosion issues.

3 BUSHFIRE ASSESSMENT RESULTS

Bushfires are uncommon on Dirk Hartog Island, but regularly occur on the mainland and in the Shire of Shark Bay.

Large fires have occurred in the Shire area and will in the future. A large fire on Dirk Hartog is highly unlikely due to the low number of potential ignition sources, the narrow arrangement of flammable vegetation broken up by sand dunes systems and the surrounding coastal environments, beaches and ocean where fires will extinguish. However, this plan recognises that a fire could start and threaten the development so this thorough assessment has been undertaken and appropriate planning is necessary to ensure risks are managed to acceptable levels.

The site is located in the designated Bushfire Prone Area 2, however the Broader Landscape Assessment as outlined in Appendix A of the Guidelines was not undertaken as the State Planning Policy 3.7 Bushfire and the Planning for Bushfire Guidelines states in Section 3 for Tourism Land Uses: The broader landscape assessment is not required for tourism land uses, recognising that many are remote and nature-based. However, it was considered appropriate to undertake a Bushfire Hazard Level assessment according to methodology in Appendix A of the Guidelines to provide a landscape perspective on the ability of a bushfire to impact and run through the site. The assessment of a 2km radius around the site determined that the site is not exposed to extreme bushfire hazard levels. The classified vegetation is Class C Shrubland and is considered a moderate hazard only. The methodology used is outlined below:

3.1 Assessment Inputs - Bushfire Hazard Level Assessment

The methodology used to assess the site is outlined in the *Planning for Bushfire Guidelines (Sept. 2024)* in Appendix A, Section A.2. The purpose of the Bushfire Hazard Level (BHL) assessment is to provide a broad brush understanding of the potential intensity of a bushfire in the landscape near the site.

The methodology is outlined in clause A.2.4 in Appendix A of the Planning for Bushfire Guidelines (2024). The pre-development site and all vegetation classes within 2 kilometres was assessed including slopes where contour data was available and measured on-site where accessible.

The vegetation classification map within 2 kilometres of the site is found in Figure 4. The bushfire hazard assessment Level map is found in Figure 5.

3.1.1 Vegetation Classification

The classified vegetation plots on and surrounding the site and within 2 kilometres of the site boundary are found in the plot descriptions below and in **Figure 4**. A small number of representative photos were taken in the broader landscape for this BHL assessment.

3.1.2 Effective Slope

The broad landscape consists of undulating sandy plains with minor low dunes, limestone rises, saline flats and gentle gradients, all measured less than 10 degrees gradient.

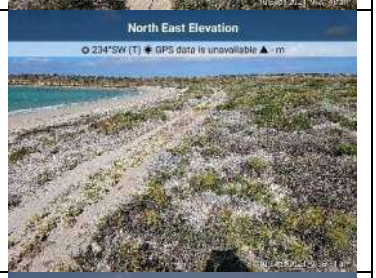
Photo ID: 1 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs on wind exposed area, maximum height 0.5 metres.	
Photo ID: 2 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs on wind exposed area, maximum height 0.5 metres.	
Photo ID: 3 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs on wind exposed area, maximum height 0.5 metres.	
Photo ID: 4 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs on wind exposed area, maximum height 0.5 metres.	
Photo ID: 5 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs on wind exposed area, maximum height 0.5 metres.	

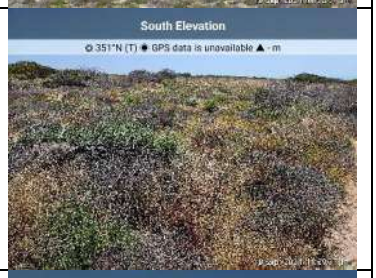
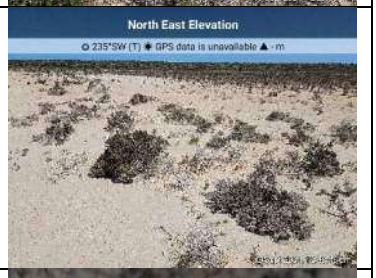
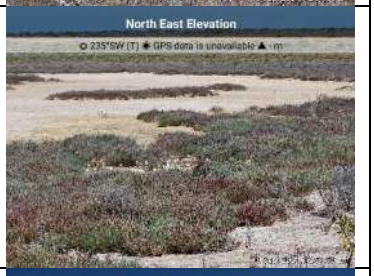
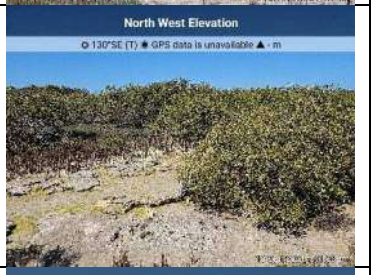
Photo ID: 6 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs on wind exposed area, maximum height 0.5 metres.	
Photo ID: 7 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs on wind exposed area, maximum height 0.5 metres.	
Photo ID: 8 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs on wind exposed area, maximum height 0.5 metres.	
Photo ID: 9 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs on wind exposed area, maximum height 0.5 metres.	
Photo ID: 10 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs on wind exposed area, maximum height 0.5 metres.	
Photo ID: 11 **Plot Number:** 2 **Vegetation classification or exclusion clause:** Exclusion Clause 2.2.3.2(f) **Description/justification of classification**: Succulent salt tolerant plants collectively known as samphire in the damp inlet area. Plants are widely spaced, with mineral earth between them and could not carry a fire front.	
Photo ID: 12 **Plot Number:** 2 **Vegetation classification or exclusion clause:** Exclusion Clause 2.2.3.2(f) **Description/justification of classification**: Close up of the succulent samphire plant, widely spaced, with mineral earth between them and could not carry a fire front.	

Photo ID: 13 **Plot Number:** 2 **Vegetation classification or exclusion clause:** Exclusion Clause 2.2.3.2(f) **Description/justification of classification**: Succulent salt tolerant plants collectively known as samphire in the damp inlet area. Plants are widely spaced, with mineral earth between them and could not carry a fire front.	
Photo ID: 14 **Plot Number:** 2 **Vegetation classification or exclusion clause:** Exclusion Clause 2.2.3.2(f) **Description/justification of classification**: Succulent salt tolerant plants collectively known as samphire in the damp inlet area. Plants are widely spaced, with mineral earth between them and could not carry a fire front.	
Photo ID: 15 **Plot Number:** 2 **Vegetation classification or exclusion clause:** Exclusion Clause 2.2.3.2(f) **Description/justification of classification**: Mangroves growing closer to the inlet, with large rocky areas and mineral earth.	
Photo ID: 16 **Plot Number:** 2 **Vegetation classification or exclusion clause:** Exclusion Clause 2.2.3.2(f) **Description/justification of classification**: Mangroves and samphire growing closer to the inlet, with large mineral earth areas. Very wet environment.	

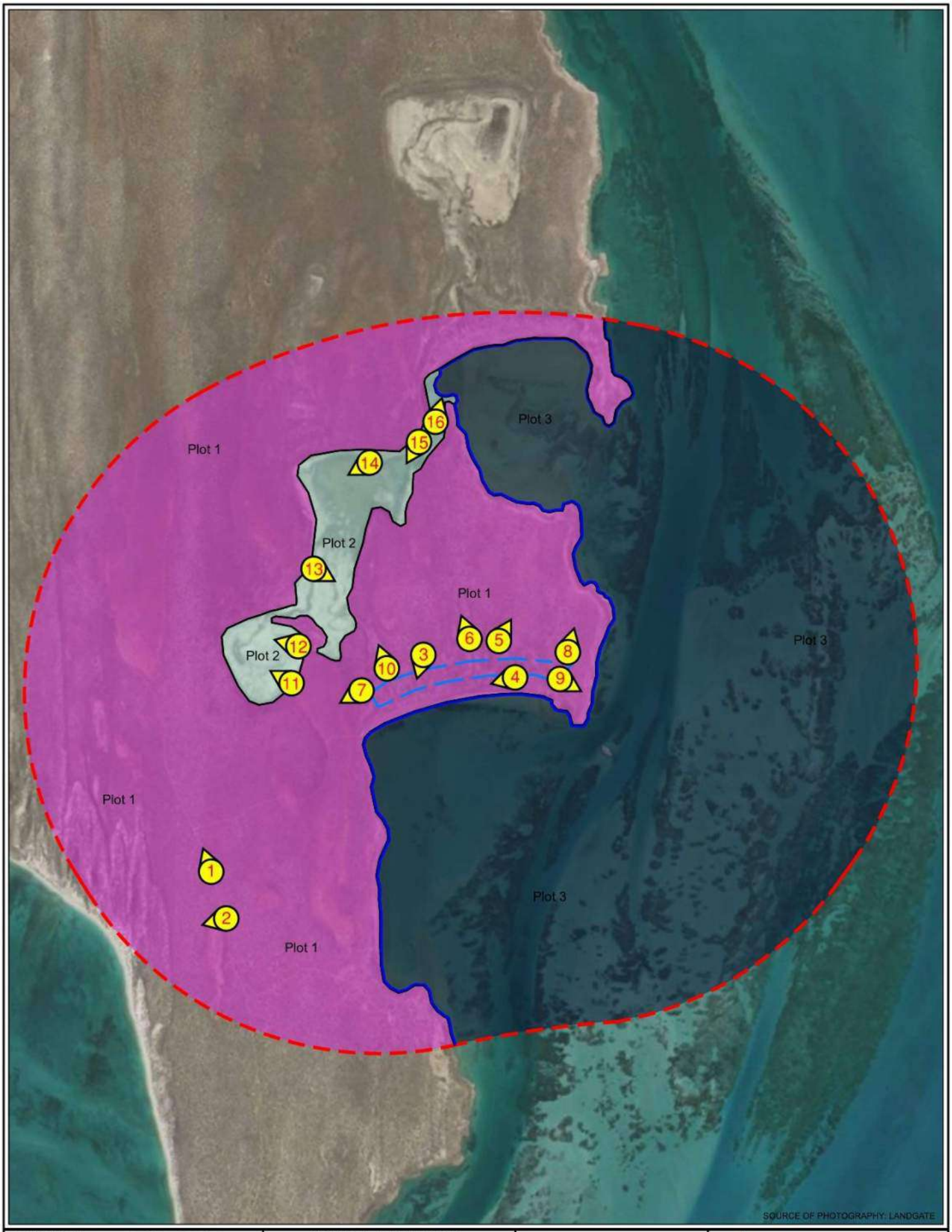
3.1 Assessment Outputs

The pre-development BHL assessment was undertaken according to the Planning for Bushfire *Guidelines (2024)* for a 2kms radius around the site and the results are found in Table 2 and Figure 5**.**

Within the assessment area, over 50% of the total area is ocean or inlet vegetation dominated by succulent samphire plants and mangroves. Of the remaining vegetated land, the landscape is covered in Class C shrubland and low shrubland vegetation only. The vegetation is wind pruned and rarely exceeds 1 metre in height. The bushfire hazard level assessment confirmed the site is exposed to a moderate hazard level from the north and west, but has minimal exposure to long fire runs from the east and south

Table 2. Summary of vegetation type and effective slope

Plot	Applied Vegetation Classification	Effective Slope under the Classified Vegetation within assessment area	Hazard Level
1	Class C Shrubland	Less than 10 °	Moderate
2	Exclusion Clause 2.2.3.2 (f)	N/A	Low unless within 100m of moderate hazard
3	Exclusion Clause 2.2.3.2 (e)	N/A	Low unless within 100m of moderate hazard



Location details:	Lot 304 on DP 50257 Dirk Hartog Island
Assessment date:	August, 2024
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

FIGURE 4 - VEGETATION CLASSIFICATION MAP (FOR BUSHFIRE HAZARD LEVEL ASSESSMENT)

0 200 400 600 800m

SCALE 1:20,000 @ A3
DATE: NOVEMBER 2024

NORTH

LEGEND:

- SUBJECT LAND
- 2km ASESSMENT BUFFER
- PLOT 1 - CLASS C SHRUBLAND
- PLOT 2 - EXCLUSION CLAUSE 2.2.3.2 (f)
- PLOT 3 - EXCLUSION CLAUSE 2.2.3.2 (e)

bushfire safety CONSULTING
Science. Culture. Solutions.
PO BOX 84 STONEVILLE WA 6081
Mbl: 0429 949 262
www.bushfiresafetyconsulting.com.au

Location details:	Lot 304 on DP 50257 Dirk Hartog Island
Assessment date:	August, 2024
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

FIGURE 5
BUSHFIRE HAZARD LEVEL ASSESSMENT

0 200 400 600 800m

SCALE 1:20,000 @ A3
DATE: NOVEMBER 2024

NORTH

LEGEND:
SUBJECT LAND
2km ASSESSMENT BUFFER

BUSHFIRE HAZARD LEVEL
EXTREME
MODERATE
LOW

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PO BOX 84 STONEVILLE WA 6081
Mbl: 0429 949 282
www.bushfiresafetyconsulting.com.au

3.2 Assessment Inputs for Bushfire Attack Level Contour Map

A detailed Bushfire Attack Level Contour map assessment was undertaken, within a 150 m radius of the site, a pre and post development vegetation classification map has been developed, a detailed assessment of effective slopes and a series of detailed BAL Contour maps are found in the following figures.

The methodology used to assess the site is outlined in the *Planning for Bushfire (2024).* The site and surrounding areas can be seen in **Figure 6** and a BAL Contour Map (**Figure 8**) is provided in accordance with Appendix A3 of the guidelines. Assessing bushfire hazards at the site-specific level accounts for the predominant class of vegetation on the site and surrounding area for a minimum of 150 m.

3.2.1 Vegetation Classification

The vegetation on and surrounding the site within the assessment areas is classed as vegetation type - low shrubland, vegetation classification - Class C Shrubland. The lot is sparsely vegetated with scattered low shrubs of *Acacia lighuata, Diplolaeana grandiflora, Thyryptomene baeckeacea and Atriplex bunburyana* (Bailey Environmental Services 2024). The vegetation exists in clumps, separated by mineral earth and open sandy areas. The fine fuels are mostly disconnected.

3.2.1.1 Height of Shrub Vegetation

A number of plants were measured using a measuring tape on-site and captured in several representative photos below. Most of the vegetation averaged less than 0.3 metres in height with the occassional shrub reach 1 metre in height. It is a very open and wind exposed site, many shrubs showed obvious signs of wind pruning as they were dying on the southern wind exposed side of the plant.

The classified vegetation plots on and surrounding the site and within 150 metres of the site boundary are found in the plot descriptions below and in **Figure 6**. The post development Vegetation classification map is found in Figure 6A.

Photo ID: 1 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre,	
Photo ID: 2 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under 0.3 metre,	

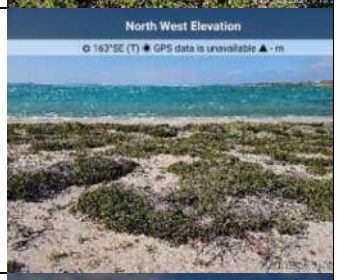
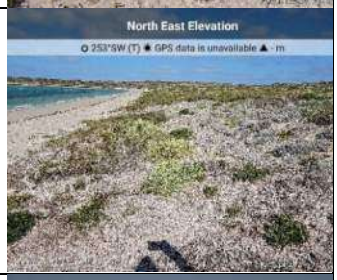
Photo ID: 3 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre. Tape measure is 30cm high, plants are 15cm high.	
Photo ID: 4 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 5 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 6 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 7 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 8 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under approx. 1 metre. Tape measure is 1 metre high.	
Photo ID: 9 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	

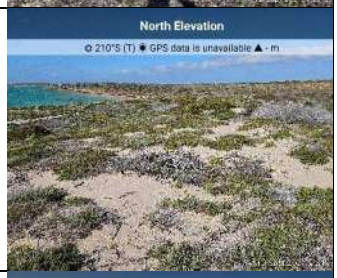
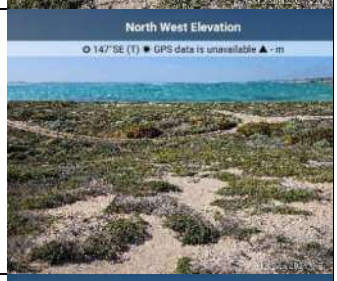
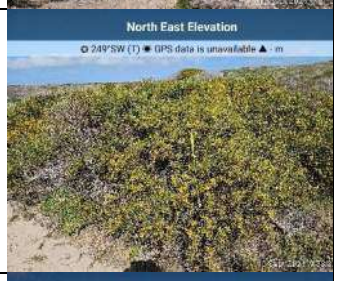
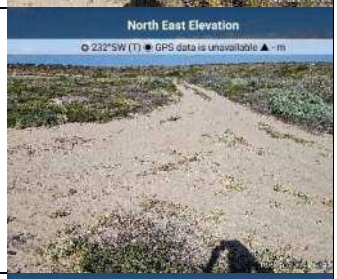
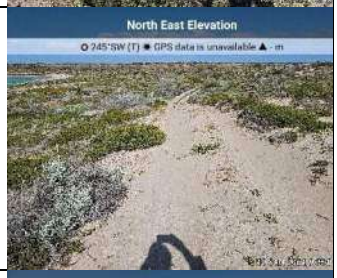
Photo ID: 10 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 11 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under 30 cms	
Photo ID: 12 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under 50cms.	
Photo ID: 13 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height of 1.5 metres. Tape measure if 1 metre hgh	
Photo ID: 14 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 15 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 16 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	

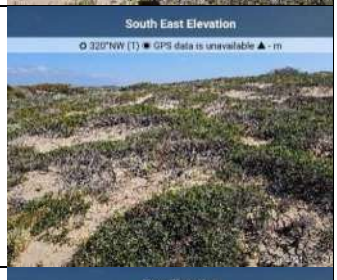
Photo ID: 17 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under 30cms	
Photo ID: 18 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 19 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 20 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 21 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under 30cms.	
Photo ID: 22 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 23 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	

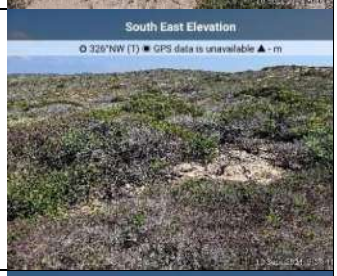
Photo ID: 24 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 25 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 26 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 27 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 28 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 29 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 30 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	

Photo ID: 31 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 32 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 33 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 34 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 35 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 36 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 37 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	

Photo ID: 38 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 39 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 40 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 41 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 42 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 43 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
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Photo ID: 45 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 46 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 47 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 48 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 49 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 50 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 51 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	

Photo ID: 52 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 53 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
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Photo ID: 58 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	

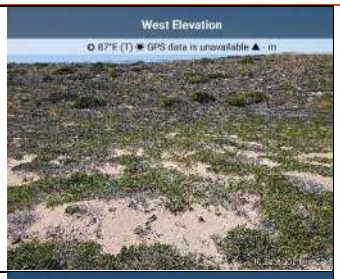
Photo ID: 59 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
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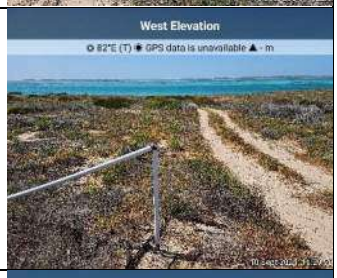
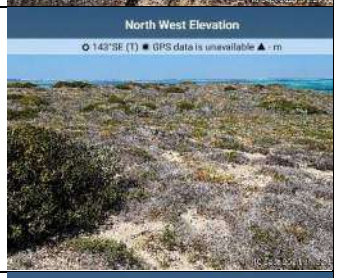
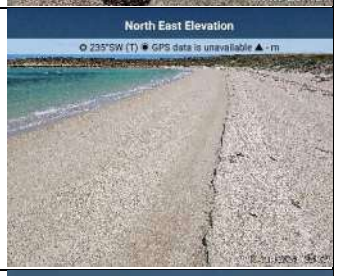
Photo ID: 61 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 62 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 63 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 64 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 65 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	

Photo ID: 66 **Plot Number:** 1 **Vegetation classification or exclusion clause:** Class C Shrubland **Description/justification of classification**: Low shrubs with average height under one metre.	
Photo ID: 67 **Plot Number:** 2 **Vegetation classification or exclusion clause:** Exclusion Clause 2.2.3.2 e **Description/justification of classification**: Sunday Island Bay beach – non vegetated	
Photo ID: 68 **Plot Number:** 2 **Vegetation classification or exclusion clause:** Exclusion Clause 2.2.3.2 e **Description/justification of classification**: Sunday Island Bay beach – non vegetated	
Photo ID: 69 **Plot Number:** 2 **Vegetation classification or exclusion clause:** Exclusion Clause 2.2.3.2 e **Description/justification of classification**: Sunday Island Bay – non vegetated	

3.2.2 Effective Slope

The effective slope varies on and surrounding the site consistent with the undulating topography in the coastal environment. The small changes in site elevations and slopes present different effective slope outcomes depending on the position of individual buildings. The same area of vegetation and topography can have different effective slope outcomes for different buildings, due to the fire runs towards different buildings. It is not possible to develop a single map showing the effective slope across the complex site for all buildings.

The effective slope assessment undertaken at the site includes two distinct methods. Firstly a landscape scale bushfire impacting the site from surrounding areas was modelled with 47 separate transects and cross-sections (Figure 7 and Appendix 5). This detailed effective slope analysis within the assessment area determined that no effective slopes exceed 10 degrees, however there is a range of effective upslope and downslope fire runs towards the site from all directions around the site.

This surrounding landscape effective slope analysis was undertaken in order to provide clarity around where on-site shelter buildings could and could not be sited within the lot and achieve a radiant heat flux less than 10kW/m² with a 1200K flame temperature and FDI of 100. The FDI of 100 was selected as this represents the fire weather trigger whereby the site will be pre-emptively evacuated ahead of any days above FDI or FBI 100 (ie. Catastrophic Fire Danger Rating).

This assessment of a landscape scale bushfire run towards the site also provides an understanding of site constraints and input limitations on where an on-site shelter could be sited when the layout of the final development is confirmed at Development Application stage (Figure 7).

The second effective slope analysis was undertaken on each indicative building cluster location and focussed both on the analysis to determine the on-site shelter exposures from fire runs in the general east and west directions and also what the effective slope was for each accommodation unit. This building cluster level analysis is mapped in Figure 7A-7G.

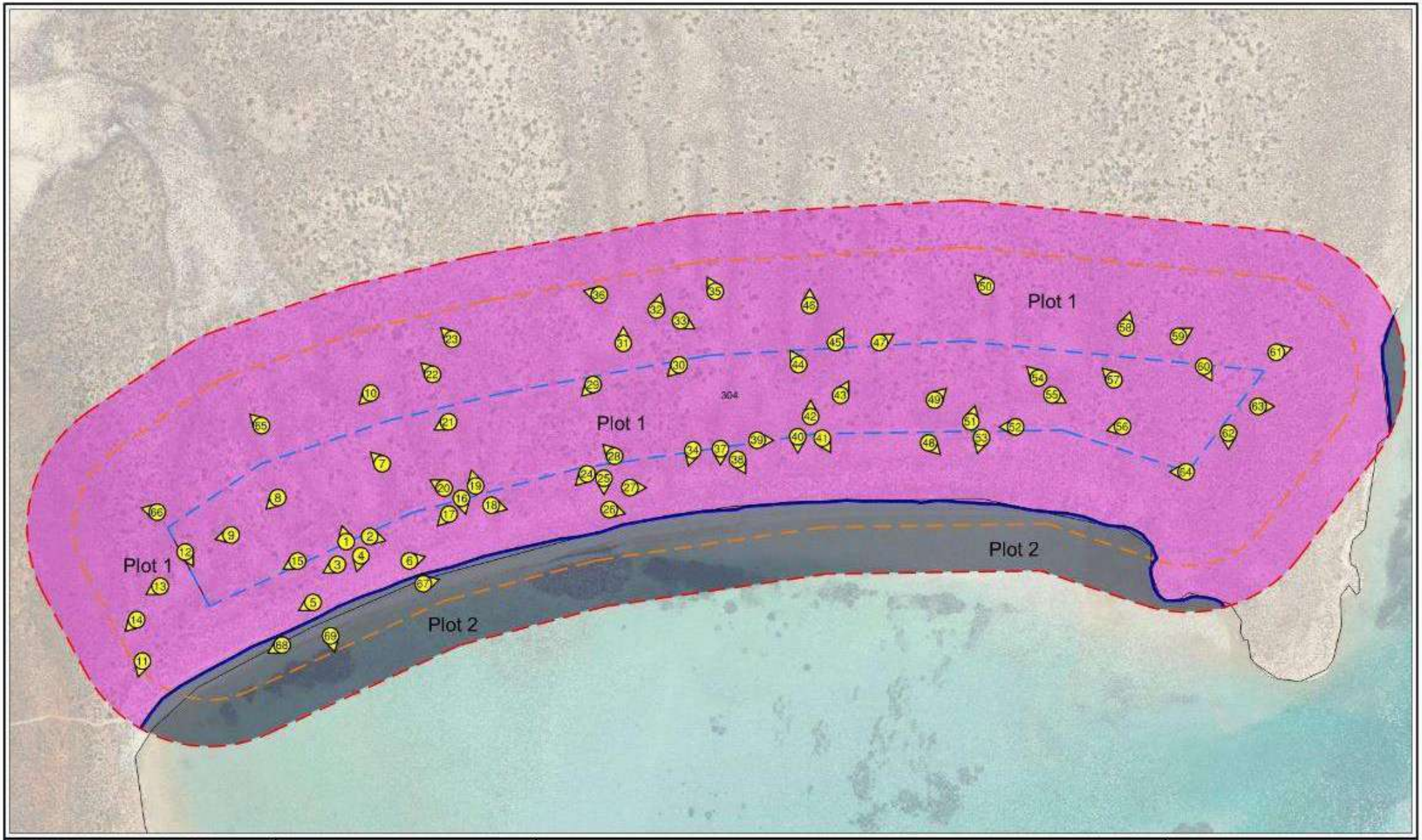
In total there were 14 effective slope outcomes from the total fire runs assessed surrounding the development site and surrounding each cluster. This analysis will be repeated to support the final site layout at Development Application stage.

A summary of the effective slope and setback distances to achieve less than 10kW/m² for the on-site shelter at each cluster is summarised in Table 3.

Table 3. Summary of effective slopes and setback distances to achieved < 10kW/m² on the on-site shelters.

Design Fire Number	Transects	Effective slope	Setback distance to achieve < 10kW/m² (metres)
1	**1,5,15,21, 28,46**	Upslope 3	30.1 metres
2	**2,8,16,22,23,25,26**	Flat	32.5 metres
3	**3,7**	Downslope 6	37.6 metres
4	**4**	Downslope 9	40.4 metres
5	**6,30,34,35, 38**	Downslope 7	38.5 metres
6	**9,10,11,17,18,24,29**	Upslope 1	31.7 metres
7	**12,14**	Upslope 2	30.9 metres
8	**13,19**	Upslope 5	28.6 metres
9	**41,42,44,47**	Downslope 3	35 metres
10	**20**	Downslope 1	33.3 metres
11	**27,45**	Downslope 2	34.1 metres
12	**31,32**	Downslope 4	35.9 metres
13	**33,39,40,43**	Downslope 5	36.7 metres
14	**36,37**	Downslope 8	39.5 metres

All slopes east and west of the building clusters are short and will have a slight impact on fire behaviour due to the wind driven nature of shrubland fires. The short effective slopes east and west of each building cluster is mapped in Figures 7A – 7H.



