DIRK HARTOG ISLAND

Mr Hans Jacob
A/Executive Director
EPA Services
Prime House
Joondalup WA 6919

Dear Mr Jacob,

Thank you for your letter earlier this month. (DWERT4319)

I have completed and attached the requested s.38 form for the EPA's consideration. In summary of the nature-based park (camping) on Lot 62 & Lot 303 Dirk Hartog Island, the following details are provided along with the supporting documents; DHI Sustainable Management Plan, Site Development Plan, Foreshore Management Plan, Site Works Plan, DHI Environmental Scoping Document, Consent Determination, DBCA Commercial Operators License and DBCA reports that provides further details on the environment. Also attached is a supporting letter from Ecosystem Solutions Pty Ltd in regard to the determination that no rare or threatened flora has been identified on the development area.

We are requesting retrospective approval for the already developed nature-based park as follows;

Lot 303: 16 x bare earth campsites with a total disturbance footprint of 0.04ha
1 x Camp-kitchen & ablution facilities with total disturbance footprint of 0.0046ha
Maximum of 56 people

Lot 62: 7 x bare earth campsites with a total disturbance footprint of 0.0175ha
2 x Camp-kitchen & ablution facilities with total disturbance footprint of 0.00722ha
Maximum of 24 people

The total combined disturbance footprint is 0.069ha of a total 2ha area of the development envelope (shaded green & blue - site development plan 5A). Lots 62 & 303 has a combined total of 57ha of freehold land.

Upon assessing the above development, I have taken into consideration the following environmental factors. Flora and Vegetation, Terrestrial Fauna and Coastal Processes as per the EPA's factor guidelines.

Flora and Vegetation and Terrestrial Fauna

The development envelope consisting of approximately 2ha was traditionally used for grazing during the island's tenure as a pastoral station. The area was severely degraded during this period and in 2006 it was noted that little to no vegetation existed within the development envelope. A strategic revegetation program was commenced to develop nature-based campsites within the plantation areas. These areas are now suitably re-vegetated providing windbreaks and shade for visitors and ecosystems for native fauna.
The only vegetation that requires removal now is to comply with the approved Bush Fire Management Plan for the construction of approximately 0.21ha of vehicle access ways and firebreaks to comply with the Shire of Shark Bays building regulations. This area of development has had a preliminary survey undertaken and no declared rare or priority flora were observed. (attached letter from Ecosystem Solutions 2019)

DBCA are undertaking the Dirk Hartog Island Ecological Restoration Project (ERP) that will include the re-introduction of 10 species of native mammal, one bird species and the introduction of 2 other threatened

mammal species for conservation reasons. DBCA acknowledges Hypermarket Pty Ltd for allowing access to freehold lots 62, 303 & 304 for the eradication programs that have been operating since 2007. DBCA have continued access to these lots for monitoring weeds and conservation purposes.

Hypermarket will continue to support the ERP in achieving their aims and has agreed not to introduce any non-native flora & fauna to DHI. It also agrees to continue to monitor and report any sightings of non-native flora & fauna to DBCA. Hypermarket acknowledges the ongoing biosecurity requirements and provides ongoing education to all visitors, contractors, builders and staff.

Dirk Hartog Island National Park has one reptile (spiny-tailed skink) and three bird species (DHI rufous fieldwren, DHI emu-wren & DHI Black and White fairy-wren) identified as threatened. DBCA have stated that *there are a lack of distinct threats on DHI (Pearson 2016) to the spiny-tailed skink* and do not think tourism on DHI will be a threat. *The rufous fieldwren appears not to be at risk, and it is recommended that consideration be given to its removal from the threatened species lists. (Threatened birds on Dirk Hartog Island 2016 A Burbridge)* Further studies are required to identify if any of the threatened birds or the spiny-tailed skink have taken up residence within our revegetated areas within the Nature Based Park.

DBCA staff provide up to date information on the ERP via newsletters, emails and verbal communication. The ERP team released both banded and rufous hare wallabies on the southern end of DHINP. The most recent surveys (Feb 2019) show that no populations are located near Lots 62 or 303. (ref DHI Environmental Scoping Document). Newsletters, Slowdown signage on tracks and verbal communication from Management is given to all visitors to be vigilant when driving within DHINP and the nature based park.

Hypermarket Pty Ltd is committed to the DBCA ERP and supports the ongoing biosecurity measures in place and abides by the States agreement to not introduce or allow any non-native flora and fauna to DHI. DBCA have addressed bio-security through strict guidelines on commercial operator's license for our vessels bringing vehicles and visitors to the island. (Appendix H DBCA License)

Coastal Processes

A Foreshore Management Plan has been prepared to address the coastal processes. The main issue identified is the potential for visitors to use unauthorised accessways to the ocean and therefore cause terrestrial vegetation loss to foreshore areas. Traditional accessways to the ocean during the pastoral station era have been kept and are clearly marked. Monitoring of these accessways for vegetation loss will be an important management tool along with educating both visitors, staff and management on staying on the designated accessways only. No vehicle access will be allowed between Lot 303 and the foreshore and no removal of vegetation will occur during the ongoing management of the area. The site has not been assessed to see if it will be subject to the 100 year planning time frame. As the bare earth campsites and supporting infrastructure are easily relocatable should coastal hazards such as erosion become a concern and the life span of these structures are only 25 years, it's considered that a formal assessment will be prepared for any future developments of lot 62 & 303.

World Heritage Values

The World Heritage Values have been considered and the main issues identified are the visual impacts of the development and the impact on the DHINP via visitor access. The nature-based park will not compromise the World Heritage Values through the development & implementing the Foreshore Management Plan and abiding by the World Heritage colour palette so that buildings and infrastructure blend to the landscape with minimal negative visual amenity. The camp grounds do not detract from the scenic quality of the land and will not compromise or detrimentally impact on any applicable world heritage values.

Key Stakeholder Engagement

A consent determination under section 38 of the Native Title Act 1993 was obtained in 2009 between Hypermarket Pty Ltd and the Malgana Shark Bay People. Hypermarket Pty Ltd has ongoing relationships with Malgana People and will continue to engage Malgana on any future developments.

I have ongoing commitments with DBCA, managing online bookings for the 12 DBCA camping sites within the DHINP. This agreement is now into its third year. Annual meetings occur to discuss ongoing concerns about camping and the lack of visitor infrastructure such as no toilets in 75% of the sites. The DBCA's response to date is that *'due to a lack of critical mass'* no funds are available to allow further development of key visitor infrastructure within the DHINP. I understand that the only issue that DBCA has with visitors staying on lots 62 & 303 are how the extra 4WD's are managed within DHINP. I have been lobbying DBCA, local government, Gascoyne Development Commission and State Government for a Strategic Tourism Management Plan for the DHINP to address 4WD numbers since 2016. This is still ongoing and maybe now this will be addressed by DBCA.

The World Heritage Committee have provided comment to the nature-based park proposal and their concerns have already been addressed in our Foreshore Management Plan and our ongoing commitment to the biosecurity requirements as per the commercial operator's license conditions, schedule 2, points 8 – 15 (appendix H) imposed upon our vessels transporting visitors, supplies and building equipment to the island. Please note that point 10 states '*The operator agrees that it shall be responsible for all costs associated with the removal of any species introduced as a result of its operations.*'

The CEO of the Shire of Shark Bay had been kept informed of the development and has received regular updates on the development application. The DA was delayed several months due to ongoing health concerns with our original planner and we subsequently had to change planners in early 2019 to complete the application.

Conclusion

I believe that the development of the nature based park on lot 62 & 303 has such an insignificant disturbance footprint that the environmental impacts associated will not detrimentally impact either the Shark Bay World Heritage Values, the Ecological Restoration Project, flora & vegetation, terrestrial fauna or the coastal processes as per the EPA's factor guidelines.

I look forward to continuing to support the transition of Dirk Hartog Island from a pastoral station to a national park and a world class tourism destination.

Kind Regards

Kieran Wardle
Hypermarket Pty Ltd
Lot 62, Dirk Hartog Island
Shark Bay, Western Australia, 6537
Ph: 0407 383 449

GOVERNMENT OF WESTERN AUSTRALIA

Environmental Protection Authority

EPA Referral Form

Form for the referral of a proposal to the Environmental Protection Authority under Section 38 of the *Environmental Protection Act 1986*

Referrer information			
Who is referring this proposal?		☒ Proponent ✓ Decision-making authority ☐ Community member/third party	
Name: Mr Kieran Wardle		**Signature**	
Position	Director	Organisation	Hypermarket Pty Ltd
Email	kieran@dirkhartogisland.com		
Address	PO Box 67	N/A	
	DENHAM	WA	6537
Date	18 October 2019		
Does the referrer request that the EPA treat any part of the proposal information in the referral as confidential? *Provide confidential information in a separate attachment.*		☐ Yes	✓ No
Referral declaration for organisations, proponents and decision-making authorities: I, Mr Kieran Wardle, declare that I am authorised to refer this proposal on behalf of Hypermarket Pty Ltd and further declare that the information contained in this form is true and not misleading.			

Part A: Proponent and proposal description

Proponent information	
Name of the proponent/s (including Trading Name if relevant)	Hypermarket Pty Ltd
Australian Company Number(s) ☐ **OR** Australian Business Number(s) ✓	13 008 770 072
Contact for the proposal (if different from the referrer) *Please include: name, physical address, phone, and email.*	☐ Yes ✓ No
Does the proponent have the legal access required for the implementation of all aspects of the proposal? ***If yes**, provide details of legal access authorisations / agreements / tenure.*	✓ Yes ☐ No The freehold land the subject of this referral is owned by Hypermarket Pty Ltd of which I am a director. The principal shareholder of

***If no**, what authorisations / agreements / tenure is required and from whom?*	Hypermarket Pty Ltd is Mr Geoff Wardle, my father, and I have lived and operated an ecotourism business on the land for over 27 years.
Proposal type	
What type of proposal is being referred? For a change to an approved proposal please state the Ministerial Statement number/s (MS No./s) of the approved proposal For a derived proposal please state the Ministerial Statement number (MS No.) of the associated strategic proposal	☐ significant – new proposal ☐ significant – change to approved proposal (MS No./s: _____) ✓ proposal under an assessed planning scheme ☐ strategic ☐ derived (Strategic MS No.: _____)
For a significant proposal: • Why do you consider the proposal may have a significant effect on the environment and warrant referral to the EPA?	
For a proposal under an assessed planning scheme, provide the following details: • Scheme name and number For the Responsible Authority: • What new environmental issues are raised by the proposal that were not assessed during the assessment of the planning scheme? • How does the proposal not comply with the assessed scheme and/or the environmental conditions in the assessed planning scheme?	Town Planning Scheme 4, Gazettal 148 1 October 2018
Proposal description	
Title of the proposal	Nature Based Park (Camping)
Name of the Local Government Authority in which the proposal is located.	Shire of Shark Bay
Location: a) street address, lot number, suburb, and nearest road intersection; or b) if remote the nearest town and distance and direction from that town to the proposal site.	Lot 62 on Deposited Plan 103194 & Lot 303 on Deposited Plan 50257, Dirk Hartog Island Denham, Western Australia is approximately 36km due East of the proposed site.
Proposal description – including the key characteristics of the proposal *Provide as an attachment to the form*	Twenty three (23) camp sites, three (3) x camp kitchens and associated ablution facilities, a new strategic firebreak around the periphery of all existing and proposed development on the land as required by the Council endorsed Bushfire Management Plan and a new vehicle access track comprising a horizontal width of 6 metres with a 4 metre bare earth trafficable surface and passing bays, all of which are located entirely on Lots 62 & 303. A total of approximately 2,100m^2 of native vegetation is required to be cleared (i.e. 0.36% of the total combined area of both

	lots) to address the specific requirements of the recently endorsed Bushfire Management Plan for the land as it applies to asset protection zones, visitor safety, vehicle access tracks/driveways and internal perimeter strategic firebreaks.
Have you provided electronic spatial data, maps and figure in the appropriate format? *Refer to instructions at the front of the form*	✓ Yes ☐ No See the scaled PDF plans attached.
What is the current land use on the property, and the extent (area in hectares) of the property?	The total combined area of Lots 62 & 303 is approximately 58.0261 hectares. A small portion of the subject land has been extensively developed and used for tourist accommodation purposes for more than thirty (30) years. The existing tourist accommodation facilities and proposed nature based park comprise a total area of approximately 3.18 hectares or 5.48% of the total combined area of both lots.
Have you had pre-referral discussions with the EPA at DWER Services? If so, quote the reference number and/or the DWER contact.	No

Part B: Environmental impacts

Environmental factors

What are the likely significant environmental factors for this proposal?	☐ Benthic Communities and Habitat ✓ Coastal Processes ☐ Marine Environmental Quality ☐ Marine Fauna ✓ Flora and Vegetation ☐ Landforms ☐ Subterranean Fauna ☐ Terrestrial Environmental Quality ✓ Terrestrial Fauna ☐ Inland Waters ☐ Air Quality ✓ Social Surroundings ☐ Human Health

*For **each** of the environmental factors identified above, complete the following table, or provide the information in a supplementary report*

Potential environmental impacts

1	***EPA Factor***	Flora and Vegetation: To protect flora and vegetation so that biological diversity and ecological integrity are maintained.

2	***EPA policy and guidance*** - What have you considered and how have you applied them in relation to this factor?	The subject land is located within the Edel Vegetation System which covers approximately 20,000 hectares of the eastern and southern portions of Dirk Hartog Island. The existing vegetation on that portion of the land where the existing tourism accommodation facilities and associated improvements have been developed mainly comprises low level shrubland less than two (2) metres in height dominated by Acacia ligulata and sparse understorey. It is significant to note the existing native vegetation has been partially cleared and/or modified with evidence of degradation and weed infestation arising from the land's historical development and use for pastoral and tourism purposes. The proposed nature based park has been carefully sited on those portions of the land previously cleared and used for pastoral purposes to avoid the need for any significant additional vegetation clearing works. The intention is to retain as much of the existing native vegetation as possible and provide for the protection and management of the remaining areas of vegetation. A significant investment has and will continue to be made in revegetation works in appropriate locations using local endemic plant species. The use of the land will also be carefully managed and controlled in consultation with the Department of Biodiversity, Conservation and Attractions (DBCA) to minimise any further environmental impacts. The remaining native vegetation on the balance portions of the land will remain untouched and will continue to be managed in consultation with the DBCA with whom Hypermarket Pty Ltd has established a longstanding working relationship, particularly in relation to biodiversity management.

