PLANNING AND DEVELOPMENT ACT 2005

Shire of Denmark
Town Planning Scheme No. 3
Amendment No. 140

The Shire of Denmark under and by virtue of the powers conferred upon it in that behalf by the *Planning and Development Act 2005* hereby amends the above Local Planning Scheme by:

a) Rezoning No. 738 (Lot 1) Ocean Beach Road, Ocean Beach, from 'Rural' zone to 'Tourist (T13)' zone and amending the Scheme Maps accordingly.

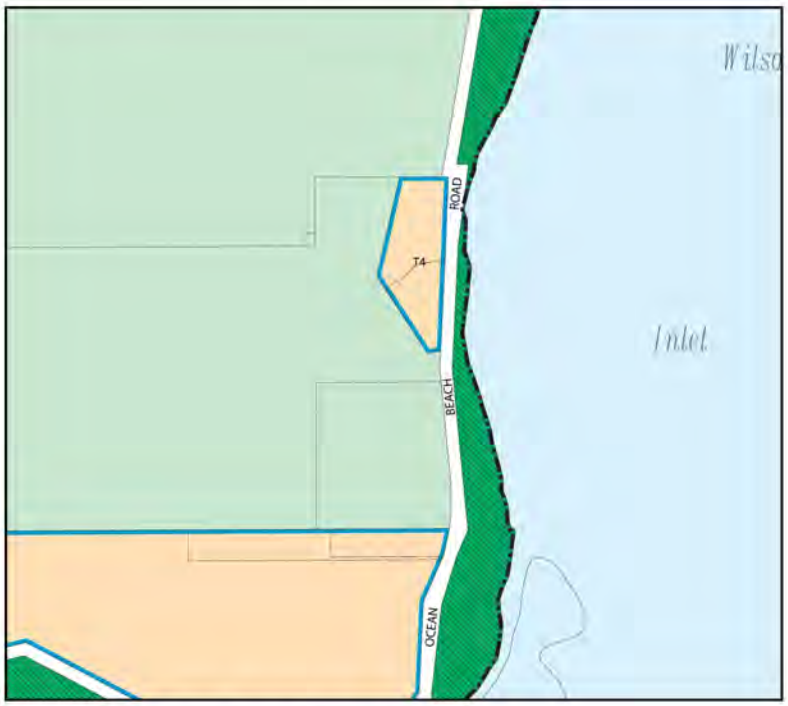
b) Inserting Tourist T13 provisions in Appendix XIII – Schedule of Tourist Zones as follows:

PARTICULARS O F THE LAND		TOURIST USE	CONDITIONS OF TOURIST USE
T13	No. 738 (Lot 1) Ocean Beach Road, Ocean Beach.	Notwithstanding any other provisions of the scheme, the following land uses are the only permitted (P) land uses and shall include: i. Holiday Accommodation ii. Holiday Home iii. Boarding House (maximum 30 guests) iv. Single House IP uses shall include: i. Caretakers / Managers Residence ii. Reception / Office	i. Development and subdivision shall generally be in accordance with the Local Development Plan (Ref:14-001-001D) dated 7 Sept 2015 or any minor variation to that plan approved by Council. Subdivision of Lot 1 shall be by way of strata title only. ii. All development shall be connected to an on-site effluent disposal system installed to the satisfaction of the Health Department of WA and Council, and shall utilise multiple Alternative Treatment Units (ATU) or a central ATU(s) treatment system. All effluent disposal systems shall be situated a minimum of 100m from the Wilson Inlet high water mark. iii. All development shall be connected to a reticulated potable water supply source to the satisfaction of Council. iv. All new development shall be setback a minimum of: • 50 metres from the front boundary • 20 metres from all other boundaries. v. All buildings within the zone shall be designed and constructed to be sympathetic to the existing landscape in terms of colour finishes, location and height, to the satisfaction of Council. Zincalume, white and off-white colours are prohibited. vi. All building heights are limited to single storey. vii. The development of all new buildings shall be undertaken to comply with the requirements of AS3959-2009 Construction of Buildings in Bushfire Prone Areas (as amended). viii. No development shall be permitted within the Development Exclusion Area(s), Tree Retention Area(s) or on land below 2.5m AHD as shown on the Local Development Plan with the exception of a boardwalk/pathway proposed in accordance with the recommendations of any Council approved Wetland Management Site for the site. ix. The proponent shall implement the recommendations of the Bushfire Management Plan prepared by Bushfire Safety Consulting dated 24 September 2015 (or any approved amended bushfire management plan) to the satisfaction of Council as a condition of development approval or subdivision approval.

			x. The proponent shall prepare and implement the recommendations of an approved Stormwater Management Plan to the satisfaction of Council as a condition of development approval or subdivision approval. xi. The proponent shall prepare and implement the recommendations of an approved Landscaping Plan to the satisfaction of Council as a condition of development approval or subdivision approval. Matters that the landscaping plan is to specifically address include: • Rehabilitation/replanting of the area identified as 'Future Managed Wetland'; and • Future on-site landscaping to assist with screening the development from Ocean Beach Road. xii. The proponent shall implement the recommendations of the Bushland Management Plan prepared by PGV Environmental, dated 25 September 2015 (or any approved amended bushland management plan) to the satisfaction of Council as a condition of development approval or subdivision approval. xiii. The proponent shall implement the recommendations of the Weed Management Plan prepared by PGV Environmental, dated 25 September 2015 (or any approved amended weed management plan) to the satisfaction of Council as a condition of development approval or subdivision approval. xiv. All fencing (internal and boundary) shall be of rural construction such as pine/steel posts and wire to the satisfaction of Council.

SCHEME MAP

SHIRE OF DENMARK
Town Planning Scheme No.3
Amendment No. 140



LEGEND

LOCAL SCHEME RESERVES

PARKS AND RECREATION

DRAINAGE AND WATERBODIES

ZONES

T13 TOURIST AREA (See Scheme Text)

RURAL

OTHER

NO ZONE

EXISTING ZONING

N

SEPTEMBER 2014

TOWN PLANNING
SCHEME NO.3

AMENDMENT NO. 140

PROPOSED ZONING

LEGEND

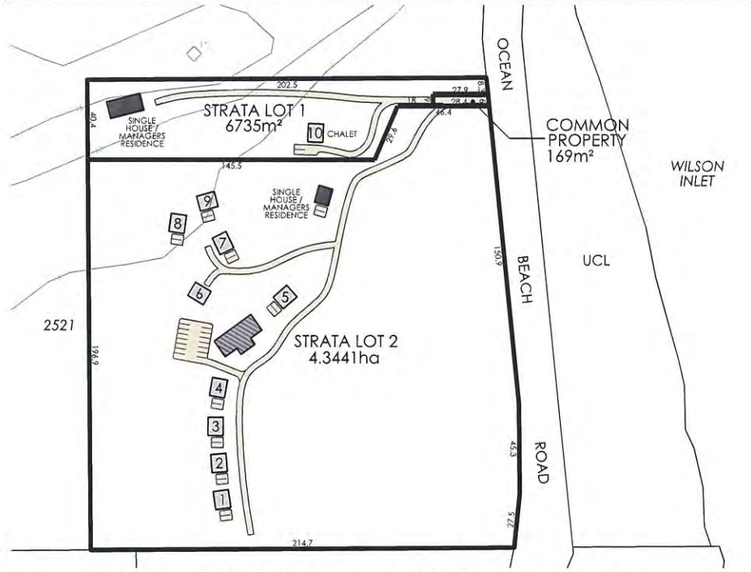
- SUBJECT SITE
- EXISTING VEGETATION
- SINGLE HOUSE / MANAGERS RESIDENCE
- INDICATIVE LOCATION OF HOLIDAY ACCOMMODATION
- INDICATIVE LOCATION OF BOARDING HOUSE(15 ROOMS, 30 BEDS)
- INTERNAL SEALED ACCESSWAY
- INDICATIVE PARKING LOCATIONS
- 20m BUILDING PROTECTION ZONE
- FLOOD HAZARD AREA - WATERLOGGING
- 100m SETBACK FROM HIGH WATER LINE
- DEVELOPMENT EXCLUSION ZONE
- GATE FOR EMERGENCY ACCESS TO LOT 51 FOR EGRESS TO OCEAN BEACH ROAD
- TREE RETENTION AREAS
- 2.5m AHD CONTOUR
- LANDSCAPING SCREENING