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Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

FIGURE 6 - VEGETATION CLASSIFICATION MAP - PRE-DEVELOPMENT

SCALE 1:3800 @ A3
DATE: NOVEMBER 2024

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- PLOT 1 - CLASS C SHRUBLAND
- PLOT 2 - EXCLUSION CLAUSE 2.2.3.2 (e)

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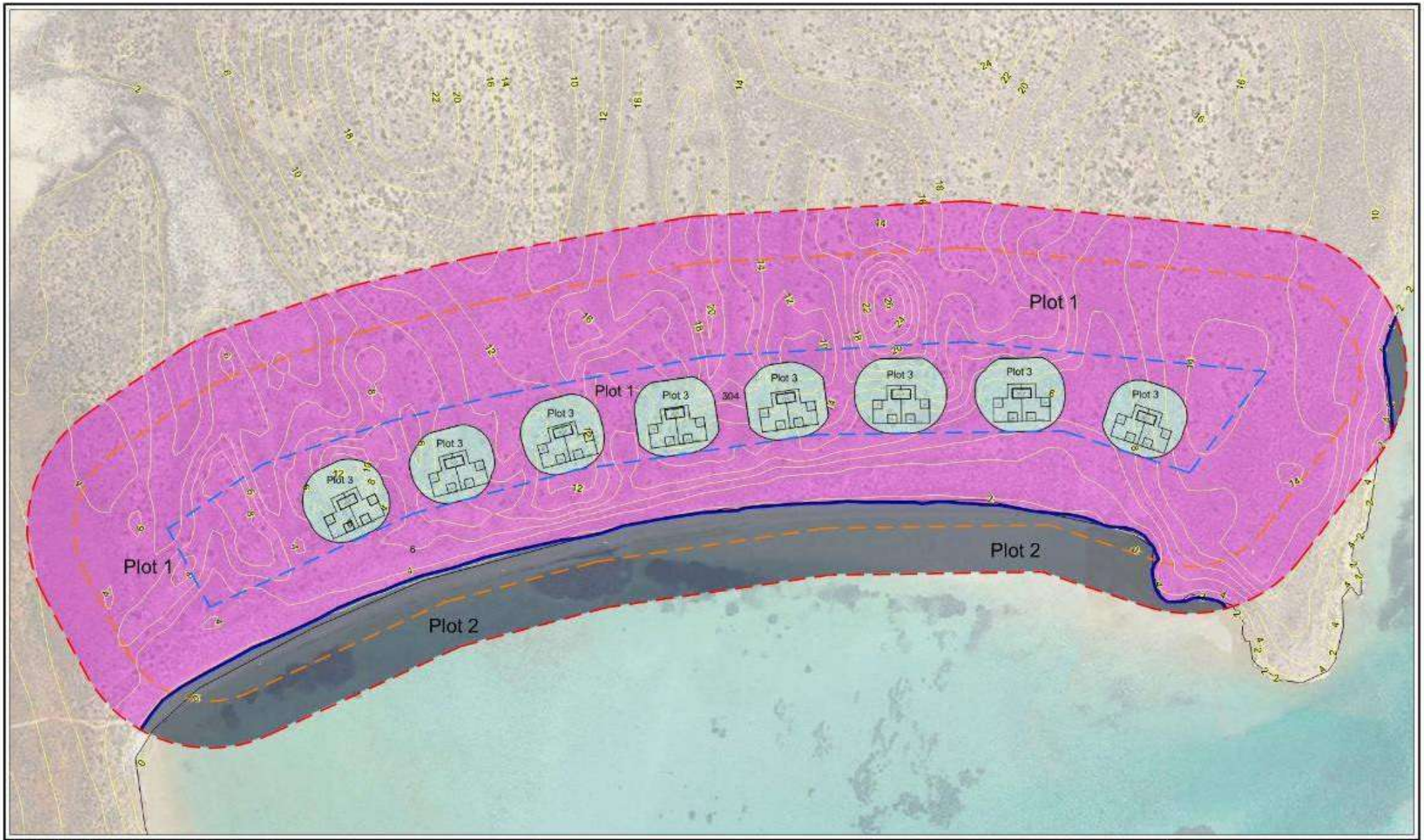

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Date aerial photo:	2013

FIGURE 6A - POST DEVELOPMENT VEGETATION CLASSIFICATION MAP (BAL CONTOUR MAP)

SCALE 1:3800 @ A3
DATE: NOVEMBER 2024

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- PLOT 1 - CLASS C SHRUBLAND
- PLOT 2 - EXCLUSION CLAUSE 2.2.3.2 (e)
- PLOT 3 - EXCLUSION CLAUSE 2.2.3.2 (f)

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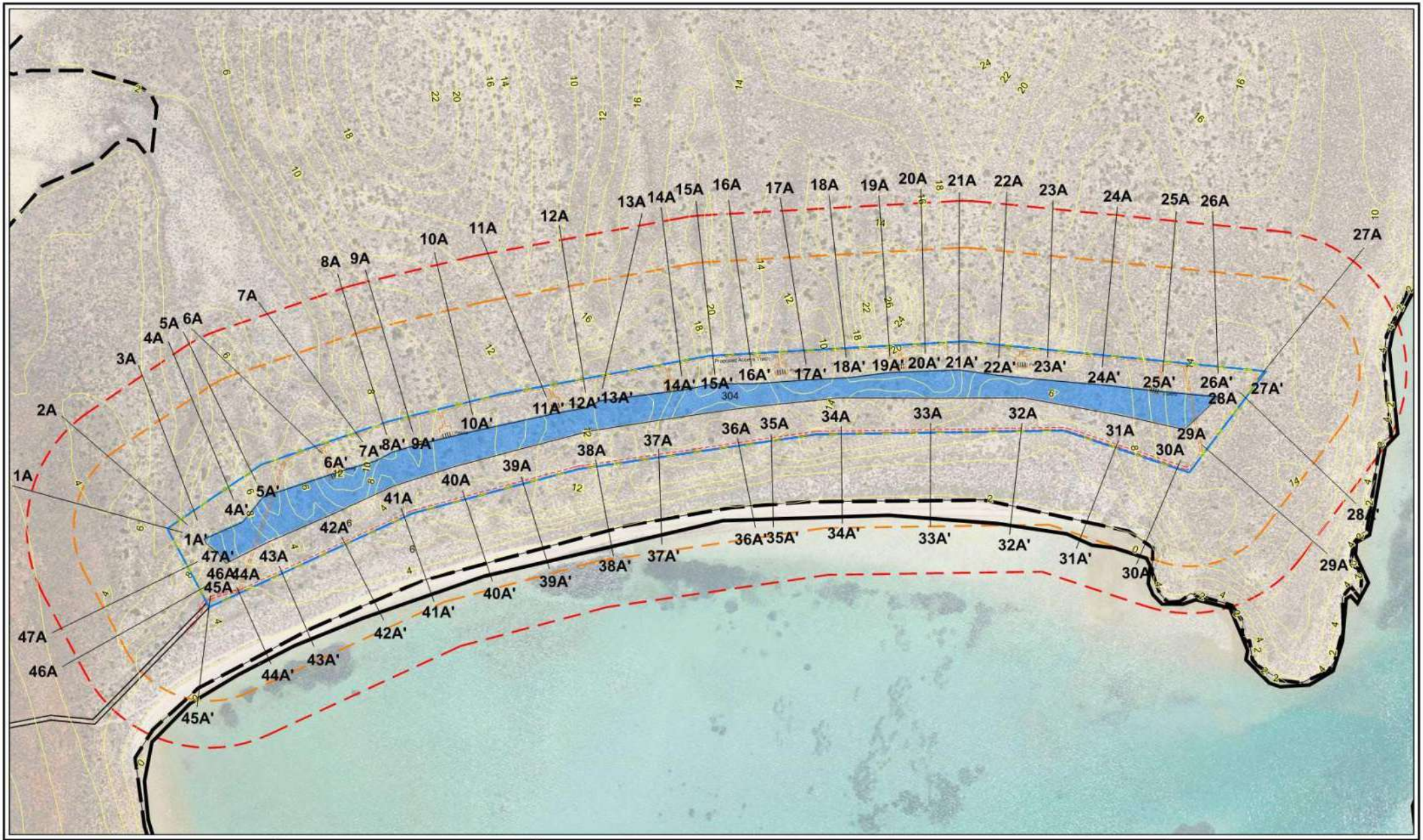

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Date aerial photo:	2013

FIGURE 7
DESIGN FIRE CROSS SECTION
LOCATION PLAN

0 50 100 150m
SCALE 1:3800 @ A3
DATE: SEPTEMBER 2024

NORTH

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- DEVELOPMENT ZONE EXPOSED TO LESS THAN 10Kw/m2 ON DAYS FDI 100 AND 1200K FLAME TEMPERATURE

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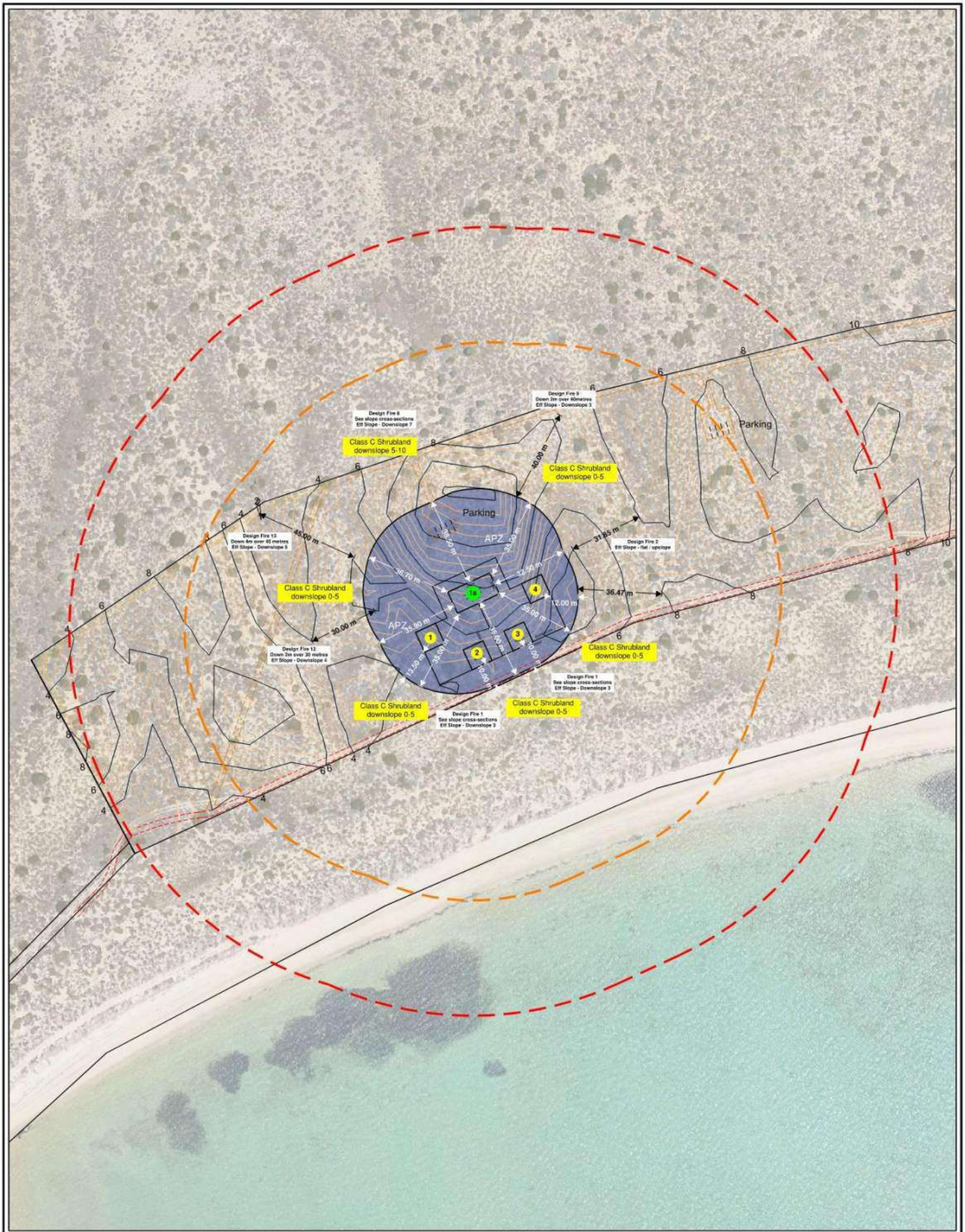

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Date aerial photo:	2013

FIGURE 7A
CLUSTER No. 1
EFFECTIVE SLOPE AND APZ

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3

DATE: NOVEMBER 2024

NORTH

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- APZ — ASSET PROTECTION ZONE
- 1 — CABIN NUMBER
- 1a — STAFF ACCOMMODATION AND ON-SITE SHELTER

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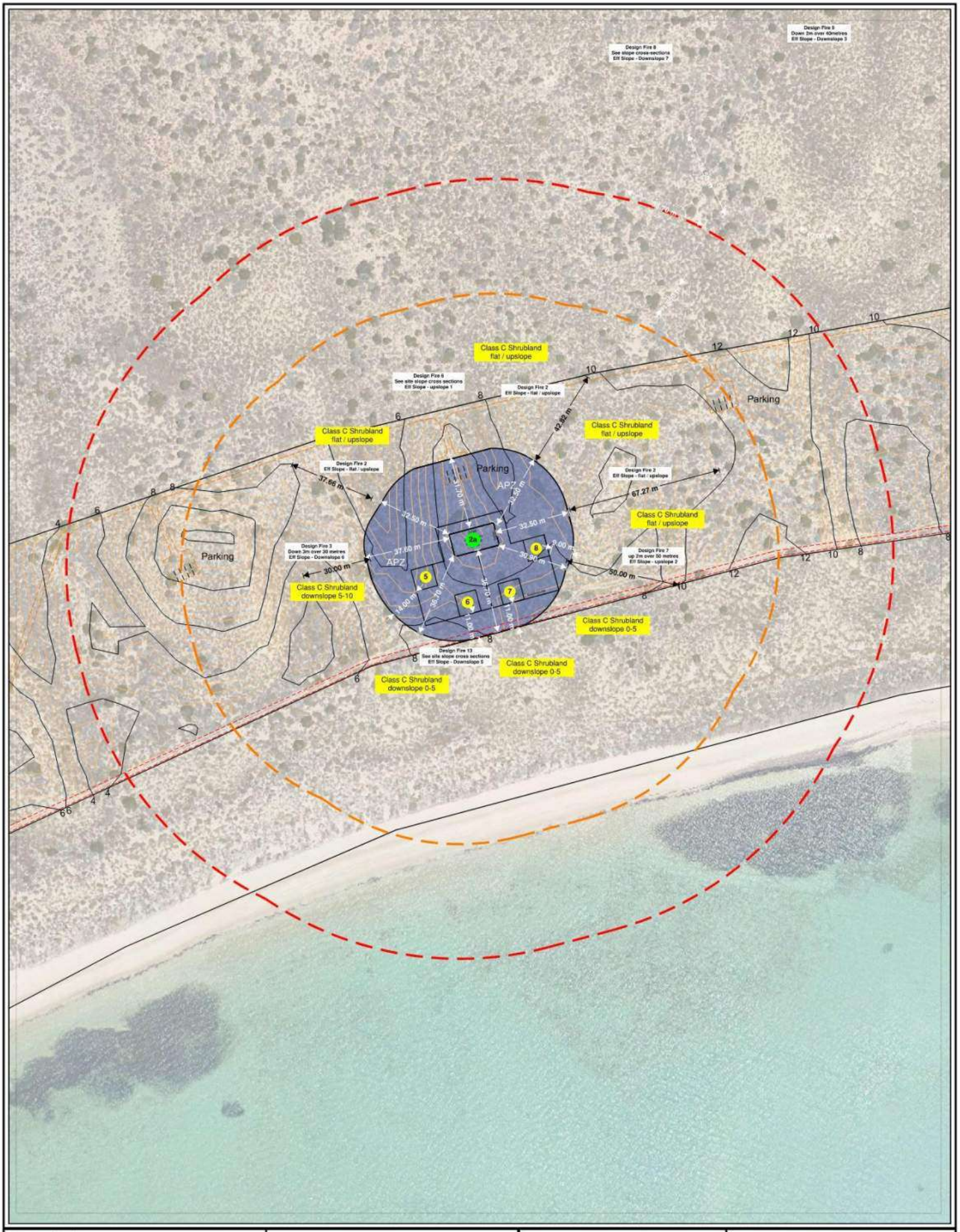

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Date aerial photo:	2013

FIGURE 7B
CLUSTER No. 2
EFFECTIVE SLOPE AND APZ

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3
DATE: NOVEMBER 2024

NORTH

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- APZ — ASSET PROTECTION ZONE
- 5 — CABIN NUMBER
- 2a — STAFF ACCOMMODATION AND ON-SITE SHELTER

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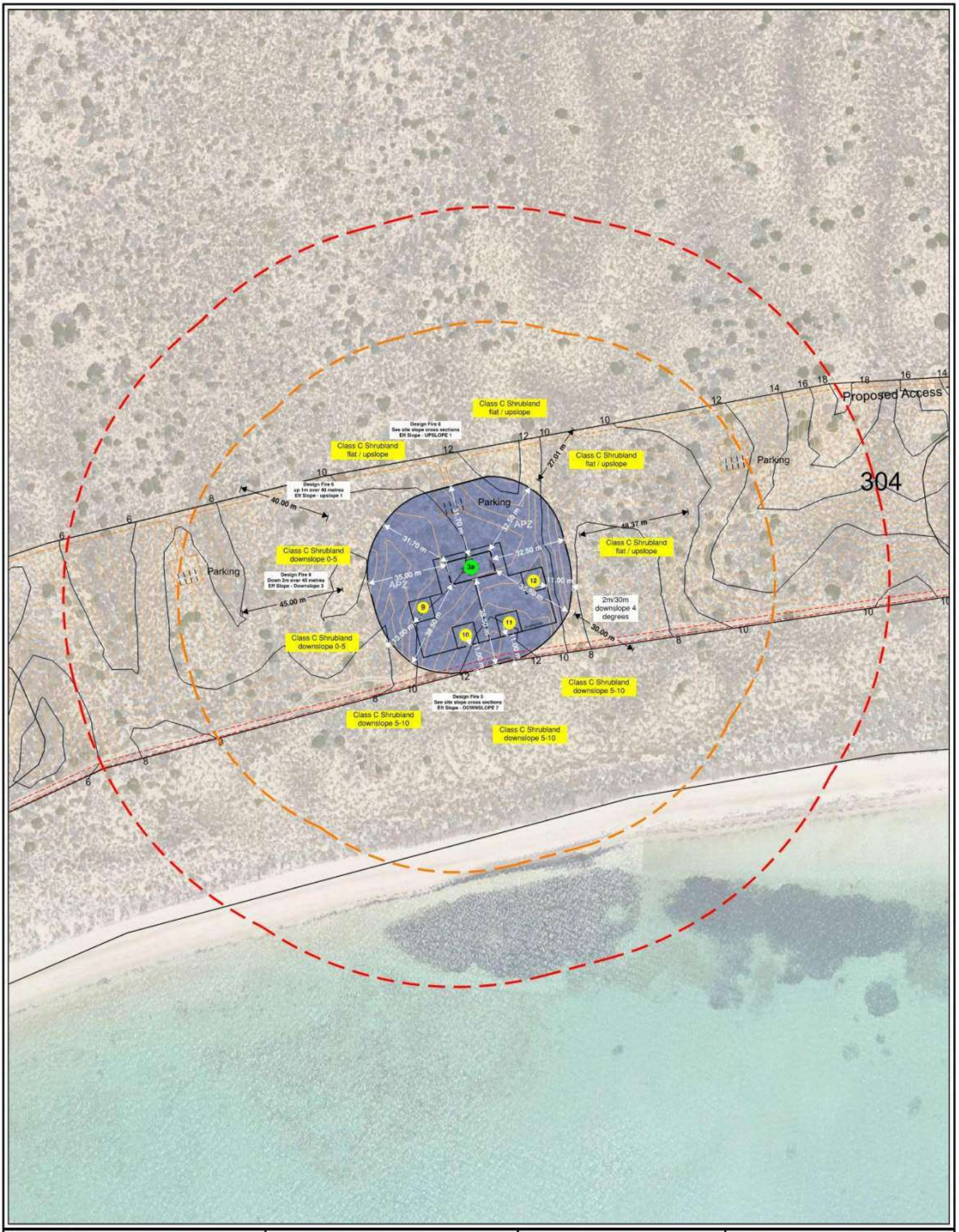

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FIGURE 7C
CLUSTER No. 3
EFFECTIVE SLOPE AND APZ

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3

DATE: NOVEMBER 2024

NORTH

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- APZ ASSET PROTECTION ZONE
- 9 CABIN NUMBER
- 3a STAFF ACCOMMODATION AND ON-SITE SHELTER

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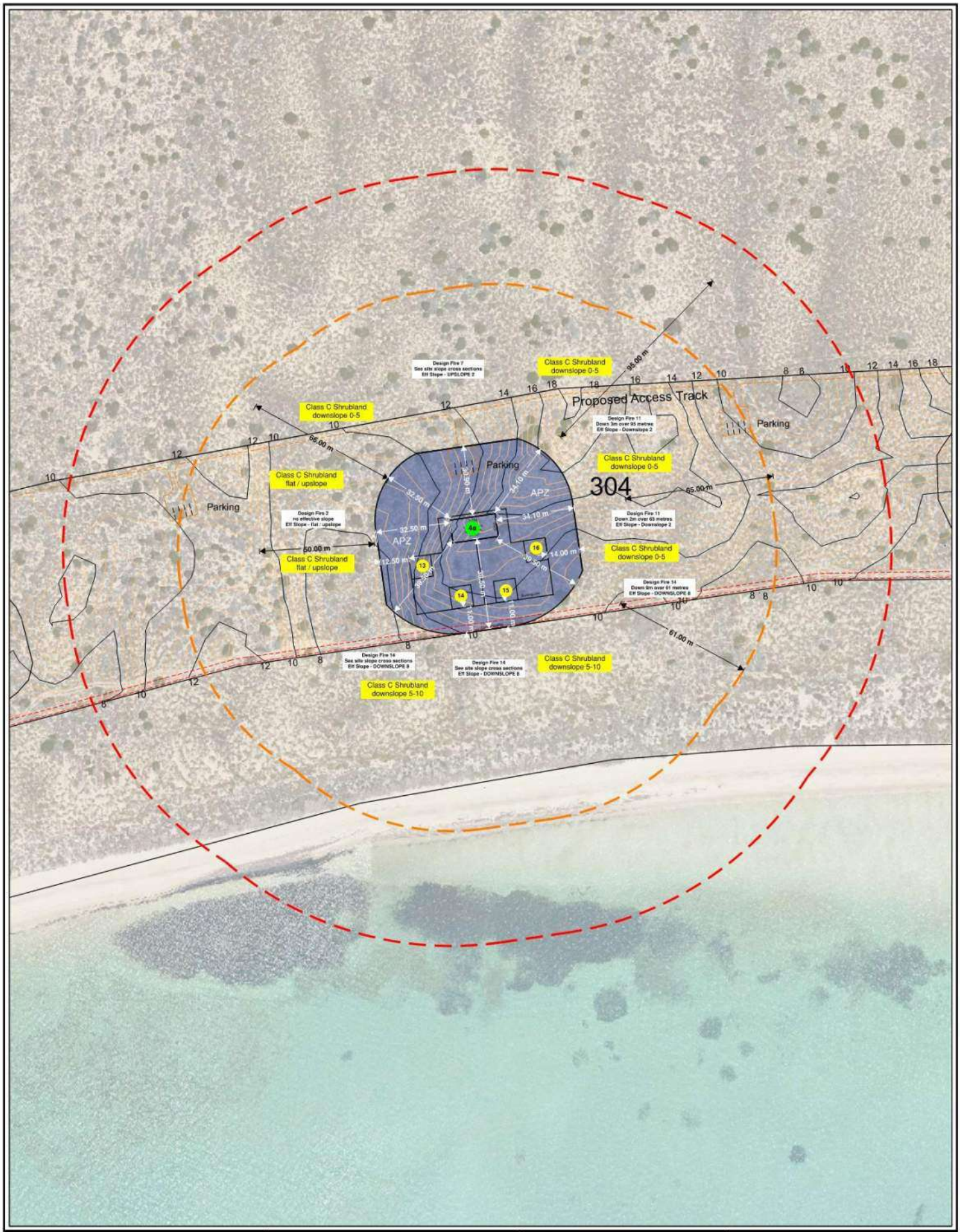

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Date aerial photo:	2013

FIGURE 7D
CLUSTER No. 4
EFFECTIVE SLOPE AND APZ

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3

DATE: NOVEMBER 2024

NORTH

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- APZ — ASSET PROTECTION ZONE
- 13 — CABIN NUMBER
- 4a — STAFF ACCOMMODATION AND ON-SITE SHELTER

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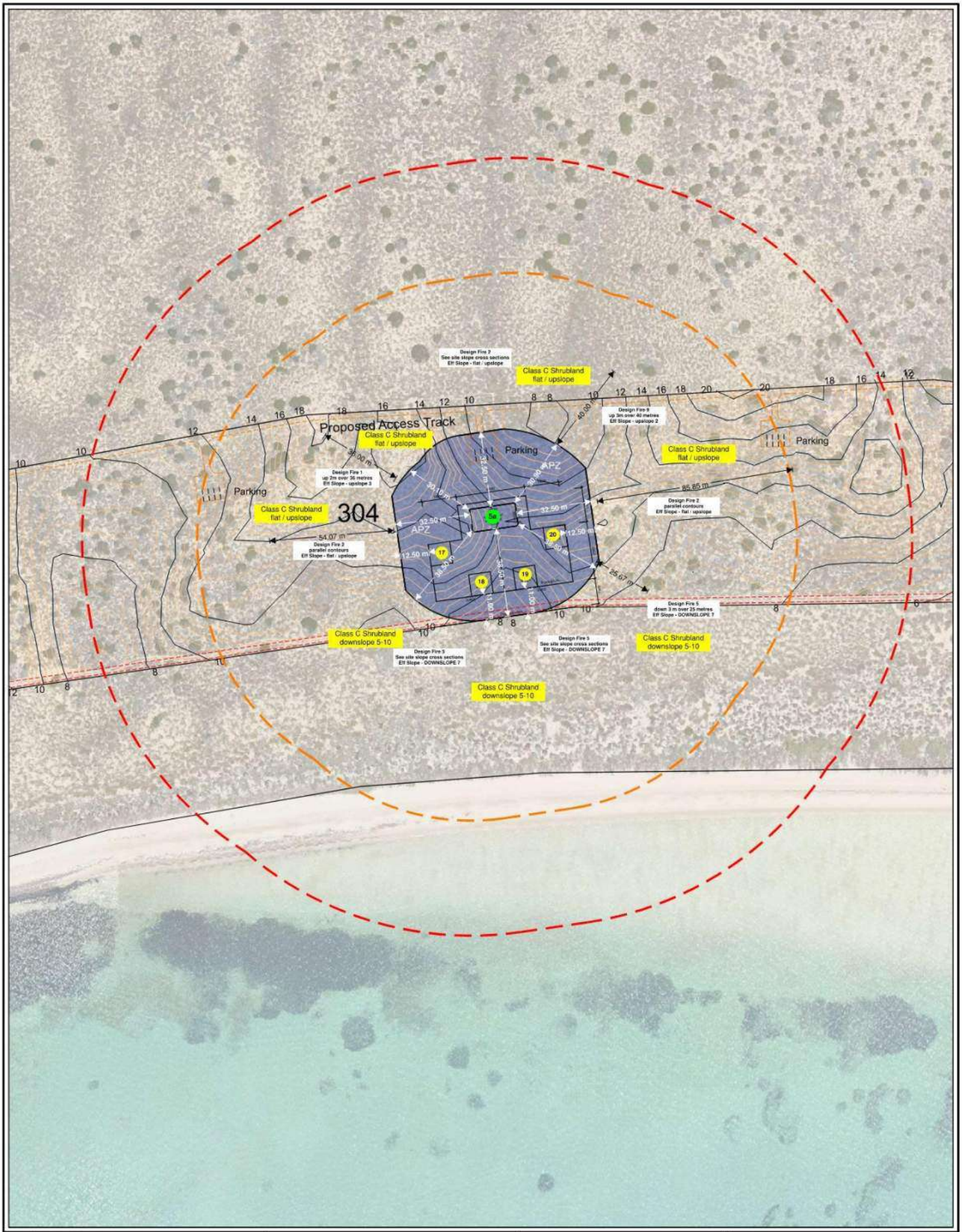

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Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

FIGURE 7E
CLUSTER No. 5
EFFECTIVE SLOPE AND APZ

0 10 20 30 40 50 80m

SCALE 1:1500 @ A3
DATE: NOVEMBER 2024

NORTH

LEGEND

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- APZ ASSET PROTECTION ZONE
- 17 CABIN NUMBER
- 5a STAFF ACCOMMODATION AND ON-SITE SHELTER

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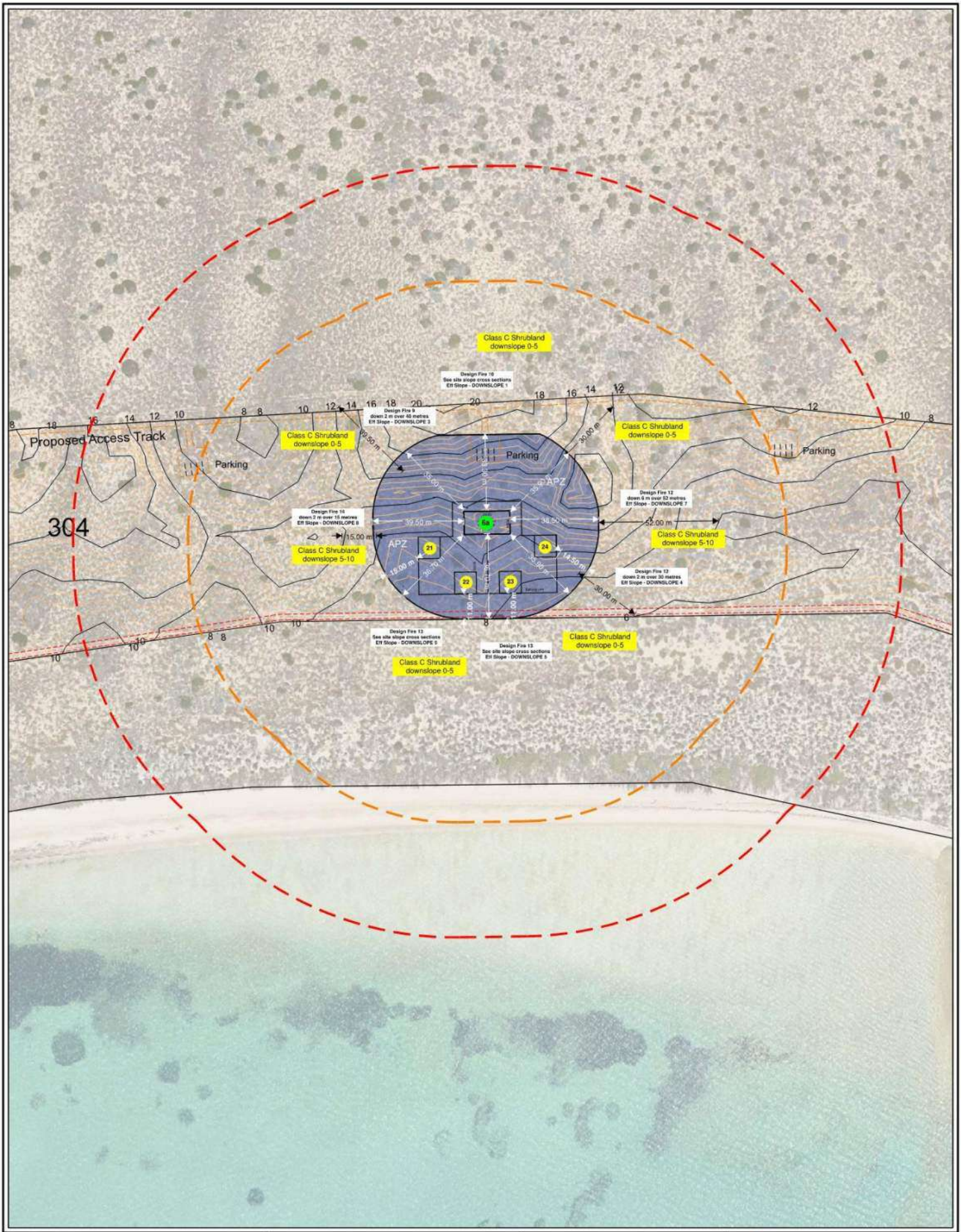