3	***Consultation*** – Outline the outcomes of consultation in relation to the potential environmental impacts	Hypermarket Pty Ltd regularly liaise and consult with the DBCA in relation to environmental management matters on Dirk Hartog Island and work in partnership with that agency to conserve and manage the island's unique environmental values. This relationship is important to the future of the island and will continue well into the future.
4	***Receiving environment*** – Describe the current condition of the receiving environment in relation to this factor.	The small portion of the subject land comprising the proposed Nature Based Park formed part of a pastoral lease that was used for grazing purposes for over 150 years until 2007. During this time there were up to 20,000 head of sheep on the island as well as significant numbers of feral goats (approx. 10,000) and cats (approx. 800). As a direct consequence of the pastoral activities and feral animals the vegetation on the island generally, as well as the subject land, suffered a significant amount of degradation. Since the removal of all livestock and feral animals from the island the native vegetation has slowly regenerated. Notwithstanding this fact, the areas surrounding the existing homestead have continue to be used for tourist related purposes. The basic vegetation structure associated within the proposed nature based park has been strategically regenerated to help fast track the rehabilitation and stabilise the area for its ongoing management. As such the camp site locations associated with the proposed nature based park were selected due to their degraded condition and limited vegetation cover in areas which have limited scope for regeneration without intensive rehabilitation works.

5	***Proposal activities*** – Describe the proposal activities that have the potential to impact the environment.	1. Clearing of approximately 2,100m^2 of native vegetation (i.e. 0.36% of the total combined area of both lots) to address the specific requirements of the recently endorsed Bushfire Management Plan for the land as it applies to asset protection zones, visitor safety, vehicle access tracks/driveways and internal perimeter strategic firebreaks. 2. Uncontrolled pedestrian and vehicle access to the coastal foreshore reserve across existing low level sand dunes and small stands of native vegetation on the subject land. 3. Potential biosecurity risk through the introduction and establishment of new invasive species on Dirk Hartog Island as a result of the tourism related activities.

6	***Mitigation*** – Describe the measures proposed to manage and mitigate the potential environmental impacts.	For the past 10 years the existing tourism business on the land has been officially certified by Ecotourism Australia as an 'Advanced Ecotourism' destination in recognition of it being one of Australia's leading and most innovative ecotourism products operating with minimal impact on the natural environment and providing opportunities for tourists to learn about the environment. This certification is only issued to operators who are committed to achieving best practice, use resources efficiently and wisely, contribute to conserving the environment and assist local communities. A copy of the most recent audit of the business's practices and procedures is attached for reference and demonstrates the ongoing commitment being made to mitigate any potential negative impacts on the natural environment. With regard to the proposed Nature Based Park, all designated campsites have been carefully positioned in areas previously cleared and degraded to ensure minimal impact on existing native vegetation in good condition in other locations on the property. There are a number of short, clearly designated walking tracks from the campsite area to the beach, all of which are historical tracks that have been there for decades (i.e. no vegetation clearing works are required). Directional signage and low level fencing will be provided in select locations to help protect and conserve all existing native vegetation. All strategic firebreaks required pursuant to the Council endorsed Bushfire Management Plan and Annual Firebreak Notice for the land have also been carefully located to include historical dirt roads and access tracks which have been in existence for decades to further minimise any negative impacts on existing native vegetation. A 'Sustainable Management Plan' has also been prepared for the land which is regularly reviewed and updated to integrate conservation initiatives and

6		values with an acceptable level of tourism use and provide clear guidance for both employees and guests regarding sustainability philosophies, policies, practices and future goals and objectives. In addition to the above, the ecotourism business provides education programs for all employees and guests and undertakes ongoing monitoring and surveillance of all tourism related activities on the land to help protect and conserve the land's environmental values. Although a small amount of vegetation clearing works are required to accommodate the proposed Nature Based Park, the business operators are committed to offsetting any negative impacts by continuing to protect and conserve the vast majority of native vegetation on the land and undertaking rehabilitation and revegetation works as and when required using local endemic plant species. Lastly it is significant to note the business operator remains committed to and will continue to undertake pest and weed management in consultation and accordance with the Department of Biodiversity, Conservation and Attractions' *Dirk Hartog Island Biosecurity Implementation Plan* to help guard against any future potential biosecurity risks. Visitors are provided with DBCA brochures including – *'Island protection brochure' and 'Quarantine Implementation Checklist brochure'* prior to travel.

7	***Impacts*** – Assess the impacts of the proposal and review the residual impacts against the EPA objective.	As mentioned previously above approximately 2,100m^2 of native vegetation (i.e. 0.36% of the total combined area of both lots) is required to be cleared in the short term future to address the specific requirements of the recently endorsed Bushfire Management Plan for the land as it applies to asset protection zones, vehicle access tracks/driveways and internal perimeter strategic firebreaks. Given: i) the vegetation to be cleared has already suffered significant disturbance with no knowledge or evidence of any rare or endangered flora or fauna species being in existence on the relevant portions of the land; ii) the ecotourism business' intention to retain, protect and manage the vast majority of native vegetation in good condition on the balance portions of the land in close consultation with the DBCA; and iii) the business' demonstrated commitment to ongoing education, monitoring and surveillance in accordance with well-established regimes and management plans, it is contended the proposal will not compromise the EPA's objective of protecting flora and vegetation to ensure the biological diversity and ecological integrity of the land and island more generally are maintained. In addition to the above, given the small amount of clearing works required involves vegetation comprising the Edel Vegetation System which covers approximately 20,000 hectares of the eastern and southern portions of Dirk Hartog Island and is therefore well represented, and the fact the majority of the existing native vegetation on the land in good condition will be retained, protected and conserved in the long term future, it is contended the potential impacts in a local and regional context will be minor. Having regard for the EPA's clearing principles and the various points raised

		above, it is considered the proposal will not: i) compromise biological diversity either locally or regionally; ii) compromise the whole or a part of, or is necessary for the maintenance of, a significant habitat for native fauna species; iii) result in the removal of any rare or endangered flora species; iv) compromise the whole or part of, or is necessary for the maintenance of any threatened ecological community; v) result in the removal of any significant remnant vegetation; vi) compromise any watercourse or wetland given none occur or exist in the area proposed to be cleared; vii) cause any appreciable land degradation given the land's gently sloping topography and coastal soil types; viii) have any negative impacts on the environmental values of any immediately adjacent or nearby conservation areas; ix) cause any deterioration in the quality of any surface or underground water sources; or x) cause or exacerbate the incidence or intensity of flooding on the land which is non-existent with no evidence of any previous events of this type on the subject land.
8	***Assumptions*** - Describe any assumptions critical to your assessment e.g. particular mitigation measures or regulatory conditions.	The following assumptions have been made: i) Continuation of the good, longstanding working relationship between the landowner, business operator, the Shire of Shark Bay and Department of Biodiversity, Conservation and Attractions to achieve clearly established and documented environmental management and conservation objectives; and ii) The ability to continue sourcing seeds from local endemic plant species to undertake revegetation works as required.

Part C: Other approvals and regulation

State and Local Government approvals

Is rezoning of any land required before the proposal can be implemented? If yes, please provide details.	☐ Yes ✓ No
If this proposal has been referred by a decision-making authority, what approval(s) are required from you?	Development approval is required in accordance with the specific requirements of the Shire of Shark Bay Local Planning Scheme No.4 and *Planning and Development (Local Planning Schemes) Regulations 2015*.

Please identify other approvals required for the proposal:

Proposal activities e.g. clearing, dewatering, mining, processing, dredging	**Land tenure/access** e.g. Crown land, Mining lease, specify legislation for access if relevant	**Type of approval** e.g. Native Vegetation Clearing Permit, licence, mining proposal,	**Legislation regulating the activity** e.g. *EP Act 1986* – Part V, *RiWI Act 1914*, *Mining Act 1979*
Clearing of native vegetation	Nil. The property is owned in fee simple (i.e. freehold tenure) by Hypermarket Pty Ltd.	A native vegetation clearing permit approval is required from the Department of Water and Environmental Regulation with the exception of the proposed strategic firebreaks shown in the approved Bushfire Management Plan and the Shire of Shark Bay Annual Firebreak Notice which are understood to be exempt from the need for clearing approval.	*Environmental Protection Act 1986* – Clause 51E, Division 2 — Clearing of native vegetation *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*

Commonwealth Government approvals

Does the proposal involve an action that may be or is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)?	☐ Yes ✓ No
Has the proposed action been referred? If yes, when was it referred and what is the reference number (EPBC No.)?	☐ Yes ✓ No Date: _____ EPBC No.: _____
If referred, has a decision been made on whether the proposed action is a controlled action? If 'yes', check the appropriate box and provide the decision in an attachment.	☐ Yes ✓ No ☐ Decision – controlled action ☐ Decision – not a controlled action

Part C: Other approvals and regulation	
State and Local Government approvals	
If the proposal is determined to be a controlled action, do you request that this proposal be assessed under the bilateral agreement or as an accredited assessment?	☐ Yes - Bilateral ✓ No ☐ Yes - Accredited
Is approval required from other Commonwealth Government/s for any part of the proposal? *If yes, describe.*	☐ Yes ✓ No Approval:

Ecosystem Solutions Pty. Ltd
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Environmental Protection Authority of Western Australia

8 Davidson Terrace

Joondalup, WA.

RE: Lots 62 & 303 Dirk Hartog Island, Shire of Shark Bay

To whom it may concern

This is to confirm that, Gary McMahon (B.Sc. M. Env Mgmt. C EnvP, FB 620000143) undertook a preliminary survey of the above site on the 5th and 6th of September 2019, for the purposes of determining the presence of any rare or threatened flora. This was required to ensure any bushfire mitigation works such as fire breaks and fuel reduction would not impact on any species of significance.

The site was walked in a systematic manner to cover the areas of potential disturbance. Data obtain from the Department of Biodiversity Conservation and Attractions confirmed five priority species (note no DRF) have been recorded within 5 kms of the site. These were targeted within this preliminary survey.

The dominant species noted were *Acacia ligulata*, *Frankenia pauciflora*, *Atriplex* species (*A bunburyana* & *A vesicaria* dominated), over a low open herb land of *Sennecio pinnatifolius* and *Acanthocarups preissii* and introduced annual and perennial grass weeds. Large areas of the site were devoid of any vegetation. No declared rare or priority flora were observed.

Should any proposed development require a more detailed survey for purposes other than fire mitigation/management, this could be completed in the future, if required, along the entire area of lots 62 and 303.

If you have any questions or queries, I would be happy to discuss this with you in more details.

Regards

Gary McMahon

Director

7/11/2019

DIRK HARTOG ISLAND

Environmental Scoping Document

Homestead Bay | Dirk Hartog Island | **Lot 62 & 303**

Dirk Hartog Island Nature Based Park

CONTENTS

9.7 Appendix G Reptiles of Dirk Hartog Island 2018
9.8 Appendix H DHI Necessary Operations Plan DBCA 2010
9.9 Appendix I DHINP Ecological Restoration Project Report 2019
9.10 Appendix J Threatened Birds of DHI

1. INTRODUCTION

Dirk Hartog Island is located within Shark Bay. Shark Bay is located on the westernmost point of Australia, about 800 km north of Perth. Dirk Hartog Island lies within the Shark Bay World Heritage Property. The Property was inscribed on the World Heritage List on 13 December 1991 on the basis of its "natural heritage" values.

On 29 October 2009 the majority of Dirk Hartog Island (Reserve 50325, 62,920ha) was created as a national park. Dirk Hartog Island is one of several conservation reserves in the Shark Bay area including Francois Peron National Park, Bernier and Dorre Islands Nature Reserve, other islands nature reserves, Shell Beach Conservation Park and Zuytdorp Nature Reserve.

This document is a scoping document that will provide guidance to protect the key values of the island and the preservation or protection of persons, property, land, waters, flora or fauna in relation to the Dirk Hartog Island Nature Based Park that has been established on freehold lots 62 & 303. It will also provide a suggested way forward to minimize the impact of visitors staying in the park and ways to monitor & reduce visitor impacts on the environment.

2. KEY VALUES

The key values associated with Dirk Hartog Island published by DBCA.

- isolation of fauna habitats on islands and peninsulas resulting in survival of threatened species;
- coastal scenery - Zuytdorp cliffs;
- endemic Dirk Hartog Island subspecies of the southern emu-wren;
- nesting populations of the green and loggerhead turtles, listed as endangered and vulnerable by IUCN;
- Dirk Hartog Island is the site of first known European landfall in Western Australia in 1616 and site of first physical evidence of European landing in Australia;
- gazettal of the Cape Inscription area of Dirk Hartog Island on the National Heritage List;
- terrestrial environments and proximity to marine environments that offer varied nature-based recreational and tourism opportunities and experiences;
- opportunities for viewing a diverse range of native marine and terrestrial flora and fauna; and
- remote and natural qualities of parts of the island.

3. MANAGING THE NATURAL ENVIRONMENT

The biota of the terrestrial environment of the Dirk Hartog Island is affected by a range of ecological processes including climate, geomorphology, hydrology and soils. Dirk Hartog Island is at the meeting point of three major climatic regions. Due to its geographical position Dirk Hartog Island is influenced by the winter rainfall of the south-west and the summer rainfall of the north but its arid to semi-arid climate makes rainfall irregular.

Dirk Hartog Island is of great zoological and botanical importance, containing habitats of many species at the limits of their range. Dirk Hartog Island contains several endemic animal species that are present

because of the climatic, geomorphological, hydrological and soil conditions. This is of importance not only because of their presence but also for understanding the biological evolution of the area.

Dirk Hartog Island forms the transition zone between two major botanical provinces – the South West dominated by eucalypt species and the Eremaean dominated by acacia species.

Dirk Hartog Island is also an area of major zoological importance primarily as a result of the isolation of habitats on peninsulas and islands. Some fauna species that have become extinct on the mainland have survived on these islands. The global significant loggerhead turtle rookery at Turtle Bay on DHI has not been affected by fox predation due to its island location in contrast to many turtle rookeries on the mainland which have been severely impacted by foxes.

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 area and relative intactness of the vegetation ensure the maintenance of the integrity of ecological processes. (DBCA 2010)

3.1 GEOLOGY, GEOMORPHOLOGY AND SOILS

The significance of the geology of the Shark Bay area contributed towards the nomination of Shark Bay as a World Heritage Property particularly the stromatolites found in Hamelin Pool. The Shark Bay area is part of the Carnarvon Basin, a geological feature along the western and north-western coastline of Western Australia. It ranges in width from 50 to 300 km and contains more than 6000 m of sedimentary rock spanning the Ordovician to Quaternary (434 to 0.01 million years ago) (Hocking *et al.* 1987). Within the Carnarvon Basin, Shark Bay lies in the Gascoyne Platform, a north-south elongated, tilted platform which contains mostly Silurian, Devonian (434 to 354 million years ago) and Cretaceous (65-1.6 million years ago) sedimentary rocks (Hocking *et al.* 1987). The appearance of the Peron, Nanga and Edel Land Peninsulas is due to the presence of anticlines (peninsulas) and intervening anticlines (gulf) that first developed during the Tertiary Period. The abrupt line of the Zuytdorp Cliffs is thought to mark one of the most prominent Pleistocene to early Holocene (1.6-0.01 million years ago) fault scarps in Australia.