APPROVAL OF LOCAL DEVELOPMENT PLAN

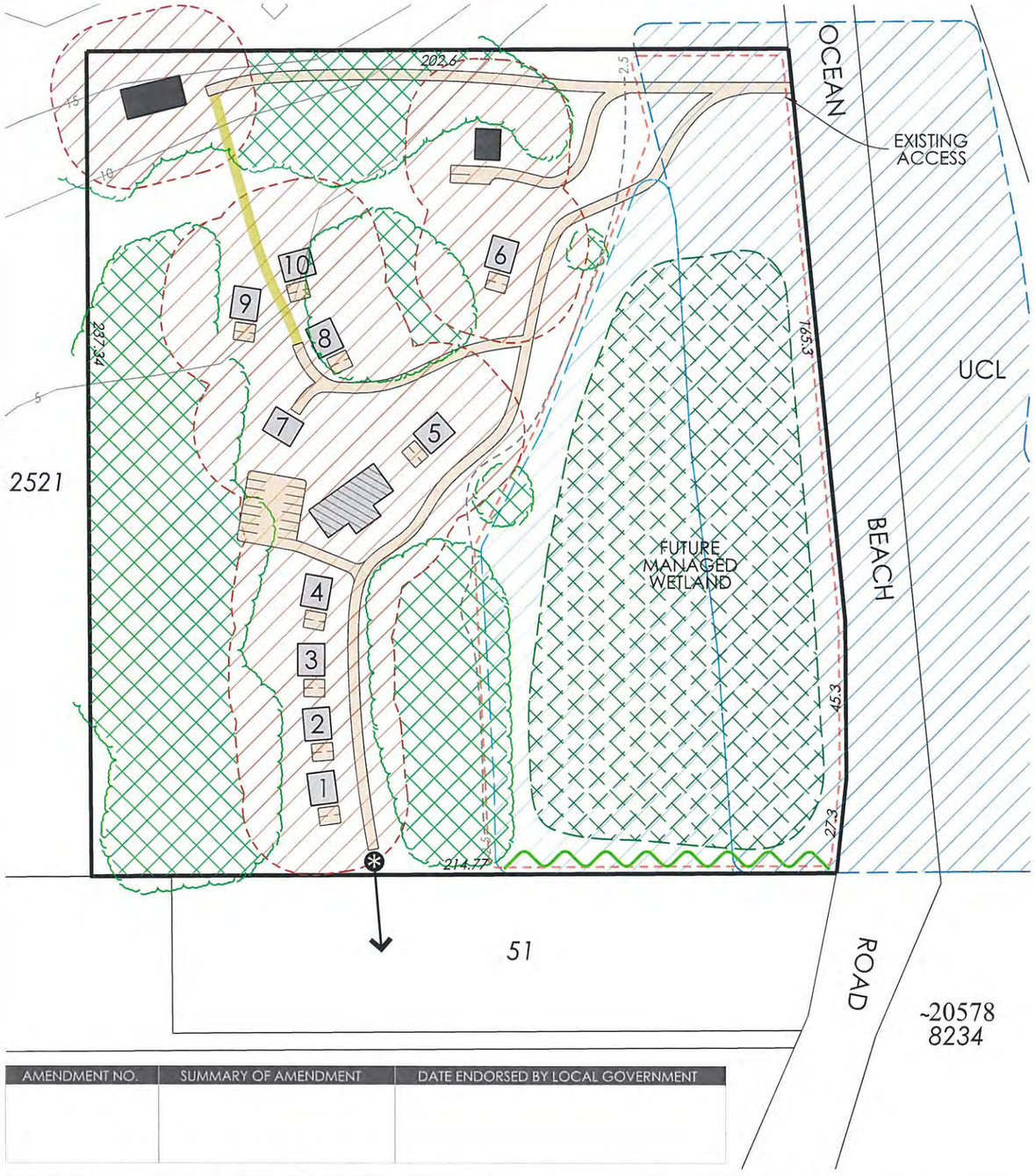
This LDP has been adopted by the Shire of Denmark

CEO Signature Date

HOLIDAY ACCOMMODATION INDICATIVE STRATA LOT SIZES



Note: Should the site be strata titled in accordance with the Local Development Plan, the holiday accommodation shown as '6' on the plan opposite will become a single house/managers residence



AMENDMENT NO.	SUMMARY OF AMENDMENT	DATE ENDORSED BY LOCAL GOVERNMENT

DEVELOPMENT GUIDELINES

- Development and subdivision shall generally be in accordance with the Local Development Plan (Ref: 14-001-001D) dated 7 Sept 2015 or any minor variation to that plan approved by Council. Subdivision of Lot 1 shall be by way of strata title only.
- All development shall be connected to an on-site effluent disposal system installed to the satisfaction of the Health Department of WA and Council, and shall utilise multiple Alternative Treatment Units (ATU) or a central ATU(s) treatment system. All effluent disposal systems shall be situated a minimum of 100m from the Wilson Inlet high water mark.
- All development shall be connected to a reticulated potable water supply source to the satisfaction of Council.
- All new development shall be setback a minimum of:
  - 50m from the front boundary
  - 20m from all other boundaries.
- All buildings within the zone shall be designed and constructed to be sympathetic to the existing landscape in terms of colour finishes, location and height, to the satisfaction of Council. Zincalume, white and off-white colours are prohibited.
- All buildings heights are limited to single storey.
- The development of all new buildings shall be undertaken to comply with the requirements of AS:3959 -2009 Construction of Buildings in Bushfire Prone Areas (as amended).
- No development shall be permitted within the Development Exclusion Area(s), Tree Retention Area(s) or on land below 2.5m AHD as shown on the Local Development Plan with the exception of a boardwalk/pathway proposed in accordance with the recommendations of any Council approved Wetland Management Site for the site.
- All fencing (internal and boundary) shall be of rural construction such as pine/steel posts and wire to the satisfaction of Council.