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Date aerial photo:	2013

FIGURE 7F
CLUSTER No. 6
EFFECTIVE SLOPE AND APZ

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3

DATE: NOVEMBER 2024

NORTH

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- APZ — ASSET PROTECTION ZONE
- 21 — CABIN NUMBER
- 5a — STAFF ACCOMMODATION AND ON-SITE SHELTER

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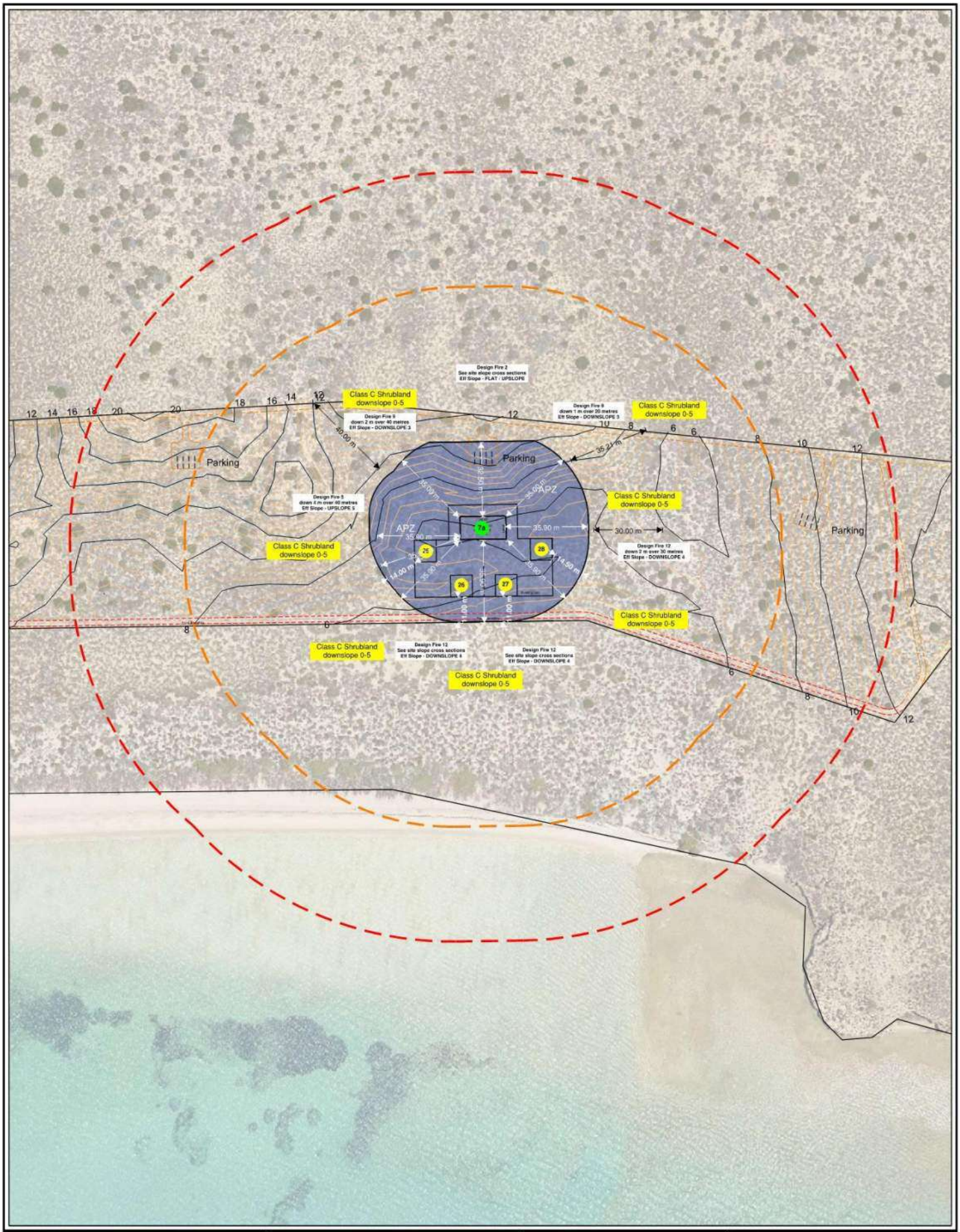

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Date aerial photo:	2013

FIGURE 7G
CLUSTER No. 7
EFFECTIVE SLOPE AND APZ

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3

DATE: NOVEMBER 2024

NORTH

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- APZ ASSET PROTECTION ZONE
- 25 CABIN NUMBER
- 7a STAFF ACCOMMODATION AND ON-SITE SHELTER

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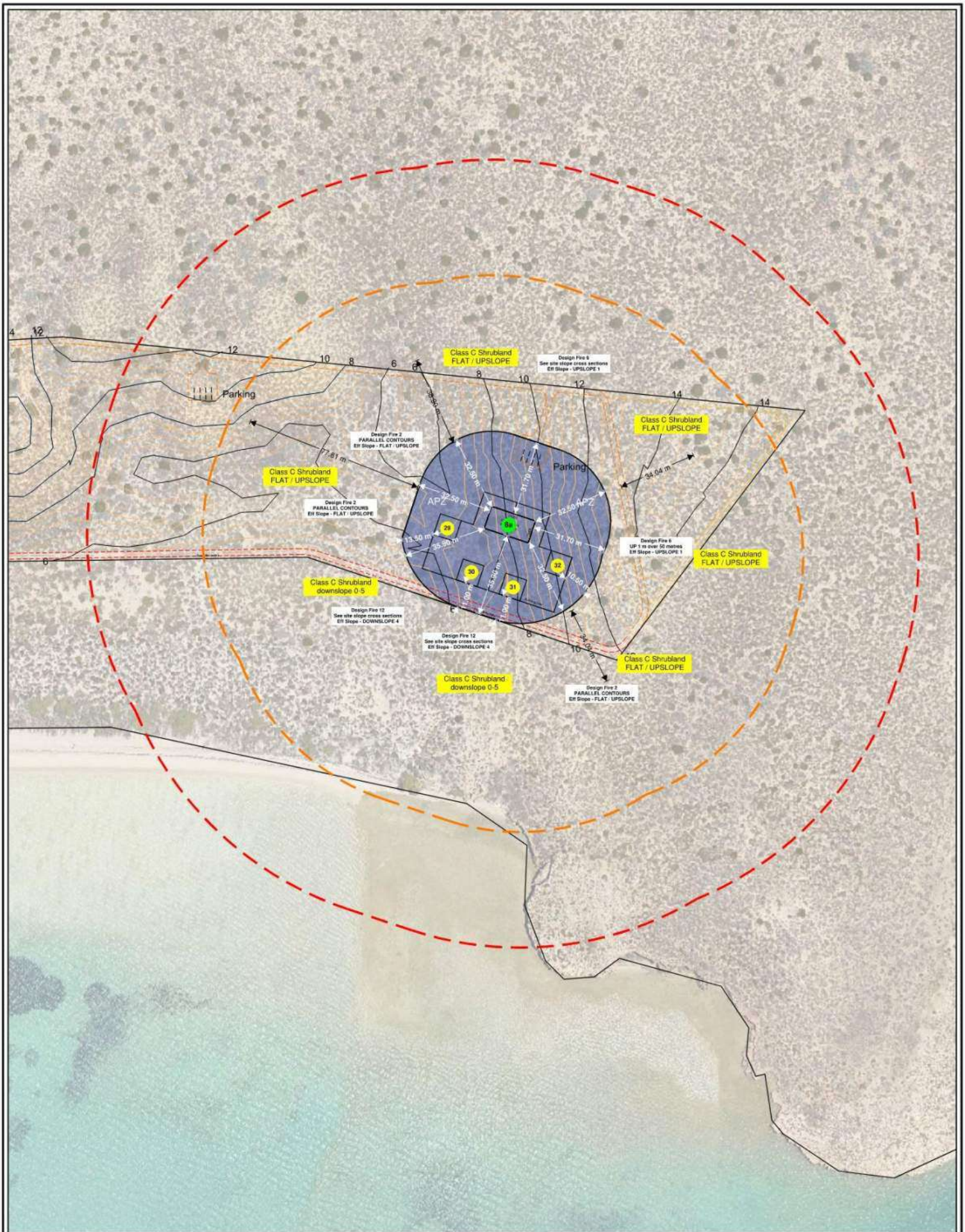

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Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

FIGURE 7H
CLUSTER No. 8
EFFECTIVE SLOPE AND APZ

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3

DATE: NOVEMBER 2024

NORTH

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- APZ — ASSET PROTECTION ZONE
- 29 — CABIN NUMBER
- 6a — STAFF ACCOMMODATION AND ON-SITE SHELTER

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3.3 Assessment Outputs for Staff Accommodation and on-site shelter

A method 2 BAL Assessment was undertaken to determine the predicted radiant heat flux impacting the proposed staff accommodation and on-site shelter buildings (Tables 4 and Figures 8-8F).

See Appendix 5 for the assessment criteria and design fire modelling for the on-site shelters.

For building cluster specific fire modelling inputs showing contours and input data for these buildings refer to Figures 7A-7F.

Table 4. Summary of Method 2 BAL assessment outputs for on-site shelter building

Building No.	Vegetation Classification	Flame Temperature	FDI	Effective slope	Setback Distance to Classified Vegetation	Predicted Radiant Heat Flux
1a	Class C Shrubland	1200K	100	Flat / upslope	32.5 metres	10kWm2
				Downslope 3°	35 metres	
				Downslope 7°	38.5 metres	
				Downslope 5°	36.7 metres	
				Downslope 4°	35.9 metres	
2a	Class C Shrubland	1200K	100	upslope 1°	31.7 metres	10kWm2
				Flat / upslope	32.5 metres	
				upslope 2°	30.9 metres	
				Downslope 5°	36.7 metres	
				Downslope 6°	37.6 metres	
3a	Class C Shrubland	1200K	100	upslope 1°	31.7 metres	10kW/2
				Flat / upslope	32.5 metres	
				Downslope 4°	35.9 metres	
				Downslope 7°	38.5 metres	
				Downslope 3°	35 metres	
4a	Class C Shrubland	1200K	100	Upslope 2°	30.9 metres	10 Kw/m2
				Downslope 2°	34.1 metres	
				Downslope 8°	39.5 metres	
				Flat / upslope	32.5 metres	
5a	Class C Shrubland	1200K	100	Flat / upslope	32.5 metres	10kW/m2
				Upslope 2°	30.9 metres	
				Downslope 7°	38.5 metres	
				Upslope 3°	30.1 metres	
6a	Class C Shrubland	1200K	100	Downslope 1°	33.3 metres	10kW/m2
				Downslope 7°	38.5 metres	
				Downslope 4°	35.9 metres	
				Downslope 5°	36.7 metres	
				Downslope 8°	39.5 metres	
				Downslope 3°	35 metres	
7a	Class C Shrubland	1200K	100	Upslope 5°	28.6 metres	10kW/m2
				Downslope 3°	35 metres	
				Flat / upslope	32.5 metres	
				Downslope 4°	35.9 metres	
8a	Class C Shrubland	1200K	100	Flat / upslope	32.5 metres	10 kW/m2
				Upslope 1	31.7 metres	
				Downslope 4	35.9 metres	

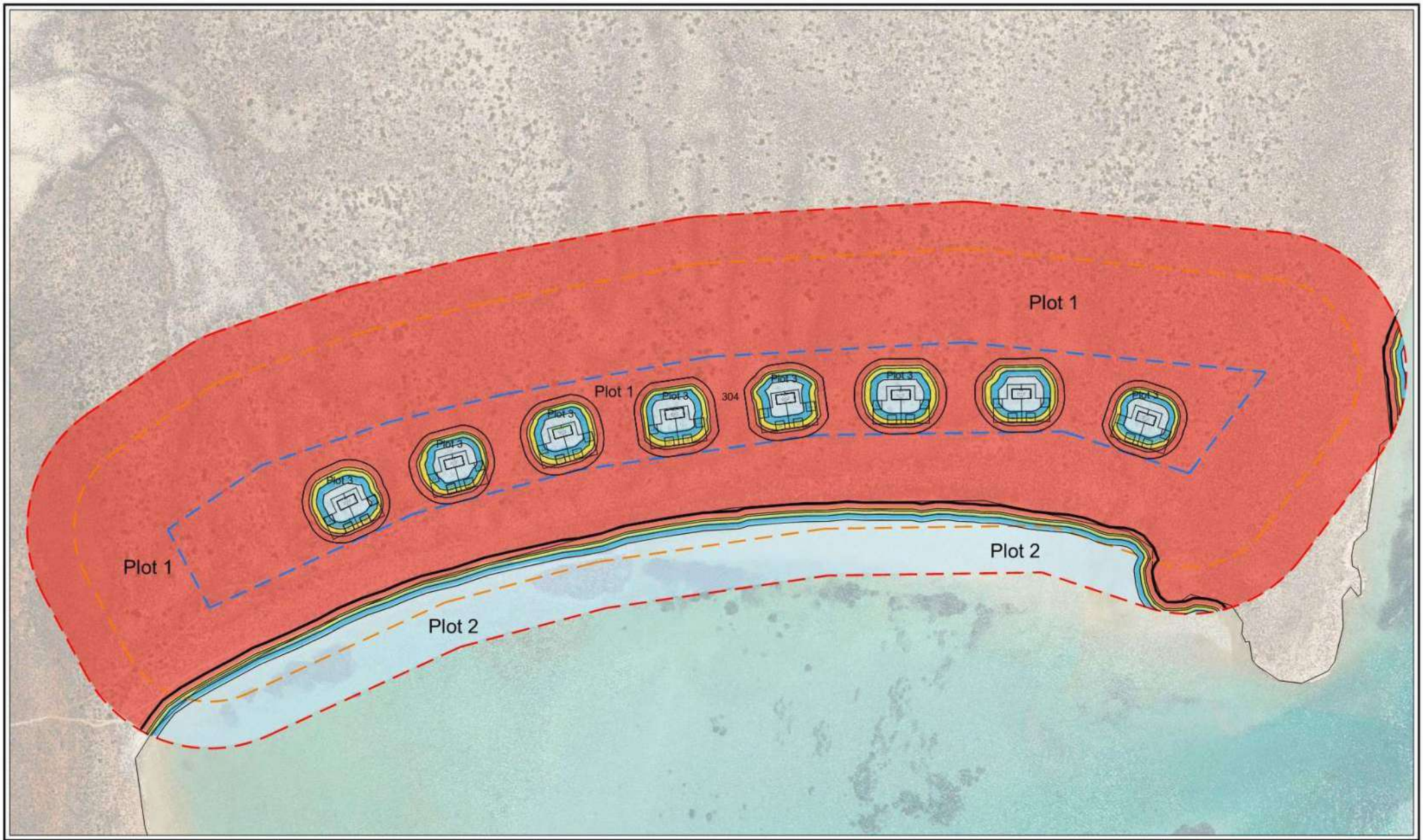
3.4 Assessment Outputs for Accommodation Cabins

A method 1 BAL Assessment was undertaken to determine the BAL contours impacting the proposed accommodation units (Table 5 and Figures 8-8F). The design and siting of the Asset Protection Zone was specifically assessed to ensure it is contained within the lot boundary and achieves BAL-29 and lower for all buildings. This is achieved as all proposed buildings are exposed to BAL-29 and lower with the BAL outcomes for each unit detailed in Table 5.

Table 5. Summary of assessment outputs for proposed Accommodation units

Unit Number	Applied Vegetation Classification	Effective slope under classified vegetation	Separation distance to Classified Vegetation	Highest BAL Contour	Indicative BAL Rating
1	Class C Shrubland	Downslope 0-5°	13.5 metres	BAL-29	BAL-29
2	Class C Shrubland	Downslope 0-5°	10 metres	BAL-29	BAL-29
3	Class C Shrubland	Downslope 0-5°	10 metres	BAL-29	BAL-29
4	Class C Shrubland	Downslope 0-5°	12 metres	BAL-29	BAL-29
5	Class C Shrubland	Downslope 5-10°	14 metres	BAL-29	BAL-29
6	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
7	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
8	Class C Shrubland	Flat / upslope	9 metres	BAL-29	BAL-29
9	Class C Shrubland	Downslope 0-5°	13 metres	BAL-29	BAL-29
10	Class C Shrubland	Downslope 5-10°	11 metres	BAL-29	BAL-29
11	Class C Shrubland	Downslope 5-10°	11 metres	BAL-29	BAL-29
12	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
13	Class C Shrubland	Flat / upslope	12.5 metres	BAL-29	BAL-29
14	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
15	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
16	Class C Shrubland	Downslope 0-5°	14 metres	BAL-29	BAL-29
17	Class C Shrubland	Flat / upslope	12.5 metres	BAL-29	BAL-29
18	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
19	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
20	Class C Shrubland	Flat / upslope	12.5 metres	BAL-29	BAL-29
21	Class C Shrubland	Downslope 0-5°	15 metres	BAL-29	BAL-29
22	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
23	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
24	Class C Shrubland	Downslope 0-5°	14.5 metres	BAL-29	BAL-29
25	Class C Shrubland	Downslope 0-5°	14 metres	BAL-29	BAL-29
26	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
27	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
28	Class C Shrubland	Downslope 0-5°	14.5 metres	BAL-29	BAL-29
29	Class C Shrubland	Downslope 0-5°	13.5 metres	BAL-29	BAL-29
30	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
31	Class C Shrubland	Downslope 0-5°	11 metres	BAL-29	BAL-29
32	Class C Shrubland	Flat / upslope	10.5 metres	BAL-29	BAL-29

Figure 8 outlines the BAL Contour outcomes showing the fully developed scenario with established Asset Protection Zones (APZ) around each building clusters at the site. Figures 8A-8H provide a close up of each cluster to show how BAL-29 and lower is achieved.



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Date aerial photo:	2013

FIGURE 8
BAL CONTOUR MAP

0 50 100 150m

SCALE 1:3800 @ A3
DATE: NOVEMBER 2024

NORTH

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE

INDICATIVE BUSHFIRE ATTACK LEVELS

- BAL LOW
- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- BAL FLAME ZONE

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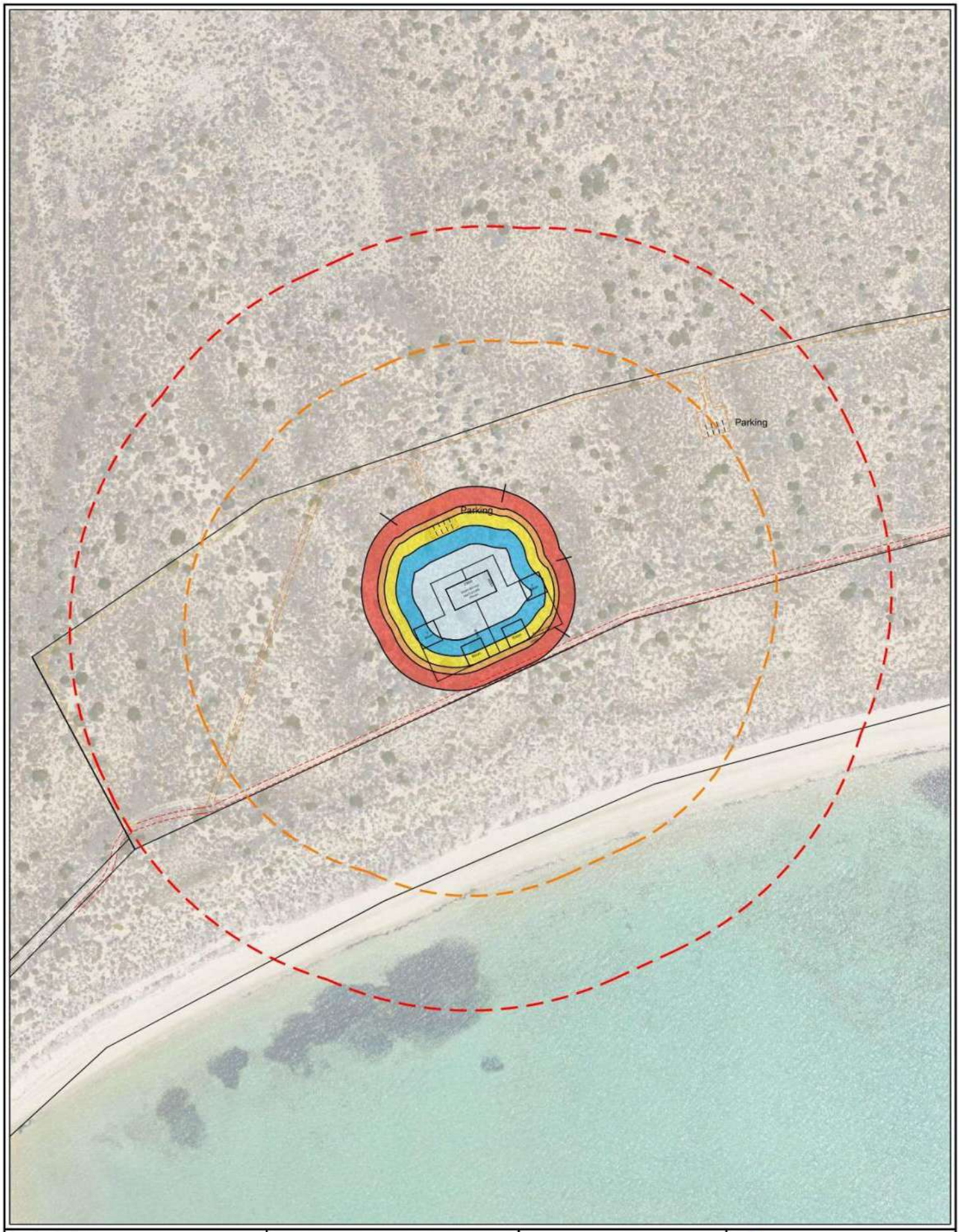

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Date aerial photo:	2013

FIGURE 8A
CLUSTER No. 1
BAL CONTOUR MAP

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3
DATE: NOVEMBER 2024

NORTH

INDICATIVE BUSHFIRE ATTACK LEVELS

- BAL LOW
- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- BAL FLAME ZONE

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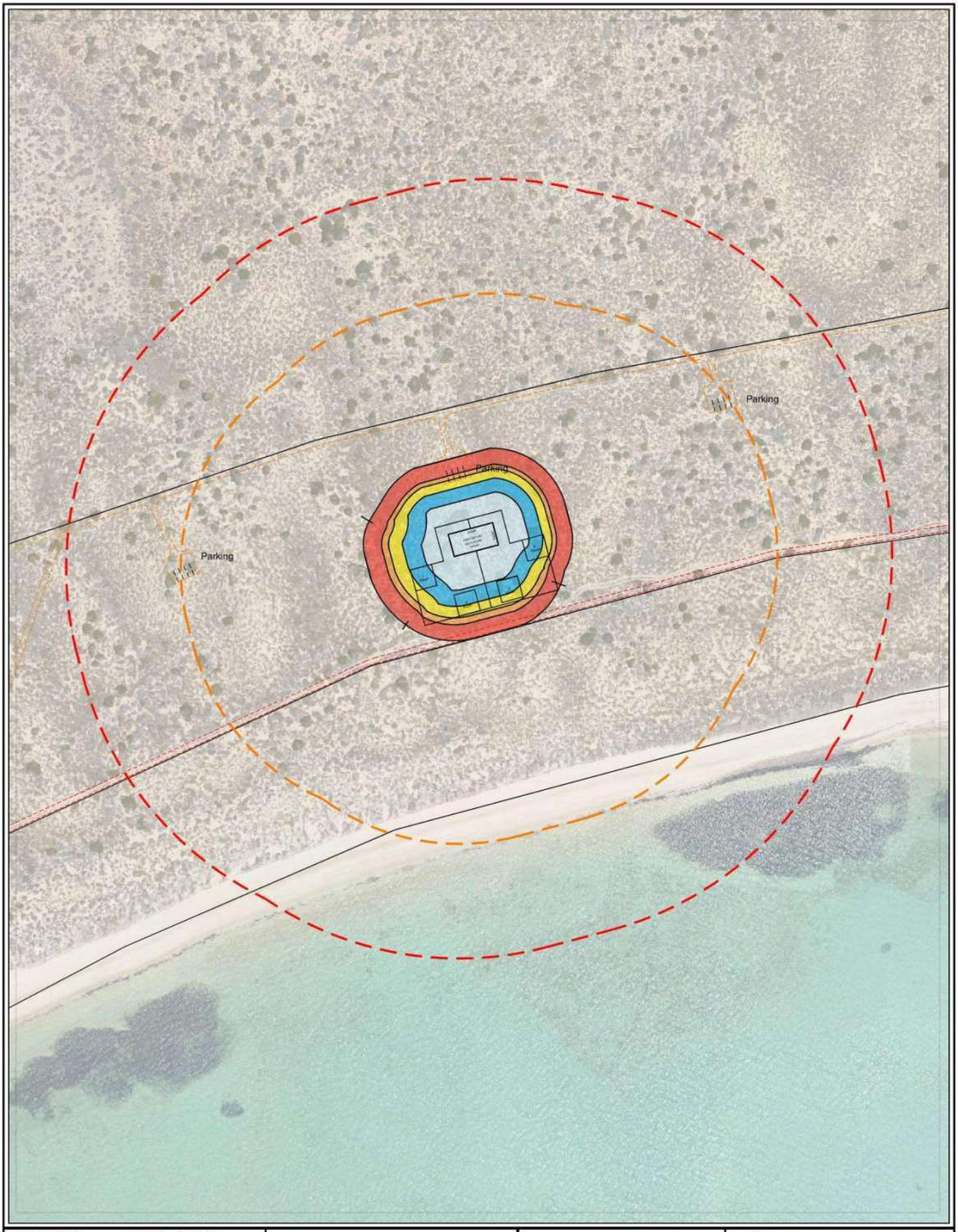

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Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

FIGURE 8B
CLUSTER No. 2
BAL CONTOUR MAP

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3

DATE: NOVEMBER 2024

NORTH

INDICATIVE BUSHFIRE ATTACK LEVELS

- BAL LOW
- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- BAL FLAME ZONE

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Mbl: 0429 949 262
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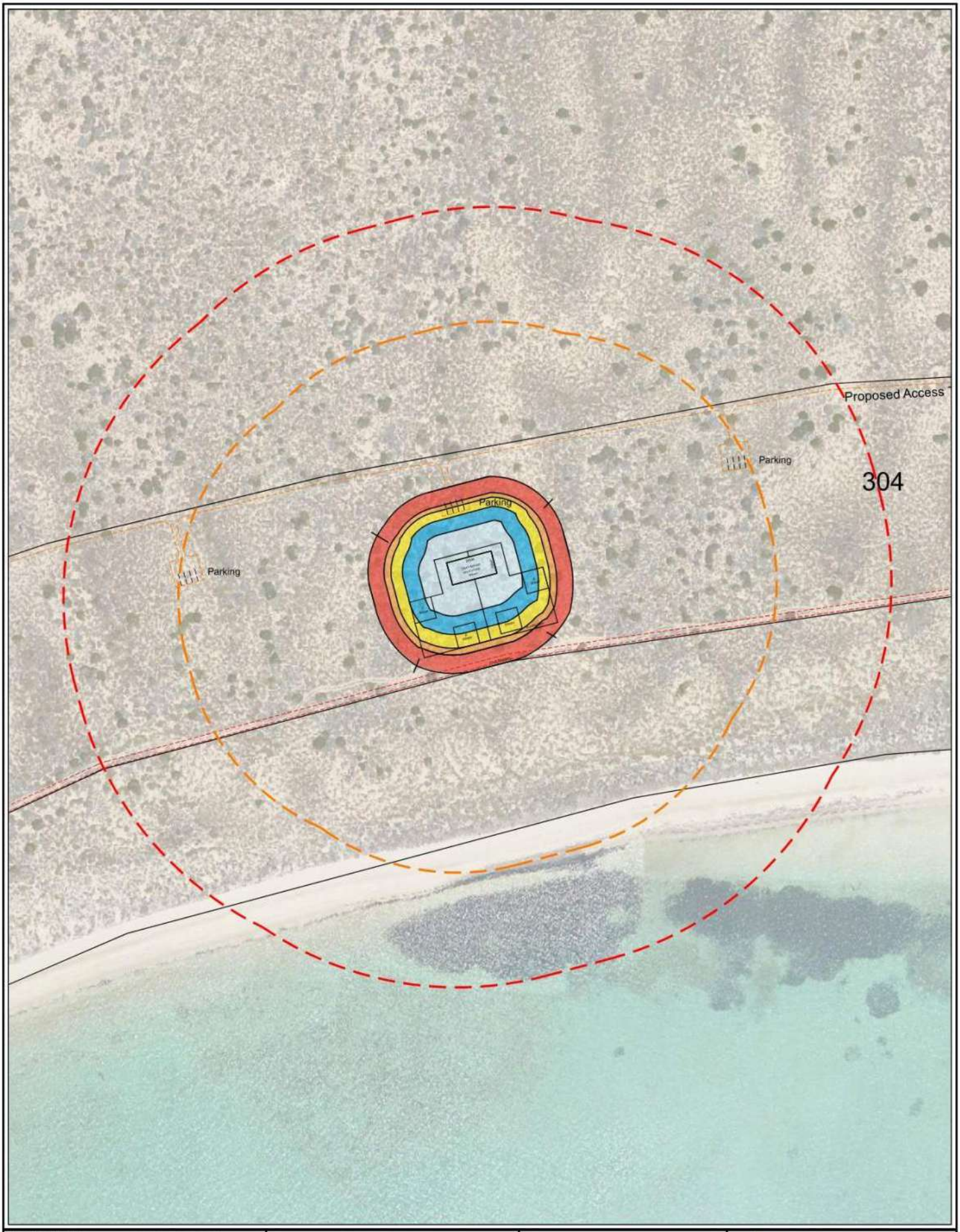