The surface geology of Dirk Hartog Island comprises:

- *Peron Sandstone* – red aeolian sandstone which accumulated as a series of interlocking longitudinal and transverse dunes, primarily exposed on Peron Peninsula;
- *Tamala Limestone* – a succession of aeolian limestone dune deposits most of which probably accumulated during glacial periods of the Pleistocene when sea levels were much lower than they are today. They are found mostly on the Edel Land Peninsula;

Between the Pleistocene dune ridges are evaporite deposits that form birridas (salt flats). They consist largely of gypsum and are probably Pleistocene in age. (DBCA 2010)

Geomorphology

The distinct geomorphology of Dirk Hartog Island contributed towards the Shark Bay area being nominated as a World Heritage Property including the striking Zuytdorp Cliffs and the island. The geomorphology of the island is characterised by calcareous, unconsolidated dunes deposited over the Tamala Limestone and found on Bernier, Dorre and Dirk Hartog Islands and Edel Land. Many of the coastal landforms are fragile and can be degraded by uncontrolled vehicle access, pedestrian use and grazing. (DBCA 2010)

Soils

Typically, the soils of Dirk Hartog Island are sandy. Payne *et al.* (1987) described four geomorphical districts based on soil types across the Shark Bay area, two of which occur on Dirk Hartog Island:

- *Coastal Dune* – occupies the western edge of Edel Peninsula and the islands to the north (Dirk Hartog, Dorre and Bernier). The soils are almost entirely uniformly sandy and generally calcareous;
- *Tamala Limestone* – includes areas adjacent to the Zuytdorp cliffs. The soils formed from the Tamala Limestone include brownish sands on undulating plains and sandplains; calcareous sands on the coastal dunes and sandplains; shallow lithosols on low hills and stony plains; shallow friable calcareous loams on stony plains and low rises; adjacent to limestone outcrops; and

Soil type will influence the amount of soil loss or movement, soil compaction, loss of vegetation, the potential intrusion of weeds and where developments may be situated. Coastal dunes are particularly susceptible to erosion and take considerable time to rehabilitate. (DBCA 2010)

3.2 NATIVE PLANTS AND VEGETATION ASSOCIATIONS

The Shark Bay area is significant for flora, being located in the transition zone of two botanical provinces – the South West and Eremaean. As such, there are many endemic flora species and many species located at the northern and southern limits of their geographical range. The transition zone is most evident on parts of former Nanga and Tamala Stations, Carrarang stations, Dirk Hartog Island and Bernier and Dorre Islands (URS 2000).

Flora

Dirk Hartog Island has high species richness for flora with a recorded list of 266 species.

There are ***no listed declared rare flora*** on Dirk Hartog Island. Dirk Harog Island contains six Priority 2, two Priority 3 and two Priority 4 flora: (DBCA 2010)

Species	Priority
Angianthus microcephalus	P2
Eremophila glabra subsp. psammophora	P2
Lepidium biplicatum	P2
Melaleuca huegelii subsp. pristicensis	P2
Olearia occidentissima	P2
Ptilotus alexandri	P2
Lepidobolus densus	P3
Stenanthemum divaricatum	P3
Lepidium puberulum	P4
Triodia bromoides	P4

Vegetation Communities

The main vegetation associations on Dirk Hartog Island are:

- spinifex hummock grassland with on overstorey of either *A. coriacea*, *Pittosporum phylliraeoides* over *A. ligulata*, or *Diplolaena dampieri*, *Exocarpus sparteus* shrubs over *Triodia* sp. In other

areas *Acanthocarpus preissii* and *Atriplex bunburyana* chenopods or shrubs over hummock grasses across the majority of the island; and

- mixed open chenopod shrubland of *Atriplex* sp., *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.

There are patches of bare areas of drift sand across the island. In some parts there are a few birridas. On the east coast there are small patches of mixed open heath of *Diplolaena dampieri*, *Myoporum* sp. and *Conostylis* sp. shrubs. (DBCA 2010)

3.3 NATIVE ANIMALS

Dirk Hartog Island contains a high diversity of native fauna and is of considerable international, national and local zoological significance. This is due to the location of Dirk Hartog Island within the transitional zone where the temperate climate of the South West gives way to the semi-arid climate of northern areas. Hence, many species are found at the limits of their northern or southern ranges.

Dirk Hartog Island is highly significant because it has acted as a refuge for threatened species and provides an environment that encourages genetic variability within native plants and animals. (DBCA 2010)

Native Fauna

The Shark Bay area shows an unusually high diversity of mammal fauna, as has been shown in a range of biological surveys of the area. Overall, 34 mammal species have been recorded in Shark Bay. The native mammal records on Dirk Hartog Island are not so diverse with four native species recorded.

The diversity of bird fauna within the Shark Bay area is moderately high, with 245 species being recorded. This is unusual as peninsulas tend to have low fauna diversities, being surrounded by sea and providing limited access for land dwelling species. This diversity is possibly attributable to the large variety of habitats and the transition zone between the arid north and the more temperate south. Dirk Hartog Island reflects this diversity of bird species.

The Shark Bay area has a very rich abundance of reptiles, supporting 120 species. Fifty-four reptiles have been recorded for Dirk Hartog Island. Occurring on Dirk Hartog Island, the loggerhead turtle is listed as endangered and the Western spiny-tailed skink as vulnerable. (DBCA 2010)

Threatened and Other Specially Protected Fauna

The mammal fauna of the Shark Bay terrestrial area is of high conservation significance, particularly on Bernier and Dorre Islands where five of the nine mammals are listed as threatened under the Wildlife Conservation Act. Although none of these five mammals occur on Dirk Hartog Island, sub-fossil remains have been found for some of these species.

Ten to fifteen percent of WA's bird fauna have declined and the Shark Bay area supports a number of threatened species. The Dirk Hartog Island rufous field-wren, Dirk Hartog black and white fairy-wren, and the southern emu-wren (Dirk Hartog Island subspecies) are all listed as 'vulnerable' under the Commonwealth EPBC Act and threatened ('rare or likely to become extinct') under the Wildlife Conservation Act. The peregrine falcon, also found on Dirk Hartog Island, is listed as specially protected under Western Australian legislation.

The island provides important habitat for the loggerhead turtle (*Caretta caretta*), which is listed as threatened ('rare or likely to become extinct') under the Wildlife Conservation Act and is endangered under the EPBC Act and the IUCN Red List. Turtle Bay on Dirk Hartog Island is one of the most important loggerhead nesting sites in the world. (DBCA 2010)

The Western spiny-tailed skink (*Egernia stokesii badia*) is listed as threatened under the Wildlife Conservation Act and endangered under the EPBC Act and is one of two disjunct populations, one found on Dirk Hartog Island and the other in the north-eastern wheatbelt. (DBCA 2010)

Migratory Species

The Shark Bay area contains a number of significant migratory birds. Sixty-seven birds are migratory and are protected under international agreements with Japan, China or under the Bonn Convention. Most of these are seabirds and the coastlines and islands in particular of the Shark Bay area provide important breeding areas. Many of these species occur along the foreshore of Dirk Hartog Island. (DBCA 2010)

Endemic, relictual and species at the limit of their geographic range

The Dirk Hartog black and white fairy-wren, and the Southern emu-wren are locally endemic, with the Shark Bay variegated fairy-wren only found on Bernier and Dorre Islands, and the Dirk Hartog black and white fairy wren and the southern emu-wren (Dirk Hartog Island subspecies) both endemic to Dirk Hartog Island. (Johnstone, *et al.*, 2000).

A number of southern bird species have their northern limits in the Shark Bay area and some of these are found on Dirk Hartog Island.

Many south-western reptile species are found at their northern limits in the Shark Bay area including Dirk Hartog Island. There are also a number of northern species which are at the southern extent of their range in Shark Bay. The species found on Dirk Hartog Island include: the geckoes *Diplodactylus spinigerus* and *Underwoodisaurus milii*; the pygopodid lizard *Pygopus lepidopodus*; the skinks, *Ctenotus fallens*, *C. lesueuri*, *Egernia stokesii badia,* and *Tiliqua rugosa*; and the elapid snake *Vermicella fasciolata*. There are also a number of northern species which are found at the southern extent of their range in Shark Bay including *Demansia calodera* and marine turtles and sea snakes (Storr and Harold 1990). (DBCA 2010)

3.4 DIRK HARTOG ISLAND ECOLOGICAL RESTORATION

DBCA is developing a plan for the long term ecological restoration of Dirk Hartog Island. The intent of this plan is to implement a wildlife conservation program focusing on both fauna and flora on the island once introduced animals (sheep, goats and cats) are removed. Dirk Hartog Island will be the largest island on which introduced animal control will be attempted and the size of the island will greatly exceed Faure Island where the successful eradication of cats has occurred.

The ecological restoration of Dirk Hartog Island will commence with the initial removal of sheep and goats. Although the removal of introduced predators and herbivores will use existing tracks as much as possible, the construction of narrow monitoring tracks in the dense vegetated areas may be required. This will have a detrimental visual impact for the duration of the feral animal control and monitoring period. Vegetation clearing associated with the construction of these grids will require appropriate approvals. These transects will be used to monitor the presence of cats after the initial baiting. Further

baiting may be required to ensure cats have been removed. Only after cats have been removed will native fauna be introduced and reintroduced to the island.

The project will also involve the control of introduced plants (particularly from the southern part of the island where past pastoral activities were focussed), establishment of an education program, establishment of an operational centre, rubbish removal, fire management, soil erosion management, hygiene control and rehabilitation. (DBCA 2010)

3.5 ENVIRONMENTAL WEEDS

Environmental weeds displace native plants, particularly on disturbed sites, by competing with them for light, nutrients, water and space. They can also have a significant adverse impact on other conservation values by altering animal habitats, harbouring pests and diseases, and increasing fire hazard. Environmental weeds can be introduced and spread through machinery and the importation of infested materials for construction.

There are forty-two weed species recorded in the WA Herbarium for Dirk Hartog Island. There are four species rated as 'High' according to the *Environmental Weed Strategy*; Mediterranean turnip (*Brassica tournifortii*), buffel grass (*Cenchrus ciliaris*), birdwood grass (*Cenchrus setigerus*) and great brome (*Bromus diandrus*). They vary in distribution and degree of threat to the biodiversity values of the island and have the potential to impact significantly on natural vegetation and fauna habitats.

Weed species have had significant impacts on different parts of Dirk Hartog Island. Buffel grass, a tough perennial bunch grass that was actively spread by the pastoral industry, is widespread over parts of Dirk Hartog Island. Buffel grass can displace native species and can rapidly establish a monoculture. The *Acacia* shrublands have become infested with Mediterranean turnip. (DBCA 2010)

3.6 REPTILES

Marine turtle fibropapillomatosis (FP) is a debilitating neoplastic disease of marine turtles of recent pandemic proportions, which is found in all major oceans and is commonly linked to heavily polluted coastal areas. Fibropapillomatosis is a severely debilitating disease and can potentially have a devastating impact on the endangered sea turtle population around the world. Although the aetiology as well as other aspects of the pathogenesis are still under study it seems clear that this disease is linked to "anthropogenic degradation of the environmental health" (Aguirre and Lutz 2004).

It is very important to carefully plan and manage turtle conservation and tagging programs. The disinfection of tagging instruments and other equipment surfaces is critical, as a potential viral agent may be spread unintentionally by researchers from one turtle to the other (Curry *et al.* 2000). Balazs *et al.* (2000) noticed that tumour growth was enhanced at the piercing site of the tags commonly used to identify the individuals and recommended using only microchips, especially in diseased animals. (DBCA 2010)

3.7 FIRE

Fire history

There is only limited documentation available of the fire history of Dirk Hartog Island. The arrival of pastoralism, together with the departure of Aboriginal people from their homelands, has resulted in considerable changes to the burning patterns and fire regimes of arid areas. Given its island status and

influence of salt laden air, it is not envisioned that naturally occurring fire is a frequent event on the island. No wildfires have been recorded in the last 150 years.

Fire environment

Fires within the Shark Bay are strongly influenced by the climate of the area, which is characterised by hot dry summers and mild winters. High summer temperatures, low rainfall but with the occasional cyclone, high annual evaporation rates, south-east trade winds which generate strong southerly winds for most of the year and the maritime influences all contribute to the fire environment.

There is a range of vegetation types within Dirk Hartog Island and there is only a limited understanding of how fire behaves within each of these. However, the risk of ignition from lightning is low, as is the ability for the vegetation to carry and sustain a fire. Shrubland vegetation communities are common and, for fire to spread in this vegetation type, weather thresholds, particularly wind speed and relative humidity, need to be exceeded. Under sub-threshold weather conditions, fire will be unlikely to spread. In contrast, on days of extreme fire weather, fires have the potential to spread rapidly in shrubland vegetation. When fire weather conditions are very severe and particularly hot and windy (generally during the summer), there is the potential for severe fires within Dirk Hartog Island that may burn over very large areas. However, these conditions are not common and fires are mostly a rare occurrence in Shark Bay.

Fire management on Dirk Hartog Island

The objective of the Department is to manage fire on lands managed by the Department to protect and promote the conservation of biodiversity and natural values whilst also providing for protection of human life and community assets. However, due to the limited knowledge of fire ecology and fire behaviour in ecosystems in the Dirk Hartog Island, the primary objectives of fire over the life of these guidelines will be to:

- advance knowledge of fire ecology and fire behaviour through targeted research and operational experience in an adaptive management framework that includes monitoring; and
- reduce the risk of large and damaging wildfires by undertaking strategic fuel reduction and modification.

Specific fire management strategies for the Dirk Hartog Island will include:

- identifying community assets and developing strategies to protect them;
- facilitating and supporting fire research programs, particularly those that will provide improved knowledge of vital attributes and fire sensitive species;
- mitigating wildfire threats to life, property and natural, cultural and recreation values using experimental prescribed burns;
- investigating appropriate methods of providing strategic fire protection, which may include fuel reduced buffers, edge burning, patch burning and provision of strategic fire access tracks;
- investigating the use of habitat management burns once there is an improved understanding of vital attributes and fire sensitive species;
- minimising the risk of human induced wildfire by prohibiting open/wood fires;
- facilitating early detection of fire through liaison with the local community and relevant agencies; and
- developing mutual aid assistance plans with neighbouring landholders.