LOCAL DEVELOPMENT PLAN
LOT 1 OCEAN BEACH ROAD, DENMARK

N

SAM WILLIAMS | TOWN PLANNER
ph: 0418 116216 | email: samwilliams@westnet.com.au

scale - 1:1500 @ A3 | date - 7 SEPT 2015
plan no.14-001-001D

0m 10 20 30m

ALL AREAS, DIMENSIONS & CONTOUR LEVELS DISPLAYED ARE SUBJECT TO DETAIL SURVEY

PLANNING

SCHEDULE OF SUBMISSIONS: AMENDMENT 140 – PROPOSED REZONING OF NO. 738 (LOT 1) OCEAN BEACH ROAD, OCEAN BEACH

Submission Number	Name & Address	Verbatim Submission	Planning Services Comment
S1	Peter & Mary Olden Winniston Farm PO Box 216 DENMARK 6333 Owners of No. 732 (Lot 2521) Ocean Beach Road, Ocean Beach	Please note the following concerns which we have regarding the proposed rezoning and development of 738 (Lot 1) Ocean Beach Rd. 1. Minimum setbacks. We have concerns regarding the proximity of this development to our land, in particular the accommodation units' proximity to our boundary. We would like to ensure that the set back is kept at 30m and not reduced, as is indicated in the proposal. This would help to provide some small level of privacy for our property which in turn diminishes the likelihood of noise, visual and human intrusion onto our land. 2. Buffer zone. Existing vegetation should be maintained as much as possible and other vegetation planted to ensure a significant buffer between the development and surrounding rural land. This would help provide some reduction in noise, visual and human intrusion. It would be appropriate to ensure there is no line of sight from the accommodation to our land. 3. Fencing. Our property is currently fenced to contain our stock. We would like to keep it that way and also avoid interference from visitors so that the fencing is maintained at the necessary standard. 4. Domestic animals. Past experience has shown that domestic animals (particularly dogs) roam the area. We have had numerous instances of dogs roaming on our land in the past as we continue to be built out by residential, tourism and special rural developments. Calves and lambs have died due to interference from dogs (and humans). We would like to ask that no visiting dogs are allowed on the development. (As it is at the moment we have more than enough neighbours, some of whom allow dogs to visit their properties). 5. Stormwater and effluent disposal. We note that one of the development requirements would be to ensure that all stormwater and effluent is disposed of on site. We trust that this will happen and that it will not impact our property! 6. Rights of farmers. We ask that the council and developers accept the existing rights of famers and allow retention of existing farming practices as it is through no fault of ours that our farming property is being	• Having regard to the tree retention areas on-site and the indicative locations of the new buildings as provided for on the Local Development Plan, the setbacks on the western and northern boundaries of the property are proposed to be in the order of 40 metres. Noting the submission and the principles provided for on the Local Development Plan, it is recommended that proposed Condition iv. be amended from "20 metres from all other boundaries" to read "40 metres from the northern and western boundaries and 20 metres from the southern boundary". • The Local Development Plan provides for extensive tree retention areas already having regard to the existing vegetation on-site. • This proposal does not alter the current fencing arrangements in place; merely references that any fencing should be of rural construction. • It is considered that this is a speculative concern and if there are any issues with dogs on-site that it is appropriately governed by the Dog Act. • This is a requirement of developing the site; if any issues arise then they can be dealt with via compliance processes. • Noted and acknowledged. It is recommended that a new condition be included to require a Section 70A notification advising prospective purchasers that the land is located in a rural area and rural activities may result in potential noise, dust and odour nuisances that may affect the use or enjoyment of the land. Recommendations:

		surrounded by developments. Apart from the concerns mentioned above we support this scheme amendment.	• Amend Condition iv. to modify the setback provision of "20 metres from all other boundaries" to "40 metres from the western and northern boundaries and 20 metres from the southern boundary". • New condition xix. to read "Notifications to be placed on titles under Section 165 of the Planning and Development Act 2005 advising prospective purchasers that the land is located in the vicinity of a rural area and rural activities may result in potential noise, dust and odour nuisances that may affect the use or enjoyment of the land."
Government Agencies			
G1	Department of Environment Regulation	I refer to the correspondence dated 25 May 2016 inviting comment from the Department of Environment Regulation (DER) on the above proposed Town Planning Scheme amendment. DER has no comment on this matter in reference to regulatory responsibilities under the *Environmental Protection Act* 1986 and the *Contaminated Sites Act 2003*.	Noted.
G2	Water Corporation	Thank you for your letter dated 25 May, 2016. The Water Corporation advises that a water supply connection is available to the subject site. Reticulated sewerage is not immediately available to serve the subject area and is not included with the Corporations overall planning.	Noted.
G3	Tourism Western Australia	Thank you for the opportunity to comment on the abovementioned scheme amendment which proposes the rezoning of No. 738 Ocean Beach Road, Ocean Beach from Rural to Tourist zone. Tourism WA has no comment to make on this amendment.	Noted.
G4	Department of Agriculture & Food, WA	Thank you for presenting the Department of Agriculture & Food, WA (DAFWA) with the opportunity to comment on the proposed rezoning of Lot 1 (No. 738) from Rural to Tourist. Although it does not appear in our records, DAFWA may have already commented on this proposal, acknowledging the lot is zoned Rural and land surrounding is rural. In response, DAFWA has no specific objection to the proposal and offers the	• From a review of the Shire records, the Scheme Amendment Request was referred to the Department for initial comment however no comments were provided at that point in time. • Refer comment and associated recommendation against Submission S1 regarding the Section 70A notification recommendation.

		following comments for your consideration: a) The lot (5.04ha) has a very small proportion identified as Priority Ag Land (PAL). b) The land area has a susceptibility to waterlogging and is in close proximity to the Wilson Inlet. c) Modification of the land-surface will require suitable surface water control structures to be implemented. d) Any land use change on rural land needs to take into account activity on the adjacent land and implement suitable buffers to prevent or reduce the potential for land use conflict.	
G5	Telstra Operations	Thank you for the above advice. At present, Telstra Corporation Limited has no objection. I have recorded this in our Development database and look forward to further correspondence in the future. Should you require any more information regarding Telstra's new infrastructure policy, please read below or contact me.	Noted.
G6	Department of Health	Thank you for your letter dated 25 May 2016, requesting comment from the Department of Health (DOH) on the above proposal. The DOH has no objection to the proposed zoning change, providing the proposed development is required to connect to the reticulated scheme water supply and compliance, with the relevant provisions of the *Health Act 1911* in particular Part V – Division 2 – Lodging Houses. Approval is also required for any on-site waste water treatment process. The necessary requirements may be referenced and downloaded from: http://www.public.health.wa.gov.au/3/672/2/wastewater_legislation_and_guidelines_pm.	• Noted. • The lodging house component of the proposal has been removed from the updated Local Development Plan and the list of Tourist Uses accordingly thus this comment is no longer applicable. • Noted; a condition already exists to this effect – noting is recommended to be modified to reflect the updated Land Capability & Environmental Assessment Report provisions and the submission by the Department of Water and Environmental Regulation (Water).
G7	Department of Water and Environmental Regulation (Water)	The Department of Water and Environmental Regulation (DWER) is writing to the Shire of Denmark with regard to Scheme Amendment 140 at Lot 1 Ocean Beach Road, Ocean Beach. The advice in this letter supersedes all previous advice on this proposal. DWER advised the Shire of Denmark in July 2016 that it could not support the scheme amendment No. 140 proposal to rezone Lot 1 Ocean Beach Road, Ocean Beach from Rural zone to Tourist zone. DWER considered that the original proposal posed a significant risk to Wilson Inlet. Since that time, DWER has worked with the proponents and consultants to	• Noted. • The updated Land Capability & Environmental Assessment Report is recommended to be incorporated into the final Scheme Amendment 140 report. • Conditions ii. & viii. are recommended to be amended and new Conditions xv. – xix. are recommended as a result of the provisions within the updated Land Capability & Environmental Assessment Report. The amended and new conditions were provided to