Location details:	Lot 304 on DP 50257 Dirk Hartog Island
Assessment date:	August, 2024
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
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Date aerial photo:	2013

FIGURE 8C
CLUSTER No. 3
BAL CONTOUR MAP

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3
DATE: NOVEMBER 2024

NORTH

INDICATIVE BUSHFIRE ATTACK LEVELS

- BAL LOW
- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- BAL FLAME ZONE

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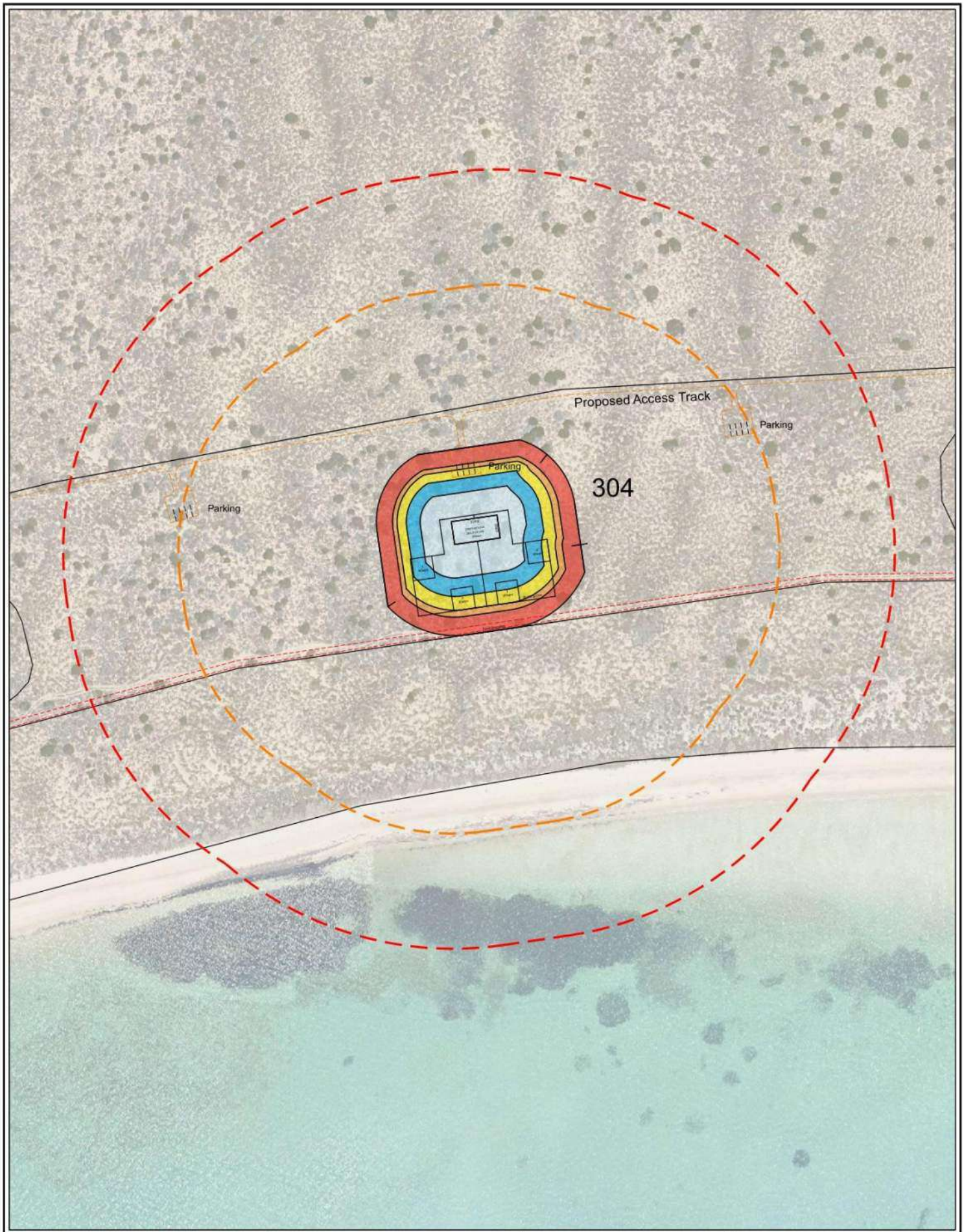

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FIGURE 8D
CLUSTER No. 4
BAL CONTOUR MAP

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3

DATE: NOVEMBER 2024

NORTH

INDICATIVE BUSHFIRE ATTACK LEVELS

- BAL LOW
- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- BAL FLAME ZONE

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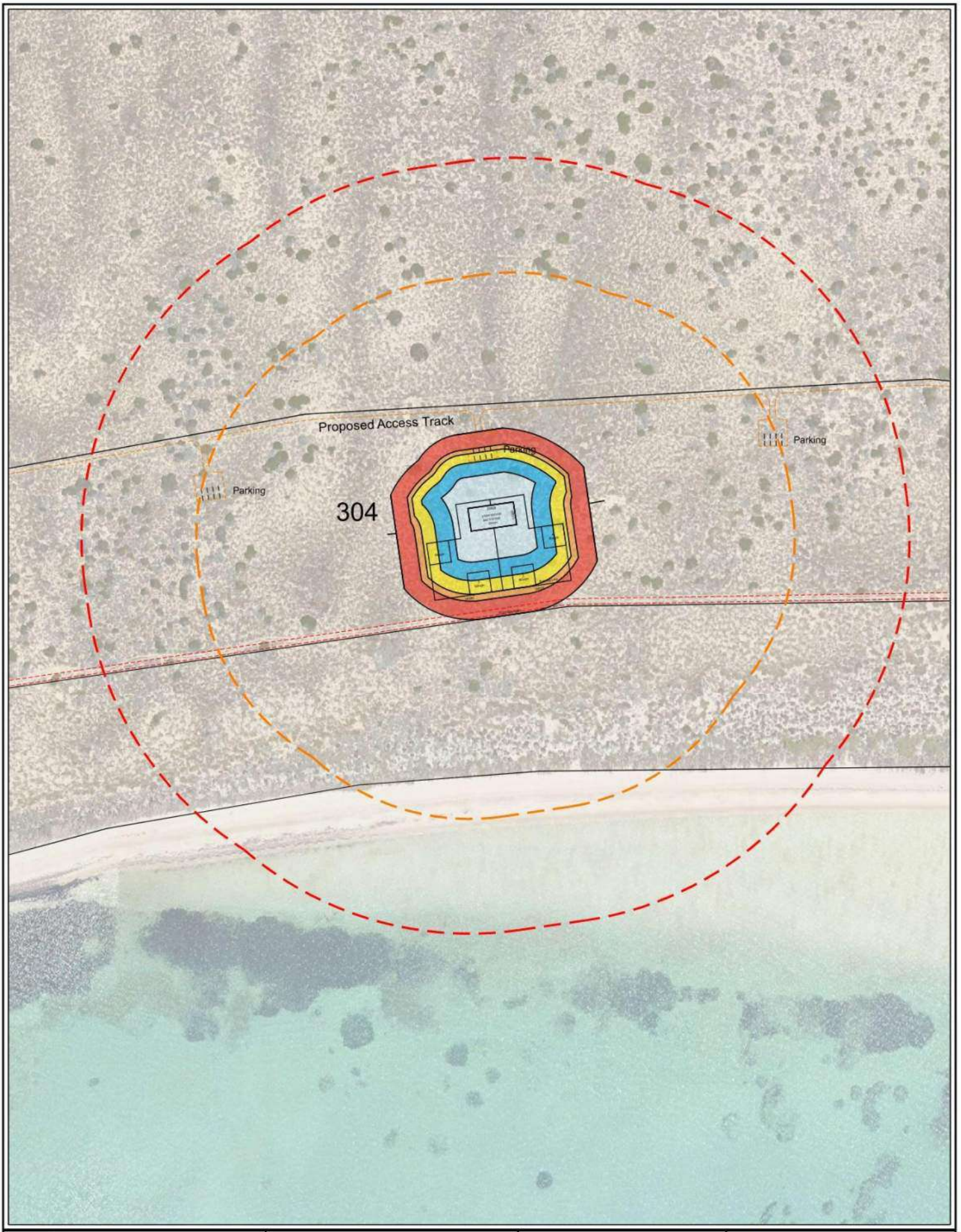

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FIGURE 8E
CLUSTER No. 5
BAL CONTOUR MAP

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3
DATE: NOVEMBER 2024

NORTH

INDICATIVE BUSHFIRE ATTACK LEVELS

- BAL LOW
- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- BAL FLAME ZONE

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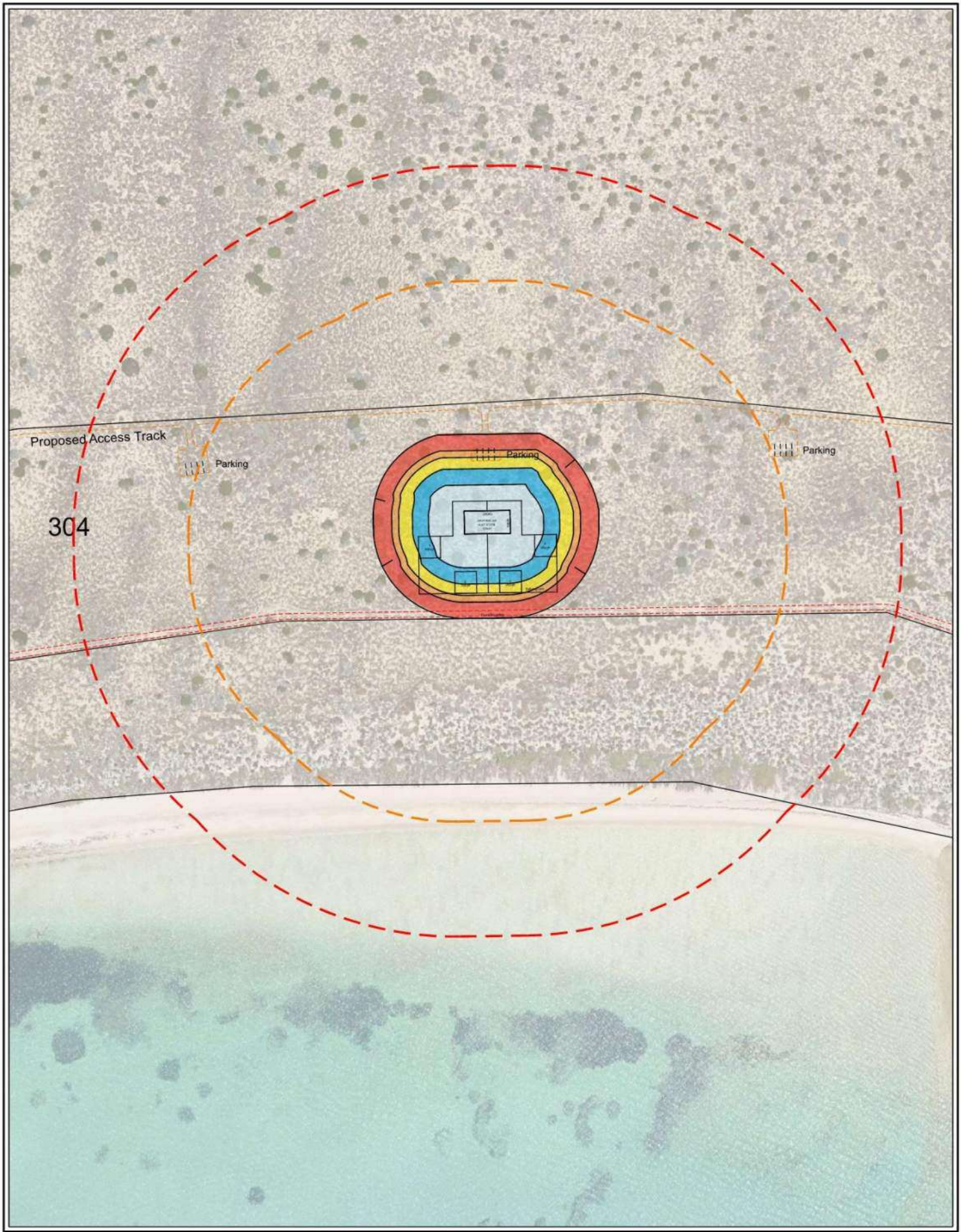

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FIGURE 8F
CLUSTER No. 6
BAL CONTOUR MAP

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3

DATE: NOVEMBER 2024

NORTH

INDICATIVE BUSHFIRE ATTACK LEVELS

- BAL LOW
- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- BAL FLAME ZONE

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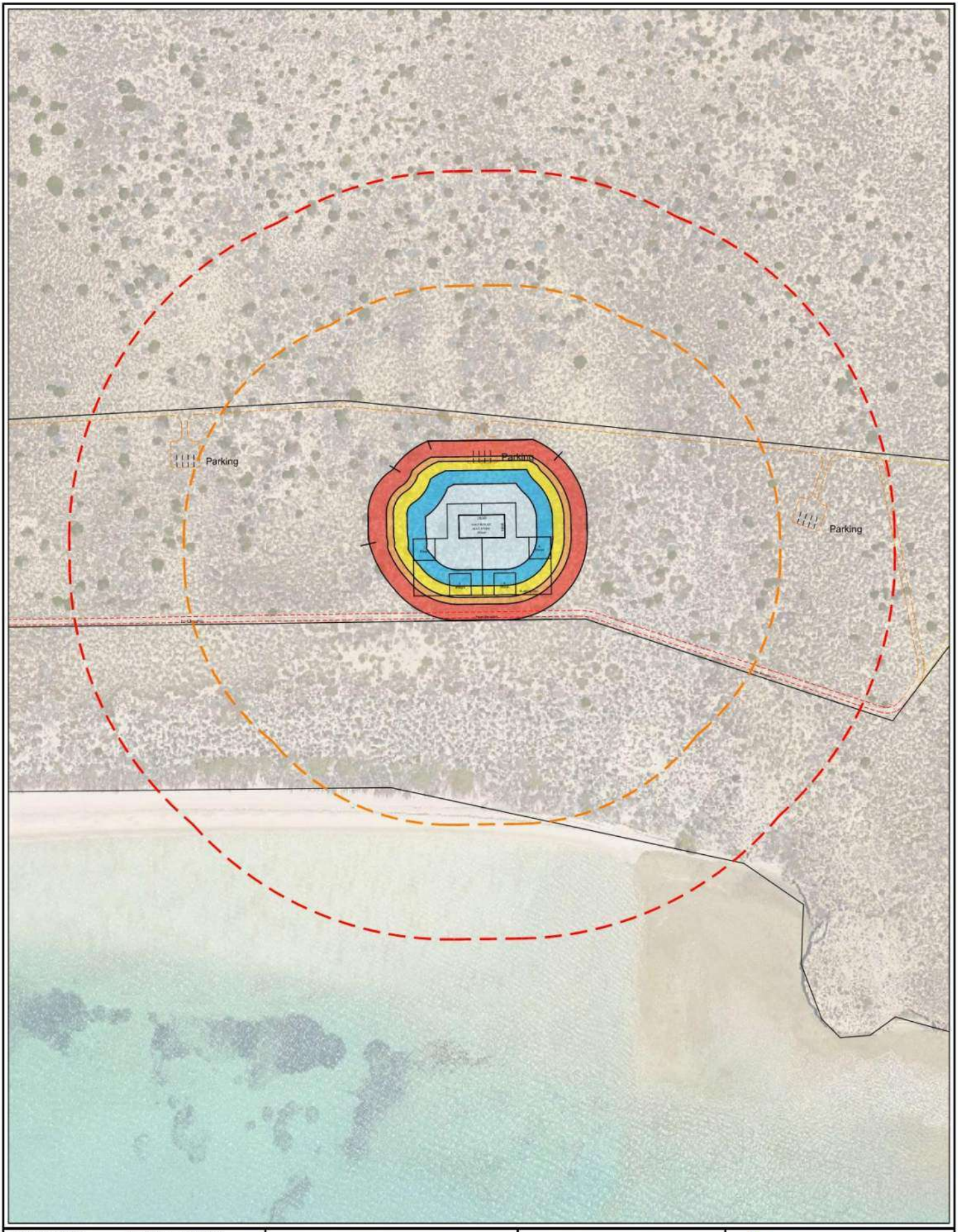

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FIGURE 8G
CLUSTER No. 7
BAL CONTOUR MAP

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3

DATE: NOVEMBER 2024

NORTH

INDICATIVE BUSHFIRE ATTACK LEVELS

- BAL LOW
- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- BAL FLAME ZONE

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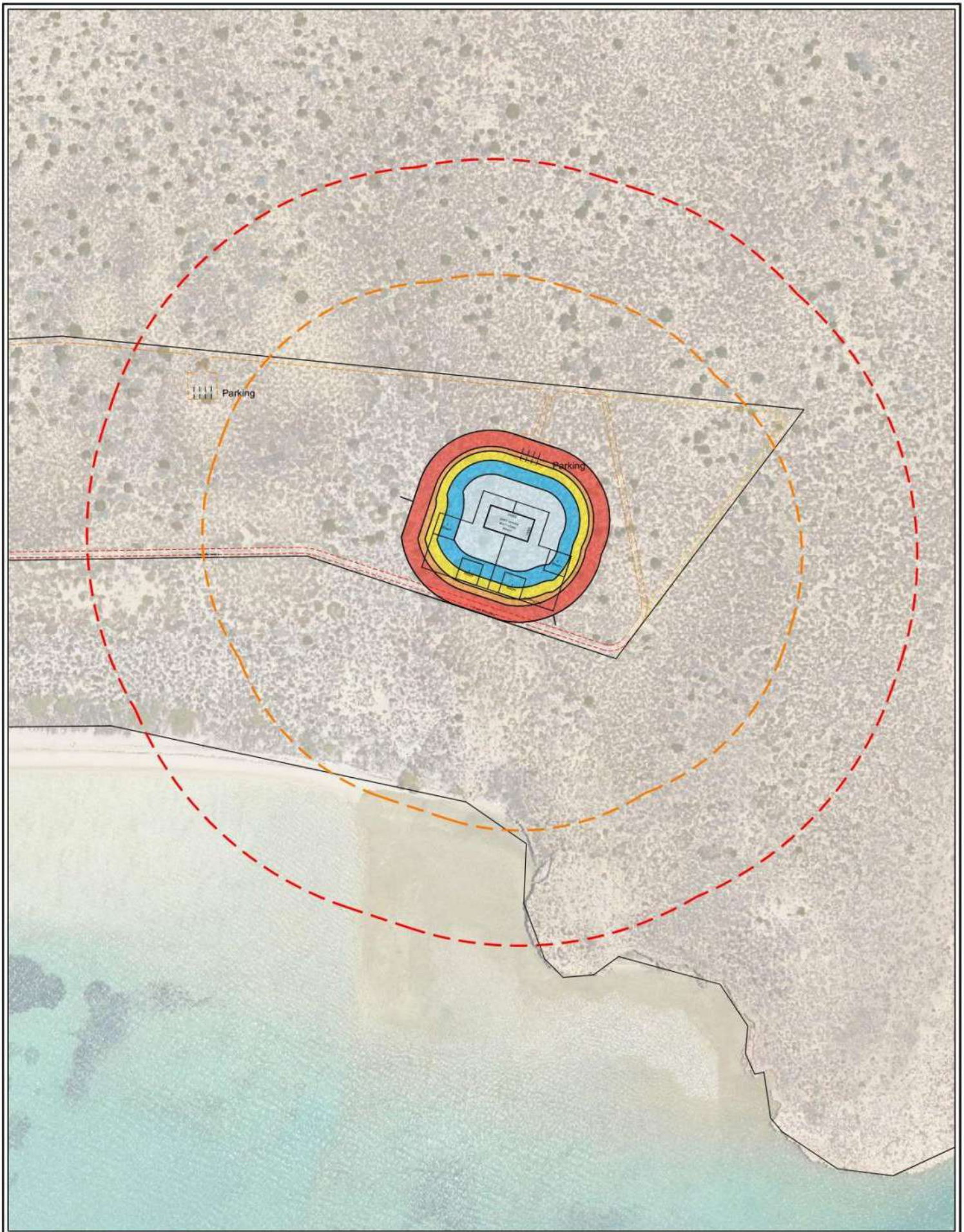

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FIGURE 8H
CLUSTER No. 8
BAL CONTOUR MAP

0 10 20 30 40 50 60m

SCALE 1:1500 @ A3

DATE: NOVEMBER 2024

NORTH

INDICATIVE BUSHFIRE ATTACK LEVELS

- BAL LOW
- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- BAL FLAME ZONE

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4 IDENTIFICATION OF BUSHFIRE HAZARD ISSUES

A search of bushfire history on the Landgate Firewatch website indicates there has been no recorded bushfires on the island since 1989. Prio to this date, records are less reliable, however it is clear that bushfires have not occured in living memory or have been very small and insignificant. The Wardle family have farmed on the island since 1969, Geoff recalls a fire being deliberately lit in 1995 north of sandy point and it failed to spread beyond a size of 500 m² (G. Wardle pers comm).

Regardless of an almost total absence of any fire history, there are a small number of potential ignition sources including illegal campfires, vehicles and visitors.

The bushfire exposure for accommodation units can achieve full compliance with the Guidelines because there is sufficient space on the development lot to contain an Asset Protection Zone so that all buildings achieve BAL-29 and lower. Access to the site is limited as is evacuation off the island, the site is isolated so there does need to be a thorough examination of the site and propose development appropriately to ensure there is an element of self resilience and people can shelter from life threatening radiant heat if a fire was to ever move across the island and impact the site.

By constructing an approved on-site shelter according to minimum standards, people can shelter from a bushfire and can co-ordinate with emergency services an evacuation off the island if needed.

Vehicular access on the island is limited to 4WD vehicle tracks, access to the island is via, boat, barge or light aircraft.

The DRAFT DBCA Emergency Response Plan (ERP) for Dirk Hartog Island recognises the unique situation on Dirk Hartog island and identifies themselves as the likely Hazard Management Agency and First Responders for any issue within the National Park. The plan also rates the likelihood of bushfire on Dirk Hartig Island as “highly unlikely”. The Shire of Shark Bay are responsible for a level 1 or 2 bushfire on freehold land on Dirk Hartog island and DFES also have a role as a Hazard Management Agency. The only permanent residents on the island are Kieran and Tory Wardle at Dirk Hartog Island Lodge. It is hard to imagine an emergency response without their involvement considering they also have the vehicle barge and other marine assets that can assist.

The Shire of Shark Bay also have a Volunteer Marine Rescue and Volunteer Fire and Rescue Service and Police are based in Denham.

5 ASSESSMENT AGAINST THE BUSHFIRE PROTECTION CRITERIA 8: Development – Vulnerable tourism land uses and day uses

This report adopts an acceptable solution and outcomes based approach system of control for each bushfire protection criteria. This methodology is consistent with the *Planning for Bushfire Guidelines (2024).* The management issues are:

- Siting and Design
- Vehicular Access.
- Water Supply

Acceptable solutions and outcome based approaches are proposed for all bushfire protection criteria.

Land use planning bushfire risk mitigation strategies are comprehensively detailed in the following sections by providing responses to the bushfire protection criteria that fulfil the outcomes of the bushfire hazard management issues outlined in the *Planning for Bushfire Guidelines (2024).* The compliance details are outlined in Table 6 below.

5.1 Compliance Table

Land use planning bushfire risk mitigation strategies are comprehensively detailed in the following sections by providing responses to the performance criteria that fulfil the intent of the bushfire hazard management issues outlined in the *Planning for Bushfire Guidelines (2024).* The compliance checklist assessed against Bushfire Protection Criteria 8 : Development - Vulnerable tourism land uses and day uses is shown in Table 6 and the final outcomes are outlined in Figure 9 and 9A as two separate spatial representation of the bushfire mitigation measures.

Table 6. Compliance table		
Bushfire Protection Criteria	**Method of compliance** **Acceptable Solutions / Outcomes Based Approach**	**Proposed bushfire management strategies**
Element 1: Location	Not applicable in Area 2.	Explanatory note: State Planning Policy 3.7 Bushfire and the Planning for Bushfire Guidelines states in Section 3 for Tourism Land Uses: The broader landscape assessment is not required for tourism land uses, recognising that many are remote and nature-based.
Element 2: Siting and Design **Outcomes:** **O2 Ensure siting and design solutions:** Manage or mitigate the bushfire risk to people, property and infrastructure; and Avoid, or where unavoidable minimise the clearing of native vegetation.	**A2.1a - Siting and Design** Every habitable building achieve a radiant heat impact no exceeding 29kW/m² (BAL-29)	**Full compliance – every proposed habitable building achieves an exposure of BAL-29 and lower**
	A2.1b Asset Protection Zone (APZ) Where a habitable building cannot be wholly within an area with a radiant heat impact not exceeding 29kW/m^2 (BAL-29) in its pre-development state, an APZ is to be provided and meet the following requirements: **Width**: the APZ is to be measured from the development site, and of sufficient size to ensure the radiant heat impact of a bushfire does not exceed 29kW/m² (BAL-29) in all circumstances **Location**: the APZ is to be contained solely within the boundaries of the lot, except in instances where: - The vegetation on the adjoining lot(s) is, and will continue to be low threat as per clause 2.2.3.2 of AS 3959 of the requirements of Appendix B2, Table 9 – APZ technical requirements, or an alternative standard in a local planning scheme, on an ongoing basis in perpetuity; or - The adjoining land is and will remain in perpetuity, non-vegetated **Management**: the APZ is managed in accordance with the requirements of Appendix B.2, Table 9 – APZ technical requirements, or an alternative standard in a gazetted local planning scheme.	**Full compliance is achieved on all criteria including the following:** **Width** – the APZ for each cluster is measured from the walls or supporting posts of each habitable building in all directions towards classified vegetation. **Location** – All APZ's are fully contained within lot 304 Sunday Island Bay. APZ technical requirements are found in Table 9 in the guidelines and are found in Appendix ? in this report **Management** – the owner of the property will establish the APZ to the technical standards after DA approval and the owner or lessee of the facility will be responsible for maintain the APZ standards in perpetuity.

	A2.2a Asset Protection Zone (APZ) siting within 40kW/m² (BAL-40) and / or more than 40kW/m² (BAL-FZ) The siting of a habitable building or structure, with a radiant heat impact exceeding 29kW/m² (BAL-40 or BAL-FZ) should only be considered where: - There are no bushfire construction standards required under the BCA; and - There are demonstrated site characteristics and/or environmental values that prevent the achievement of a radiant heat impact not exceeding 29kW/m² (BAL-29) and - It is acknowledged within the bushfire management plan that it is understood that in the event of a bushfire it is possible the building or structure will be damaged or destroyed	**Full compliance is achieved as outlined in this BMP.**
	A2.2b Asset Protection Zone (APZ) Where the provision of an APZ in accordance with acceptable solution A2.1b cannot be achieved, then the vegetation immediately surrounding the habitable building is to be managed as defendable space in accordance with Appendix b.2, Table 9 – APZ technical requirements.	**Full compliance is achieved as acceptable solution A2.1b is achieved as outlined in this BMP.**
	A2.3 Clearing of native vegetation The development avoids, or where unavoidable, minimises the clearing of native vegetation.	**Full compliance is achieved.** Technical fire modelling and detailed effective slope analysis has been undertaken in 47 fire run locations surrounding the entire site (see fire modelling Appendix 5). In addition to this, each indicative cluster of buildings has been individually assessed for effective slope and fire behaviour using AS3959 method 2 methodology. This includes a further approximate 48 potential fire runs towards the cluster of buildings and on-site shelter building. All of this analysis has been completed to ensure the minimum amount of vegetation will need to be modified/impacted to comply with acceptable radiant heat flux standards and compliance with SPP 3.7 and the Guidelines. The footprint of potential development impact is reduced significantly because of the analysis in this BMP.

	A2.4 Landscape Management Plan A Landscape Management Plan is to be prepared to identify on-going on-site vegetation management	**Full compliance is achieved for this stage of planning**. Assessment completed includes: - An Environmental Report prepared by Bayley Environmental Services - A Draft Foreshore Access Management Plan and a Management Plan for the entire site developed by DHI Development Pty Ltd The Environmental Report demonstrates that development of the visitor accommodation as proposed in the LDP can be undertaken in accordance with the Shire of Shark Bay LPS No.4 and without any significant adverse impacts on the environment of Dirk Hartog Island or its surrounding waters. If required, a Landscape Management Plan can be developed at the Development Application (DA) stage which is when the final site layout will be confirmed.

	A2.5 On-site Shelter (if required) Where an on-site shelter is proposed, to comply with A3.5 On-site shelter, it is to meet all the following requirements: - Where a building is to function as an on-site shelter, there is to be sufficient separation distance from the predominant bushfire prone vegetation to avoid exposure to a radiant heat flux exceeding 10 kW/m²(with an assumed flame temperature of 1200K); or - Where an open space is to function as an on-site shelter, there is to be sufficient separation distance from the predominant bushfire prone vegetation to avoid exposure to a radiant heat flux exceeding 10 kW/m²(with an assumed flame temperature of 1200K); and - buildings identified as suitable for on-site shelter , to be designed in accordance with Building Code of Australia and the ABCA Design and Construction of Community Bushfire Refuges Handbook and located within an area of 10kW/m² - pedestrian paths to any on-site shelter should be provided and be clearly signposted	**Full compliance is achieved.** A building is to function as an on-site shelter at each cluster of accommodation units. Technical fire modelling and detailed effective slope analysis has been undertaken in 47 fire run locations surrounding the entire site (see fire modelling Appendix 5). In addition to this, each indicative cluster of buildings has been individually assessed for effective slope and fire behaviour using AS3959 method 2 methodology. This includes a further approximate 40 potential fire runs towards the cluster of buildings and on-site shelter building. All of this analysis has been completed to ensure the on-site shelter is appropriately sited to ensure it is exposed to a predicted radiant heat flux of less than 10kW/m² using a flame temperature of 1200K and a FDI of 100. On days over FDI 100, as outlined in the Evacuation plan , the site will be pre-emptively closed and visitors evacuated the day before. The proposed siting of the on-site shelter in the middle of each cluster of accommodation units, walking paths are short (ie, less than 20m long) and will be signposted, the staff member / caretaker will live in the on-site shelter thereby providing additional guidance during any bushfire event to visitors. In the final design at DA stage, the eco-tourism facility will have appropriately sized on-site shelters capable of accommodating the total number of visitors and staff on site at any one time whenever visitors are accommodated, and they will be easily accessed by short walking tracks. The indicative on-site shelters assessed here are up 200m² in size, are within a very short walk from the accommodation units on signposted paths and will be able to accommodate multiple times the number of people that will ever be on-site considering the 1m² per person requirement. At DA stage, a fire engineer will be engaged to ensure the building is designed in accordance with the Building Code of Australia and the ABCA Design and Construction of Community Bushfire Refuges Handbook (2014). Importantly at this stage in planning we have demonstrated the siting of a suitable building can be accommodated in multiple locations within the site and detailed design work will occur at DA.