Active wildfire suppression is generally not feasible in Dirk Hartog Island due to inaccessibility. However, during the life of these guidelines, community assets requiring protection from fire will be identified, and suppression activities undertaken as required. Prescribed burning activities on Dirk Hartog Island during the term of these guidelines will aim to undertake experimental research burns

to collect information on fire behaviour, fire ecology, biological indicators and habitat requirements of threatened species and animals, plants and vegetation communities of conservation significance. In addition experimentation with different fire regimes to understand their impacts on flora and fauna of Dirk Hartog Island may be undertaken. (DBCA 2010)

Given the very high value of the threatened fauna populations on the islands and the high sensitivity of these islands to fire, a fire response plan should be developed considering factors such as:

- strategies to reduce the risk of fires starting on the islands and reducing the extent of fire runs;
- appropriate methods for wildfire suppression;
- strategies to support, capture or protect threatened fauna in the event of a wildfire; and
- methods for rehabilitation and recovery following a wildfire.

4. MANAGING OUR CULTURAL HERITAGE

In Western Australia, the Department of Indigenous Affairs (DIA) is responsible for the administration of the Aboriginal Heritage Act. The Act provides for the protection of sites and objects used by, or traditional to, the original inhabitants of Australia and the management of Aboriginal sites in consultation with the Aboriginal community. All Aboriginal sites and objects are protected, including those sites not yet registered with the DIA. Under the Act, it is an offence for anyone to alter in any way an Aboriginal site or object without the relevant Minister's permission. Prior to any development or activity that involves disturbing the land, DIA recommends that suitably qualified consultants be engaged to conduct ethnographic and archaeological surveys of the area to ensure that no site is damaged or altered that would result in a breach of section 17 of the Act. In order to avoid a possible breach of the Act, a Notice under section 18 of the Act should be submitted to the Aboriginal Cultural Material Committee seeking the Minister for Indigenous Affairs prior written consent to use the land. (DBCA 2010)

4.1 ABORIGINAL HERITAGE

The Shark Bay area is significant to Aboriginal people because of the long history of use and occupation and because they have a cultural obligation to understand and care for the area. Aboriginal caring for country is about the protection of significant sites and, just as importantly, the interconnected nature of the sites, people and environment. (DBCA 2010)

Aboriginal Use and Occupation

Dirk Hartog Island is within the area of the Malgana people Native Title claim.

Archaeological research has been conducted at several sites across the Shark Bay area including Useless Loop, Monkey Mia and Eagle Bluff (Bowdler 1989, 1990a, 1990b, 1995) and Zuytdorp Cliffs near the *Zuytdorp* shipwreck (Morse 1988). The Silver Dollar site near Eagle Bluff provides the oldest and most detailed evidence of human occupation of the region (Bowdler 1999). It was occupied for two periods, firstly between 30 000 and 18 000 years and secondly between 7000 and 6000 years (Bowdler 1999). Rockshelter sites at Eagle Bluff and Zuytdorp are dated at 4000 to 4600 years before present (Bowdler 1999, Morse 1988). A third occupation period from 1000 years before present has also been noted at the Monkey Mia sites (Bowdler 1995, 1999).

There has been limited formal archaeological research conducted on Dirk Hartog Island and there is limited knowledge of Aboriginal occupation of the island. There are several known midden sites on the island but the DIA database provides only one record of a midden site in the north-west corner of the island. The period of occupation by Aboriginal people on the island has yet to be determined.

The French explorer St Alouarn in 1772 recorded seeing smoke on the island as they sailed past Dirk Hartog Island. Crew found what they believed was evidence of fires and a cleared area for dancing. However, no other early European explorer recorded signs of Aboriginal people or evidence of their occupation of the island. (DBCA 2010)

4.2 NON-INDIGENOUS HERITAGE

Shark Bay is well known as the site of the first European landfall in Western Australia, but the historical significance of other early expeditions from Europe is not so well recognised. Studies and collections made by explorers of the 17th, 18th and 19th centuries represent some of the earliest records of Australia's flora and fauna. Many of these specimens are kept in European museums and are of great value to scientific research. Early explorers noted the abundance of turtle and fish resources in Shark Bay but all were unable to find freshwater. Dampier, Freycinet and King all commented favourably on the prodigious quantities of fish in the area and the safe and protected harbour.

Exploration

Dirk Hartog landed on Dirk Hartog Island on 25 October 1616 leaving a pewter plate inscribed with a message nailed to a post at the site now known as Cape Inscription (Playford 1998, 2005) This plate is the oldest extant record of Europeans landing in Australia.

On 30 January 1697 Vlamingh's ships (*Geelvinck*, *Nyptangh* and *Weseltje*) anchored in South Passage between what is now known as the southern tip of Dirk Hartog Island and Steep Point and boats were dispatched over the next four days to sail around the island (Robert 1972, Playford 1998). On 2 February men in the *Geelvinck's* pinnace went ashore at the north end of the island at Cape Inscription, climbing the cliff and finding an oak post with a pewter plate lying beside it. Vlamingh replaced Hartog's plate with one of his own, inscribing the original message and adding a record of his own visit before nailing it to a new post (Robert 1972, Playford 1998). Expedition members explored parts of Shark Bay for several days and recorded that turtles can be turned over and eggs collected on a beach now known as Turtle Bay (Robert 1972, Playford 1998).

Dampier in the HMS *Roebuck* in 1699 spent several days in Shark Bay anchored off Dirk Hartog Island at what is now known as Dampier's Landing, south-east of Cape Inscription (Spencer 1981, George 1999). Dampier spent time on the Island looking for freshwater and although unsuccessful, he did manage to obtain a good supply of firewood (Spencer 1981). Dampier made many valuable observations of the plants and animals of Shark Bay and especially of Dirk Hartog Island, where he made the first collection of Australian plants at what is now known as Dampier Landing. This collection is still preserved at Oxford University.

St Alouarn in the *Gros Ventre* in 1772 landed at Turtle Bay and took possession of the country in the name of the French king (Marchant 1982). Two bottles, one containing a parchment recording the annexation event and both sealed with silver coins and lead seals were buried at the foot of a tree (Marchant 1982). During an expedition to the area in 1998 by a party led by Phillipe Godard found a French silver coin in the lead seal of a bottle that had been left there by St Alouarn in 1772. Soon afterwards, the Western Australian Museum found, at the same site, an intact bottle, with an attached lead seal and silver coin (Edwards 1999). Further excavations of the area were undertaken by the WA Museum in 2006. The report of this survey states that no additional evidence was discovered (Green

et al., 2007). The report recommends that a site management plan including interpretation requirements be prepared in consultation with WAMM.

Vlamingh's plate remained untouched at Cape Inscription for 104 years before being found by a sailor from the French vessel *Naturaliste* in July 1801 (Playford 1998, Cornell 1974). Hamelin of the *Naturaliste* believed it would be sacrilege to remove the plate and therefore nailed it to a new post and fixed a lead plate recording his visit to another post at a prominent headland on the north-east side of the island (Playford 1998, Cornell 1974). The precise locality of this second post is not known and the lead plate has never been found (Playford 1998). One of Hamelin's young officers, Louis de Freycinet, was not happy with the decision to leave the Vlamingh plate on the island. In 1818 as commander of the *Uranie*, he recovered the plate on 13 September and had it delivered to the Royal Academy of Inscriptions and Elegant Literature in Paris (Playford 1998, Marchant 1982).

On 21 January 1822 King, commander of the HMS *Bathurst*, landed at Cape Inscription to discover that the Vlamingh plate had been removed but the Hamelin post remained (King 1827). To mark his visit he left his name and the name of one of his officers, John Septimus Roe, on the Hamelin post (King 1827, Playford 1998).

The original Hartog plate is located in the Rijksmuseum in Amsterdam, and in 1947 the Vlamingh plate was returned to Australia and is now on display at the WA Maritime Museum in Fremantle. The Vlamingh and Hamelin original posts were removed in 1908 and now held at the WA Maritime Museum. Representations of these original posts were installed in 1997.

On 28 March 1839 Grey landed on Dirk Hartog Island during his return voyage from the north (Grey 1841). He spent part of a day exploring the Island noting its heath-like vegetation. Grey travelled southwards along the east side of the Island before sailing with some difficulty though the passage between Steep Point and Dirk Hartog Island (Grey 1841).

On 6 March 1858 Denham in the *Herald* anchored offshore from Cape Inscription. He visited Cape Inscription and found a post with 'King 1822' to which he added '*Herald* 1858' (David 1995). Denham made a comprehensive survey of Shark Bay, spending several weeks in the area and naming many prominent features.

Several shipwrecks have been found just offshore the Island near the Cape Inscription area. The French whaler, *Perseverant*, foundered off Dirk Hartog Island in 1841 and crew from the ship spent several weeks camped on the island with five men dying of scurvy (Henderson 1980 cited in Stanbury 1986). The place where the *Perseverant* foundered and the adjacent survivors' camping area require protection and interpretation. Green *et al.* (2007) recommends that the site be declared a maritime archaeological site under the Maritime Archaeology Act and a site management plan including interpretation requirements be prepared in consultation with WAMM.

Guano loading was a hazardous task and in 1850 the *Prince Charlie* struck Cape Levillain after loading guano (Henderson 1980 cited in Stanbury 1986). In 1878 the brigantine *Macquarie* also ran aground on the Levillain shoal (WAMM file cited in Stanbury 1986). The *Beagle* in 1904 is believed to have temporarily run aground at Dampier Reef to the north of the island. A cyclone in 1921 resulted in a pearl boat being washed ashore on Dirk Hartog Island at a place called Tumbledown and two Malay sailors were drowned (Fry 1995).

Post Settlement

Dirk Hartog Island was first settled for pastoral purposes in 1860 with the first lease issued to von Bibra in 1868 (Cooper 1997). Over the years the island pastoral lease has had various lessees and by

the early 1960s it was estimated to contain 20 000 sheep (Cooper 1997) but today has about 300 sheep. Several out-camps were constructed including Sammy Well at Dampier Landing near Cape Levillain.

To protect coastal shipping, construction of a lighthouse at Cape Inscription was commenced in 1908 along with quarters for two lighthouse keepers, a storehouse, oil store, a 20,000 gallon underground water tank and stable (Palassis Architects 1996, Grey & Forgione 2004). In Turtle Bay, a 232 foot long jetty was built with a two foot gauge tramway to facilitate the delivery of goods to the lighthouse and a horse operated winch to haul freight up the cliffs (Cooper 1997). In 1917 the lighthouse became automated and consequently unmanned. The Cape Inscription area was placed on the Australian Register of the National Estate on 6 October 1994 and on the National Heritage List in 2006. The Cape Inscription Lighthouse and Quarters was entered on the register of Heritage Places (P03261) in 2001. It is also classified by the National Trust of Australia (WA) and adopted to the Shire of Shark Bay Municipal Heritage Inventory. (DBCA 2010)

5. DHI NATURE BASED PARK (CAMPING)

5.1 Summary

The existing Dirk Hartog Island Eco Lodge on Lot 62 on Deposited Plan 103194 Dirk Hartog Island, Shark Bay, is situated in the Shark Bay area approximately 36km east of the township of Denham. Shark Bay is located on the mid-west coast of Western Australia, some 700 kilometres north of Perth. Lot 62 borders the Shark Bay Marine Park, and lies within the Shark Bay World Heritage Area.

The lodge is located within the original freehold lot allocated to the pastoral station owners. This 40ha parcel of land which is undeveloped, but historically has been used for pastoral purposes. The lodge site itself is situated on land which has a long history of grazing pressures from both sheep and feral goats.

Dirk Hartog Island Eco Lodge has become an exclusive tourist destination with the main attraction being the isolation, rustic luxury and family friendly environment. The site also provides facilities for both tourists and DBCA staff as the site of the only permanent residents on the island.

To expand the offer from the exclusive and limited accommodation options to include an affordable camping facility that targets a nature-based family demographic a Nature Based Park has been developed. The Eco Lodge is based on Lot 62 and the majority of the proposed nature-based park is based on Lot 303 on Deposited Plan 50257. Lot 303 is approx. 17ha and when combined with lot 62 has a size of approx. 57ha. The camping sites are located on severely degraded land with little to no vegetation due to overgrazing. (see image below)taken in circa 2006..

Image above shows virtually no vegetation exists on the area of the now Nature Based Park

This area has been slowly regenerated over the past 10 years to develop strategically located campsites protected by native vegetation that have been planted to help slow the movement of soil. Currently, the lodge and associated accommodation only sleeps approx. 24 people. The development of the Nature Based camping facilities will allow for an additional 80 people.

Image above shows considerable revegetation of the Homestead area and campgrounds.

In total only 0.21ha of vegetation is required to be cleared (i.e. 0.36% of the total combined area of both lots) to address the specific requirements of the recently endorsed Bushfire Management Plan for the land as it applies to asset protection zones, visitor safety, vehicle access tracks/driveways and internal perimeter strategic firebreaks.

Twenty three (23) camp sites, three (3) x camp kitchens and associated ablution facilities, a new strategic firebreak around the periphery of all existing and proposed development on the land as required by the Council endorsed Bushfire Management Plan and a new vehicle access track comprising a horizontal width of 6 metres with a 4 metre bare earth trafficable surface and passing bays, all of which are located entirely on Lots 62 & 303. A total of approximately 2,100m^2 of native vegetation is required to be cleared (i.e. 0.36% of the total combined area of both lots) to address the specific requirements of the recently endorsed Bushfire Management Plan for the land as it applies to asset protection zones, visitor safety, vehicle access tracks/driveways and internal perimeter strategic firebreaks.

5.2 Physical Elements

23 x nature-based campsites strategical placed within a severely degraded site on Lot 303 & 62

3 x camp kitchens with associated facilities including toilets and showers

3 x septic tanks and leach drains

1 x strategic fire break to satisfy the approved bushfire management plan

0.21ha of native vegetation clearing is required to install the strategic fire break

300m of vehicle access tracks to satisfy the approved bush fire management plan

5.3 Basis for Justifying the Nature Based Park

The development of a Nature Based Park will provide the facilities and amenities that are currently not available within the Dirk Hartog Island National Park (DHINP). The Nature Based Park on lot 303 is developed for the rapidly growing visitor numbers to DHINP seeking a safe and friendly environment before and after visiting the DHINP. These visitors are high yielding and are nature conscious meaning they are the perfect demographic to target and complements the DBCA's 'Return to 1616' project. Through providing these facilities, the pressure on DBCA to develop appropriate camping grounds within the DHINP will be reduced.

It is envisaged over time DBCA will develop a tourism strategy that will see a development plan for upgrading facilities within the DHINP. These facilities could include walk trails, interpretive signage, 4WD tracks and toilets. DBCA have recognised that although visitor numbers have been growing rapidly, critical mass has not been reached and therefore funds are not available for any upgrade of facilities within the DHINP.

Private investment is required to provide the facilities for a higher yielding visitor and to reduce the environmental impact of visitors to the DHINP.