		modify and improve the proposal in order to achieve a development proposal that is supported by DWER. The amended development proposal and operating systems that is supported by DWER is contained within the *Land Capability and Environmental Assessment Report* prepared by Kathryn Kinnear, Biodiverse Solutions version 6, dated 13 December 2017. While DWER supports the updated Land Capability Report, the scheme provisions also need to be updated to reflect the agreements between DWER and the proponents in order to support the proposal. This includes (but is not limited to); • Implementation of the approved groundwater monitoring program (as contained in Land Capability and Environmental Assessment Report prepared by Kathryn Kinnear, Biodiverse Solutions version 6, dated 13 December 2017. On-going monitoring post development with annual water monitoring reports, including contingency responses to observed impacts to be prepared and sent to the Department of Water and Environmental Regulation and the Shire of Denmark. • The discharge point of the on-site sewage disposal system should be at least 1.5m from the highest known groundwater level. • Wastewater treatment system to be approved by the Department of Health (not sure whether this needs to be a provision, or can it just be a condition of a Development approval?). • Preparation and implementation of an irrigation management plan, which includes contingencies for storage of wastewater during wet periods when it is unsuitable to irrigate. DWER requests the opportunity to provide comment on an updated list of scheme provisions prior to the matter being approved by Council.	the Department of Water and Environmental Regulation (Water) for their review and subsequent agreeance. <u>Recommendations:</u> • Replace the Land Capability & Environmental Assessment Report in the Scheme Amendment report to reflect the updated Land Capability & Environmental Assessment Report (Version 6 dated 13/12/2017). • Amend Conditions ii. and viii. accordingly to reflect the updated Land Capability & Environmental Assessment Report provisions and in response to the Department's submission. • Add new conditions xv. – xix. to reflect the updated Land Capability & Environmental Assessment Report provisions and in response to the Department's submission.

Lot 1
Ocean Beach Road
Denmark
WA

Land Capability & Environmental Assessment Report

Kathryn Kinnear
Bio Diverse Solutions
13/12/2017 Version 6

BIO DIVERSE SOLUTIONS

DOCUMENT CONTROL

TITLE

Land Capability & Environmental Assessment Report – Lot 1 Ocean Beach Road, Denmark WA.

Author (s): Kathryn Kinnear

Reviewer (s): Sam Williams, Mark and Steve Allen

Job No.: DSM013

Client: Mark and Steve Allen

REVISION RECORD

Revision	Summary	Revised By	Date
Draft 1	DSM Review	J. Dowling	8/11/13
Draft 2	Issued to client	M & S Allen	13/11/13
Final	Issued to Client	M & S Allen	1/10/2014
Final ID 16/11/2016	Issued to Client	K. Kinnear	16/11/2016
Final ID Vers 2 14/2/2017	Updated as per comments from DoW	K. Kinnear	14/2/2017
Final ID Vers 3 2/3/2017	Updated with new Aquasol Report	K. Kinnear	2/3/2017
Final ID Vers 4 2/3/2017	Updated with further calculations Section 4.2.6	K. Kinnear	3/4/2017
Final ID Vers 5 2/3/2017	Updated to include revised development plan and monitoring program	C. Burges	12/9/2017
Final ID Vers 6 13/11/2017	Updated as per comments from DoW. Updated with new Etec report.	B. Theyer	13/11/2017
Final ID Vers 7 13/12/2017	Updated as per comments from DoW. Updated with new Etec report.	B. Theyer	13/12/2017
Final ID Vers 7 13/12/2017	Issued to Client as Final	K. Kinnear	13/12/2017

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CONTENTS

APPENDICES

1. Executive Summary

Mark and Steve Allen commissioned Bio Diverse Solutions (Environmental Consultants) to undertake an Environmental and Land Capability Assessment at Lot 1 Ocean Beach Road, Denmark, in the Shire of Denmark, Western Australia ("the Subject Site").

The Subject Site is on the western side of Ocean Beach Road, 10km south from the Denmark town site. The Subject Site measures 235 metres from north to south, 220 metres east to west at the widest location. It covers approximately 5 hectares (ha). The Subject Site is located west of Wilson Inlet.

This Environmental and Land Capability Assessment (LCA) is a supporting document for planning to guide the proponent and decision makers for a tourist development. The Tourist Development proposes 12 chalets for the site. A Land Capability Assessment is required to inform the relevant regulatory authorities for the purposes of tourist development of the Subject Site.

The Scope of works undertaken by Bio Diverse Solutions included:

- Undertake a targeted flora survey of Subject Site to map vegetation types and identify any presence of Threatened Flora as Listed by Department of Parks and Wildlife (DPAW) (Priority or Declared Rare Flora (DRF);
- Undertake soil sampling to ascertain conditions on the Subject site (soil types, water table levels, soil assessment) to identify site suitability;
- Undertake Environmental Assessment of the Subject site to identify any limitations and give planning advise;
- Assess the Subject Site in terms of vicinity (i.e. buffer requirements etc.) to the Wilson Inlet; and
- Prepare a Land Capability and Environmental Assessment Report, which includes all of the above environmental considerations.

The land use that has been considered for this LCA is defined as "*Rural Residential with on-site effluent disposal*, (as per the State Planning Commission (1989) Land Capability Assessment definition **not any other planning instrument**) as per the definition in the State Planning Commission, *Land Capability Assessment for Local Rural Strategies* (1989) document.

The assessment process was undertaken by Bio Diverse Solutions and involved desktop analysis of climate, site history, vegetation, fauna, and geology of the Subject Site. Site assessment included flora survey and analysis of soil types to ascertain site suitability to assist in the planning of on-site effluent disposal, development areas and limitations mapping.

The Subject Site has currently two existing dwellings and a disused shed, with the remainder of the property being predominantly cleared paddock areas. The Land Capability Assessment compares the physical requirements for a particular land use with the qualities of the land. The analysis determines the ability of the land to sustain a particular land use without resulting in significant environmental degradation. The proposed land use for the Subject Site is a tourist development of the site, subject to rezoning to tourism.

The soil testing was undertaken in late winter conditions by Bio Diverse Solutions on the 5th September 2013. The soils are mostly deep sands encountered across the site. The Subject Site is located on a flat aspect with low slopes (the average slope for the site assessed to be between 0-<5°) across the site.

The soils were generally of a sandy nature in the A Horizon and B Horizon. The soil testing found soils with low PRIs and moderate permeability. The site is also in close proximity to the Wilson Inlet

and setbacks of >100m are required. The soils are deemed capable of Residential use with the use of Department of Health/Shire of Denmark approved systems. A proposed design system is provided from Aquasol in Appendix F. The waterlogged (low areas) closer to the Wilson Inlet are not deemed suitable for Rural Residential Land use.

Soil testing occurred on the higher ground >4m contour with the south-eastern portion deemed to be waterlogged and not tested. The soil conditions are fairly uniform across the north and western portion of the site with the main difference being the level at which the groundwater enters the profile. At Test Pit 2 groundwater was intercepted at 510mm below Ground Level (BGL), with the remainder of the site between 1100-1800mm BGL. The soils are generally moderately draining due to the presence of some silt.

The Subject Site vegetation is also quite uniform and low in diversity. The majority of the site is *Agonis Flexuosa* Low Open Woodland. A targeted search for possible Threatened Flora Species was undertaken with no species located on site.

The mapping of land units revealed three Mapping Units:

1) Map Unit "A" (Sands):

2) Map Unit "B" (Sands in wet, waterlogged areas):

Map Unit A revealed a Land Capability Class Rating of **II - Areas with a High capability for the proposed activity or use.** Map Unit B revealed a Land Capability Class Rating of **IV – Areas with a low capability for the proposed activity or use**.