Element 3: Vehicular Access **Outcomes:** **O3 Ensure the design and capacity of vehicular access and egress provide:** - **for efficient evacuation to a suitable destination(s) and / or** - **as a contingency measure for vulnerable land uses, an onsite shelter, where demonstrated**	**A3.1a - Public Roads** There are no public roads on Dirk Hartog Island.	Not applicable as there are no public roads on Dirk Hartog Island. The island is a 63,000 ha World Heritage National Park managed by the Department of Biodiversity, Conservation and Attractions. The track network in the southern portion of the island is shown in Figure 2. The Parks and Wildlife Road Operational Guidelines 01 (ROG 01) identifies the Departmental Road categories and according to this guideline, the tracks on Dirk Hartog Island are categorised as Category E (Track) with desired design speeds of 20-40 km/hr. The purpose of "tracks" is to provide access for primarily four-wheel drive vehicles. There is no regular maintenance of the island tracks outside of necessary repairs for 4WD access by DBCA. The corrugations can help regulate vehicle speeds.

appropriate, as a last resort option	**A3.2a - Access routes** Area 2: Public road access should be provided in two different directions to at least two different suitable destinations, with an all weather surface.	The tracks on the island are on the natural surface and are suitable for all weather access for 4WD vehicles. The track into the site from the main north-south access track is approximately 1450 m long. The destinations on the island that could be suitable for evacuation include, but are not limited too: - the island landing barge point at Cape Ransonnet, 3.7 km south on the main track - boat transfer from Dirk Hartog island Lodge 16 km north of the main track to Denham - light aircraft transfer from island airstrip, 17km north on the main access track - the island landing barge from Sunday Island Bay beach The safest assessed destination on all of Dirk Hartog Island will be the on-site shelter building (s) proposed with this development. The on-site shelters will be designed with input from a fire engineer, they will be sited to be exposed to less than 10kW/m² on days up to FDI 100. There is no other location on Dirk Hartog Island assessed for community safety to these standards. The only other location where an assessment has been completed is Dirk Hartog Island Lodge which has a designated open space area on-site shelter. This has been assessed in 2019 by Ecosystem Solutions to support a Development Application to support additional facilities at that site. Unofficial destinations could include beaches or sand dunes of which there are multiple potential sites on the island. As per clause B5.3.1 in the guidelines which states: where a vulnerable land use (other than a school) cannot achieve compliance with the acceptable solutions for vehicle access to two different suitable destinations, a shelter on-site for up to 100 employees and visitors can (and is) being proposed as an acceptable solution.
	A3.2a - For a day-use with no overnight accommodation	Not applicable.

	A3.3a - No-through roads Area 2: if the public road access to the subject site is via a no-through road which cannot be avoided due to demonstrated site constraints, the public road access is to be a maximum of 200 metres from the proposed lot(s) boundary to an intersection where two-way access is provided. The no through road may exceed 200 metres if it is demonstrated that an alternative access, including an emergency access way, cannot be provided due to suite constraints, and the following requirements are met: - the no through road travels towards a suitable destination; and - the balance of the no-through road, that is greater than 200 metres from the subject site, is wholley within BAL-LOW, or is within a residential built-out area, or is within Area 1	All tracks on Dirk Hartog Island are dead ends, this site constraint is unavoidable. The safest assessed destination on all of Dirk Hartog Island will be the on-site shelter building(s) proposed with this development. The on-site shelters will be designed with input from a fire engineer, they will be sited in areas exposed to less than 10kW/m² on days up to FDI 100. There is no other location on Dirk Hartog Island assessed for community safety to these standards. As per clause B5.3.1 in the guidelines which states: where a vulnerable land use (other than a school) cannot achieve compliance with the acceptable solutions for vehicle access to two different suitable destinations, a shelter on-site for up to 100 employees and visitors can (and is) being proposed as an acceptable solution.
	A3.3b - No through road requirements A no-through road is to meet all the following requirements: - requirements of a public road (Appendix 3) - turn around area/head (Appendix 3)	The track network in the development site will mirror the tracks on Dirk Hartog Island. The purpose of "tracks" is to provide access for primarily four-wheel drive vehicles. Turn around areas for fire appliances is accommodated in the t-shaped track intersection at the entrance to each carpark area at each development cluster.
	A3.4b Emergency Access Ways	Not applicable.

	A3.5 On-site shelter Where A3.2, A3.3a and A3.4 (if required), cannot be achieved, and the proposed development has a capacity of up to a maximum of 100 visitors and employees at any one time, an on-site shelter is to be provided in accordance with A2.5	The maximum number of visitors and employees do not exceed 100 for the proposed development. A number of on-site shelters are proposed to be developed as the development staging occurs. Each cluster of accommodation buildings is to contain an on-site shelter which will double as accommodation for a manager / staff member / caretaker. Pre-emptive evacuation as outlined in the Bushfire Emergency Plan (BEP) will occur when days exceed FDI 100. The safest assessed destination on all of Dirk Hartog Island will be the on-site shelter building (s) proposed with this development. The on-site shelters will be designed with input from a fire engineer, they will be sited to be exposed to less than 10kW/m² on days up to FDI 100. There is no other location on Dirk Hartog Island assessed for community safety to these standards. The on-site shelters will provide sufficient space for the maximum number of employees and visitor that could be on-site at each cluster, they are positioned a short distance from the accommodation units and the short footpaths will be signposted appropriately. The shelters will be reasonable sealed from external environmental hazards, have multiple access doors for ease of entry and exit during an emergency and contain, toilets, drinking water and first aid facilities. At DA stage the on-site shelters will be: - Designed and constructed in accordance with the Building Code of Australia and ABCB Design and Construction of Community Bushfire Refuges Handbook (2014). The design will be undertaken by a suitably qualified fire engineer with fire risk assessment expertise, accredited with Engineers Australia. - Prior to occupation of the development, a final inspection of the on-site shelters will be undertaken by a qualified fire engineer. The fire engineer will provide certification to the satisfaction of the Shire of Shark Bay, that the works have been completed in accordance with requirements of the Building Code of Australia and ABCB Design and

		Construction of Community Bushfire Refuges Handbook (2014). - Prior to occupation of the development, an on-site shelter maintenance plan will be prepared by a suitably qualified fire engineer and will include: - Details of maintenance requirements; and - Details of annual testing for operational compliance. As per clause B5.3.1 in the guidelines which states: where a vulnerable land use (other than a school) cannot achieve compliance with the acceptable solutions for vehicle access to tow different suitable destinations, a shelter on-site for up to 100 employees and visitors can (and is) being proposed as an acceptable solution.

	A3.6 Fire service access route Where proposed lots adjoin classified vegetation under AS3959, a for service access route is to be provided to provide fire fighter access, where access is not available to the classified vegetation. A fire service access route is to meet the following requirements: - Requirements of Appendix b.3, table 10, column 4 - Be through routes with no dead ends - Must be signposted - No further than 500 metres form a public road - The proponent obtaining consent from the local government that it will accept care, control and management; and - If gated, gates open the whole carriageway width and can be locked by the local government and/or the emergency services if keys are provided for each gate.	No formal fire service access route is proposed, a loop driveway network will follow the perimeter of the site and provide 4WD access consistent with the island track network and consistent with providing adequate access for light fire fighting appliances. Passing bays will be provided every 200 metres on this perimeter loop driveway and this access way provides visitors and staff access to the accommodation units.
	A3.7 Internal vehicular access and private driveways Internal vehicular access and private driveways longer than 70 metres should meet all the following requirements: - Requirements of Appendix b.3, table 10, column 5 (attach standards) - Passing bays every 200 metres with a minimum length of 20 metres and a minimum carriage way width of 6 metres; and - Turn around areas as shown (Appendix ?) – add..	The proposed loop driveway network will generally follow the perimeter of the site and provide 4WD access consistent with the island track network and consistent with providing adequate access for visitors and light fire fighting appliances. Passing bays will be provided every 200 metres on this perimeter loop driveway. The internal driveway provides access to visitors and staff to the accommodation units.

Element 4: Water Supply **Outcomes:** **O3 Ensure that sufficient water is available to enable people, property and infrastructure to be defended from bushfire.**	**A4.1 Water supply** Where a reticulated water supply is existing or proposed , a hydrant connection(s) should be provided in accordance with the specifications of the relevant water supply authority. Where these specifications cannot be met, a water tank(s) should be provided in accordance with the requirements of Appendix B.4. Table 11 (add in appendice) – Water supply dedicated for bushfire fighting	Dirk Hartog island has natural fresh water springs that have serviced the agricultural industry on the island since 1909. The island has at various stages since then accommodated up to 25,000 sheep. Each building cluster of four accommodation units and caretakers accommodation / on-site shelter will be serviced with a 50,000 litre dedicated fire fighting water tank with compliant outlet fittings. The tank will be located near the carpark area of each cluster in an area exposed to BAL-29 or lower. Light 4WD fire appliance access on a natural hard base material will be provided to within 3 metres of the outlet fittings to ensure water can be drafted easily. These series of water tanks will be the largest dedicated source of water on the entire island for fire fighting and will be a very useful resource for DBCA and Emergency Services for any fire suppression operations if required. There are no bores on the island, shallow ground water wells have provided water for livestock at various locations for more than 100 years. Water to fill the dedicated fire fighting water tanks will be sourced from the existing wells on the island via the documented and registered water easement and piped along the registered easement for 'carriage of water'. Non-potable water can also be carted to site from the wells and sourced from the mainland.

5.2 Bushfire Mitigation Measures

A comprehensive Bushfire Emergency Plan (BEP) is an important component of the overall risk mitigation at this site.

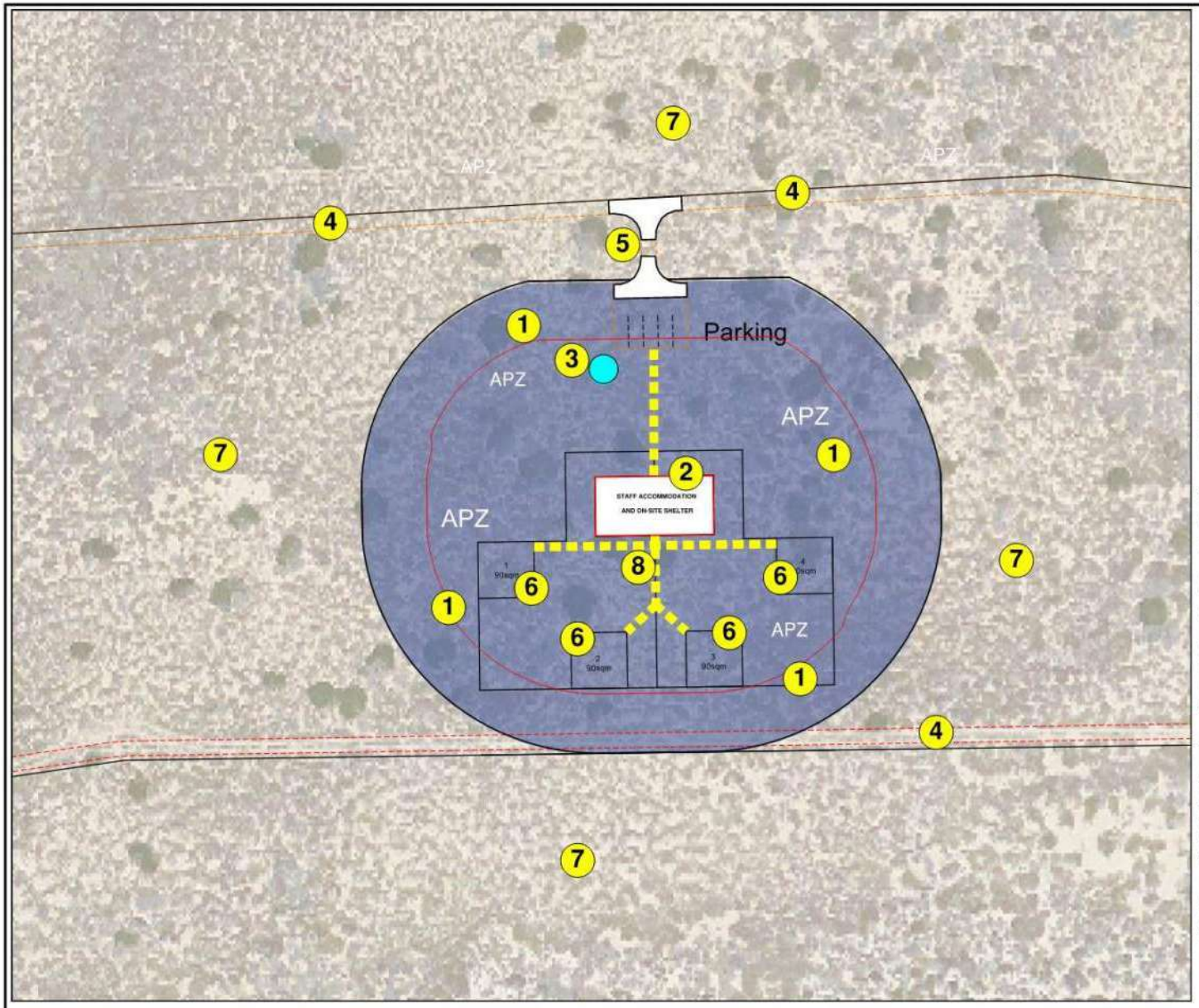
During a bushfire that occurs when the facility is open (with predicted FBI less than 100), the internal relocation of visitors and visitors into the on-site shelter ahead of threat during a bushfire is required to ensure the safety of people. Specific details are provided in the Bushfire Emergency Plan (BEP: see Appendix 6).

The BEP provides the management with triggers and actions to implement if the site is ever threatened by a bushfire when open. Shelter on-site is the primary action to undertake for all staff and visitors to remove themselves from the impacts of bushfire prior to the bushfire front arriving.

The spatial representation of bushfire management strategies is outlined in **Figure 9 and 9A and the BEP is found in Appendix 6**.

Additional to the land use planning mitigation measures, the site once occupied and operational will have a slip-on fire unit mounted to a 4WD work vehicle at the site during the entire fire season. This allows staff with the appropriate training to assist with any property defence strategies and be less reliant on outside assistance.

The future planning application for this site will be the Development Application Stage and this BMP will be updated to accommodate the final site layout and conditions against the relevant policy and guidelines at the time.



LEGEND:

- DEDICATED 50,000 LITRE WATER TANK
- LINE WHERE BAL-29 IS ACHIEVED
- ASSET PROTECTION ZONE
- SIGNPOSTED PATHS TO ON-SITE SHELTER BUILDING
- STAFF ACCOMMODATION / CARETAKER AND ON-SITE SHELTER
- TURN - AROUND AREAS

FIGURE 9 - SPATIAL REPRESENTATION OF BUSHFIRE MITIGATION MEASURES FOR ONE REPRESENTATIVE BUILDING CLUSTER

REQUIREMENTS

1. The Asset Protection Zone has been determined to provide reduced radiant heat flux outputs on accommodation units to BAL-29 or lower and importantly to reduce radiant heat flux to below 10kW/m2 for the on-site shelter

2. The staff accommodation buildings also doubles as the fire engineer designed on-site shelter, it is exposed to less than 10kW/m2 radiant heat flux and will comply with the Building Code of Australia and ABCB Design and Construction of Community Bushfire Refuges Handbook (2014). .

3. The dedicated fire fighting 50,000 litre water tank will be sited near the carpark and turn around areas and will be sited within BAL-29 or lower exposure levels.

4. The loop driveway is consistent with track conditions on the island and passing bays are located every 200 metres.

5. Turn-around areas are sited near each driveway entrance and carpark.

6. The accommodation units are all sited in BAL-29 and lower and are constructed to BAL-29 construction standards.

7. Low shrubland surrounds each cluster, average height of the dominant vegetation is 100-200mm, some isolated shrubs achieve a maximum height of 1.5 metres. All of the vegetation is wind pruned from the predominant southerly coastal winds.

8. Short signposted paths lead all visitors from their accommodation units to the on-site shelter.

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Mbl: 0429 949 262
www.bushfiresafety.net

0 5 10 15 20 25 30m
SCALE 1:750 @ A3
DATE: NOVEMBER 2024

NORTH

Location details:	Lot 304 on DP 50257 Dirk Hartog Island
Assessment date:	August, 2024
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

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1. The Asset Protection Zone has been determined to provide reduced radiant heat flux outputs on accommodation units to BAL-29 or lower and importantly to reduce radiant heat flux to below 10kW/m2 for the on-site shelter

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8. Short signposted paths lead all visitors from their accommodation units to the on-site shelter.

LEGEND:

- INTERNAL LOOP DRIVEWAY
- DEDICATED 50,000 LITRE WATER TANK
- LINE WHERE BAL-29 IS ACHIEVED
- APZ — ASSET PROTECTION ZONE
- SIGNPOSTED PATHS TO ON-SITE SHELTER BUILDING
- DEDICATED 20m x 6m WIDE PASSING BAYS WILL BE SITED EVERY 200 METRES
- STAFF ACCOMMODATION AND ON-SITE SHELTER — STAFF ACCOMMODATION / CARETAKER AND ON-SITE SHELTER
- TURN - AROUND AREAS

FIGURE 9A - SPATIAL REPRESENTATION OF BUSHFIRE MITIGATION MEASURES SITE ACCESS AND WATER SUPPLY

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0 50 100 150m
SCALE 1:4400 @ A3
DATE: NOVEMBER 2024

NORTH

Location details:	Lot 304 on DP 50257 Dirk Hartog Island
Assessment date:	August, 2024
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
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Date aerial photo:	2013

6 RESPONSIBILITIES FOR IMPLEMENTATION AND MANAGEMENT OF THE BUSHFIRE MITIGATION MEASURES

Table 7 outlines the initial and ongoing responsibilities, actions and associated works that need to be undertaken by the management. The check boxes for implementation actions will be used by management of the ecotourism development. A Bushfire Planning Practitioner will certify that the necessary implementation action has been completed.

Table 7. Responsibility for bushfire measures

LAND OWNER / DEVELOPER – AT DEVELOPMENT APPLICATION STAGE	
No.	**Implementation Action**
1	Update this BMP to SPP 3.7 and the Guidelines
2	Update and annually review the Bushfire Emergency Plan.
3	Continue to ensure the lot is compliant with the Shire of Shark Bay Firebreak and Fuel Load Notice.
LAND OWNER / DEVELOPER – POST DEVELOPMENT APPLICATION STAGE	
4	Establish the APZ to minimum standards
5	Construct all accommodation units to AS3959 standards
6	Engage a suitably qualified Fire engineer to designed and constructed the on-site shelters in accordance with the Building Code of Australia and ABCB Design and Construction of Community Bushfire Refuges Handbook (2014).
7	Install, maintain and signpost the paths at each building cluster.
8	Establish and maintain the driveway loop network including the passing bays and turn arounds to 'track' conditions consistent with other access tracks on Dirk Hartog island.
9	Install water tanks at each cluster at development stages to compliant standards.
10	Comply with minimum requirements outlined in the annual Shire of Shark Bay firebreak notice
SHIRE OF SHRK BAY - ONGOING	
11	Publish and enforce the annual firebreak notice issued under S33 of the Bush Fires Act 1954

7 CONCLUSION

The planning of this development and building envelope proposal has comprehensively considered the unique location in the World Heritage area of Shark Bay and the island can become a world leading nature-based adventure tourism destination rich in heritage, cultural, terrestrial, aquatic activities. The proponent has a long family history on the island and Lot 304 is designated as Special Use Zone 14 (SU14) in the Shire of Shark Bay Local Planning Scheme No.4 that has the objective of providing for eco-tourism developments, camping grounds and holiday accommodation.

The vehicle tracks on the island are natural surface and are suitable for all weather access for 4WD vehicles, there are no public roads, access onto and off the island is restricted to the vehicle barge, light aircraft or other marine vessels

This BMP and BEP has been developed to respond to Condition 3 (iv) to develop a Bushfire Management Plan in accordance with relevant state planning policy. It does this by assessing the LDP Application against the State Planning Policy 3.7 Bushfire (SPP 3.7) and the associated Planning for Bushfire Guidelines (2024).

This BMP also supersedes the previously submitted report (Version 1.1) prepared by Smith Bushfire Consultants Pty Ltd dated 29 January, 2024. This assessment also responds to feedback provided to the Shire of Shark Bay (the Shire) by the Department of Fire and Emergency Services (DFES) on 26 March 2024 and also responds to feedback provided by the Shire to the proponent with correspondence dated 21 February, 2024.

The proposed 'vulnerable land use' is supported by a Bushfire Emergency Plan developed consistent with the guidelines and templates. It is a crucial component of the overall bushfire planning at the site and identifies that the primary action to take during a bushfire is to initially shelter-in-place and evacuate when it is safe to do so. It is a living document that will be updated during the DA stage and annually when the facility is completed. The facility will be pre-emptively closed on days exceeding FBI 100 (Fire Danger Rating – Catastrophic).

An assessment of a 2km radius around the site determined that over 50% of that assessment area is ocean or inlet vegetation dominated by mangroves and succulent samphire plants. Of the remaining vegetated land, the landscape is covered in Class C shrubland and low shrubland vegetation only. The vegetation rarely exceeds 1 metres in height. The bushfire hazard level assessment confirmed the site is exposed to a moderate hazard level from the north and west, but has minimal exposure to long fire runs from the east and south. The site is not exposed to extreme bushfire hazard levels.

Over 100 short and long fire runs were assessed around the site and building clusters. The Asset Protection Zone (APZ) requirements around the on-site shelter buildings and each accommodation unit were specifically calculated from the assessment of fire runs into the site and indicative devleiopment.

An on-site shelters will be designed and constructed in accordance with the Building Code of Australia and ABCB Design and Construction of Community Bushfire Refuges Handbook (2014). This is the acceptable solution for singe access sites. The design will be undertaken by a suitably qualified fire engineer with fire risk assessment expertise, accredited with Engineers Australia at DA stage. Additional equipment will include a slip-on fire unit on the back of a 4WD ute that will be located at the site during the fire season.

The proposed indicative development achieves all the acceptable solutions and provides outcomes based approaches suitable to mitigate risk in this unique isolated location consistent with an ecotourism development in this isolated World Heritage environment. The proposal for building envelopes achieves the intent of the Planning for Bushfire Guidelines and SPP 3.7 and will be updated at Development Application (DA) stage when firmer plans are lodged for the final development at the next stage in planning approval.

8 REFERENCES

Bayley Environmental Services (2024) SUNDAY ISLAND BAY, DIRK HARTOG ISLAND LOCAL DEVELOPMENT PLAN – ENVIRONMENTAL REPORT – prepared for DHI Development Pty Ltd

Department of Parks and Wildlife. Road Operational Guideline 01(ROG 01). Classification of Department-managed roads.

Department of Biodiversity, Conservation and Attractions (DBCA) Parks and Wildlife Service, Gascoyne District. Emergency Response Plan – Dirk Hartog Island National Park (Vers. 18 Sept, 2023)

Markettrade Consultancy, 2023 report for DBCA. DIRK HARTOG ISLAND RECREATION & TOURISM OPPORTUNITIES ANALYSIS

Standards Australia. 2018. Construction of buildings in bushfire-prone areas (Amendments 1-3), AS 3959-2018, Standards Australia International Ltd, Sydney.

Western Australian Planning Commission (WAPC). 2024. State Planning Policy No. 3.7: Bushfire (SPP3.7). 2024. Western Australian Planning Commission and Department of Planning WA, Government of Western Australia.

Western Australian Planning Commission (WAPC). 2024. Planning for Bushfire Guidelines (2024). Western Australian Planning Commission and Department of Planning WA, Government of Western Australia.

APPENDICES

Appendix 1: Shire of Shark Bay Bushfire Notice 2024/2025
Appendix 2: Asset Protection Zone Standards
Appendix 3: Vehicular Access Technical Requirements
Appendix 4: Water Supply Standards
Appendix 5: Assessment Criteria and Design Fire Modelling – On-site shelters
Appendix 6: Bushfire Emergency Plan

Appendix 1: Shire of Shark Bay Bushfire Notice 2024-2025

BUSH FIRE FIREBREAK NOTICE AND REQUIREMENTS

NOTICE TO ALL OWNERS AND / OR OCCUPIERS OF LAND
IN THE SHIRE OF SHARK BAY

FIREBREAKS

Shall consist of a strip of land free of all flammable material with the intention of minimizing the spread or extension of a bushfire and providing safe access on the property for emergency vehicles and other firefighting operations. Firebreaks may be constructed by one or more of the following methods:

- Ploughing
- Mulching
- Cultivating
- Scarifying
- Raking
- Burning
- Chemical spraying

Or other method approved by an authorized officer.

https://publications.dfes.wa.gov.au/publications/a-guide-to-constructing-and-maintaining-fire-breaks

Asset / Building Protection Zone

Maintain a fuel-reduced zone around all buildings and assets which extends 20 meters from the outermost point of all buildings and assets.

- Gutters, roofs, and walls of all buildings to be free of flammable matter and maintained.
- Trees over 5 metres in height within the 20-metre zone to be under-pruned up to 2 metres.
- Trees or shrubs within 2 metres of a building/asset shall be pruned to a height no greater than 2 metres and/or pruned away from the building/asset to a distance greater than 2 metres.
- Maintain all dry grass on the land to a height no greater than 50mm inside of the 20m zone.
- Fuel loads within the 20-metre zone is reduced and maintained to no more than 2 tonnes per hectare.

https://publications.dfes.wa.gov.au/publications/building-protection-zone-standards

ADDITIONAL WORKS

In addition to the requirements of this Notice, regardless of land size and location, you may be required to carry out further fire prevention works to reduce hazards considered necessary by an Authorised Officer. Any further requirement would be specified by way of a "work order" forwarded to the address of the owner(s) and/or occupier(s).

Some examples of these could be:

- remove accumulated fuel such as leaf litter, twigs, dead bush, and dead trees capable of carrying a running fire.
- reduce unmanaged grasses/weeds by slashing, mowing or other means.
- reduce long grasses in areas not being grazed or cultivated by slashing, mowing, bailing, or by other means.
- reduce vegetation to a low-threat state from the outer edge of the firebreak through to the property boundary (e.g., no long grass, overhanging branches).

Green Waste and Mitigation Burning in the Shire of Shark Bay

RESTRICTED BURNING Between the 1st of October to the 30th of November & 1st of April to the 30th of April each year during this period:

- A permit is required to burn, permits will only be issued for fuel mitigation burning of the bush, green waste, or campfires.
- Burning is prohibited on any day when the Fire Danger Rating reaches High, Extreme, or Catastrophic
- Burning is prohibited when a Total Fire Ban has been declared.
- During the Restricted Burning Periods, you are only allowed to burn on days that are Moderate.

Fire Danger Ratings are on the BOM website: http://www.bom.gov.au/wa/forecasts/fire-danger-ratings.shtml

Burning is Prohibited from the 1st of December to the 31st of March each year inclusive.

BUSH FIRE FIREBREAK NOTICE AND REQUIREMENTS

NOTICE TO ALL OWNERS AND / OR OCCUPIERS OF LAND IN THE SHIRE OF SHARK BAY

In accordance with Section 33 of the Bush Fires Act 1954, you are required to carry out fire prevention work on land owned or occupied by you as set out in this Notice by the dates specified. If the requirements of this Notice are not met by the due date or are not completed to the satisfaction of an inspecting officer, an on-the-spot fine of $250 will be issued. The maximum fine for failure to comply is $5,000. Council can also enter upon the land and carry out required works at the owner/occupier's expense.
Reference (Section 33 Bush Fires Act 1954)

All landowners and occupiers of land within the Shire of Shark Bay shall comply with the dates set out in this notice or within 14 days of becoming the owner or occupier of land if after that date clear firebreaks and maintain them up to and including the last date set out in this notice pending on the location of the property, in accordance with this notice.
Where a property is affected by an approved bushfire management plan, the property owner and or occupier must still comply with all requirements in this notice and with **ALL** additional requirements outlined within that plan.

FIRE BREAK NOTICE 2024/2025

DENHAM GAZETTED TOWNSITE.

Refers to all land within the Department of Fire and Emergency Services gazetted town site of Denham.
Must be installed before 1 November and maintained clear of all flammable material to 31 October inclusive.

Where the land is 2,024 square meters or less:	Where the land is greater than 2,024 square meters:
· Maintain all dry grass on the land to a height no greater than 50mm · Ensure no tree crowns overhang buildings · Prune trees and shrubs and remove dead flammable material within 1.5m around all buildings · Ensure the roofs, gutters, and walls of all buildings on the land are free of flammable matter · Establish and maintain the entire lot to an Asset Protection Zone standard, external to any buildings, and within the lot boundaries	· Install and maintain a minimum 3-meter-wide by 4-meter-high clearance, continuous (no dead ends) trafficable fire break as close as possible inside the entire perimeter of the land. · Keep a 20m low fuel Asset Protection Zone, clear of all flammable material, around all buildings and Structures · Establish and maintain the entire lot to an Asset Protection Zone standard, external to any buildings, and within the lot boundaries

PASTORAL & RURAL LAND

Refers to all land outside the Department of Fire and Emergency Services gazetted town site of Denham.
Must be installed before 1 November and maintained clear of all flammable material to 30 April inclusive.