5.4 Land Tenure

Dirk Hartog Island National Park (Reserve 50325), is a class A reserve of 62,928.5 ha. It was created on 29 October 2009 for the purpose of 'national park'. The park was created as a result of the State Government's purchase of Dirk Hartog Island pastoral lease (PL No. 3114/400) in 2009. The proposed name is subject to endorsement by the Department's nomenclature committee and approval of the State Geographic Names Committee.

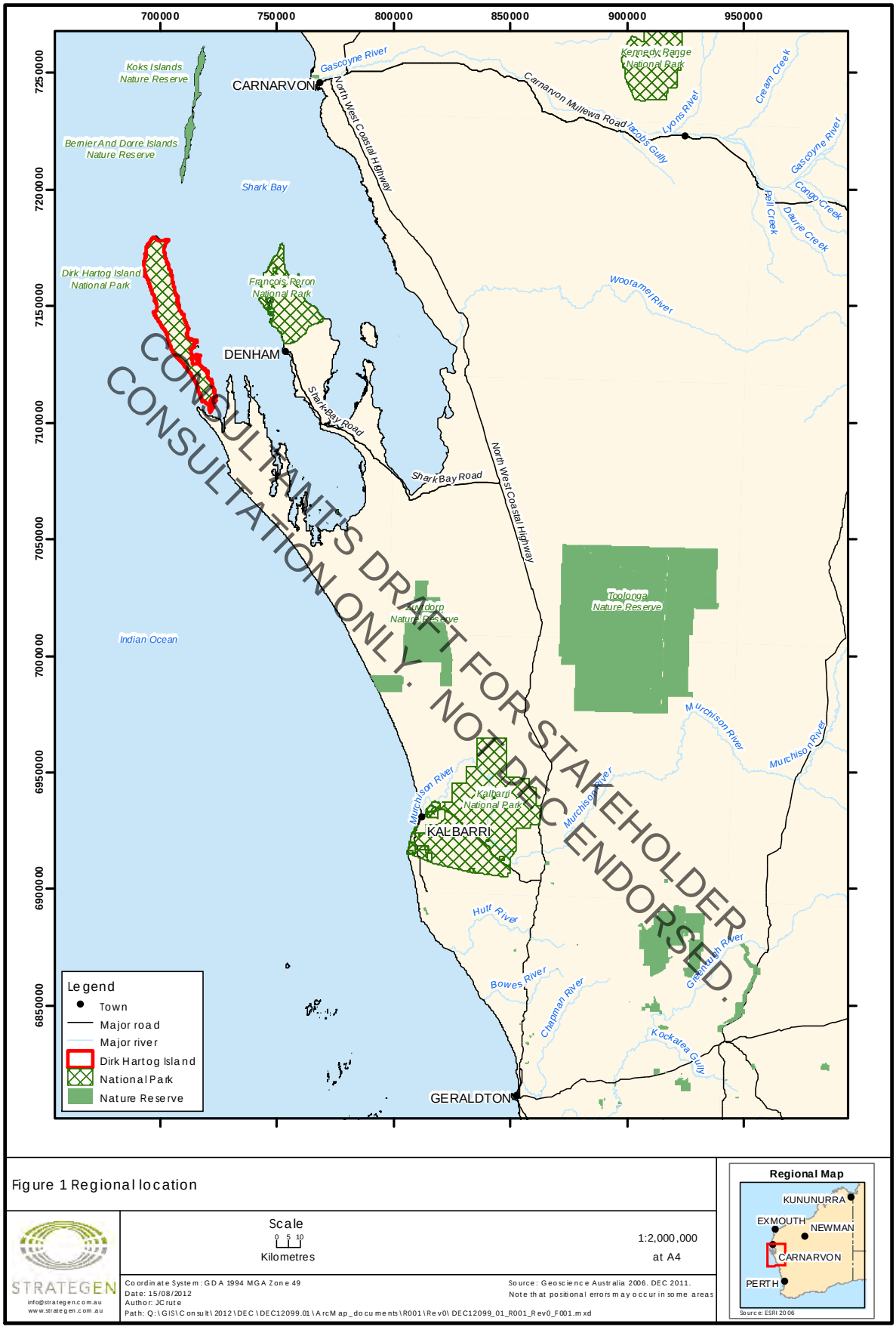
The park incorporates the 40 m strip of UCL beteeen the former pastoral lease boundary and HWM. On the eastern, northern and southern sides of the island, it adjoins the Shark Bay Marine Park at HWM. On the western side of the island adjacent to the Zuytdorp Cliffs, the park extends to LWM. In the event that the Shark Bay Marine Park is extended to include the western part of the coastline, the boundary of the terrestrial reserve will be changed from LWM to HWM and the marine park boundary established to HWM.

As part of the settlement, two existing freehold lots (Edel Location 20 (16 ha) and North Location 63 (40.47 ha) were relinquished by the pastoral lessee and incorporated into the national park. Three

new freehold lots were established, two (Lot 304 [about 11.3 ha] and Lot 305 [about 4.6 ha]) at Sunday Island Bay and one (Lot 303 about 17.3 ha) adjoining the existing homestead freehold lot (Location 62 [about 42 ha]). The existing homestead lot extends to LWM. Also as part of the settlement, Lot 300 was created for a lease over an area adjacent to Cape Levillain (about 2.5 ha) for the purpose of ecotourism.

5.5 Location

Freehold Lots 62 & 303 are located approximately 20km north of the Cape Ransonnet which is the southern-most point on Dirk Hartog Island. These lots are on the eastern side of the island and are protected from the prevailing winds as they are north facing.


700000
750000
800000
850000
900000
950000
7250000
7200000
7150000
7100000
7050000
7000000
6950000
6900000
6850000
Koks Islands Nature Reserve
Bernier And Dorre Islands Nature Reserve
Dirk Hartog Island National Park
Francois Peron National Park
Shark Bay
Indian Ocean
CARNARVON
DENHAM
KALBARRI
GERALDTON
Gascoyne River
North West Coastal Highway
Carnarvon Mullewa Road
Jacobs Gully
Lyons River
Kennedy Range National Park
Cream Creek
Gascoyne River
Congo Creek
Pell Creek
Dalrie Creek
Woorarnel River
Shark Bay Road
Zuytdorp Nature Reserve
Toolonga Nature Reserve
Murchison River
Kalbarri National Park
Hutt River
Bowes River
Chapman River
Greenough River
Kockatea Gully
CONSULTANTS DRAFT FOR STAKEHOLDER CONSULTATION ONLY. NOT DEC ENDORSED.
Legend
Town
Major road
Major river
Dirk Hartog Island
National Park
Nature Reserve
Regional Map
KUNUNURRA
EXMOUTH
NEWMAN
CARNARVON
PERTH
Source: ESRI 2006
Figure 1 Regional location
STRATEGEN
info@strategen.com.au
www.strategen.com.au
Scale
0 5 10
Kilometres
1:2,000,000
at A4
Coordinate System: GDA 1994 MGA Zone 49
Date: 15/08/2012
Author: JCrute
Path: Q:\GIS\Consult\2012\DEC\DEC12099.01\ArcMap_documents\R001\Rev0\DEC12099_01_R001_Rev0_F001.mxd
Source: Geoscience Australia 2006. DEC 2011.
Note that positional errors may occur in some areas

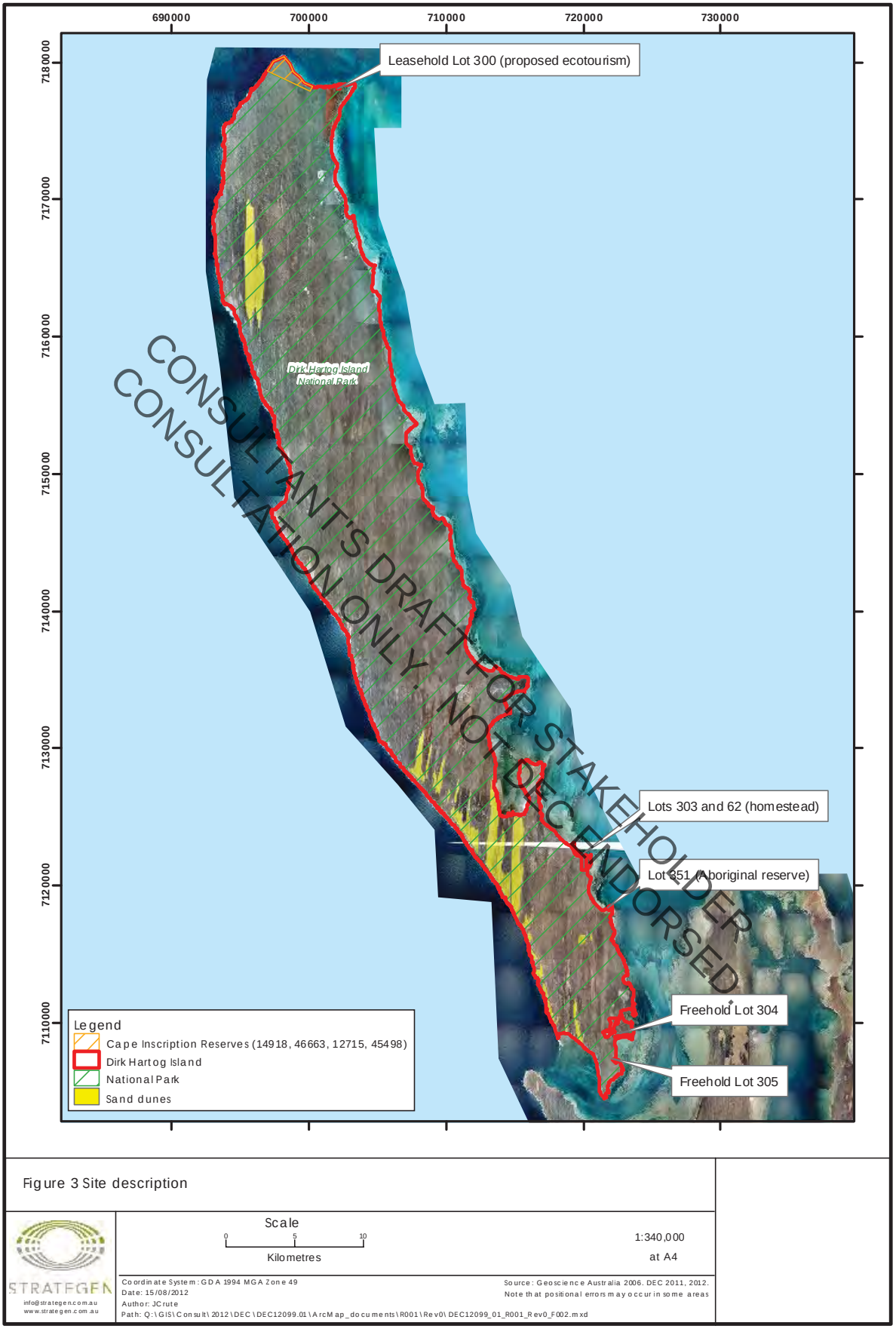


Figure 3 Site description

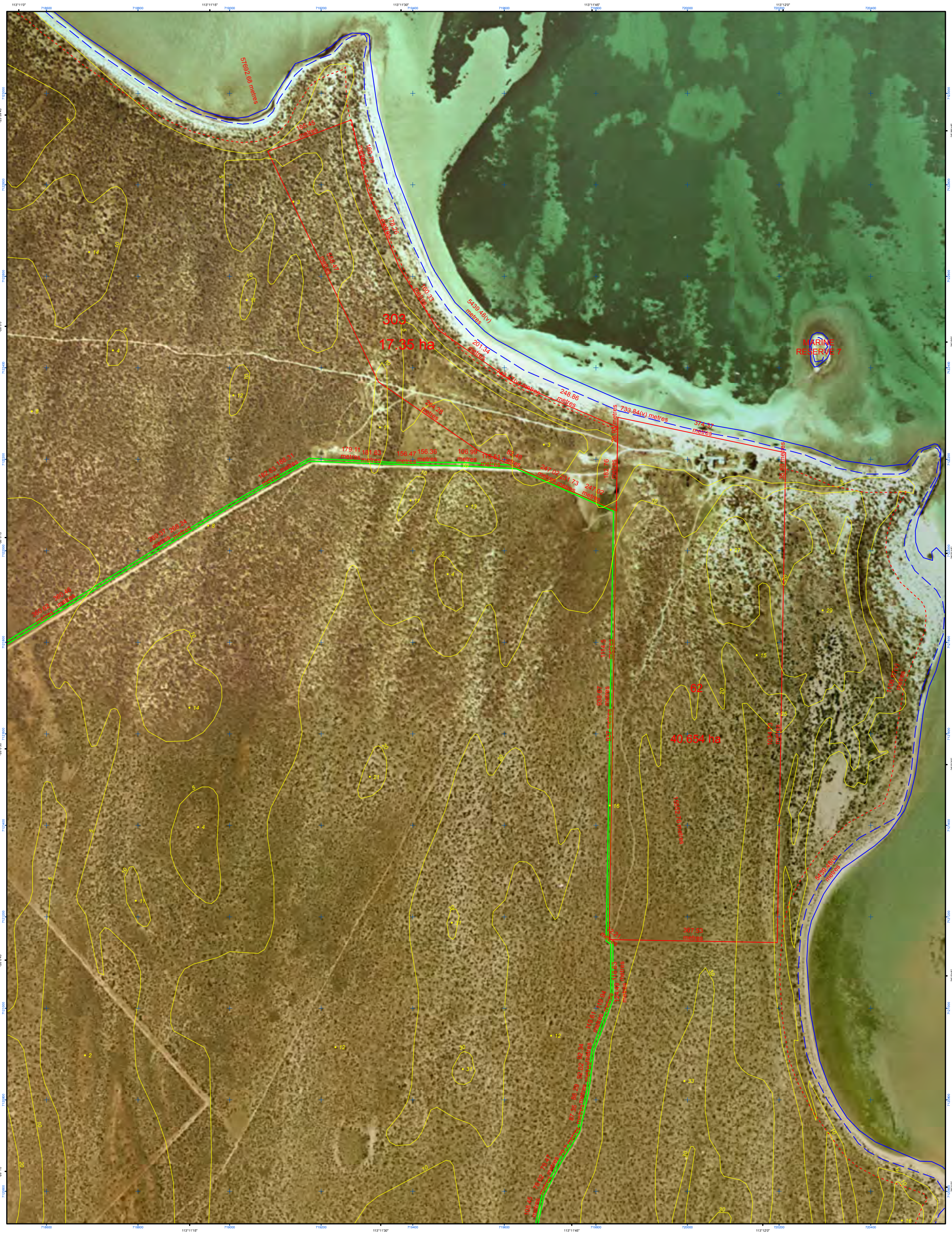
STRATEGEN
info@strategen.com.au
www.strategen.com.au

Scale
0 5 10
Kilometres

1:340,000
at A4

Coordinate System: GDA 1994 MGA Zone 49
Date: 15/08/2012
Author: JCrute
Path: Q:\GIS\Consult\2012\DEC\DEC12099.01\ArcMap_documents\R001\Rev0\DEC12099_01_R001_Rev0_F002.mxd

Source: Geoscience Australia 2006. DEC 2011, 2012.
Note that positional errors may occur in some areas



100 50 0 100 200 300 400 Metres

Scale: 1:5,000

Refer to this map as a SkyView Cad & Contour Map of:

Lot 303 Dirk Hartog Island

MAP USER INFORMATION

PROJECTION	Universal Transverse Mercator.
DIMENSION DATUMS	Horizontal: Geocentric Datum of Australia 1994. Vertical: Australian Height Datum 1971.
GRID VALUES	Map Grid of Australia (MGA) values are shown in metres.
GRATICULE VALUES	Longitude & latitude values are shown in degrees, minutes and seconds.
DATA SOURCES	Orthophoto sourced from SkyView WA ortho-rectified mosaics. Cadastral and Tenure information sourced from the Spatial Cadastral Database (SCDB) of Western Australia. Contour information sourced from Landgate Topographical Dataset.