Some planning considerations are required for development, particularly a 100m buffer from the Wilson Inlet (environmentally sensitive areas) and fire hazard setbacks. A proposed effluent disposal system is provided from Aquasol in Appendix F which is to be approved by the Department of Water and the Shire of Denmark.

Native trees on the Subject Site should be retained as much as possible for purpose of amenity, however some may need to be removed for bushfire protection. Retaining trees where possible will assist in the stabilisation of the site, provide refuge for birds/reptiles and provide buffers to adjacent land uses.

It is noted that this assessment does not include a detailed Bushfire Management Plan, Storm water Management, engineering assessment or geotechnical assessment for structural footings/building construction and road pavement design. It is noted that imported fill can assist with increasing finished floor heights of proposed chalets Bio Diverse Solutions recommends that these assessments would be required prior to commencement of building/ development.

A detailed Bushfire Management Plan prepared by a Level 3 accredited Bushfire Practitioner will be required as the tourist development is classified as a "Vulnerable Land Use" under State Planning Policy (SPP) 3.7 (WAPC, 2015b).

Although not undertaken, a Level 2 Flora Assessment or Fauna survey is not deemed necessary as the Subject Site has been severely altered and this risk of disturbing threatened species is low.

Bio Diverse Solutions conclude that if the listed "Planning and Management Recommendations" (Section 7.0) are implemented by the client, the Shire of Denmark could consider the Subject Site suitable for a scheme amendment for the purpose of rezoning the Subject Site to tourism. If the listed recommendations are undertaken, the proposed tourist development could be implemented sustainably and in an environmentally sound manner.

2. Introduction

Bio Diverse Solutions was commissioned to undertake a Land Capability and Environmental Assessment of the Subject Site for the purposes of a tourist development, requiring approval from the relevant regulatory bodies in relation to rezoning the land. The Land Capability Assessment is aligned to the State Planning Commission Land Capability Assessment for Local Rural Strategies (1989).

The Subject Site is on the Western side of Ocean Beach Road and approximately 10km south of Denmark town site in the Municipality of the Shire of Denmark. The Subject Site measures 235 metres from north to south, 220 metres east to west at the widest location. It covers approximately 5 hectares (ha). The Subject Site is located west of Wilson Inlet. Please refer to Location Mapping Appendix A.

2.1. Land Capability Assessment Method

Bio Diverse Solutions (Environmental Consultants) was commissioned to undertake a Land Capability and Environmental Assessment of Lot 1 Ocean Beach Road Denmark. The methodology for establishing the site suitability for the proposed use (Tourism) is similar for establishing rural residential use and the methodology as per the (previous) Department of Planning and Urban Development Department document "Rural Residential Development in the Perth Metropolitan Region' has been used to guide the site capability for this site in the absence in that document for the tourism land use definition.

To assess the capability of the land, the WAPC Land Capability Assessment does not have a tourism category, therefore the site has been assessed as "*Rural Residential with on-site effluent disposal*" (as per the State Planning Commission (1989) Land Capability Assessment definition not any other planning instrument) and is aligned to the Department of Agriculture and Food standards and State Planning Commission Land Capability Assessment for Local Rural Strategies (1989).

The Land Capability Assessment involves a number of inter-related stages including:

1. **Land Use Requirements** – Specifies and defines the proposed land use, list the land qualities and characteristics to determine each land quality.
2. **Land Resource Survey** – Divides the study area into mapping units which have measurable differences and may influence the land attributes and land capabilities.
3. **Land Capability Analysis** – For each mapping unit rate each individual land quality and determine overall capability to sustain the land use.

The land use that has been considered for this study area is defined as "*Rural Residential with on-site effluent disposal*, (as per the State Planning Commission (1989) Land Capability Assessment definition not any other planning instrument) as per the definition in the State Planning Commission, *Land Capability Assessment for Local Rural Strategies* (1989) document.

The Land Capability Assessment process (SPC, 1989) compares the physical requirements for a particular land use with the qualities of the land. This analysis determines the ability of the land to sustain a particular land use without resulting in significant environmental degradation.

This study was undertaken in late winter conditions in September 2013 and has included analysis of the soil and landform from soil survey, field vegetation survey and analysis, environmental assessment and laboratory analysis of soils.

2.2. Alignment to Legislation, Policy and Guidelines

In assessing the site, Bio Diverse Solutions has prepared this report aligned to the following legislation:

- State Planning Commission, Land Capability Assessment for Local Rural Strategies (1989);
- *Health Act (1911)* and draft *Health Act (2008);*
- *Biosecurity and Agriculture Management Act 2007 (BAM Act);*
- *Environmental Protection Act* 1986;
- *Environmental and Protection and Biodiversity Conservation Act 1999*;
- Environmental Protection Authority (EPA) (2005) *Environmental Guidance for Planning and Development* Draft Guidance Statement No 33 June 2005;
- *Environmental Protection (Clearing Native Vegetation) Regulations;*
- Environmental Weeds Strategy for Western Australia 1999;
- DER Acid Sulphate Soils Assessment Guidelines;
- *Wildlife Conservation Act* 1950;
- *Contaminated Sites Act 2003*;
- Draft Government Sewerage Policy – Consultation Draft 2016;
- *Country Area Water Supply Act 1947;* and
- *CALM Act 1980;* and
- Wilson Inlet Catchment Management Plan 2013-2022.

2.3. Desktop Assessment

Desktop assessment was undertaken of government databases and associated literature. A desktop review of the Subject Site within and adjacent to the site was undertaken. This assessment was conducted to various levels, ranging from state-wide to area specific information. The following searches were conducted as part of this report:

- Interim Biogeographic Regionalisation of Australia (IBRA) – identifies, at a regional level, the vegetation communities and land systems present within Australia;
- Land Systems – Further detailed information on the vegetation communities and land systems;
- DER (formerly DEC) ASS Risk Mapping;
- Department of Indigenous Affairs - Aboriginal Heritage Database
- Department of Water – 250K Hydrogeological Mapping and Public Drinking Water Source Areas datasets, 2001;
- Department of Agriculture and Food WA (DAFWA) – Declared weeds database;
- Pre-European vegetation mapping dataset (DEC 2005) based on the project AJM Hopkins, GR Beeston, JM Harvey (2000);
- Beard's Vegetation Classification dataset, 1: 3,000,000 digital representation of Beard's vegetation map of the state of Western Australia.

2.4. Site survey

Level 1 targeted Flora and Vegetation Survey has been undertaken on the whole of the property with targeted searches for Threatened Flora adjacent to any proposed disturbance areas. Flora searches were undertaken in spring on 5th September 2013 by Kathryn Kinnear, (Environmental Consultant, Bio Diverse Solutions).

Soil sampling was undertaken on the Subject Site by Kathryn Kinnear, (Environment Consultant, Bio Diverse Solutions) on 5th September 2013 and sent to laboratories (CSBP Soil Laboratory and Coffey) for technical analysis.

3. Site Details

The Subject Site is on the western side of Ocean Beach Road, 5km south from the Denmark town site. The Subject Site measures 235 metres from north to south, 220 metres east to west at the widest location. It covers approximately 5 hectares (ha). The Subject Site is located west of Wilson Inlet. Please refer to Figure 1 below and Location Mapping Appendix A.

Figure 1 – Subject Site Locality

The Subject Site is in close proximity to the Wilson Inlet. To the south is the Ocean Beach Caravan Park and Chalets. Other Rural and Residential lots border the Subject Site to the north east of the site. The Tourist Development proposes 12 chalets for the site.