· Install and maintain a minimum 3-meter-wide by 4-meter-high clearance (for pastoral lands recommended 6-15m wide break be installed dependent on fuel loading and vegetation), being a continuous (no dead ends) Trafficable fire break as close as possible inside the entire perimeter of the land. · Keep a 20m low fuel Asset/building Protection Zone, clear of all flammable material, around all buildings and Structures

ALTERNATE STYLE FIREBREAK

If you consider it impracticable or environmentally damaging to carry out the requirements set out in this Notice, you can apply to the Shire of Shark Bay by 1 October for permission to provide alternative firebreaks or other fire prevention measures. In the absence of written approval for alternative measures, the owner/occupier must adhere to the requirements of this Notice. For further information, contact the Shire of Shark Bay.

Appendix 2: Asset Protection Zone Technical Standards

Management of Asset Protection Zone and Technical Requirements

B.2.2 DESIGNING AN ASSET PROTECTION ZONE

An APZ should not be seen as an area entirely cleared of vegetation, but as a strategically designed space that considers how existing and future mature vegetation, and combustible and non-combustible features interact with and affect the building's resilience to bushfire.

An APZ should provide the greatest level of vegetation management within at least three metres of a habitable building, to ensure adequate unobstructed defendable space for emergency services to operate. This area should contain minimal vegetation and be free of combustible materials and obstructions. Within the remainder of the APZ, planting of vegetation can increase as you move farther away from the building.

The placement of plants within an APZ is a key design technique. Separation of garden beds with areas of low fuel or non-combustible material will break up fuel continuity and reduce the likelihood of vegetation within an APZ supporting a bushfire. It is important to consider the plant density and final structure and form of plants in their mature state.

Strategic landscaping measures can be applied, such as replacing weeds with low flammability vegetation to create horizontal and vertical separations between the retained vegetation.

Mulches used within the APZ should be non-combustible. The use of stone, gravel, shells, rock and crushed mineral earth is encouraged. Very fine or light mulch (such as shredded pine bark, pine needles, or poplar woodchips) less than five millimeters in diameter should be avoided. It is recommended that wood mulch is used in garden beds or areas where the moisture level is higher by regular irrigation, and these areas are separated with non-combustible elements, such as pathways and open spaces.

Incorporation of landscaping features, such as masonry feature walls, can provide habitable buildings with barriers to wind, radiant heat and embers. These features can include noise walls or wind breaks. Use of Appendix F of AS 3959 for bushfire resistant timber selection or the use of non-combustible fencing materials such as iron, brick, limestone, metal post and wire is encouraged within an APZ.

B.2.3 MANAGEMENT OF AN ASSET PROTECTION ZONE

Ongoing maintenance of an APZ is usually enforced through a condition of a development approval, which should refer to **Table 9** APZ technical requirements within this Appendix.

In addition to regular maintenance of an APZ, further bushfire protection can be provided by:

- ensuring gutters are free from vegetation
- installing gutter guards or plugs
- regular cleaning of underfloor spaces, or enclosing them to prevent gaps
- trimming and removing dead plants or leaf litter
- pruning climbing vegetation (such as vines) on a trellis, to ensure it does not connect to a building, particularly near windows and doors
- removing vegetation in close proximity to a water tank to ensure it is not touching the sides of a tank
- following the requirements of the relevant local government firebreak notice, which may include additional provisions such as locating wood piles more than 10 metres from a building.

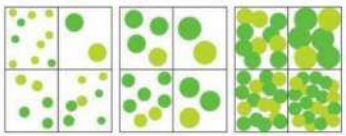
Preparation of a property prior to the bushfire season and/or in anticipation of a bushfire is beneficial even if your plan is to evacuate. Embers can travel up to several kilometres from a bushfire and fall into small spaces and crevices or land against the external walls of a building. Best practice recommends objects within the APZ are moved away from the building prior to any bushfire event. Objects may include, but are not limited to:

- door mats
- outdoor furniture
- potted plants
- shade sails or umbrellas
- plastic garbage bins
- firewood stacks
- flammable sculptures
- playground equipment and children's toys.

Table 9: Asset Protection Zone (APZ) technical requirements

OBJECT	REQUIREMENT
Fences within the APZ	Should be constructed from non-combustible materials (for example, iron, brick, limestone, metal post and wire, or bushfire-resisting timber referenced in Appendix F of AS 3959).
Fine fuel load (combustible, dead vegetation matter less than 6 mm in thickness)	• Should be managed and removed on a regular basis to be maintained as low threat vegetation • Should be maintained at less than two tonnes per hectare (on average) • Mulches should be non-combustible such as stone, gravel, shells, rock or crushed mineral earth or wood mulch more than five millimetres in thickness.
Trees* (more than 6 m in height)	• Trunks at maturity should be a minimum distance of six metres from all elevations of the building • Branches at maturity should not touch or overhang a building or powerline • Lower branches and loose bark should be removed to a height of two metres above the ground and/or surface vegetation. • Canopy cover within the APZ should be less than 15 per cent of the total APZ area • Tree canopies at maturity should be at least 5 m apart to avoid forming a continuous canopy. Stands of existing mature trees with interlocking canopies may be treated as an individual canopy provided the total canopy cover within the APZ does not exceed 15 per cent and is not connected to the tree canopy outside the APZ.

Tree canopy cover – ranging from 15 to 70 per cent at maturity



OBJECT	REQUIREMENT
Shrub* and scrub* (0.5 m to 6 m in height). Shrub and scrub more than 6 m in height are to be treated as trees.	• Should not be located under trees or within three metres of buildings • Should not be planted in clumps more than five square metres in area • Clumps should be separated from each other and any exposed window or door by at least 10 metres.
Ground cover* (less than 0.5 m in height. Ground cover more than 0.5 m in height is to be treated as shrub)	• Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load' above • Can be located within two metres of a structure but three metres from windows or doors if more than 100 mm in height.
Grass	• Grass should be maintained at a height of 100 mm or less, at all times • Wherever possible, perennial grasses should be used and well-hydrated with regular application of wetting agents and efficient irrigation.
Defendable space	Within three metres of each wall or supporting post of a habitable building, the area is kept free from vegetation but can include ground cover, grass and non-combustible mulches as prescribed above.
Liquid petroleum gas cylinders	• Should be located on the side of a building farthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building • The pressure relief valve should point away from the house • No flammable material within six metres from the front of the valve • Must sit on a firm, level and non-combustible base and be secured to a solid structure.

Notes:
** Plant flammability, landscaping design and maintenance should be considered – refer to following explanatory notes*

Fine fuel load is the combustible, dead or dry vegetation matter on the ground, near ground, or elevated. Fine fuel includes grass, leaves, bark and twigs less than six millimetres in diameter that ignite readily and are burnt rapidly when dry.

Fine fuel should be maintained at less than 2t/ha. 100gm/m² equates to 1t/ha. To estimate a fuel load (in t/ha), collect the dry fine fuel from a representative one square meter and weigh (in grams using kitchen scales) and multiply the weight by 0.01.

Appendix 3: Access Standards

Driveway Standards and turn-around requirements

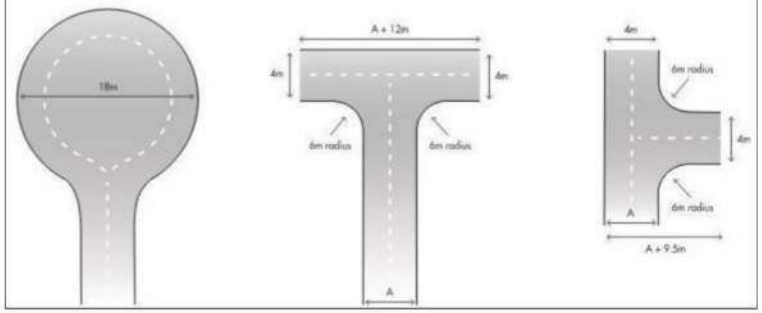
Table 10: Vehicular access technical requirements

	1		2		3		4		5	
TECHNICAL REQUIREMENTS	**PERIMETER ROADS**		**PUBLIC ROADS**		**EMERGENCY ACCESS WAY[3]**		**FIRE SERVICE ACCESS ROUTE[3]**		**BATTLE-AXE & PRIVATE DRIVEWAYS[1]**	
MAP OF BUSH FIRE PRONE AREAS DESIGNATION	**Area 2**	**Area 1**	**Area 2**	**Area 1**	**Area 2**	**Area 1**	**Area 2**	**Area 1**	**Area 2**	**Area 1**
Minimum horizontal clearance (metres)	12	8	See note 5		10	6	10	6	6	
Minimum vertical clearance (metres)	4.5									
Minimum weight capacity (tonnes)	15									
Maximum grade unsealed road[2]	See note 5		See note 5				1:10 (10% or 6°)			
Maximum grade sealed road[2,4]							1:7 (14.3% or 8°)			
Maximum average grade sealed road							1:10 (10% or 6°)			
Minimum inner radius of road curves (metres)							8.5			

Notes:

1. Driveways and battle-axe legs to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision where not required to comply with the widths in this Appendix or the Guidelines.
2. Dips must have no more than a 1 in 8 (12.5% - 7.1 degrees) entry and exit angle.
3. To have crossfalls between 3 per cent and 6 per cent.
4. For sealed roads only the maximum grade of no more than 1 in 5 (20 per cent) (11.3 degrees) for no more than 50 metres is permissible, except for short constrictions to 3.5 metres for no more than 30 metres in length where an obstruction cannot be reasonably avoided or removed.
5. As outlined in the Institute of **Public Works Engineering Australasia (IPWEA) subdivision guidelines**, **Liveable Neighbourhoods**, **Austroads Standards** Main Roads standard, supplement, policy or guideline and/or any applicable or relevant local government standard or policy.

Figure 30: Design requirements for a turn-around area



Appendix 4: Water Supply Standards

B.4: WATER SUPPLY

State Planning Policy outcome for Element 4: Water Supply

Ensure that sufficient water is available and accessible for emergency services use, to enable people, property and infrastructure to be defended from bushfire.

B.4.1 CONSTRUCTION AND DESIGN

An above-ground tank and associated stand should be constructed of non-combustible material.

Below-ground tanks should have a 200 millimetres diameter access hole to allow tankers or emergency services vehicles to refill direct from the tank, with the outlet location clearly marked on the surface.

Above and below ground tanks may need to comply with AS/NZS 3500.1:2018.

An inspection opening may double as the access hole provided that the inspection opening meets the requirements of AS/NZS 3500.1:2018.

Where an outlet for an emergency services vehicle is provided, then an unobstructed, hardened ground surface is to be supplied within four metres of any water supply.

B.4.1.1 Pipes and fittings

All above-ground, exposed water supply pipes and fittings should be metal. Fittings should be located away from the source of bushfire hazard and be in accordance with the applicable section below, unless otherwise specified by the local government.

B.4.1.2 Fittings for above-ground water tanks:

- Commercial land uses: 125 millimetres Storz fitting; or
- Strategic water tanks: 50 millimetres or 100 millimetres (where applicable and adapters are available) male camlock coupling with full flow valve; or
- Standalone water tanks: 50 millimetres male camlock coupling with full flow valve; or
- Combined water tanks: 50 millimetres male camlock coupling with full flow valve or a domestic fitting, being a standard household tap that enables an occupant to access the water supply with domestic hoses.

B.4.1.3 Remote outlets

In certain circumstances, it may be beneficial to have the outlet located away from the water supply. In instances in which a remote outlet is to be used, the applicant should consult the local government and DFES on their proposal.

B.4.2 USE OF WATER SUPPLY

Water supply for firefighting in the event of a bushfire can be provided on a lot for use by emergency services or for use by the landowner, if their **Bushfire Survival Plan** is to stay and defend their property.

Appendix 5: Assessment Criteria and Design Fire Modelling – On-site shelters.

Method 2 assessment to determine <10kW/m² for On-site Shelter Buildings

1. Introduction

Within each cluster of accommodation buildings, the staff accommodation building will be constructed to on-site shelter standards. The buildings will be designed and constructed in accordance with the Building Code of Australia and ABCB Design and Construction of Community Bushfire Refuges Handbook (2014). The design will be undertaken by a suitably qualified fire engineer with fire risk assessment expertise, accredited with Engineers Australia.

Purposed built accommodation structures such as those proposed can provide a suitable on-site shelter if sufficient separation distance from the predominant bushfire prone vegetation can be achieved to avoid exposure to a radiant heat flux exceeding 10kW/m². The flame temperature of 1200K is used in all calculations. An FFDI of 100 has been used for the calculations as pre-emptive closures will occur and people will not be present at the site when the FDI is predicted to be above 100 (equivalent to FBI 100). The site is remote so removing visitors from the island on days prior to a FDI (FBI) day over 100 requires significant logistics.

The staff accommodation building within each cluster is sited in the middle of a proposed Asset Protection Zone that has been specifically modelled and designed to ensure the predicted radiant heat flux does not exceed 10kW/m² on days up to FBI 100.

The buildings will have a suitable Asset Protection Zone (APZ) which will include carparks, walking paths, hard surfaces and retained native vegetation which complies with APZ standards and contains managed fuel loads. This provides a large area to shelter in a building from life threatening radiant heat during the passage of a fire front. All visitors accommodation cabins are within 20 metres of this on-site shelter and can make their way towards the shelter relatively quickly in the event of a bushfire.

2. Aim

- Provide a bushfire protection outcome that meets the performance requirements of the proposed safer location at the site and;
    - Approval under State Planning Policy No. 3.7 - Bushfire (2024); and
    - Compliance with the Planning for Bushfire Guidelines (2024).

3. Objectives

- Demonstrate the Radiant Heat Flux (RHF) exposure profile is < 10kW/m² contour;
- Demonstrate that the exposure profile under specific design fire evaluation that includes:
    - Class C Shrubland (Classified Vegetation) as default fuels loads specified in AS3959-2018.
    - Flame temperature is set at 1200K as a conservative level to assess life safety priorities.
    - FFDI set at 100 because facility will be pre-emptively closed on days when the predicted FBI is 100 or greater (on declared "Catastrophic" Fire Danger Rated days).
    - Site specific values for effective slope under classified vegetation.
    - Site slope set at 0 degrees for this indicative assessment as the influence on outcomes in minimal and the calculations will be refined when the final site layout is confirmed at Development Application stage.

4. Design Fire Assessment to determine <10W/m² radiant heat flux

The design fire assessments determine the level to which predicted radiant heat flux (RHF) exposure from surrounding areas impacts the proposed on-site shelters.

The predicted bushfire attack is reduced by specific site factors that are different to those used in a method 1 BAL assessment in AS3959-2018. The predicted radiant heat flux received on the building from surrounding areas is determined by accurate assessment of effective slope characteristics and separation distances from the classified vegetation that will support a fire front.

5. Specific Design Fire Inputs

Specific design fire inputs used to evaluate the three design fires from the north, west and east/south is listed below and detailed in Tables 1-2 (provided).

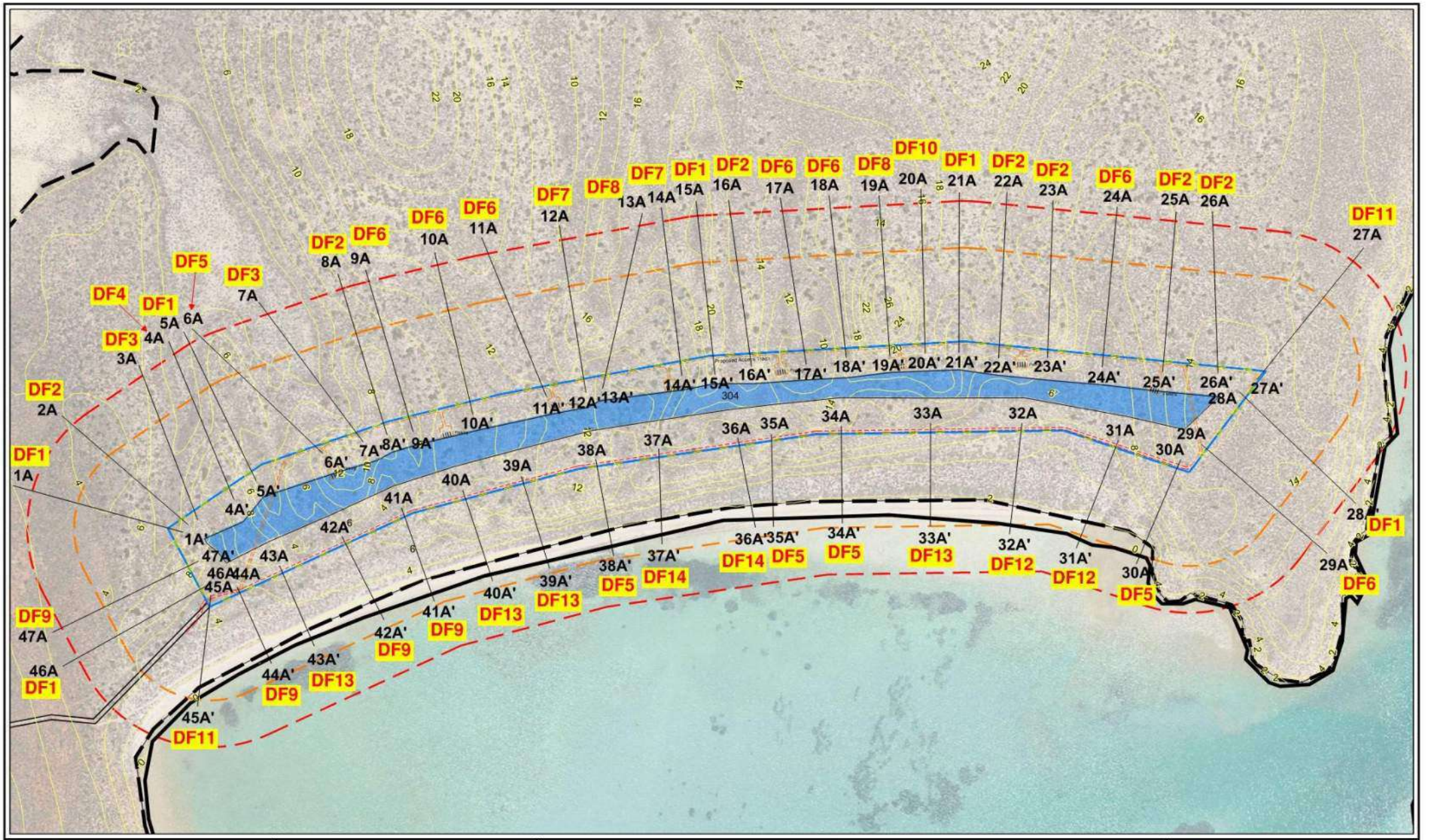
- Effective slope analysis using 0.5 and 2m contours calculated using Pythagoras Theorem and site assessment using Forestry Pro digital field instrument to determine the effective slope under the classified vegetation surrounding the site.
- Flame temperature set at 1200K to reflect life safety priorities.
- Forest Fire Danger Index (FDI) and Fire Behaviour index (FBI) of 100 because the site will be pre-emptively closed on days above FFDI 50.
- An APZ consisting of setback distances specifically outlined in Figures 7, 7A-7G and table 3 in the BMP.

Table 1: Summary of 14 design fire Inputs

Design Fire No.	Vegetation Classification	Effective slope	Surface fuel Load (t/ha)	Overall fuel load (t/ha)	FFDI	APZ (metres)	Flame temperature
1	Class C Shrubland	Upslope 3 degrees	15	15	100	30.1	1200K
2	Class C Shrubland	Flat / upslope	15	15	100	32.5	1200K
3	Class C Shrubland	Downslope 6 degrees	15	15	100	37.6	1200K
4	Class C Shrubland	Downslope 9 degrees	15	15	100	40.4	1200K
5	Class C Shrubland	Downslope 7 degrees	15	15	100	38.5	1200K
6	Class C Shrubland	Upslope 1 degree	15	15	100	31.7	1200K
7	Class C Shrubland	Upslope 2 degrees	15	15	100	30.9	1200K
8	Class C Shrubland	Upslope 5 degrees	15	15	100	28.6	1200K
9	Class C Shrubland	Downslope 3 degrees	15	15	100	35	1200K
10	Class C Shrubland	Downslope 1 degree	15	15	100	33.3	1200K
11	Class C Shrubland	Downslope 2 degrees	15	15	100	34.1	1200K
12	Class C Shrubland	Downslope 4 degrees	15	15	100	35.9	1200K
13	Class C Shrubland	Downslope 5 degrees	15	15	100	36.7	1200K
14	Class C Shrubland	Downslope 8 degrees	15	15	100	39.5	1200K

6. Methodology

- The Method 2 Approach to determine the radiant heat flux exposure and corresponding Bushfire Attack Level (BAL) is described in Appendix B: Detailed method for determining the Bushfire Attack Level (BAL) – Method 2 in AS3959-2018.
- Site specific inputs and bushfire modelling calculations were undertaken using the software tool Bushfire Attack Level calculator (BALc) version 4.9 developed for FPAA by Flamesol.
- The Bushfire Attack Level calculator (BALc) version 4.9 is a software tool approved for use by the FPAA that implements the Method 2 bushfire behaviour and view factor calculations and heat transfer models to determine the exposure of a site to a radiant heat flux.
- Elevation of Receiver is set at default levels and FFDI set at 100 as the site will be pre-emptively closed when conditions exceed this.



Location details:	Lot 304 on DP 50257 Dirk Hartog Island
Assessment date:	August, 2024
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

FIGURE 1
DESIGN FIRE CROSS -SECTION LOCATIONS

0 50 100 150m

SCALE 1:3800 @ A3
DATE: SEPTEMBER 2024

NORTH

LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- DEVELOPMENT ZONE EXPOSED TO LESS THAN 10Kw/m2 ON DAYS FDI 100 AND 1200K FLAME TEMPERATURE
- DF2 DESIGN FIRE NUMBER AND LOCATION

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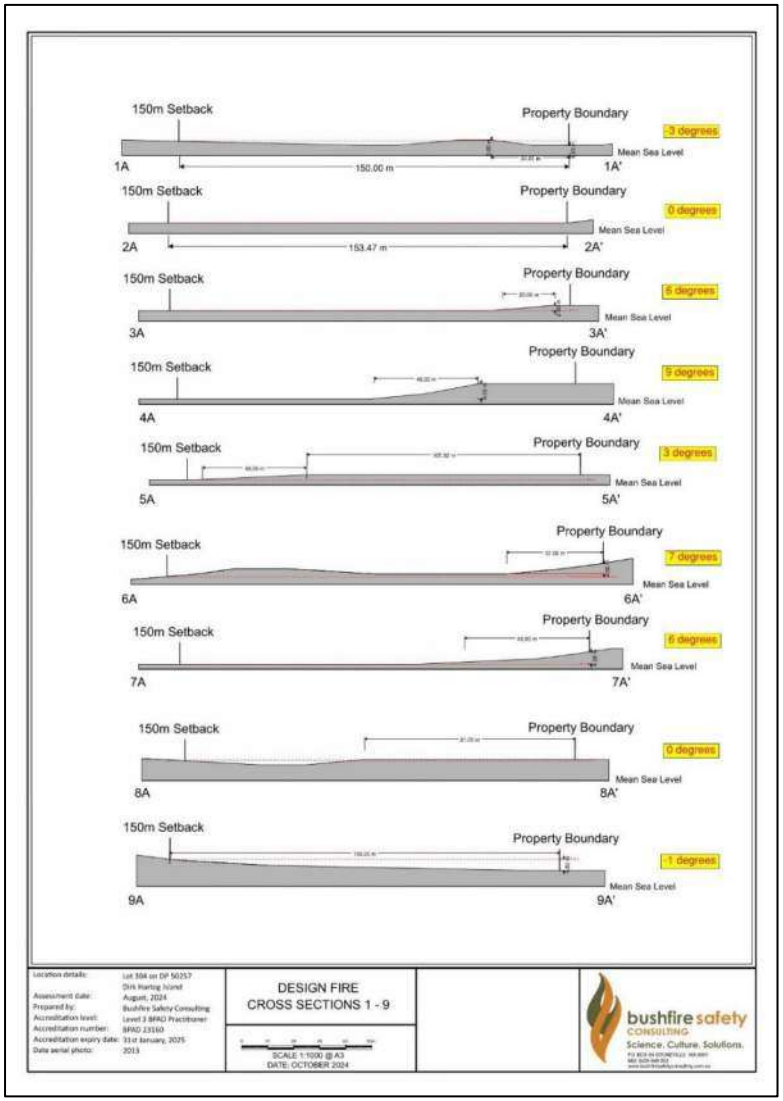
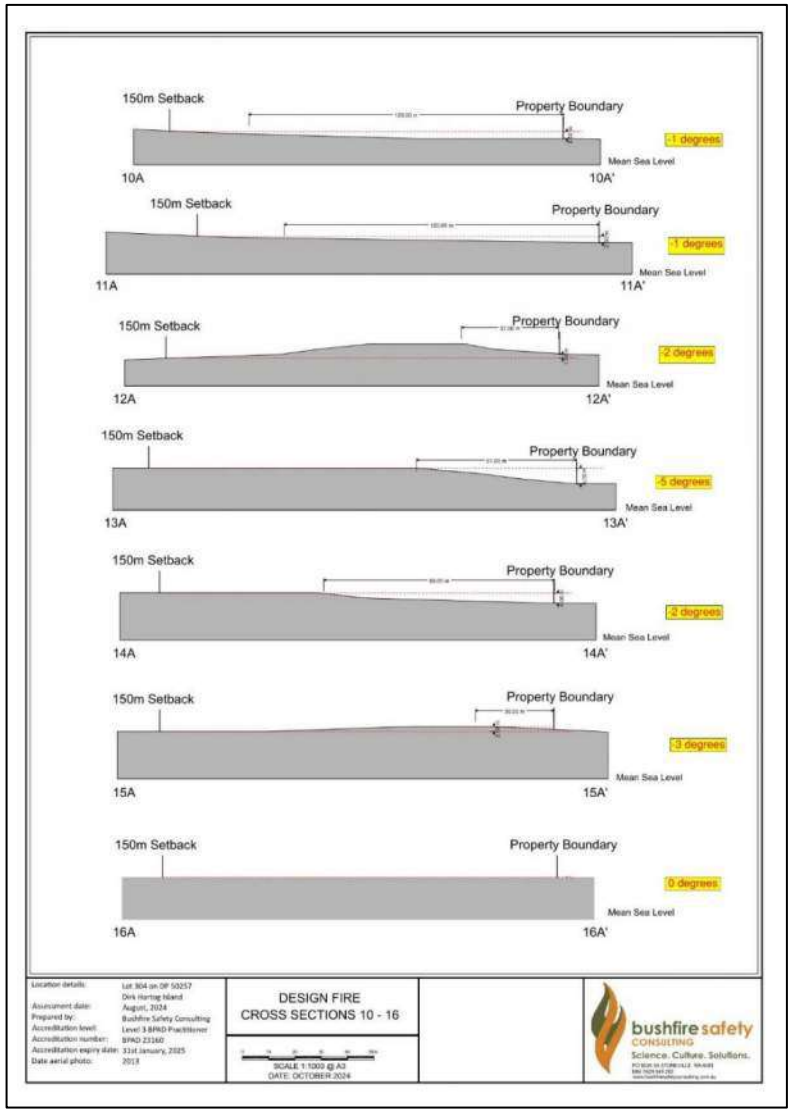
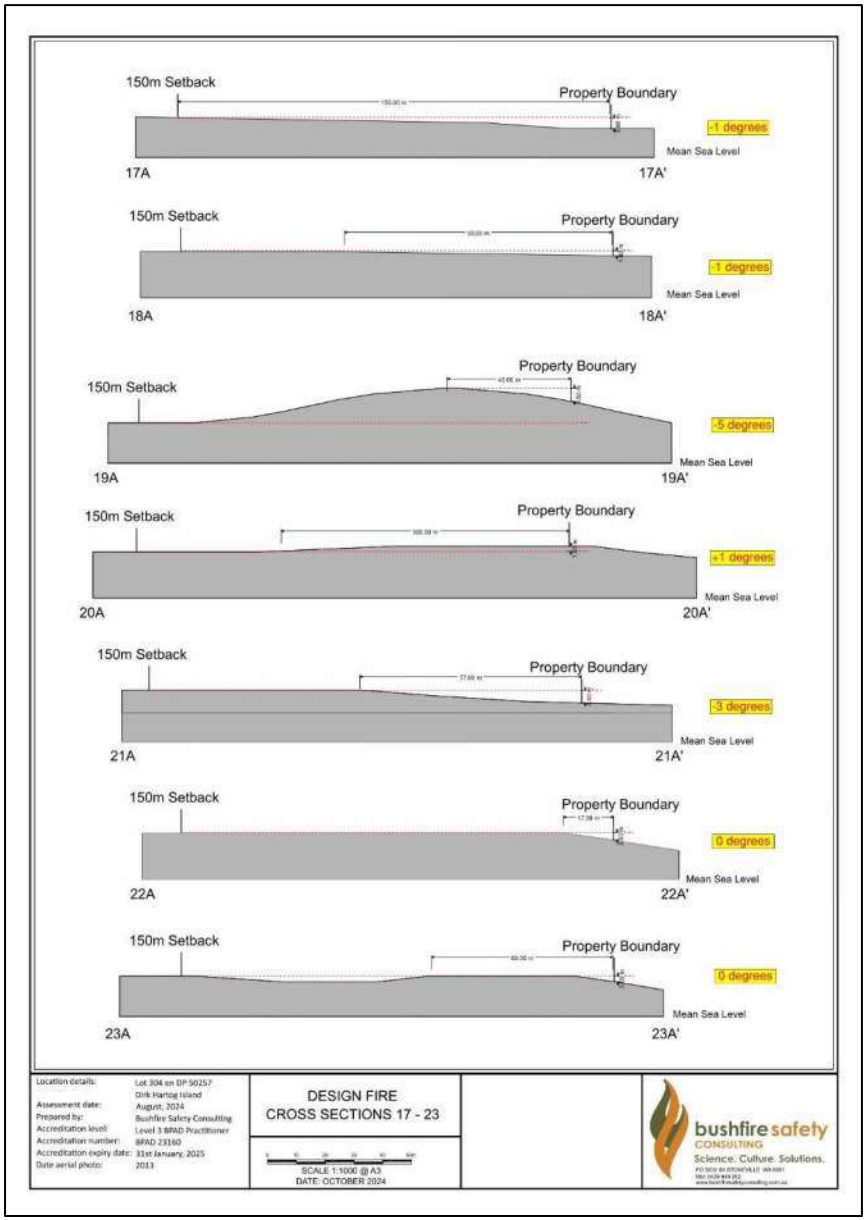
PO BOX 84 STONEVILLE WA 6081
Mbl: 0429 949 262
www.bushfiresafetyconsulting.com.au