GDA

ORTHOPHOTO MOSAIC INFORMATION

Mosaic Name:	Shark Bay Mosaic
Date Flown:	January 2003
Ground Pixel Size (Metres):	1.4
Scanned at (dpi):	453dpi
Capture Scale:	1:25 000
Accuracy:	+/- 10m

CADASTRAL HORIZONTAL ACCURACY

+/- 1.0 millimetre at map scale for areas/boundaries that have not been spatially upgraded (this translates to 2 metres at 1:2 000 and 250 metres at 1:250 000).
+/- 0.2 metres in spatially upgraded urban areas.
+/- 2.0 metres in spatially upgraded rural areas.
+/- 10.0 metres in spatially upgraded pastoral/remote areas.

	Surveyed	Unsurveyed
Cadastral Boundary		
Water Mark		
Interests		
Lot Number	52	

TOPOGRAPHIC DATA (ACCURACIES STATED ARE RELATIVE TO THE SCALE OF CAPTURE)

Captured from:	1:40 000 scale aerial photography
Date of Capture:	June 1999
Contour Interval (m):	10
Accuracy (m):	+/- 3.13 m horizontal, 1.67 m vertical (contours)
Source of data:	Landgate
Contour	30
Spot Height	• 29.14

N
Grid North

Landgate

Street address: 1 Midland Square, Midland, WA 6056
Postal address: PO Box 2222, Midland, WA 6936
Tel: (08) 9273 7373 Fax: (08) 9273 7666
eMail: sales@landgate.wa.gov.au
Internet: www.landgate.wa.gov.au
Digital orthophotos are available from Landgate's eShop
www.landonline.com.au
Digital cadastral and tenure information is available from Landgate's
GEOSPATIAL PRODUCTS & SERVICES
Tel: (08) 9273 7045 Fax: (08) 9273 7655
eMail: geodata@landgate.wa.gov.au

Printed as at:

Tuesday, 4 March 2008

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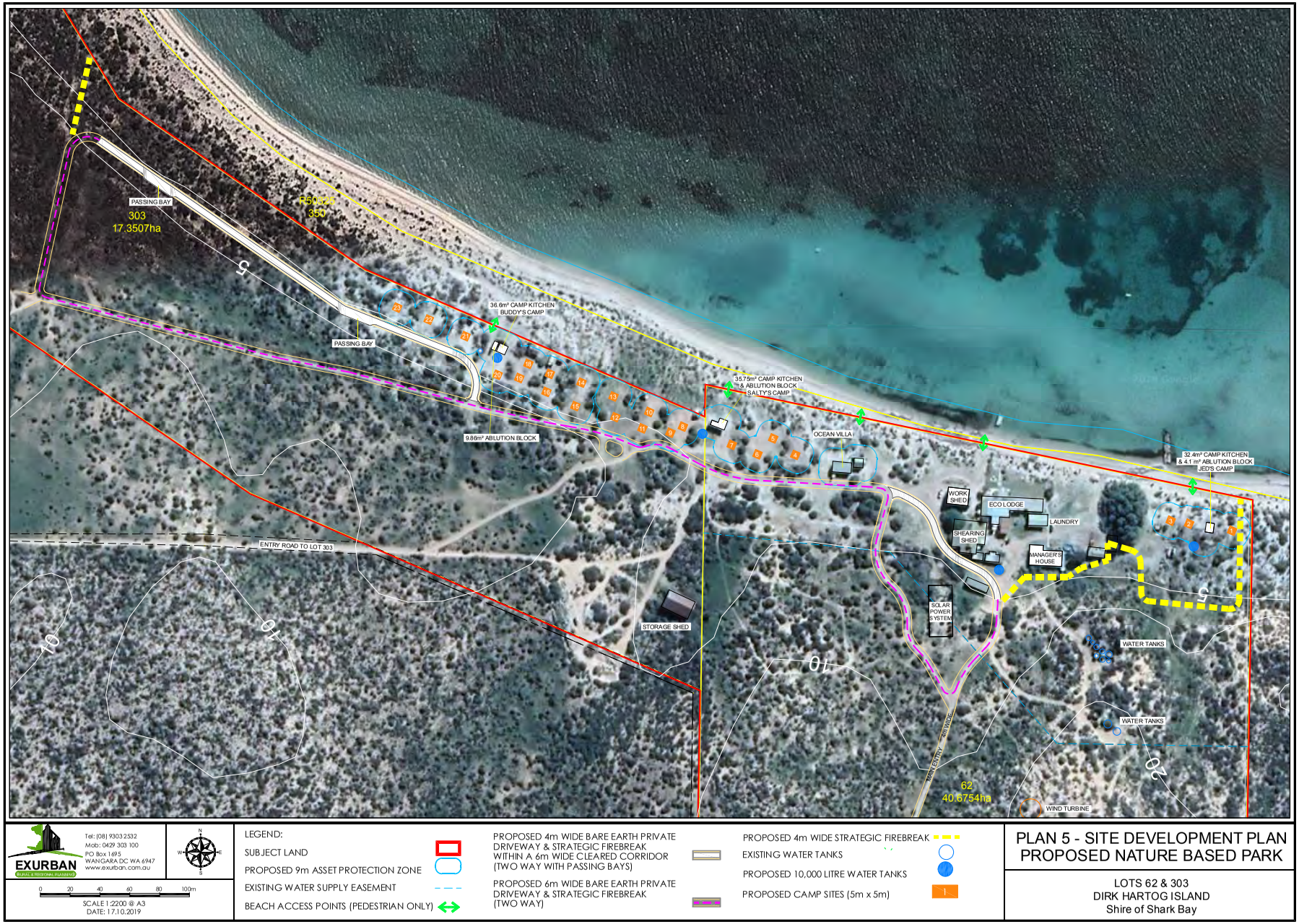
Our Ref: Job Job_2868 07/08

FOR INFORMATION PURPOSES ONLY. THIS MAP IS A PICTORIAL REPRESENTATION OF DATA EXTRACTED FROM LANDGATE DATASETS AND IS INTENDED TO BE AN OVERVIEW OF GENERAL GEOSPATIAL INFORMATION



EXURBAN
Tel: (08) 9303 2532
Mob: 0429 303 100
PO Box 1695
WANGARA DC WA 6947
www.exurban.com.au

0 20 40 60 80 100m

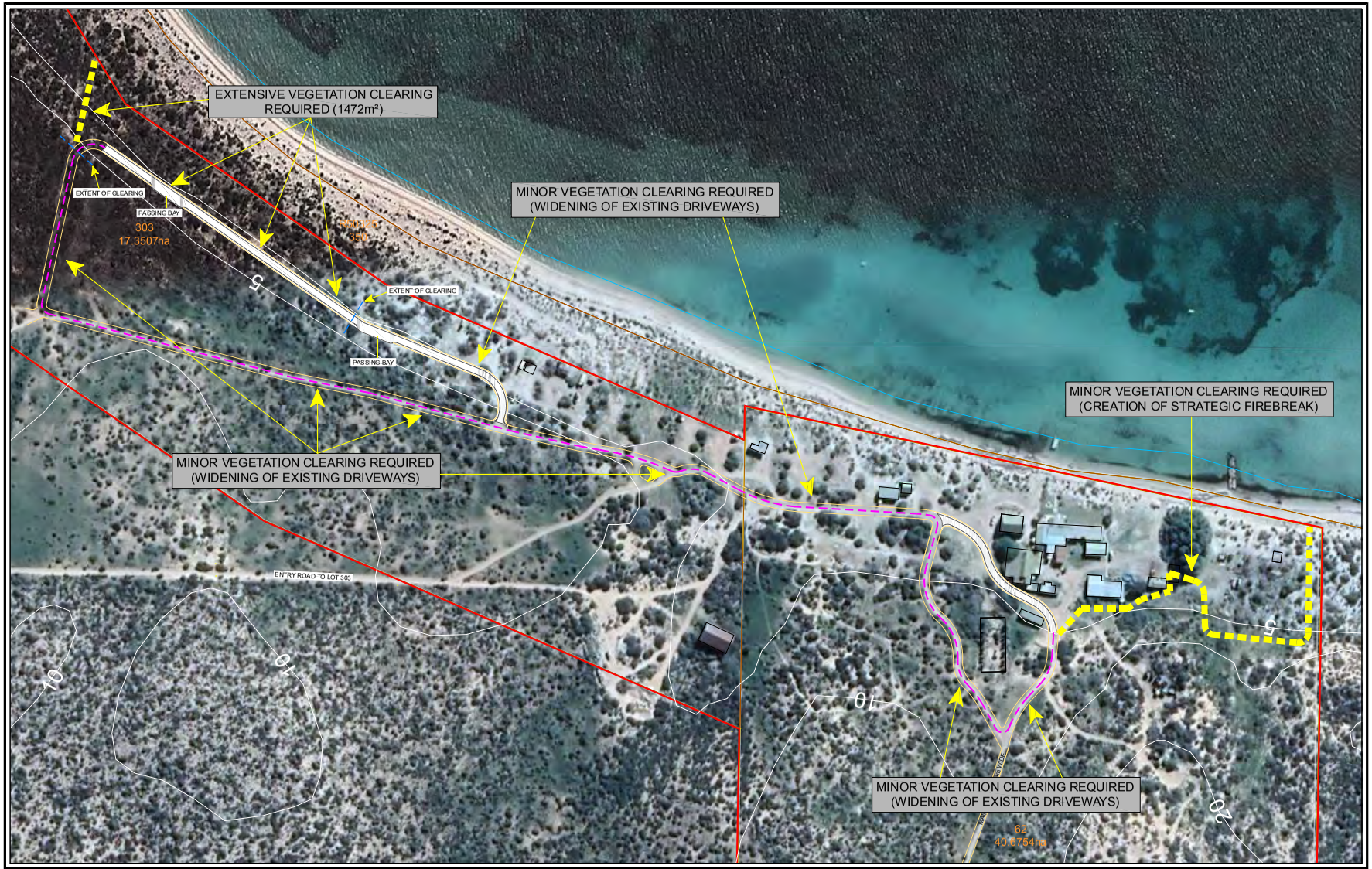
SCALE 1:2200 @ A3
DATE: 17.10.2019

LEGEND:

- SUBJECT LAND
- PROPOSED 9m ASSET PROTECTION ZONE
- EXISTING WATER SUPPLY EASEMENT
- BEACH ACCESS POINTS (PEDESTRIAN ONLY)
- PROPOSED 4m WIDE BARE EARTH PRIVATE DRIVEWAY & STRATEGIC FIREBREAK WITHIN A 6m WIDE CLEARED CORRIDOR (TWO WAY WITH PASSING BAYS)
- PROPOSED 6m WIDE BARE EARTH PRIVATE DRIVEWAY & STRATEGIC FIREBREAK (TWO WAY)
- PROPOSED 4m WIDE STRATEGIC FIREBREAK
- EXISTING WATER TANKS
- PROPOSED 10,000 LITRE WATER TANKS
- PROPOSED CAMP SITES (5m x 5m)

PLAN 5 - SITE DEVELOPMENT PLAN
PROPOSED NATURE BASED PARK

LOTS 62 & 303
DIRK HARTOG ISLAND
Shire of Shark Bay



EXURBAN
Tel: (08) 9303 2532
Mob: 0429 303 100
PO Box 1695
WANGARA DC WA 6947
www.exurban.com.au

SCALE 1:2200 @ A3
DATE: 31.10.2019

LEGEND:

SUBJECT LAND

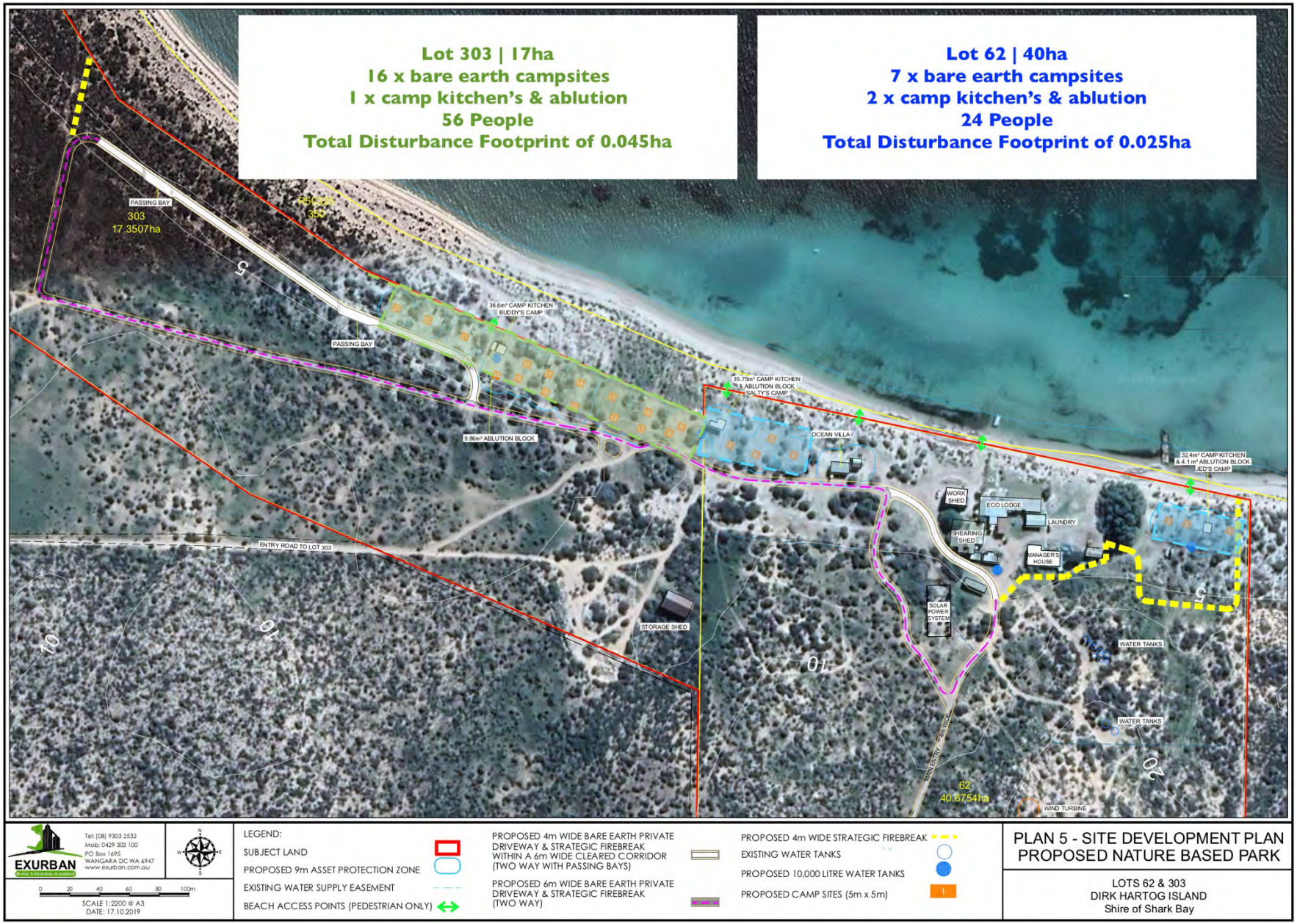
PROPOSED 4m WIDE STRATEGIC FIREBREAK

PROPOSED 4m WIDE BARE EARTH PRIVATE DRIVEWAY & STRATEGIC FIREBREAK WITHIN A 6m WIDE CLEARED CORRIDOR (TWO WAY WITH PASSING BAYS)