This Land Capability Assessment relates to the Subject Site as per the requirements of 'Rural Residential with onsite effluent disposal' as defined in the State Planning Commission, Land Capability Assessment for Local Rural Strategies (1989).

3.1. Current site land use

The Subject Site currently has 2 existing buildings and an old disused shed located in the north of the property. The lot was previously used for grazing (cattle) from the previous owners (pre-2008) and possibly potato farming pre-1990's in the lower wetter areas (*Pers Comms* M. Allen September 2013). Please refer to Photographs 1 and 2 below.

Photograph 1 – View of the existing house north central of the Subject Site.

Photograph 2 – View of old shed in north west of Subject Site.

The Subject Site is one lot of Peppermint trees (*Agonis flexuosa*) and paddock grasses on the western two thirds of the site and low lying wetland on the eastern side adjacent to the Wilson Inlet.

3.2. Zoning and Proposed Development

The site is currently zoned rural in TPS No3 and identified in the Local Planning Strategy as "General Agriculture". It is proposed that a more appropriate land use is for tourism purposes and "Tourist Zone" is proposed.

Please refer to Development Plan Appendix A.

Access is restricted to the Subject Site along a driveway in the north off Ocean Beach Road, please refer to Photographs 3 and 4 below.

Photograph 3 – View of existing driveway access off Ocean Beach Road to the north.

Photograph 4 – View of Ocean Beach Road to the west of the Subject Site.

3.3. Adjacent Land uses

The Subject Site is located within rural/rural residential interfaces and has a tourist caravan park/chalets adjacent to the south of the property, refer to Photograph 5 below. Wilson Inlet is directly to the east (Photograph 6) and the Southern Ocean (Surf life saving club and recreational beach sites) are within walking distance south of the Subject Site.

Photograph 5 – View of Chalets/Caravan park to the south of the Subject Site.

Photograph 6 – View of Wilson Inlet to the west of the Subject Site.

3.4. Historical land use

The Subject Site has been historically used for agriculture/farming activities such as grazing and possibly growing potatoes in the lower south east of the site (intensive horticulture) (*Pers Comms* M. Allen, 2013). Analysis of Landgate aerial photography available for the site (2001-2011) indicates there has been no other land use for the site.

The Wilson Inlet is adjacent to the Subject Site, please refer to Photograph 6. Historical uses of the Inlet and surrounding catchment include farming, fishing, the historic railway line, guesthouses and holiday parks. Commercial fishing was occurring in the estuaries adjacent to Denmark/Albany in the early 1890s. In the early 1900s J.D. Smith and brothers began operating as professional fishermen on the Wilson Inlet (WICC, 2013).

3.5. Aboriginal Heritage

A search of the Department of Indigenous Affairs (DIA) database revealed that there are no Aboriginal Heritage sites located within the Subject Site. The Wilson to the east of the Subject Site were highly significant hunting and gathering areas for Aboriginal communities of south-western Australia. (DEC, 2009). This area still holds a strong significance for the indigenous people of the south – west. There is a Aboriginal Heritage Site adjacent to the Subject Site (150m to the north) The development is not anticipated to affect this site. Please refer to the Aboriginal Heritage Site Report at Appendix B.

3.6. Climate

Denmark's long-term median annual rainfall is approximately 995.9mm though there can be considerable variation in the total rainfall from year to year. Annual rainfall has ranged from on average, approximately 72 per cent of the annual rainfall occurs between May and October. Although cold fronts are responsible for much of the recorded rainfall total, a moist onshore flow can occur in any season and bring showers or drizzle. Denmark records rainfall on average 138.3 days annually (BOM, 2012).

July is the wettest month, with the wettest month recorded in August 1955 of 292.6, rain occurs on two days out of every three during an average winter. The driest month is January with a mean of 22.3 mm and in winter the average is 158.9mm (July). Please refer to Figure 2 below - Mean Rainfall Denmark (BOM 2012).

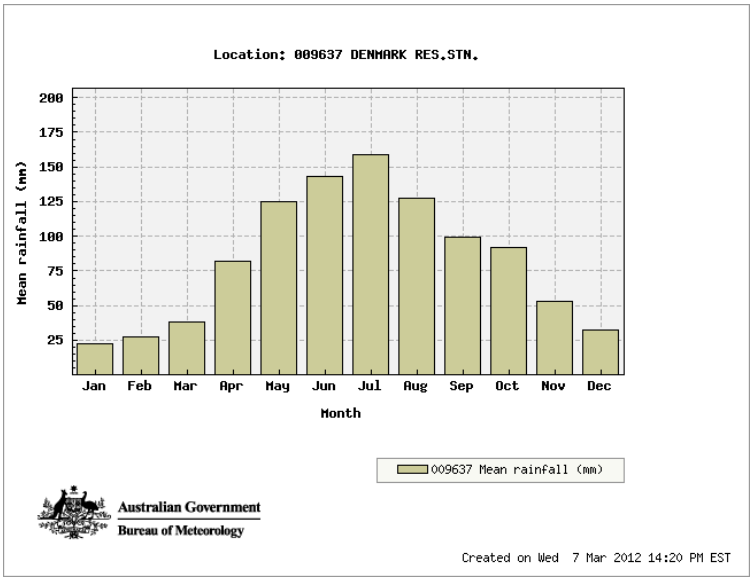


Figure 2 – Mean Rainfall Denmark Station (BOM)
(Source BoM Website, 2012)

3.6.1. Temperature

Average maximum temperatures peak in January and February in Denmark, with monthly means of 25.9°C although temperatures above 35°C sometimes occur when hot, dry northerly winds arrive from the interior of WA. Overnight minima also peak in January and February at a mild 13°C, on average.

Winter daily maximum temperatures average approximately 16.1°C, while the average minimum is approximately 6.9°C in July and August. Daily minimum temperatures below 5°C can be expected about once or twice a month in winter, but Denmark daily temperature records between 1907 and 1965 show no occasion where the temperature fell to zero. Please refer to Figure 3 and Figure 4 illustrating Average Temperatures Denmark (BOM 2012).

Figure 3 –Mean Maximum Temperatures Denmark Station (BOM, 2012)

Figure 4 –Mean Minimum Temperatures Denmark Station (BOM, 2012)

3.6.2. Wind

The dominant wind direction in summer is from the north west and afternoon sea breezes occur from the south west/south east. During winter, southwest winds prevail and northwest storm events occur (BOM, 2012). Although fronts and depressions may bring strong to gale force winds, winter winds are more variable and generally lighter than those of summer. Please refer to Figure 5 and 6.

Evaporation in the summer months is high with a January average of 240mm (8mm a day). The monthly evaporation decreases to 66mm in June (2mm a day). Daily evaporation can vary significantly from over 15mm on a hot windy summer day to almost negligible on a cold wet winter day.