7. Landscape Transects






150m Setback
Property Boundary
-1 degrees
Mean Sea Level
17A
17A'
150m Setback
Property Boundary
-1 degrees
Mean Sea Level
18A
18A'
Property Boundary
150m Setback
-5 degrees
Mean Sea Level
19A
19A'
150m Setback
Property Boundary
+1 degrees
Mean Sea Level
20A
20A'
150m Setback
Property Boundary
-3 degrees
Mean Sea Level
21A
21A'
150m Setback
Property Boundary
0 degrees
Mean Sea Level
22A
22A'
150m Setback
Property Boundary
0 degrees
Mean Sea Level
23A
23A'
Location details:
Lot 304 on DP 50257
Dirk Hartog Island
Assessment date:
August, 2024
Prepared by:
Bushfire Safety Consulting
Accreditation level:
Level 3 BPAD Practitioner
Accreditation number:
BPAD 23160
Accreditation expiry date:
31st January, 2025
Date aerial photo:
2013
DESIGN FIRE
CROSS SECTIONS 17 - 23
SCALE 1:1000 @ A3
DATE: OCTOBER 2024
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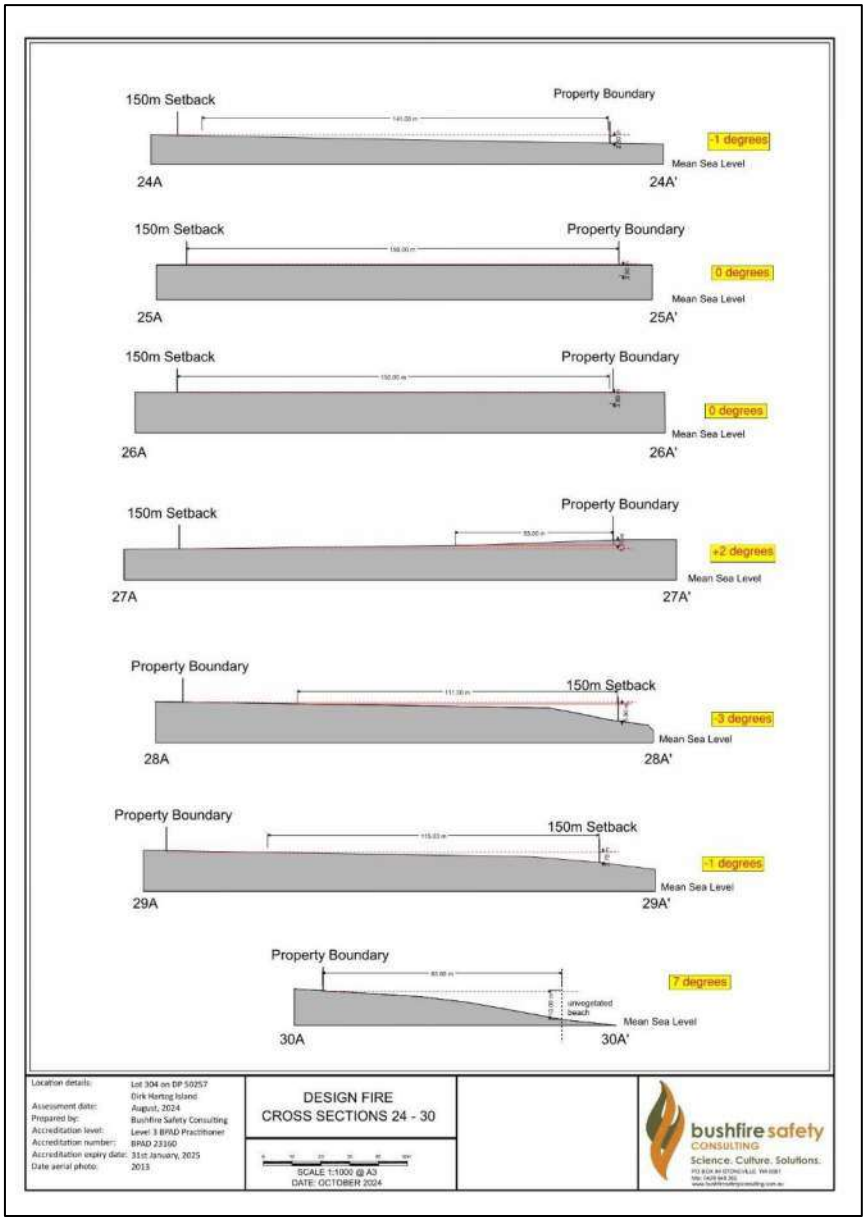
150m Setback
Property Boundary
-1 degrees
Mean Sea Level
24A
24A'
150m Setback
Property Boundary
0 degrees
Mean Sea Level
25A
25A'
150m Setback
Property Boundary
0 degrees
Mean Sea Level
26A
26A'
150m Setback
Property Boundary
+2 degrees
Mean Sea Level
27A
27A'
Property Boundary
150m Setback
-3 degrees
Mean Sea Level
28A
28A'
Property Boundary
150m Setback
-1 degrees
Mean Sea Level
29A
29A'
Property Boundary
7 degrees
unvegetated
beach
Mean Sea Level
30A
30A'
Location details:
Lot 304 on DP 50257
Dirk Hartog Island
Assessment date:
August, 2024
Prepared by:
Bushfire Safety Consulting
Accreditation level:
Level 3 BPAD Practitioner
Accreditation number:
BPAD 23160
Accreditation expiry date:
31st January, 2025
Date aerial photo:
2013
DESIGN FIRE
CROSS SECTIONS 24 - 30
SCALE 1:1000 @ A3
DATE: OCTOBER 2024
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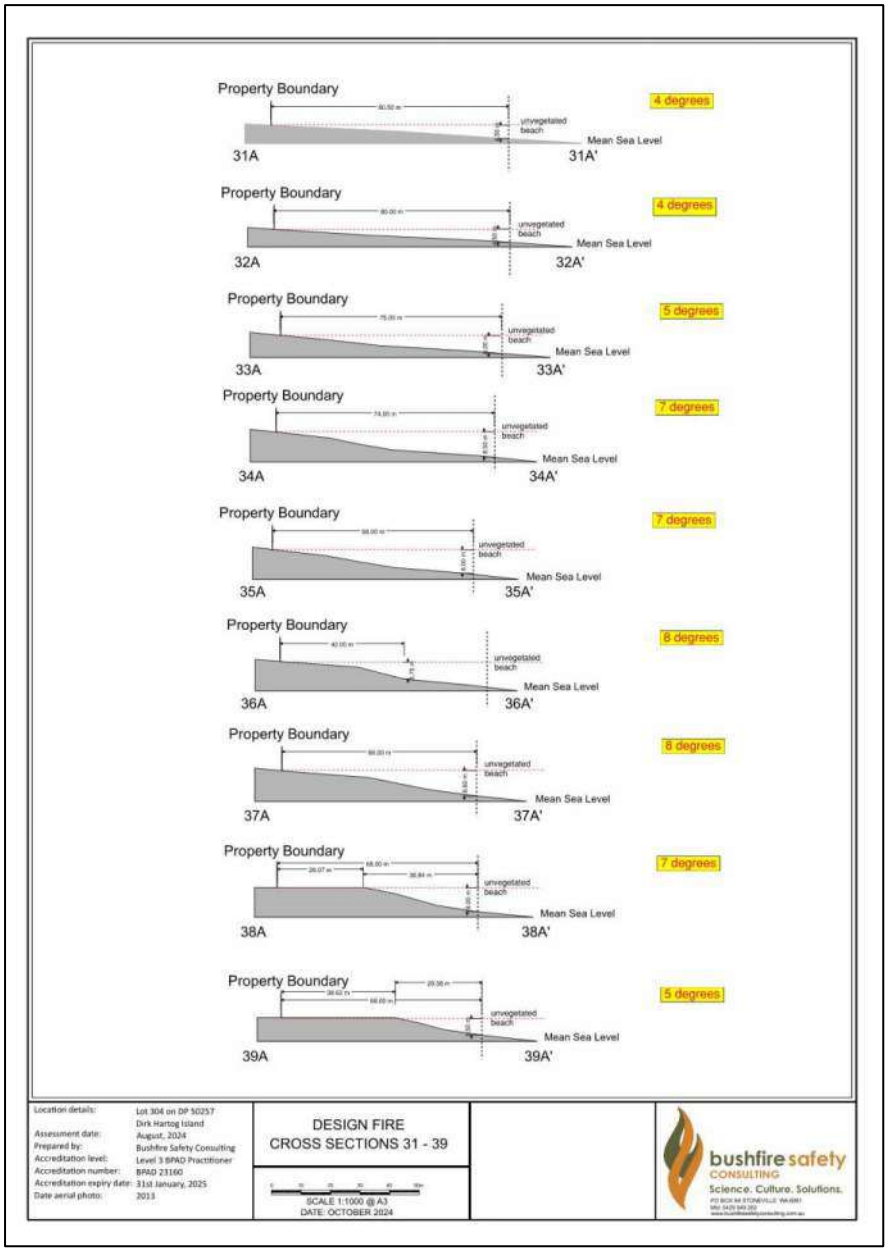
Property Boundary
4 degrees
unvegetated beach
Mean Sea Level
31A
31A'
Property Boundary
4 degrees
unvegetated beach
Mean Sea Level
32A
32A'
Property Boundary
5 degrees
unvegetated beach
Mean Sea Level
33A
33A'
Property Boundary
7 degrees
unvegetated beach
Mean Sea Level
34A
34A'
Property Boundary
7 degrees
unvegetated beach
Mean Sea Level
35A
35A'
Property Boundary
8 degrees
unvegetated beach
Mean Sea Level
36A
36A'
Property Boundary
8 degrees
unvegetated beach
Mean Sea Level
37A
37A'
Property Boundary
7 degrees
unvegetated beach
Mean Sea Level
38A
38A'
Property Boundary
5 degrees
unvegetated beach
Mean Sea Level
39A
39A'
Location details:
Lot 304 on DP 50257
Dirk Hartog Island
Assessment date:
August, 2024
Prepared by:
Bushfire Safety Consulting
Accreditation level:
Level 3 BPAD Practitioner
Accreditation number:
BPAD 23160
Accreditation expiry date:
31st January, 2025
Date aerial photo:
2013
DESIGN FIRE
CROSS SECTIONS 31 - 39
SCALE 1:1000 @ A3
DATE: OCTOBER 2024
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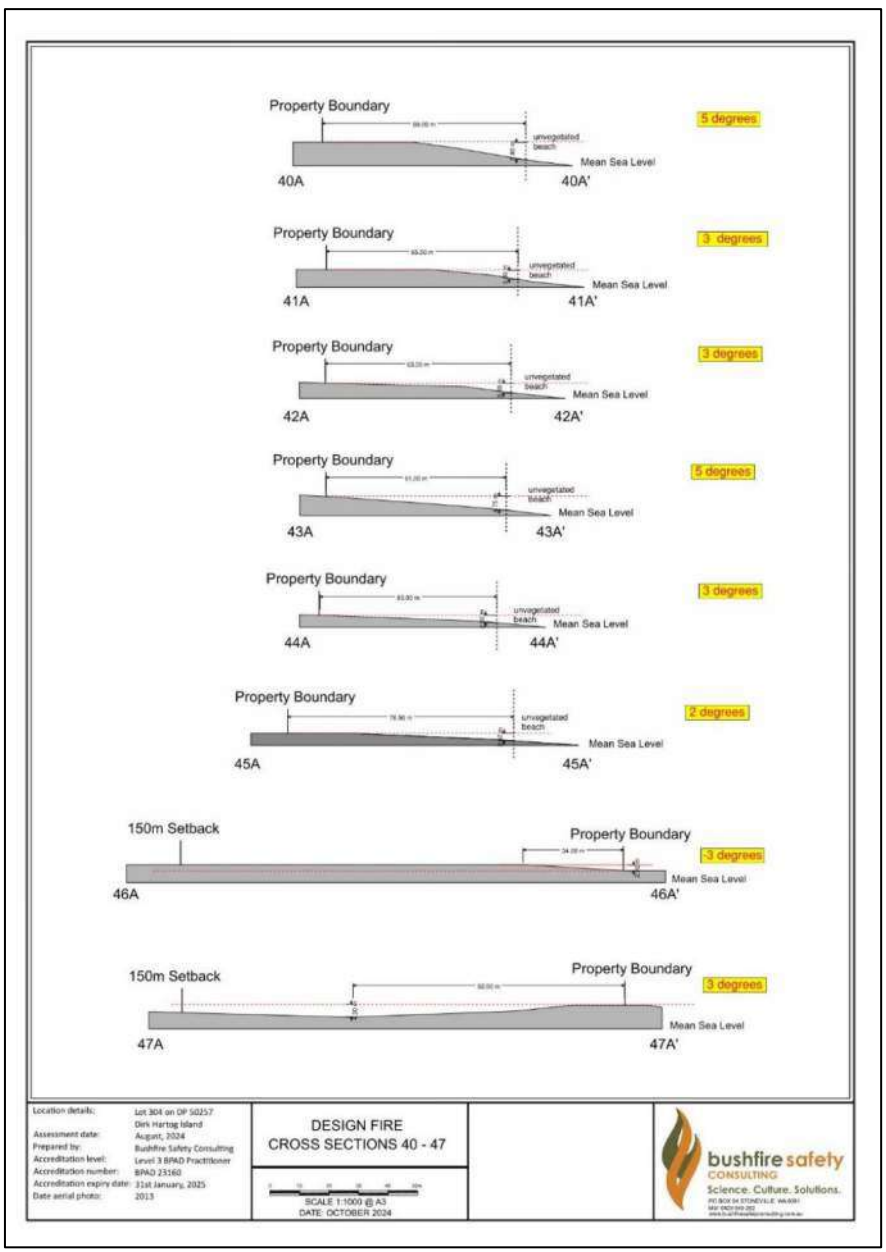
Property Boundary
5 degrees
unvegetated beach
Mean Sea Level
40A
40A'
Property Boundary
3 degrees
unvegetated beach
Mean Sea Level
41A
41A'
Property Boundary
3 degrees
unvegetated beach
Mean Sea Level
42A
42A'
Property Boundary
5 degrees
unvegetated beach
Mean Sea Level
43A
43A'
Property Boundary
3 degrees
unvegetated beach
Mean Sea Level
44A
44A'
Property Boundary
2 degrees
unvegetated beach
Mean Sea Level
45A
45A'
150m Setback
Property Boundary
3 degrees
Mean Sea Level
46A
46A'
150m Setback
Property Boundary
3 degrees
Mean Sea Level
47A
47A'
Location details:
Lot 304 on DP 50257
Dirk Hartog Island
Assessment date:
August, 2024
Prepared by:
Bushfire Safety Consulting
Accreditation level:
Level 3 BPAD Practitioner
Accreditation number:
BPAD 23160
Accreditation expiry date:
31st January, 2025
Date aerial photo:
2013
DESIGN FIRE
CROSS SECTIONS 40 - 47
SCALE 1:1000 @ A3
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8. Results

The inputs and results of the radiant heat flux analysis are summarised below in Table 4 which incorporates the design fire inputs and outputs.

Design Fire	Vegetation type	Fuel Load (t/ha)		Effective slope	Setback distance (m)	Flame Temp.	FDI	Elevation of receiver	Flame Width (m)	Flame length (m)	Radiant Heat Flux
		surface	overall								
1	Class C Shrubland	15	15	Upslope 3°	30.1	1200K	100	default	100m	7.03	<10 kW/m2
2	Class C Shrubland	15	15	Flat / upslope	32.5	1200K	100	default	100m	7.73	<10 kW/m2
3	Class C Shrubland	15	15	Downslope 6°	37.6	1200K	100	default	100m	9.36	<10 kW/m2
4	Class C Shrubland	15	15	Downslope 9°	40.4	1200K	100	default	100m	10.29	<10 kW/m2
5	Class C Shrubland	15	15	Downslope 7°	38.5	1200K	100	default	100m	9.66	<10 kW/m2
6	Class C Shrubland	15	15	Upslope 1°	31.7	1200K	100	default	100m	7.49	<10 kW/m2
7	Class C Shrubland	15	15	Upslope 2°	30.9	1200K	100	default	100m	7.26	<10 kW/m2
8	Class C Shrubland	15	15	Upslope 5°	28.6	1200K	100	default	100m	6.6	<10 kW/m2
9	Class C Shrubland	15	15	Downslope 3°	35	1200K	100	default	100m	8.51	<10 kW/m2

10	**Class C Shrubland**	**15**	**15**	**Downslope 1 o**	**33.3**	**1200K**	**100**	**default**	**100m**	**7.98**	**<10 kW/m2**
11	**Class C Shrubland**	**15**	**15**	**Downslope 2 o**	**34.1**	**1200K**	**100**	**default**	**100m**	**8.24**	**<10 kW/m2**
12	**Class C Shrubland**	**15**	**15**	**Downslope 4 o**	**35.9**	**1200K**	**100**	**default**	**100m**	**8.78**	**<10 kW/m2**
13	**Class C Shrubland**	**15**	**15**	**Downslope 5 o**	**36.7**	**1200K**	**100**	**default**	**100m**	**9.07**	**<10 kW/m2**
14	**Class C Shrubland**	**15**	**15**	**Downslope 8 o**	**39.5**	**1200K**	**100**	**default**	**100m**	**9.97**	**<10 kW/m2**

Table 2: Summary of Radiant Heat Flux analysis for the Safer Places

The predicted RHF exposure summarised above demonstrates that a fire from Class C Shrubland utilising site specific inputs results in predicted radiant heat flux less than 2kW/m² on each on-site shelter building from the 14 separate design fire scenarios determined from examining approximately 100 fire run directions into the stie and each cluster of buildings.

Design Fire 1 – Landscape Transects 1,5,15,21,28 & 46

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Calculated November 25, 2024, 5:53 pm (MDc v.4.9)

effective slope -3

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	2.32 km/h
Vegetation classification	Shrubland	Flame length	7.03 m
Understorey fuel load	15 t/ha	Flame angle	66 °, 72 °, 78 °, 81 °, 82 ° & 86 °
Total fuel load	15 t/ha	Elevation of receiver	3.21 m, 3.34 m, 3.44 m, 3.47 m, 3.48 m & 3.5 m
Vegetation height	m	Fire intensity	18,055 kW/m
Effective slope	-3 °	Transmissivity	0.88, 0.868, 0.848, 0.827, 0.8139999999999999 & 0.749
Site slope	0 °	Viewfactor	0.4038, 0.2968, 0.1993, 0.1352, 0.1096 & 0.0298
Flame width	100 m	Minimum distance to < 40 kW/m²	8.6 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	11.7 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	17.3 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	25 m
		Minimum distance to < 10 kW/m²	30.1 m

Rate of Spread - Catchpole et al. 1998
Flame length - Byram, 1959
Elevation of receiver - Douglas & Tan, 2005
Flame angle - Douglas & Tan, 2005
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 2 – Landscape Transects 2,8,16,22,23,25 & 26

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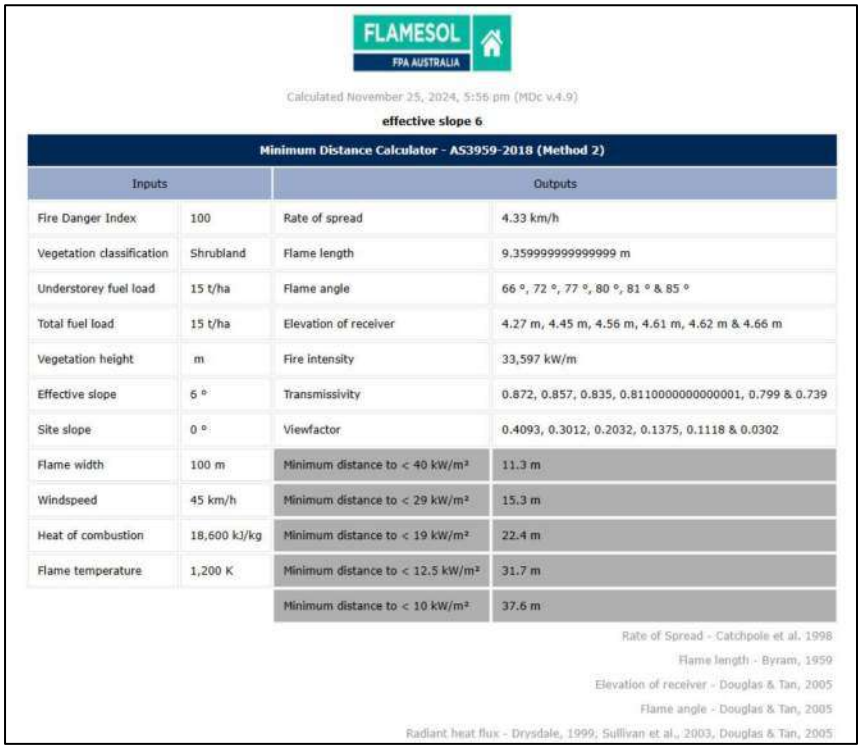
Calculated November 25, 2024, 5:55 pm (MDc v.4.9)

Effective slope 0

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	2.86 km/h
Vegetation classification	Shrubland	Flame length	7.73 m
Understorey fuel load	15 t/ha	Flame angle	66 °, 72 °, 78 °, 81 °, 82 ° & 86 °
Total fuel load	15 t/ha	Elevation of receiver	3.53 m, 3.68 m, 3.78 m, 3.82 m, 3.83 m & 3.86 m
Vegetation height	m	Fire intensity	22,207 kW/m
Effective slope	0 °	Transmissivity	0.878, 0.864, 0.844, 0.822, 0.8090000000000001 & 0.746
Site slope	0 °	Viewfactor	0.4065, 0.2983, 0.2011, 0.136, 0.1102 & 0.0299
Flame width	100 m	Minimum distance to < 40 kW/m²	9.4 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	12.8 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	18.9 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	27.1 m
		Minimum distance to < 10 kW/m²	32.5 m

Rate of Spread - Catchpole et al. 1998
Flame length - Byram, 1959
Elevation of receiver - Douglas & Tan, 2005
Flame angle - Douglas & Tan, 2005
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 3 – Landscape Transects 3 & 7



FLAMESOL FPA AUSTRALIA

Calculated November 25, 2024, 5:56 pm (MDc v.4.9)

effective slope 6

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	4.33 km/h
Vegetation classification	Shrubland	Flame length	9.359999999999999 m
Understorey fuel load	15 t/ha	Flame angle	66 °, 72 °, 77 °, 80 °, 81 ° & 85 °
Total fuel load	15 t/ha	Elevation of receiver	4.27 m, 4.45 m, 4.56 m, 4.61 m, 4.62 m & 4.66 m
Vegetation height	m	Fire intensity	33,597 kW/m
Effective slope	6 °	Transmissivity	0.872, 0.857, 0.835, 0.8110000000000001, 0.799 & 0.739
Site slope	0 °	Viewfactor	0.4093, 0.3012, 0.2032, 0.1375, 0.1118 & 0.0302
Flame width	100 m	Minimum distance to < 40 kW/m²	11.3 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	15.3 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	22.4 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	31.7 m
		Minimum distance to < 10 kW/m²	37.6 m

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 4 – Landscape Transect 4

FLAMESOL FPA AUSTRALIA

Calculated November 25, 2024, 5:58 pm (MDc v.4.9)

effective slope 9

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	5.33 km/h
Vegetation classification	Shrubland	Flame length	10.29 m
Understorey fuel load	15 t/ha	Flame angle	65 °, 72 °, 77 °, 80 °, 81 ° & 85 °
Total fuel load	15 t/ha	Elevation of receiver	4.66 m, 4.89 m, 5.01 m, 5.07 m, 5.08 m & 5.12 m
Vegetation height	m	Fire intensity	41,324 kW/m
Effective slope	9 °	Transmissivity	0.869, 0.853, 0.83, 0.806, 0.794 & 0.736
Site slope	0 °	Viewfactor	0.4102, 0.303, 0.2046, 0.1383, 0.1124 & 0.0303
Flame width	100 m	Minimum distance to < 40 kW/m²	12.4 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	16.7 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	24.3 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	34.2 m
		Minimum distance to < 10 kW/m²	40.4 m

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 5 – Landscape Transects 6,30,34,35 & 38

FLAMESOL FPA AUSTRALIA

Calculated November 25, 2024, 6:00 pm (MDc v.4.9)

effective slope 7

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	4.64 km/h
Vegetation classification	Shrubland	Flame length	9.66 m
Understorey fuel load	15 t/ha	Flame angle	66 °, 72 °, 77 °, 80 °, 81 ° & 85 °
Total fuel load	15 t/ha	Elevation of receiver	4.41 m, 4.59 m, 4.7 m, 4.75 m, 4.77 m & 4.81 m
Vegetation height	m	Fire intensity	35,997 kW/m
Effective slope	7 °	Transmissivity	0.871, 0.856, 0.833, 0.8100000000000001, 0.798 & 0.738
Site slope	0 °	Viewfactor	0.4081, 0.3029, 0.2038, 0.1379, 0.1121 & 0.0302
Flame width	100 m	Minimum distance to < 40 kW/m²	11.7 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	15.7 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	23 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	32.5 m
		Minimum distance to < 10 kW/m²	38.5 m

Rate of Spread - Catchpole et al. 1998
Flame length - Byram, 1959
Elevation of receiver - Douglas & Tan, 2005
Flame angle - Douglas & Tan, 2005
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 6 – Landscape Transects 9,10,11,17,18,24 & 29

FLAMESOL FPA AUSTRALIA

Calculated November 25, 2024, 6:02 pm (MDc v.4.9)

Effective slope -1

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	2.67 km/h
Vegetation classification	Shrubland	Flame length	7.49 m
Understorey fuel load	15 t/ha	Flame angle	66 °, 72 °, 78 °, 81 °, 82 ° & 86 °
Total fuel load	15 t/ha	Elevation of receiver	3.42 m, 3.56 m, 3.66 m, 3.7 m, 3.71 m & 3.73 m
Vegetation height	m	Fire intensity	20,727 kW/m
Effective slope	-1 °	Transmissivity	0.879, 0.866, 0.845, 0.823, 0.8110000000000001 & 0.747
Site slope	0 °	Viewfactor	0.4068, 0.2984, 0.2003, 0.1356, 0.11 & 0.0299
Flame width	100 m	Minimum distance to < 40 kW/m²	9.1 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	12.4 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	18.3 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	26.4 m
		Minimum distance to < 10 kW/m²	31.7 m

Rate of Spread - Catchpole et al. 1998
Flame length - Byram, 1959
Elevation of receiver - Douglas & Tan, 2005
Flame angle - Douglas & Tan, 2005
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 7 – Landscape Transects 12 & 14

FLAMESOL FPA AUSTRALIA

Calculated November 25, 2024, 6:02 pm (MDc v.4.9)

effective slope -2

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	2.49 km/h
Vegetation classification	Shrubland	Flame length	7.26 m
Understorey fuel load	15 t/ha	Flame angle	66 °, 72 °, 78 °, 81 °, 82 ° & 86 °
Total fuel load	15 t/ha	Elevation of receiver	3.31 m, 3.45 m, 3.55 m, 3.58 m, 3.59 m & 3.62 m
Vegetation height	m	Fire intensity	19,345 kW/m
Effective slope	-2 °	Transmissivity	0.879, 0.867, 0.847, 0.825, 0.8120000000000001 & 0.748
Site slope	0 °	Viewfactor	0.4028, 0.2987, 0.1997, 0.1354, 0.1098 & 0.0298
Flame width	100 m	Minimum distance to < 40 kW/m²	8.9 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	12 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	17.8 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	25.7 m
		Minimum distance to < 10 kW/m²	30.9 m

Rate of Spread - Catchpole et al. 1998
Flame length - Byram, 1959
Elevation of receiver - Douglas & Tan, 2005
Flame angle - Douglas & Tan, 2005
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 8 – Landscape Transects 13 & 19

FLAMESOL FPA AUSTRALIA

Calculated November 25, 2024, 6:04 pm (MDc v.4.9)

effective slope -5

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	2.02 km/h
Vegetation classification	Shrubland	Flame length	6.6 m
Understorey fuel load	15 t/ha	Flame angle	66 °, 73 °, 78 °, 81 °, 82 ° & 86 °
Total fuel load	15 t/ha	Elevation of receiver	3.01 m, 3.15 m, 3.22 m, 3.26 m, 3.26 m & 3.29 m
Vegetation height	m	Fire intensity	15,728 kW/m
Effective slope	-5 °	Transmissivity	0.882, 0.87, 0.851, 0.83, 0.8179999999999999 & 0.752
Site slope	0 °	Viewfactor	0.4021, 0.2964, 0.1989, 0.1345, 0.1091 & 0.0297
Flame width	100 m	Minimum distance to < 40 kW/m²	8.1 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	11 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	16.3 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	23.7 m
		Minimum distance to < 10 kW/m²	28.6 m

Rate of Spread - Catchpole et al. 1998
Flame length - Byram, 1959
Elevation of receiver - Douglas & Tan, 2005
Flame angle - Douglas & Tan, 2005
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 9 – Landscape Transects 41,42,44 & 47