PROPOSED 6m WIDE BARE EARTH PRIVATE DRIVEWAY & STRATEGIC FIREBREAK (TWO WAY)

PLAN 6 - SITE WORKS PLAN
PROPOSED NATURE BASED PARK

LOTS 62 & 303
DIRK HARTOG ISLAND
Shire of Shark Bay


Lot 303 | 17ha
16 x bare earth campsites
1 x camp kitchen's & ablution
56 People
Total Disturbance Footprint of 0.045ha
Lot 62 | 40ha
7 x bare earth campsites
2 x camp kitchen's & ablution
24 People
Total Disturbance Footprint of 0.025ha
PASSING BAY
303
17.3507ha
PASSING BAY
36.6m² CAMP KITCHEN
BUDDY'S CAMP
35.75m² CAMP KITCHEN
& ABLUTION BLOCK
SALTY'S CAMP
9.86m² ABLUTION BLOCK
OCEAN VILLA
32.4m² CAMP KITCHEN
6.4.1 m² ABLUTION BLOCK
JED'S CAMP
WORK SHED
ECO LODGE
LAUNDRY
SHEARING SHED
MANAGER'S HOUSE
SOLAR POWER SYSTEM
WATER TANKS
WATER TANKS
ENTRY ROAD TO LOT 303
STORAGE SHED
62
40.6754ha
WIND TURBINE
EXURBAN
Tel: (08) 9303 2532
Mob: 0429 303 100
PO Box 1495
WANGARA DC WA 6947
www.exurban.com.au
SCALE 1:2200 @ A3
DATE: 17.10.2019
LEGEND:
SUBJECT LAND
PROPOSED 9m ASSET PROTECTION ZONE
EXISTING WATER SUPPLY EASEMENT
BEACH ACCESS POINTS (PEDESTRIAN ONLY)
PROPOSED 4m WIDE BARE EARTH PRIVATE DRIVEWAY & STRATEGIC FIREBREAK WITHIN A 6m WIDE CLEARED CORRIDOR (TWO WAY WITH PASSING BAYS)
PROPOSED 6m WIDE BARE EARTH PRIVATE DRIVEWAY & STRATEGIC FIREBREAK (TWO WAY)
PROPOSED 4m WIDE STRATEGIC FIREBREAK
EXISTING WATER TANKS
PROPOSED 10,000 LITRE WATER TANKS
PROPOSED CAMP SITES (5m x 5m)
PLAN 5 - SITE DEVELOPMENT PLAN
PROPOSED NATURE BASED PARK
LOTS 62 & 303
DIRK HARTOG ISLAND
Shire of Shark Bay

5.6 Environment

The biota of the terrestrial environment of the Dirk Hartog Island is affected by a range of ecological processes including climate, geomorphology, hydrology and soils. Dirk Hartog Island is at the meeting point of three major climatic regions. Due to its geographical position Dirk Hartog Island is influenced by the winter rainfall of the south-west and the summer rainfall of the north but its arid to semi-arid climate makes rainfall irregular.

Dirk Hartog Island is of great zoological and botanical importance, containing habitats of many species at the limits of their range. Dirk Hartog Island contains several endemic animal species that are present because of the climatic, geomorphological, hydrological and soil conditions. This is of importance not only because of their presence but also for understanding the biological evolution of the area.

Dirk Hartog Island forms the transition zone between two major botanical provinces – the South West dominated by eucalypt species and the Eremaean dominated by acacia species.

Dirk Hartog Island is also an area of major zoological importance primarily as a result of the isolation of habitats on peninsulas and islands. Some fauna species that have become extinct on the mainland have survived on these islands. The global significant loggerhead turtle rookery at Turtle Bay on DHI has not been affected by fox predation due to its island location in contrast to many turtle rookeries on the mainland which have been severely impacted by foxes.

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 area and relative intactness of the vegetation ensure the maintenance of the integrity of ecological processes.

- *Peron Sandstone* – red aeolian sandstone which accumulated as a series of interlocking longitudinal and transverse dunes, primarily exposed on Peron Peninsula;
- *Tamala Limestone* – a succession of aeolian limestone dune deposits most of which probably accumulated during glacial periods of the Pleistocene when sea levels were much lower than they are today. They are found mostly on the Edel Land Peninsula;

Between the Pleistocene dune ridges are evaporite deposits that form birridas (salt flats). They consist largely of gypsum and are probably Pleistocene in age.

Soils

Typically, the soils of Dirk Hartog Island are sandy. Payne *et al.* (1987) described four geomorphical districts based on soil types across the Shark Bay area, two of which occur on Dirk Hartog Island:

- *Coastal Dune* – occupies the western edge of Edel Peninsula and the islands to the north (Dirk Hartog, Dorre and Bernier). The soils are almost entirely uniformly sandy and generally calcareous;
- *Tamala Limestone* – includes areas adjacent to the Zuytdorp cliffs. The soils formed from the Tamala Limestone include brownish sands on undulating plains and sandplains; calcareous sands on the coastal dunes and sandplains; shallow lithosols on low hills and stony plains; shallow friable calcareous loams on stony plains and low rises; adjacent to limestone outcrops; and

Soil type will influence the amount of soil loss or movement, soil compaction, loss of vegetation, the potential intrusion of weeds and where developments may be situated. Coastal dunes are particularly susceptible to erosion and take considerable time to rehabilitate.

Native Plants and Vegetation

The Shark Bay area is significant for flora, being located in the transition zone of two botanical provinces – the South West and Eremaean. As such, there are many endemic flora species and many species located at the northern and southern limits of their geographical range. The transition zone is most evident on parts of former Nanga and Tamala Stations, Carrarang stations, Dirk Hartog Island and Bernier and Dorre Islands (URS 2000).

Flora

Dirk Hartog Island has high species richness for flora with a recorded list of 266 species.

There are no listed declared rare flora on Dirk Hartog Island. Dirk Harog Island contains six Priority 2, two Priority 3 and two Priority 4 flora:

Species	Priority
Angianthus microcephalus	P2
Eremophila glabra subsp. psammophora	P2
Lepidium biplicatum	P2
Melaleuca huegelii subsp. pristicensis	P2
Olearia occidentissima	P2
Ptilotus alexandri	P2
Lepidobolus densus	P3
Stenanthemum divaricatum	P3
Lepidium puberulum	P4
Triodia bromoides	P4

Vegetation Communities

The main vegetation associations on Dirk Hartog Island are:

- spinifex hummock grassland with on overstorey of either *A. coriacea*, *Pittosporum phylliraeoides* over *A. ligulata*, or *Diplolaena dampieri*, *Exocarpus sparteus* shrubs over *Triodia* sp. In other areas *Acanthocarpus preissii* and *Atriplex bunburyana* chenopods or shrubs over hummock grasses across the majority of the island; and
- mixed open chenopod shrubland of *Atriplex* sp., *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.

There are patches of bare areas of drift sand across the island. In some parts there are a few birridas. On the east coast there are small patches of mixed open heath of *Diplolaena dampieri*, *Myoporum* sp. and *Conostylis* sp. shrubs.

5.7 Social Context

Tourism

Tourism on the island has been pioneered by Kieran & Tory Wardle and they have invested over 27 years of their life developing the industry with improved access, refurbishment of the Eco Lodge and establishing campgrounds. They have created a tourism destination that is quickly becoming a 'must do' on traveller's list.

The introduction of a purpose-built landing barge in 2015 by Kieran & Tory has opened up access to the island that has appeal to the 'experience seeker' market. Although there has been significant growth in this product and is forecast to grow further, there is a market perception that the product is too expensive. Our intensions are not to appeal to the 'mass markets' and turn the island into another 'Fraser Island'. Our plan is to progressively improve infrastructure, visitor experiences and services and align with Parks & Wildlife's 'Return to 1616' project. This will position the island as a quality nature based, heritage and cultural destination appealing to specific interest target markets.

Visitor numbers are increasing each year since the introduction of the barge. Total annual visitor numbers to Dirk Hartog Island last year were approximately 1800 people, of which approximately 1200 stayed either in the DHINP or the camp grounds at Homestead Bay. The other 600 people stayed in the Eco Lodge. The average stay is 6 nights. The main attraction is the natural environment and escaping the crowds to enjoy camping, snorkelling, fishing and wildlife encounters. Homestead Bay camp grounds provided DBCA researcher staff (Return to 1616 restoration project) facilities to be based at to study the southern end of DHINP.

Aboriginal Heritage and Culture

The Shark Bay area is significant to Aboriginal people because of the long history of use and occupation and because they have a cultural obligation to understand and care for the area. Aboriginal caring for country is about the protection of significant sites and, just as importantly, the interconnected nature of the sites, people and environment.

Dirk Hartog Island is within the area of the Malgana people Native Title claim.

There has been limited formal archaeological research conducted on Dirk Hartog Island and there is limited knowledge of Aboriginal occupation of the island. There are several known midden sites on the island but the DIA database provides only one record of a midden site in the north-west corner of the island. The period of occupation by Aboriginal people on the island has yet to be determined.

The French explorer St Alouarn in 1772 recorded seeing smoke on the island as they sailed past Dirk Hartog Island. Crew found what they believed was evidence of fires and a cleared area for dancing. However, no other early European explorer recorded signs of Aboriginal people or evidence of their occupation of the island.

Native Title

In June 2007, Hypermarket Pty Ltd and the Malgana native title claimant (represented by the Yamatji Land and Sea Council) reached agreement on a native title claim over Lot 303. The agreement accepted the land allocation from the WA State Government to Hypermarket Pty Ltd and agreed that no Aboriginal cultural sites are located on Lot 303. (Appendix D)

6. POTENTIAL ENVIRONMENTAL IMPACTS, THEIR SIGNIFICANCE AND POSSIBLE MANAGEMENT SOLUTIONS

The key mitigation strategy for the proposal is avoidance by design, particularly regarding the retention of conservation significant vegetation within the Nature Based Park, which provides habitat for conservation significant fauna.

Flora & Fauna | Coastal Processes | Landscape Values | World Heritage

6.1 FLORA & FAUNA

The Site includes pockets of coastal shrubland vegetation with scattered trees to provide shade, shelter and visual amenity for guests.

A basic desktop assessment for environmental values has been completed. Data provided through the Protected Matters Search Tool, accessed 21 January 2019, did not show any threated flora recorded within the area. The search did identify a large number of threatened fauna species likely to be found in proximity to the Site. SLIP data identified the Site as being within the Shark Bay World Heritage area. The Site is within the Dirk Hartog National Park.

Significant environmental values identified within the Site

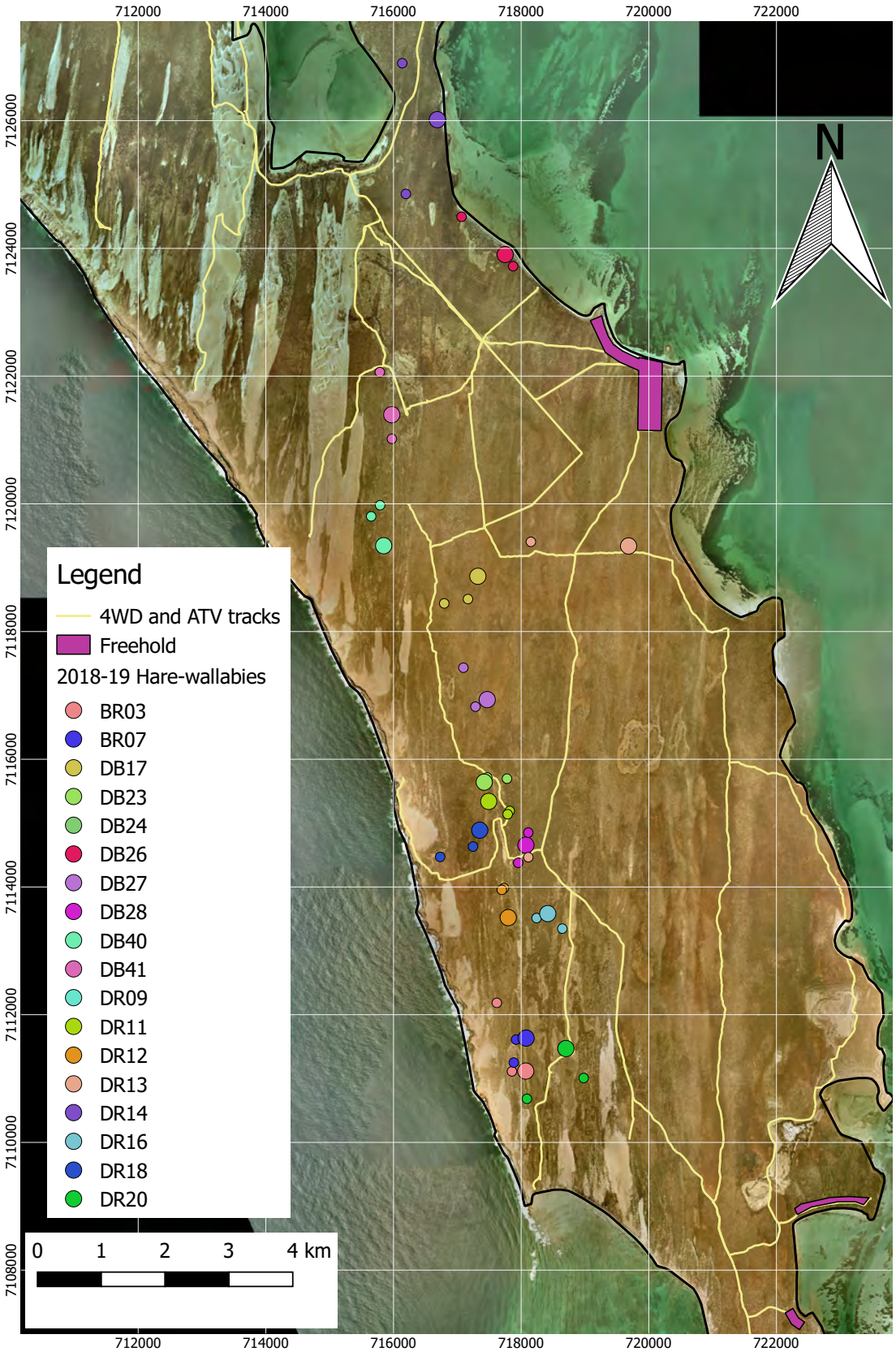
Conservation Covenants:	NO
Bushfire Forever Sites:	NO
Conservation Category Wetlands and Buffer	NO
Threatened Ecological Communities (TECs)	NO
Declared Rare Flora (DRF)	NO
Significant through Local Planning or Biodiversity Strategy	YES | Shark Bay World Heritage Area & Dirk Hartog National Park