Figure 5 – Summer (Jan) wind rose BoM

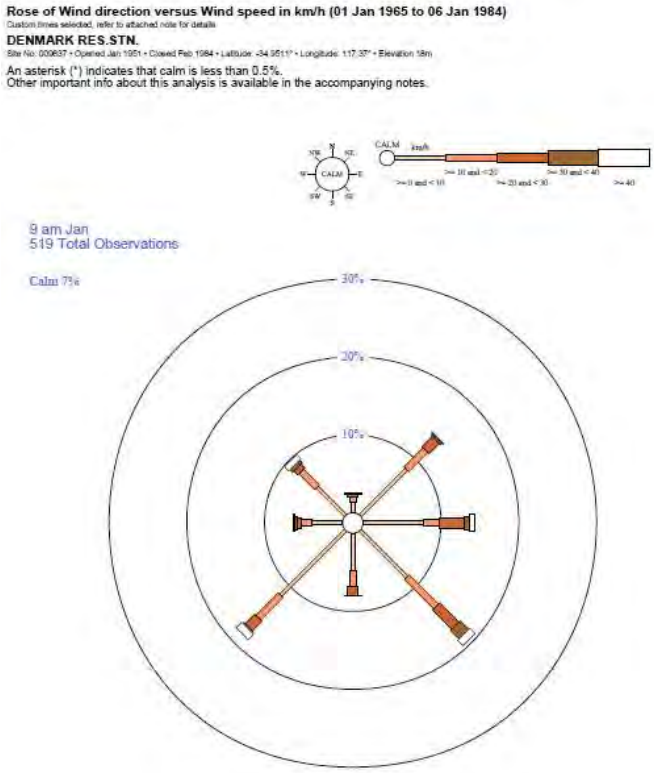


Figure 6 – Winter (July) wind rose BoM (BOM, 2012).

3.7. Prevalent Fire Weather

Fire weather is characterised by mid-level disturbances across the south west of Western Australia, bringing unstable atmospheric conditions (thunder and lightning) from the north or north-west wind directions. This is characteristic of “Extreme” Fire Weather conditions to the area with hot dry conditions prior to storm events. Risk of lightning strikes, spark ignition, arson and other causes of fire give rise to wild fires under these conditions.

Prevalent winds which most wildfire events occur in the region are from the north-west, east and north-east direction. Conditions tend to be dry with low relative humidity. High winds and excess fuels can lead to hazardous conditions for residents. Strong easterly and south westerly winds exist at the subject site during dry summer periods. These circumstances place residential housing under the most risk from wildfire events.

3.8. Climate Change

Climate change is expected to impact on the future rainfall pattern of the area. It is recognised that the average rainfall has already declined by 20%-30% over the past few decades and that the long term impact of climate change may lead to a shift in rainfall, as well as dryer climatic conditions for the region. The long term changes are predicted to impact on the flora, fauna and water availability for the region.

The Climate Commission (Climate Commission 2010) estimates that:

> *"…Rainfall patterns in Western Australia have changed over the last 40 years. There is significant evidence that climate change has contributed to the marked drying trend in the southwest of the state."*

The construction of the proposed tourist development could be affected by sea-level rise, from increased intensity rainfall events or extended drying periods. It is recommended that a setback of 100m occurs from the Wilson Inlet occur to allow precautionary principles with building placement, fire breaks, on-site effluent disposal and other structural designs. This will ensure that any flooding or high rainfall periods do not affect infrastructure proposed and that any watershed from the development from increased intensity rainfall events can be managed onsite with effective planning.

3.9. Geology

The greater part of the Wilson Inlet catchment lies in the Albany/Frazer geological province with its Precambrian granitic overlain by Quaternary sands and laterite (Mitchell 2008). Soils around the Wilson Inlet and its catchment consist of a variety of silts, sand, clays and gravel. The primary soil types being yellowish brown sandy and gravelly duplex soils (South Coast NRM, 2011).

The catchment is characterised by undulating lateritic plains and poorly drained flats, hilly terrain with rock outcrops and deeply incised valleys where the waterways have exposed the weathered profile and underlying bedrock (Collins & Fowlie 1981; Kern 1992; Bari et al. 2004).The Inlet is situated on a narrow coastal plain about 10km wide, with coastal dunes to the south and an undulating, hilly plain to the north leading up to the plateau of the upper catchment. West of the Inlet there are moderate hills while to the east, the land is dominated by stagnant, low lying flats and plains.

Australian Geoscience Mapping and Department of Water 250K Hydrogeological mapping places the Subject Site from the Quaternary/Cainozoic/Phanerozoic Time period:

(Qe): Estuarine and lagoonal deposits – clay silt and sand; and

(Qa) Alluvium, minor colluvium-gravel, sand, silt and clay

The aquifer is described as *Surficial aquifer - local aquifer, possible sedimentary aquifer beneath, minor groundwater resource* (GSWA, 1984).

4. Site Assessment

Site assessment was undertaken by Bio Diverse Solutions of the Subject Site on the 5th September 2013 of site soils, remnant vegetation, fauna and other landscape values (Appendix C). Laboratory testing of soils was undertaken by CSBP Soil Laboratory and Coffey Laboratories (Appendix D).

4.1. Topography and Slope

The Subject Site is located on a flat aspect in along the Wilson Inlet foreshore with the average slope for the site assessed to be between approximately 0 to <5° across the site. The northern western edge of the site is at approximately 15m AHD, and the contours gently decrease in a south easterly direction to Ocean Beach Road in the west to <5m AHD.

4.2. Site Soils

Site soil testing was undertaken in late winter conditions (September 2013) by Bio Diverse Solutions. The soil sampling strategy focussed on the proposed disturbed areas with the lower wet areas inaccessible due to inundation (and not deemed to be disturbed through the development process). Site soil testing confirmed the site to be one soil category – Deep sands. Please refer to the Soil Profile Sampling record sheets at Appendix C.

4.2.1. Deep sands

This soil type was encountered over the sampling area in the western two thirds of the site. All of the six Test pits generally had an A Horizon of dark grey organic matter (top soil) ranging from 0-250mm Below Ground Level (BGL), with dark grey sand from 250-650mm BGL grading to grey/brown coarse sand at 650-1100mm BGL. The B Horizon consisted of generally grey to cream silty sands at depths between 1100-2000mm BGL.

Groundwater was intersected in all the test pits. The highest water table (510mm BGL) was recorded at Test Pit 2 (closest to the wet area), with the remaining test pits recording between 1130mm to 1840mm BGL. Please refer to Soil Profile Sampling results at Appendix C.

4.2.2. Soil Laboratory testing

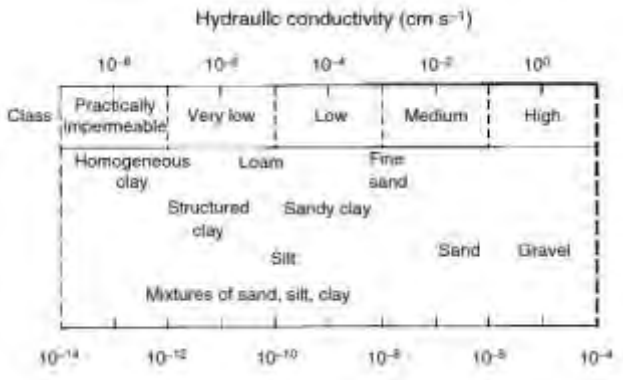
Laboratory testing was undertaken of representative samples for Permeability and Phosphorous Retention Index (PRI).

4.2.3. Soil Permeability

Permeability Testing was undertaken by Coffey, indicating the soils are medium draining (Appendix D). The sandy A Horizon soils were generally medium permeability being 4.3E-06 m/sec (10^{-6}m/sec) (Test Pit 1 650-1100mm) and 2.0E-07 (10^{-7} m/sec) (50-650mm BGL).

Sandy soils generally record high permeability, however the presence of some silt in the sample may account for the moderate permeability. The results indicate the sand soils on the Subject Site generally would be medium draining in the A – Horizon. Refer to Figure 7 and 8 outlining general permeability of soil types.