FLAMESOL FPA AUSTRALIA

Calculated November 25, 2024, 6:05 pm (MDc v.4.9)

effective slope 3

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	3.52 km/h
Vegetation classification	Shrubland	Flame length	8.51 m
Understorey fuel load	15 t/ha	Flame angle	66 °, 72 °, 77 °, 80 °, 82 ° & 85 °
Total fuel load	15 t/ha	Elevation of receiver	3.88 m, 4.04 m, 4.14 m, 4.19 m, 4.21 m & 4.23 m
Vegetation height	m	Fire intensity	27,315 kW/m
Effective slope	3 °	Transmissivity	0.875, 0.861, 0.84, 0.8159999999999999, 0.804 & 0.743
Site slope	0 °	Viewfactor	0.4082, 0.2997, 0.202, 0.1364, 0.111 & 0.0301
Flame width	100 m	Minimum distance to < 40 kW/m²	10.3 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	14 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	20.6 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	29.4 m
		Minimum distance to < 10 kW/m²	35 m

Rate of Spread - Catchpole et al. 1998
Flame length - Byram, 1959
Elevation of receiver - Douglas & Tan, 2005
Flame angle - Douglas & Tan, 2005
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 10 – Landscape Transect 20

FLAMESOL FPA AUSTRALIA

Calculated November 25, 2024, 6:06 pm (MDc v.4.9)

effeitive slope 1

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	3.07 km/h
Vegetation classification	Shrubland	Flame length	7.98 m
Understorey fuel load	15 t/ha	Flame angle	66 °, 72 °, 78 °, 81 °, 82 ° & 85 °
Total fuel load	15 t/ha	Elevation of receiver	3.64 m, 3.79 m, 3.9 m, 3.94 m, 3.95 m & 3.97 m
Vegetation height	m	Fire intensity	23,794 kW/m
Effective slope	1 °	Transmissivity	0.877, 0.863, 0.842, 0.82, 0.8070000000000001 & 0.745
Site slope	0 °	Viewfactor	0.4067, 0.2985, 0.2008, 0.1358, 0.1106 & 0.03
Flame width	100 m	Minimum distance to < 40 kW/m²	9.699999999999999 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	13.2 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	19.5 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	27.9 m
		Minimum distance to < 10 kW/m²	33.3 m

Rate of Spread - Catchpole et al. 1998
Flame length - Byram, 1959
Elevation of receiver - Douglas & Tan, 2005
Flame angle - Douglas & Tan, 2005
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 11 – Landscape Transects 27 & 45

FLAMESOL FPA AUSTRALIA

Calculated November 25, 2024, 6:08 pm (MDc v.4.9)

effective slope 2

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	3.28 km/h
Vegetation classification	Shrubland	Flame length	8.24 m
Understorey fuel load	15 t/ha	Flame angle	66 °, 72 °, 77 °, 81 °, 82 ° & 85 °
Total fuel load	15 t/ha	Elevation of receiver	3.76 m, 3.92 m, 4.01 m, 4.07 m, 4.08 m & 4.1 m
Vegetation height	m	Fire intensity	25,494 kW/m
Effective slope	2 °	Transmissivity	0.876, 0.862, 0.841, 0.8179999999999999, 0.806 & 0.744
Site slope	0 °	Viewfactor	0.4073, 0.299, 0.2019, 0.1363, 0.1109 & 0.03
Flame width	100 m	Minimum distance to < 40 kW/m²	10 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	13.6 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	20 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	28.6 m
		Minimum distance to < 10 kW/m²	34.1 m

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 12 – Landscape Transects 31 & 32

FLAMESOL FPA AUSTRALIA

Calculated November 25, 2024, 6:08 pm (MDc v.4.9)

effective slope 4

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	3.77 km/h
Vegetation classification	Shrubland	Flame length	8.779999999999999 m
Understorey fuel load	15 t/ha	Flame angle	66 °, 72 °, 77 °, 80 °, 81 ° & 85 °
Total fuel load	15 t/ha	Elevation of receiver	4.01 m, 4.17 m, 4.28 m, 4.32 m, 4.33 m & 4.37 m
Vegetation height	m	Fire intensity	29,266 kW/m
Effective slope	4 °	Transmissivity	0.874, 0.86, 0.838, 0.8149999999999999, 0.802 & 0.742
Site slope	0 °	Viewfactor	0.4057, 0.3007, 0.2022, 0.137, 0.1111 & 0.0301
Flame width	100 m	Minimum distance to < 40 kW/m²	10.7 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	14.4 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	21.2 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	30.1 m
		Minimum distance to < 10 kW/m²	35.9 m

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 13 – Landscape Transects 33,39,40 & 43

FLAMESOL FPA AUSTRALIA

Calculated November 25, 2024, 6:10 pm (MDc v.4.9)

effective slope 5

Minimum Distance Calculator - AS3959-2018 (Method 2)

Inputs		Outputs	
Fire Danger Index	100	Rate of spread	4.04 km/h
Vegetation classification	Shrubland	Flame length	9.07 m
Understorey fuel load	15 t/ha	Flame angle	66 °, 72 °, 77 °, 80 °, 81 ° & 85 °
Total fuel load	15 t/ha	Elevation of receiver	4.14 m, 4.31 m, 4.41 m, 4.46 m, 4.47 m & 4.51 m
Vegetation height	m	Fire intensity	31,357 kW/m
Effective slope	5 °	Transmissivity	0.873, 0.858, 0.836, 0.8129999999999999, 0.801 & 0.74
Site slope	0 °	Viewfactor	0.4074, 0.3019, 0.2026, 0.1372, 0.1116 & 0.0301
Flame width	100 m	Minimum distance to < 40 kW/m²	11 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	14.8 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	21.8 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	30.9 m
		Minimum distance to < 10 kW/m²	36.7 m

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Design Fire 14 – Landscape Transects 36 & 37

FLAMESOL FPA AUSTRALIA

Calculated December 3, 2024, 11:32 am (MDc v.4.9)

effective slope 8

Minimum Distance Calculator - AS3959-2018 (Method 2)

Inputs		Outputs	
Fire Danger Index	100	Rate of spread	4.97 km/h
Vegetation classification	Shrubland	Flame length	9.970000000000001 m
Understorey fuel load	15 t/ha	Flame angle	65 °, 72 °, 77 °, 80 °, 81 ° & 85 °
Total fuel load	15 t/ha	Elevation of receiver	4.52 m, 4.74 m, 4.86 m, 4.91 m, 4.92 m & 4.96 m
Vegetation height	m	Fire intensity	38,568 kW/m
Effective slope	8 °	Transmissivity	0.87, 0.854, 0.832, 0.8080000000000001, 0.796 & 0.737
Site slope	0 °	Viewfactor	0.4107, 0.3028, 0.2037, 0.1383, 0.112 & 0.0303
Flame width	100 m	Minimum distance to < 40 kW/m²	12 m
Windspeed	45 km/h	Minimum distance to < 29 kW/m²	16.2 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	23.7 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	33.3 m
		Minimum distance to < 10 kW/m²	39.5 m

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

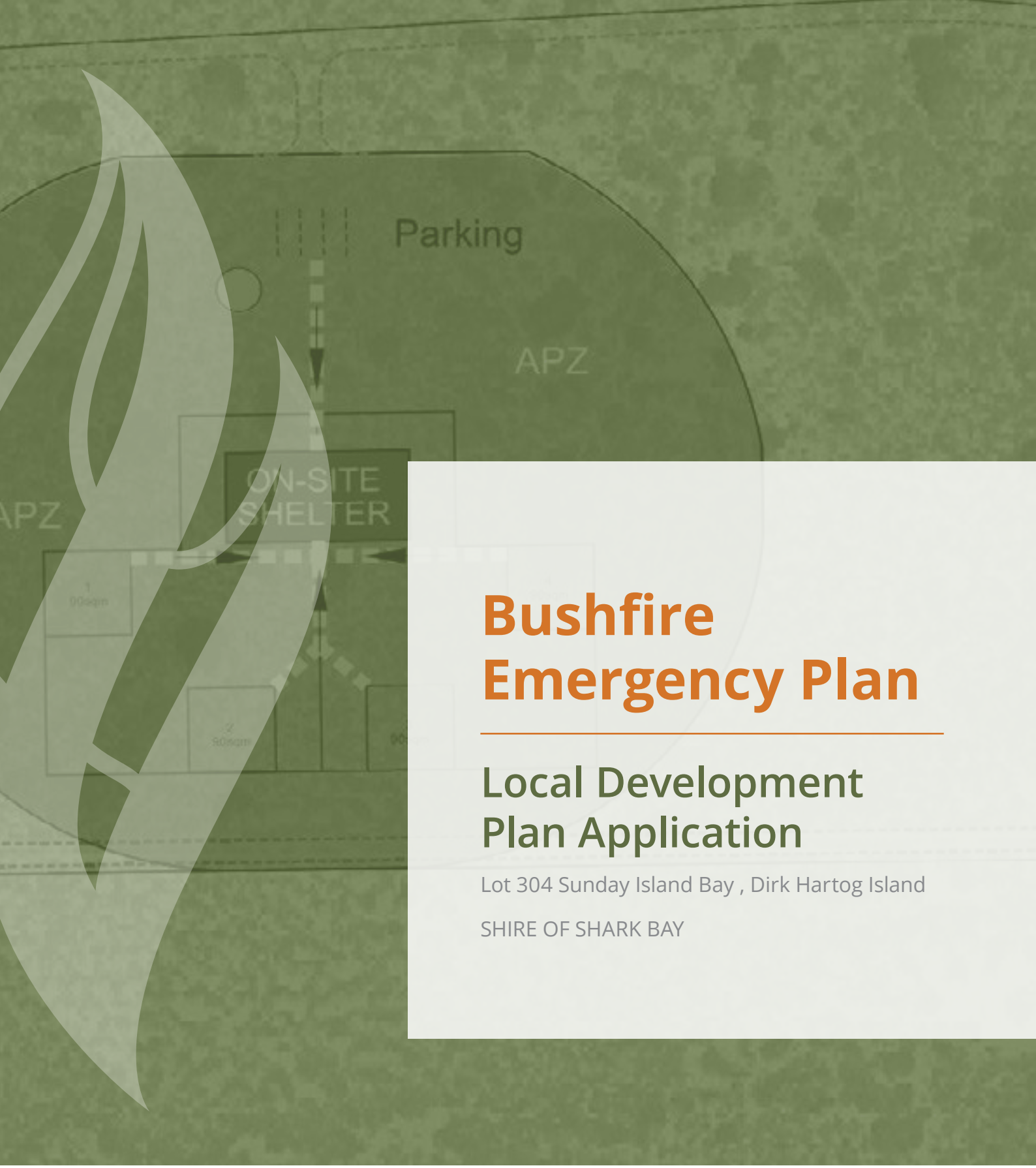
Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

9. Conclusion

The design fires demonstrate that the on-site shelters can be sited in areas where they are exposed to less than 10kW/m² from a fire front in adjacent shrubland (Class C) vegetation on a day up to FDI 100 using 1200K input.

Appendix 6: Bushfire Emergency Plan



Bushfire Emergency Plan

Local Development Plan Application

Lot 304 Sunday Island Bay , Dirk Hartog Island

SHIRE OF SHARK BAY

bushfiresafety CONSULTING
Science. Culture. Solutions.

Prepared For:
DHID Pty Ltd
16 December 2024
Version 1.0

bushfiresafetyconsulting.com.au

BUSHFIRE EMERGENCY PLAN

FACILITY: SUNDAY ISLAND BAY ECO-TOURISM DEVELOPMENT

ADDRESS: LOT 304 SUNDAY ISLAND BAY - DIRK HARTOG ISLAND

PREPARED BY: ROHAN CARBOON – BPAD LEVEL 3

OWNER / OPERATOR: DHI Development Pty Ltd

DATE: 15/12/2024 **VERSION:** 1.0

Document Control

VERSION	DATE	DETAILS	Undertaken by:
V1.0	16 December 2024	Draft for LDP Application	Rohan Carboon (Level 3 - BPAD 32160)

Emergency Management Team

Name / position	Organisation	Contact details
Owner	**DHI Development Pty Ltd**	**Geoff Wardle – 0437 231 377**
Cluster 1 Manager	**DHI Development Pty Ltd**	**TBC**
Cluster 2 Manager	**DHI Development Pty Ltd**	**TBC**
Cluster 3 Manager	**DHI Development Pty Ltd**	**TBC**
Cluster 4 Manager	**DHI Development Pty Ltd**	**TBC**
Cluster 5 Manager	**DHI Development Pty Ltd**	**TBC**
Cluster 6 Manager	**DHI Development Pty Ltd**	**TBC**
Cluster 7 Manager	**DHI Development Pty Ltd**	**TBC**
Cluster 8 Manager	**DHI Development Pty Ltd**	**TBC**

FACILITY DETAILS

This plan is for the Sunday Island Eco-tourism facility and has been designed to assist management to protect life and property in the event of a bushfire.

This plan outlines procedures for both **evacuation** and **shelter-in-place** to enhance the protection of occupants from the threat of a bushfire.

LOCATION	**LOT 304 Sunday Island Bay, Dirk Hartog Island**

THE PRIMARY ACTION TO FOLLOW IN A BUSHFIRE EMERGENCY IS TO :

SHELTER-IN-PLACE ☑ **EVACUATE WHEN SAFE TO DO SO** ☐

Name of on-site contact person		Geoff Wardle On-site Manager confirmed post development	
Position / role of contact person		Owner / Site Manager	
Phone Number		0437 231 377	
Facility type	Accommodation Unit	**No. of buildings**	5 per cluster
Number of Employees	3 per cluster	**Number of occupants**	16 people per cluster
Number of occupants with support needs		0 – visitors arrive independently, and self cater	

RESPONSIBLITIES

The following outlines who has responsibility for implementing the emergency procedures in the event of a bushfire.

Position	Name of Person	Area of Responsiblities	Responsibilities	Mobile number
Site Manager	TBC	Chief Fire Warden	Brief all arriving visitors during the fire season as to bushfire procedures, including monitoring for fires, triggers and actions if a fire starts on the island	TBC
			Respond and take control as appropriate – Confirm allocated roles	
			Assess the location and threat of the fire and implement appropriate action	
			Liaise with other island occupants including: - Dirk Hartog Lodge owners, - Vehicle barge operator - Charter Aircraft operators - Boat charters	
			Liaise with Emergency Services including: - Denham Police - Denham DBCA - Denham DFES - Denham SES - Shire of Shark Bay - Volunteer Marine Rescue - Volunteer Fire and Rescue	
			Initiate shelter-in place of visitors	
			Determine if and when safe to evacuate (if required), including what departure point (ie, Dirk Hartog Lodge, Airstrip, Sunday Island Bay or Ransonnet Point)	
Warden - Building Cluster 1	TBC	Warden for visitors at building cluster	Manage visitors, including: - Morning briefings on fire weather - Brief visitors on triggers, on-site shelter and island evacuation destinations - Manage visitor and staff vehicles including slip on fire unit	TBC
Warden - Building Cluster 2	TBC	Warden for visitors at building cluster	Manage visitors, including: - Morning briefings on fire weather - Brief visitors on triggers, on-site shelter and island evacuation destinations Manage visitor and staff vehicles including slip on fire unit	TBC

EMERGENCY CONTACTS

Organisation	Office / contact	Contact Details
Fire, Police Ambulance	Fire or Emergency	000
Department of Biodiversity Conservation and Attractions (DBCA)	Fire or Emergency	Denham District Office - 9948 2226 After hours – 0459 830 655 VHF channel - 504
Dept of Fire and Emergency Services (DFES)	Emergency Information	13 DFES (133337)
	Michael Antony (CESM)	0448 081 637
Emergency WA	Warnings and Incidents	www.emergency.wa.gov.au
Shark Bay Aviation – Fixed Wind Denham VH-PRY – (Cessna 172) VH-WSC (Cessna 172) VH-ESU (Cessna 206) VH-AEI (Cessna 206) Comms: Air band 126.70	Eric (Rollo) Roulston	0427 492 880
	Kerit Wilkie	0417 919 059 & 9948 1773
Shark Bay Police	Sgt David Gannaway	9915 9100
St John Ambulance – Shark Bay Sub Centre		000
SES Denham	Shaun Burton	0429 481 218
	SES Emergency assistance	13 25 00
Shire of Shark Bay	Shire Office	9948 1218
Volunteer Marine Rescue (VMR)	Drew Wassman	0429 991 292
Volunteer Fire and Rescue (VFR)	Dave Harrower	0429 998 944
Dirk Hartog Island Lodge	Kieran and Tory Wardle	9948 1211 0407 383 449

PREPAREDNESS - Bushfire Season : 1 October to 30 April

Actions	Frequency	Responsible person
Ongoing		
1. Check water tank levels and condition of tank fittings and access	monthly	Chief Fire Warden
2. Check signage on walk paths to on-site shelter	monthly	Cluster fire warden
3. Brief all visitors on arrival, BEP procedures and communications	on arrival	Cluster fire warden
4. Check fire hydrants are within service schedules and all in position	monthly	Cluster fire warden
5. Check the Evacuation plan diagram is clearly displayed for all visitors in each cabin	In-between visitors departing and arriving	Cluster fire warden
6. Check vehicle access ways within and around the entire facility and to the main north-south access track on the island	monthly	Cluster fire warden
7. Conduct training and awareness sessions on the BEP for all staff	monthly	Cluster fire warden
To be completed just prior to the bushfire season by : 30 September		
1. Ensure Asset Protection Zone is fully established to minimum standards	Weekly through the month of September	Chief Fire Warden
2. Check 7 days of emergency food and water is available in the on-site shelter for all visitors,	Before season and weekly during fire season	Chief Fire Warden
3. Check gas cylinders are secured with relief values facing away from building and classified vegetation within minimum 6m gap	Before season and whenever gas cylinders are changed over	Chief Fire Warden
4. Verify and update all emergency contacts	October	Chief Fire Warden
5. Make contact with local Fire Control Officer and Shire Chief Fire Control Officer to confirm fire season arrangements	October	Chief Fire Warden
To be completed during the bushfire season by : 1 October to 30 April		
1. Ensure fire access track is complaint with Shire firebreak Order	October	All fire wardens
2. Ensure nominated fire fighting water tanks and slip on fire unit are full of water	monthly	All fire wardens
3. Monitor ABC Radio, and other emergency channels for bushfire alerts and extreme heat waves, fire weather alerts	Daily	All fire wardens
4. Continually visually inspect the skies over the island for smoke, if detected by staff or visitors, contact DFES and the Shire by calling 000	Daily	All fire wardens

AWARENESS AND PRE-EMPTIVE PROCEDURES

Actions	Frequency	Responsible person
Days forecast High Fire Danger rating		
1. Each morning provide visitors with details on what the "HIGH" Fire Danger Rating means and where on the island to seek refuge if they become aware of a fire when away from the accommodation units.	**Daily**	**Chief fire warden**
2. Ensure water tanks and slip on fire unit is full of water	**Daily**	**Chief fire warden**
3. Ensure hydrants are charged and operational	**Daily**	**Chief fire warden**
4. Check communications are working	**Daily**	**Chief fire warden**
Days forecast Extreme Fire Danger rating		
1. Each morning provide visitors with details on what the "EXTREME" Fire Danger Rating means and where on the island to seek refuge if they become aware of a fire when away from the accommodation units.	**Daily**	**Chief fire warden**
2. Caretaker to stay at the Facility and with communication working	**Daily**	**Chief fire warden**
3. Provide each visitors vehicle with a 2 way satellite messaging device similar to a "Spot X" so communications can be maintained throughout the day between the Fire wardens and each group of visitors.	**Daily**	**Chief fire warden**
4. Limit visitor moving beyond the southern end of the island and not to travel further north than Dirk Hartog Island Lodge	**Daily**	**Chief fire warden**
5. Establish the communications process for contacting and staying in touch with visitors so that they can be contacted in an emergency.	**Daily**	**Chief fire warden**
Days forecast Catastrophic Fire Danger rating		
1. Facility is pre-emptively closed and visitors will be evacuated the day before a "Catastrophic" FDR day.	**Daily**	**Chief fire warden**
An 'Advice', Watch and Act', or 'Emergency' alert or other communications has been issued by an Emergency Services Authority		
Advice – communicate with visitors what the incident is and whether there is a requirement to relocate to the on-site shelters or the Dirk Hartog Island Lodge	**Everytime**	**Chief Fire Warden**
Watch and Act - communicate with visitors the requirement to move to an on-site shelter or the Dirk Hartog Island Lodge	**Everytime**	**Chief Fire Warden**
Emergency - communicate with visitors the requirement to move to immediately to an on-site shelter or the Dirk Hartog Island Lodge.	**Everytime**	**Chief Fire Warden**

EMERGENCY PROCEDURE LOCATION AND TRANSPORT DETAILS

EVACUATION – Only when safe to do so.

Designated evacuation assembly point(s)	
1	On-site shelter at each accommodation cluster

Primary off-site location	
Name of venue	Dirk Hartog Island Lodge
Address of venue	Homestead Bay, Dirk Hartog Island
Venue phone number	9948 1211
Primary Route to venue	West to main island access track then north direct to Dirk Hartog Island Lodge (see Figure 1)

Secondary off-site location	
Name of venue	Cape Ransonnet barge landing point
Address of venue	Cape Ransonnet - Southern Point Dirk Hartog Island
Venu phone number	Not attended site- large open beach area
Primary Route to venue	West to main island access track then south direct to Cape Ransonnet barge landing piont (see Figure 1)

Transport Arrangements	
Vehicle s required	All visitors are self sufficient with a vehicle during the fire season
Transport provider	Own transport on island tracks
Transport provider	Dirk Hartog Island Barge/ 40 passenger tour vessel - Cape Ransonnet / Sunday Island Bay – Steep Point
Contact Number	9948 1211
Transport provider	Light Aircraft or charter flight - Airstrip Monkey Mia Airport to Dirk Hartog Island
Contact Number	08 99481 773
Transport provider	Boat transfers ex Denham to Homestead Bay
Contact Number	9948 1211

Location details:	Lot 304 on DP 50257 Dirk Hartog Island
Assessment date:	August, 2024
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

FIGURE 1
EVACUATION PLAN

0 0.5 1 2 3 4km

SCALE 1:60,000 @ A3
DATE: SEPTEMBER 2024

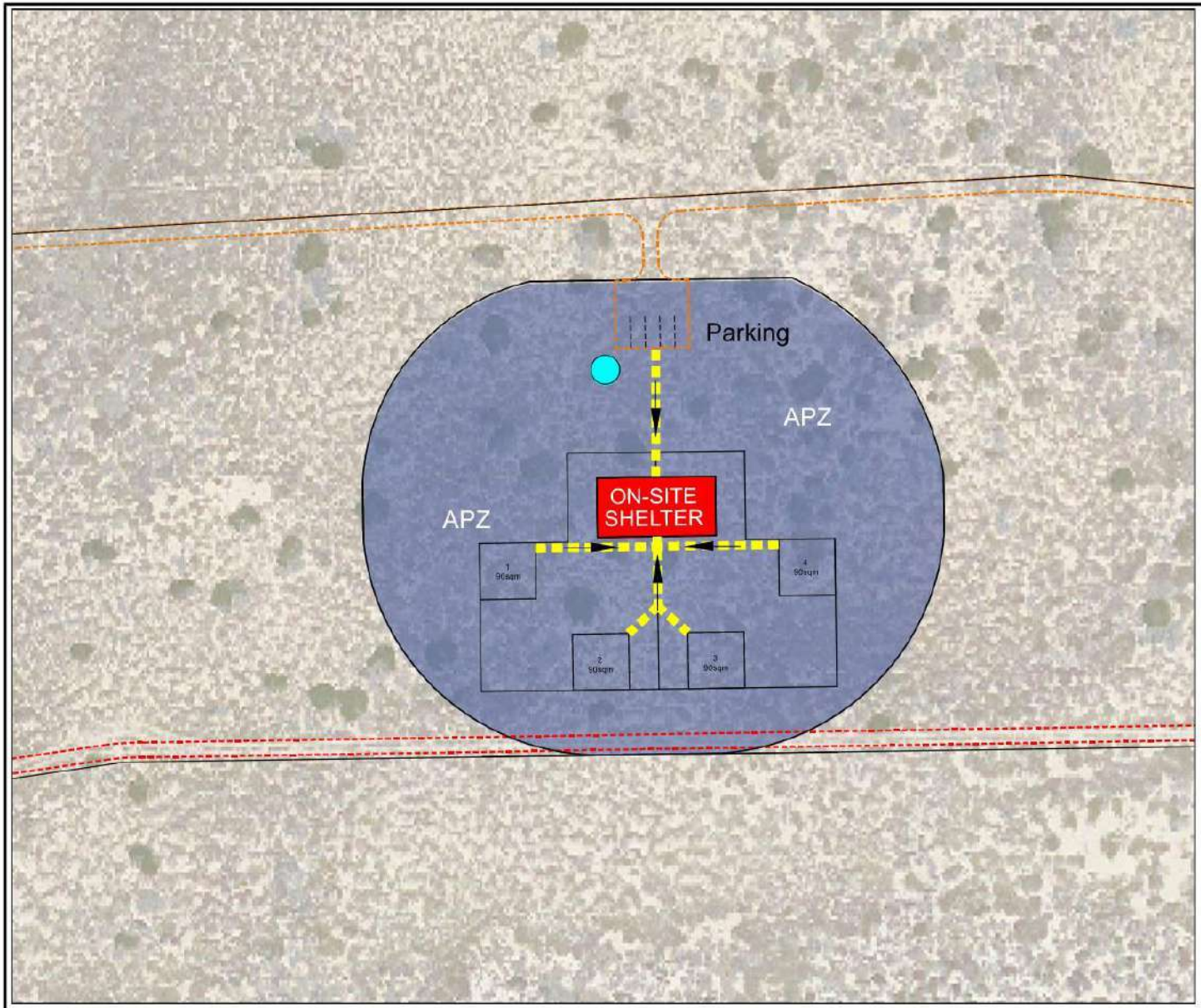
North

PRIMARY ROUTE TO DIRK HARTOG ISLAND LODGE

SECONDARY ROUTE TO CAPE RANSONNET

SOURCE OF PHOTOGRAPHY: LANDGATE

bushfire safety CONSULTING
Science. Culture. Solutions.
PO BOX 84 STONEVILLE WA 6081
Mbl: 0429 949 262
www.bushfiresafetyconsulting.com.au



LEGEND:

- DEDICATED 50,000 LITRE WATER TANK
- INTERNAL LOOP DRIVEWAY
- APZ — ASSET PROTECTION ZONE
- SIGNPOSTED PATHS TO ON-SITE SHELTER BUILDING
- ON-SITE SHELTER — CARETAKERS ACCOMMODATION AND ON-SITE SHELTER

FIGURE 2 - SHELTER-IN-PLACE PLAN

bushfire CONSULTING
Science. Culture. Solutions.
PO BOX 84 STONEVILLE WA 6081
Mbl 0429 949 262
www.bushfiresafety.net

0 5 10 15 20 25 30m

SCALE 1:750 @ A3
DATE: NOVEMBER 2024

NORTH

Location details:	Lot 304 on DP 50257 Dirk Hartog Island
Assessment date:	August, 2024
Prepared by:	Bushfire Safety Consulting
Accreditation level:	Level 3 BPAD Practitioner
Accreditation number:	BPAD 23160
Accreditation expiry date:	31st January, 2025
Date aerial photo:	2013

EMERGENCY RESPONSE

PROCEDURES FOR SHELTER-IN-PLACE AND EVACUATION IN THE EVENT OF A BUSHFIRE

Due to the remote location, early evacuation may be difficult to implement, therefore sheltering in place is the primary action followed by Evacuation when safe to do so and when transport off the island is arranged.

THE PRIMARY ACTION TO FOLLOW WITH AN IMMINENT BUSHFIRE THREAT IS TO :

SHELTER-IN-PLACE **EVACUATE WHEN SAFE TO DO SO**

Trigger	Action	Responsible person
1. Contact from emergency services or website / alert, etc	Advice from authorities to remain on Dirk Hartog Island	On-site caretaker/ team leader : fire warden
2. Nearby smoke or flames	No external advice, but logical decision when a threat is assessed as potentially life threatening	On-site caretaker/ team leader : fire warden
3. Nearby smoke or flames and before imminent attack of fire front	Activate the on-site shelter and communicate with visitors and staff that immediate relocation to the shelter is required.	On-site caretaker/ team leader : fire warden
4. All people enter the on-site shelter	Reconcile all visitors against records of bookings	On-site caretaker/ team leader : fire warden
5. After reconciling visitor records	Notify Authorities if anyone is missing and obtain advice on how to proceed	On-site caretaker/ team leader : fire warden
6. During passage of fire front	Shelter inside during the passage of a fire front to protect life safety from radiant heat	On-site caretaker/ team leader : fire warden
7. After fire front has passed and flame activity has subsided.	Once fire front has passed, check if safe to move outside, wearing PPE and extinguish all remaining embers or ember fires around buildings, vehicles and facilities	On-site caretaker/ team leader : fire warden

RECOVERY

PROCEDURES FOLLOWING THE BUSHFIRE IF SHELTERED IN PLACE

Actions	Responsible person
1. Prior to allowing staff and visitors out of the facility, check all budlings and vegetation / vehicles to ensure they are safe and not hazardous	On-site caretaker : fire warden
2. Ensure no burning vegetation or hotspots are still active that could pose a risk to people	On-site caretaker : fire warden

PROCEDURES FOLLOWING THE BUSHFIRE IF EVACUATED

Actions	Responsible person
1. Obtain approval from the incident Controller that the island vehicle tracks and facilities are safe to return to if the island was evacuated.	On-site caretaker : fire warden
2. Ensure there is no more fire activity in areas that could compromise peoples safety	On-site caretaker : fire warden
3. If buildings / facilities are damaged by fire, only return when officially declared safe by the incident controller	On-site caretaker : fire warden

ATTACHMENTS

1. **Occupants Register**
2. **Employee Register**

Occupants Register

Name	Visitor	Room Number	Present today	Present in On-site shelter	Emergency Contact	
					Name	Contact No.

Employee Register

Name	Room Number	Present today	Present in On-site shelter	Emergency Contact	
				Name	Contact No.