Terrestrial Fauna

The DHI National Park ecological restoration project, entitled Return to 1616, offers a unique opportunity to restore the major ecological values of DHI to what they were when the Dutch navigator Dirk Hartog landed on the island in 1616; it is the largest ecological restoration project in the southern hemisphere. This would be achieved by first eradicating sheep, feral goats and feral cats from the island; confirming black rat absence; implementing quarantine protocols; and re-establishing healthy vegetation and ecosystem processes. This would allow for the second stage of re-establishing 10 species (Shark Bay bandicoot, dibbler, boodie, Shark Bay mouse, stick-nest rat, woylie, heath mouse, desert mouse, mulgara and chuditch) of mostly threatened mammals and one native bird species (western grasswren). Two additional mammal species (rufous and banded hare-wallabies), that may have previously inhabited the island, will also be introduced for conservation purposes. Once completed, the terrestrial mammal fauna will be increased to 15 species, the most diverse of any Western Australian island, further enhancing the values of the World Heritage Property (DEC 2012a). Many of the mammal species are now restricted to a few offshore islands, or mainland fenced conservation enclosures (Morris et al. 2017); with eight species listed as threatened under the WA Wildlife Conservation Act 1950 and Commonwealth Environment Protection and Biodiversity Conservation Act 1999. *(Dirk Hartog Island National Park ecological restoration project Stage one final report February 2012 – February 2019)*

It is believed that the re-introduction of the above fauna will attract additional visitors to the island and therefore increase the risk of potential impact on the project. Mitigation of these risks will include working closely with DBCA management to address issues such as Bio-security, vegetation degradation, vehicles strikes and fire.

Dirk Hartog Island Pty Ltd operate the only public access barge operation to Dirk Hartog Island and is licensed to do so with DBCA. This license requires the operator to abide by the DHI Biosecurity Plan.



No Hare-wallabies are located on Freehold lot 62 or Lot 303 as per the above 2019 DBCA map. 2019

The wrens of Dirk Hartog Island National Park comprise six species: two fairy-wrens, an emu-wren, a grasswren, scrubwren and a fieldwren. They are a group of small, thin-billed, mainly insectivorous birds that live on or near the ground in shrubs, heaths and thickets. Three of which are listed WA status is Vulnerable.

Black & White fairy-wren:	Vulnerable
Southern emu-wren:	Vulnerable
Dirk Hartog rufous fieldwren:	Vulnerable

The impact of the proposed developments on the Grasswrens may be lessened by the retention of native vegetation, particularly large acacias, which is planned as a buffer along the Denham to Monkey Mia Road. Retention of this vegetation along the road would protect part of the territory of the group of Grasswrens that is likely to be displaced by the development (Bamford, 2003).

The wrens around Lots 62 & 303 have been observed regularly. The reasoning for this is probably due to the revegetation to area after the removal of the sheep and goats. Therefore, given the clearing of native vegetation is less than 0.21ha of the total land area, it is believed that the nature based park will have limited to no affect on wrens. It is more likely that through the revegetation programs will create larger areas of suitable vegetation around and within Lots 62 & 303 and therefore wren numbers may increase on the site.

Careful monitoring of the population, in conjunction with specifically scheduling clearing activities so that they are conducted well after the completion of nesting when the fledglings have left their nests may allow individuals to be protected.

Also, in conjunction with DBCA, there is the potential for the provision of signage and other educational materials to both park guests and day visitors, informing them of the important conservation status of the wrens. (see attached brochure from DBCA: *Wrens of Dirk Hartog Island National Park)*

The variability between years is particularly challenging in relation to being able to draw firm conclusions from monitoring, but the relatively large total population sizes for each species means that they are likely to be reasonably resilient, and all species surveyed were widespread on the island, suggesting that individual management actions with a small footprint are not likely to have a large population impact. Previous broad scale impacts (introduced grazing animals and feral cats) have now been removed from the island, and so future potential impacts are likely to be localised. Given the known abundance and widespread occurrence of the threatened bird species on the island, they should all be relatively secure. (Threatened birds on DHI, 2017-18 report: population estimates, A Burbidge June 2018)

6.2. Coastal Processes

Setbacks

The proposed nature-based park is on the boarder of the 100m guideline setback recommended by the State Coastal Planning Strategy. However, a reduced setback is considered critical to the success of the nature-based park for the special purpose of optimising visitor enjoyment. With over 1500km of mostly protected coastline contained in the Shark Bay World Heritage Area, a reduction of setback along the beach for a distance of just over 100m is not considered a significant impact.

However, dynamic coastal processes such as natural fluctuations in sea level and climate, climate change, storm events and shoreline changes, need to be considered when determining a sustainable setback for future developed structures.

An investigation to determine the vulnerability of the development to storm surge and the environmental consequences of undertaking protective works could be done. However it is considered that the infrastructure associated with the nature based park is negligible in terms of loss over its life span.

Foreshore Protection

Potential impacts of uncontrolled access through the foreshore environment include trampling of vegetation supporting the foreshore dunes, which in turn increases the erosion of the dunes and results in the need for rehabilitation of the areas. The Foreshore management plan has formalised access points from the nature-based park to the beach and any future boardwalk could be planned with DBCA in order to minimise the risk of erosion of the dunes. The locations for these access points are detailed further in a Foreshore Management Plan and site plan.

6.3 Landscape Values and Visual Amenity

Building Design

The existing development infrastructure in Homestead Bay has been constructed as single storey buildings which generally fit in well with the landscape. The view of Homestead Bay from the Shark Bay Marine Park is minimal and does not impact on the appearance of the area. The existing buildings in Homestead Bay have a unifying character of local stone, rustic corrugated tin which is generally mist green or grey. Although these are not apart of the World Heritage colour pallet, it is intended that any future structures to comply and meet the World Heritage standards.

Construction

Conventional earth-working machinery are only required to install the septic tanks and to clear the vegetation for the strategic fire breaks. This activity is not anticipated to have any potential impact on the landscape values for the area.

6.4 Waste Management

Marine Water Quality

The principle risk to marine water quality posed by the nature based park derives from sewerage and effluent disposal. Should insufficiently treated effluent reach the marine system it could cause eutrophication and contamination of near-shore waters and sediments with pathogens. Any resultant decline in water quality could trigger a decline in ecosystem structure.

The current septic tank effluent treatment system for the nature based park do not comply with the EPA's principles of best practice and continuous improvement as identified in EA Guideline 8. It is intended to a more suitable ATU or similar unit would replace the septic tanks over the coming years to comply with the EPA's guidelines.

Stormwater runoff is another potential source of contaminants to the marine environment. Runoff from small rainfall events may be managed by soil infiltration. However, occasional high volumes of rainfall, such as those which can occur during cyclonic events, may require stormwater from the nature based park to be discharged directly into the adjacent marine environment. The stormwater runoff from the park facility that could occur during cyclonic rains would contain elevated levels of sediments and other suspended solids. The increase in local turbidity is expected to be within the natural range.

6.5 World Heritage

Shark Bay was inscribed on the World Heritage List in 1991. The Shark Bay World Heritage Area is about 250 kilometres long and 130 kilometres wide covering an area of approximately 22,000km^2, 66% of this area is a marine environment and contains about 1500km of coastline (CALM, 1998).

It is one of the few World Heritage properties inscribed for all four outstanding natural universal values:

- As an outstanding example representing the major stages in earth's evolutionary history;
- As an outstanding example representing significant ongoing geological processes, biological evolution and man's interaction with the environment;
- Containing unique, rare or superlative natural phenomena, formations or features of exceptional natural beauty; and
- Containing the most important and significant habitats where threatened species of plants and animals of outstanding universal value from the point of view of science and conservation still survive (Environment Australia, 2001).

Primary Management Objectives

The Draft Strategic Plan for the Shark Bay World Heritage Property (CALM, 1998) details the specific objectives, strategies and actions that address the protection, conservation and presentation requirements of the Shark Bay World Heritage Property as required by the World Heritage Convention. Some of the objectives, strategies and actions that can be applied to this proposal are:

- Develop and implement effective management arrangements in order to maintain the integrity of World Heritage values, and the overall integrity of the World Heritage Property;
- Seek through effective consultation, the appropriate assessment of the impact of the activities or developments proposed to occur within or adjacent to World Heritage Property;

- Evaluate, monitor, and control through appropriate regulations, point sources of nutrient inputs into the marine and groundwater environments of the World Heritage Property;
- Minimise the impact of introduced plants and animals on World Heritage Values and the integrity of the World Heritage Property;
- Through collaboration, ensure human-induced disturbances to the integrity of World Heritage values are minimised;
- Maintain, and where appropriate, restore and enhance the integrity of visual seascape and landscape values of the World Heritage Property;
- Encourage residents and visitors to enjoy and appreciate the values of Shark Bay by providing for diverse and sustainable recreational activities that do not adversely impact on the World Heritage Values or overall integrity of the property;
- Through effective management avoid, or minimise, the adverse impact of nature-based tourism on the integrity of World Heritage values or the overall integrity of the property;
- Apply, where appropriate, the annual monitoring of environmental impacts as a condition of approval for tourism activities in the World Heritage property;
- Improve land and marine access in a manner which provides opportunities for the community to experience and appreciate World Heritage values whilst minimising adverse impacts; and
- Provide information that increases community knowledge about the World Heritage property and encourages support for the protection of World Heritage sites.

The above values and actions will be addressed along with the development of management strategies to maintain the integrity of the World Heritage Property in the local area.

7. RELEVANT ENVIRONMENTAL ISSUES AND CONSIDERATION OF MANAGEMENT RESPONSES

Relevant Environmental Issues and Factors and Proposed Scope of Work & Responses

7.1. Flora and Vegetation

Environmental Objective:	To minimise the impact upon the abundance, diversity, geographic distribution and productivity of flora at a species and ecosystem level through the avoidance or management of adverse impacts and improvements in knowledge.
Potential Impacts:	Loss of approx. 0.21ha of native vegetation
Work Required:	construction of strategic fire breaks
Potential Management:	Removal of vegetation to be kept to an absolute minimum. Studies by appropriately trained and experienced persons to identify the diversity, distribution and condition of the existing vegetation which may be directly or indirectly in the future.

7.2 Fauna

Environmental Objective:	To minimise the impact upon the abundance, diversity, geographic distribution and productivity of terrestrial fauna at a species and ecosystem level through the avoidance or management of adverse impacts and improvement in knowledge
Potential Impacts: project	Loss of territory for future introduced fauna through the Return to 1616 restoration
Work Required:	Document studies by appropriately trained and experienced persons that identify territories within the nature-based park area and determine the regional significance of the potential impacts.
Potential Management:	Fence the freehold lots to prevent natural fauna from entering the area

7.3 Coastal Processes

Environmental Factor:	Coastline immediately adjacent to the nature based park
Environmental Objective: landform and coast.	To maintain the integrity, ecological functions and environmental values of the
Potential Impacts:	Increase in visitors may cause erosion in coastal dunes. Landscape Values and Visual Amenity
Work Required: environment	Determine the potential impact of increased visitors upon the coastal dune
Potential Management	Provision of formalised beach access routes Ensure that the visual amenity of an area is not unacceptably affected by development and land use change.

7.4 Waste Management

Environmental Objective:	To ensure that emissions do not adversely affect the environment or health, welfare and amenity of people and nearby land uses by meeting statutory requirements and acceptable standards.
Potential Impacts:	Increased levels of waste water, nutrients, irrigation and stormwater run-off may impact upon groundwater and marine water quality of the surrounding area. Local hydrological zone and surrounding marine water Development is planned inside the 100m coastal setback.
Work Required	Describe how groundwater and marine water quality will be directly or indirectly impacted by the proposal. Determine the vulnerability of the development to storm surge and the environmental consequences of undertaking protective works will be undertaken as part of the PER
Potential Management	Development and implementation of a Foreshore Management Plan prior to construction. Development and implementation of Drainage Management Plan and Nutrient and Irrigation Management Plan. prior to construction.

7.5 World Heritage & Aboriginal Heritage

Environmental Objective	To ensure that changes to the biophysical environment resulting from the proposal do not affect the area's status as a World Heritage Area. To ensure that changes to the biophysical environment resulting from the proposal do not affect historical and cultural associations within the area and comply with relevant heritage legislation
Potential Impacts	Shark Bay World Heritage Area Values
Work Required	Determine potential impacts on the values of the World Heritage Area in the context of the objectives of Australia's management objectives for World Heritage Properties and the Draft Strategic Plan for the Shark Bay World Heritage Property.
Potential Management	Continue to monitor the visual, coastal and environmental impacts do not detract or detrimentally impact any applicable World Heritage Values

8. COMMUNITY AND OTHER STAKEHODER CONSULTATION PROGRAMME

During the preparation of future supporting documentation, Hypermarket Pty Ltd will continue consultation with the following stakeholders:

- Shark Bay World Heritage Property Scientific Advisory and Community Consultative Committees
- Department for Planning and Infrastructure
- Department Biosecurity, Conservation & Attractions
- Department of Environment
- Shire of Shark Bay