Figure 7 – Generalised Permeability (Hydraulic Conductivity of Soil Types)
(Source, Artiola *et al* 2004)



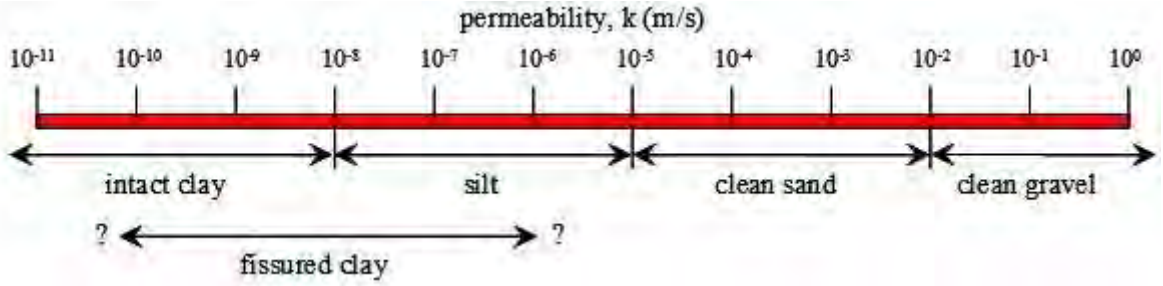


Figure 8 – Permeability scale m/sec
Source: UWA, 2013

4.2.4. Phosphorous Retention Index

Phosphorous Retention Index (PRI) is the ability of soils to absorb and treat nutrients within the soil (i.e. Soil microbe disinfecting ability). Soils with a PRI less than 1 have a very poor ability to treat effluent waters, with soils >5 have a high ability to treat effluent waters (nutrients). PRI Testing was undertaken on the same samples for permeability by CSBP Soil Laboratories. The test results indicate the site has extremely low to exceedingly low ability (Summers and Weaver, 2011) of treating effluent waters, with PRI of 2.5, ,0.0 and 1.0 recorded.

A value of 0.0 indicates that the PRI was less than the detection limits of reporting, this was recorded at Test pit 4. Sandy soils generally record a moderate-low PRI, the laboratory testing (CSBP, 2013) at Appendix D, demonstrate that these soils have an extremely low to exceedingly low ability to fix nutrients from wastewater produced within the soil profile. This has the potential to cause issues such as phosphorous pollution leading to algal blooms within the Wilson Inlet (*Pers Comms* K. McKeough, January 2017).

4.2.5. Acid Sulphate Soils

Acid Sulphate Soils (ASS) are naturally occurring soils containing iron sulphides. These soils are typically benign within an anaerobic environment. However, when they become oxidised through disturbance, acidification of soil and groundwater can occur. The resulting sulphuric acid can also break heavy metal bonds, releasing metals such as aluminium, iron and arsenic into the groundwater and environment.

A desktop assessment aimed at determining the potential for ASS within the project site revealed limited datasets available for the Denmark Area. The Wilson Inlet is defined as a High Risk in the Department of Environmental Regulation (DER, formerly DEC dataset) “Estuary” ASS digital dataset (Sourced WA Atlas 2012). Given the close proximity to the Wilson Inlet it is probable that ASS could be located in the inundated areas in the south east of the property. The “grey sands” in the north and west are not waterlogged until depths over 1100-1300mm BGL, ASS is unlikely in this soil type.

It is recommended when the nature of the disturbances are known for the development (i.e. cut fill etc.), then a Department of Environment and Regulation (DER, formerly part of DEC) “ASS Self-Assessment” form is completed, and if required, an ASS Investigation and reporting occur as required by the DER. This could be undertaken at conditional approval of tourist.

It is therefore recommended:

- When the nature of the disturbances are known for the development (i.e. cut fill etc.), a Department of Environment and Regulation (DER, formerly part of DEC) “ASS Self-Assessment” form is completed, and if required, an ASS Investigation and reporting occur as required by the DER.

4.2.6. On site effluent disposal

The health and environmental requirements for wastewater treatment and disposal for developments not serviced by deep sewerage systems are contained in the *Draft Government Sewerage Policy*, (Department of Planning, 2016). The Subject Site is situated in an area that does not have deep or reticulated sewerage. The Subject Site is adjacent to the Wilson Inlet, placing it within a sewerage sensitive area (DoP, 2016). Furthermore, under the Policy the development would be considered a non-residential development (DoP, 2016).

The Draft Government Sewerage Policy (2016) states the following minimum general site features for on-site sewage disposal systems. Please refer to Table 1 below.

Table 1 – Minimum and general requirements for on-site wastewater disposal systems

Site Feature	Minimum Requirement
Drainage System/channels	Should be located further than 100m of surface and / or subsurface drainage system that discharges directly into a downstream waterbody or waterway. In consultation with the Department of Water setbacks between 30 and 100m may be considered on a case-by-case basis.
Land application area	The size of the land application area should be determined in accordance with the conversion factors prescribed in Table 4 and *AS/NZS 1547* On-site domestic wastewater management as follows: 1. Estimate hydraulic load (L/day): • occupancy rate (persons) x design loading rate (L/person/day) 2. Calculate land application area *(m2)*: hydraulic load (L/day) x conversion factor from Table 4 in Schedule 3 of the Draft Government Sewerage Policy (2016)
	The land application area excludes the area required for the apparatus and should be kept free of any temporary or permanent structures.
	Activities within the land application area shall not interfere with the function of the current and future land application system and people should avoid potential contact with effluent residues. Unless allowed for in the design, the land application area (excluding the apparatus) should: • not be built on or paved in a manner which precludes reasonable access; and • not be subject to vehicular traffic (other than a pedestrian controlled lawnmower); • not be subject to regular foot traffic such as pathways and clothes line areas; and • be kept in a manner which enables servicing and maintenance of the disposal system.
Separation from groundwater	The discharge point for the on-site effluent disposal system should be at least the following distances from the highest known groundwater level: • 2m above in public drinking water source areas; • 1.2 to 1.5m (depending on the soil type) in sewerage sensitive areas; and • 0.6 to 1.5m in all other areas, depending on soil type and proposed treatment system.
	On-site effluent disposal should not be within 100m of a waterway (setbacks between 30m and 100m may be considered on a case by case basis).
	On-site effluent disposal should not be within 100m of surface or subsurface drainage system(s) that discharges directly into a downstream waterway / waterbody (setbacks between 30m and 100m may be considered on a case by case basis).
	On-site sewerage disposal systems should not be located within 30m of a private bore for household/drinking water purposes.
	On-site sewerage disposal systems should not be located within 100m of a significant wetland.

Table 1 Continued

Site Feature	Minimum Requirement
Separation from groundwater – outside of public drinking water source and sensitive sewage areas.	Where land is not within a Public Drinking Water Source Area or a sewage sensitive area, the discharge point of the on-site sewage disposal system should be located the following distances above the highest known groundwater level: • For loams and heavy soils, the base of the proposed land application system should have a depth of at least 0.6 metres above the highest seasonal post development water table. • For gravels, the base of the proposed land application system should have a depth of at least one metre above the highest seasonal post development water table • For sands the base of the proposed land application system should have a depth of at least 1.5 metres above the highest seasonal post development water table. • Where a nutrient retentive secondary treatment system will be used, the proposed land application system should have a depth of at least 0.6 metre above the highest seasonal post development water table.
Flooding	On-site sewage disposal systems should not be located within any area subject to inundation / flooding in a 10% Annual Exceedance Probability (AEP) rainfall event.
Gradient to the Land	Not to exceed one in five (1:5). Shall be engineered to prevent run-off from the land application area (e.g. bunding, Gradient of the land terracing) application area.
	Surface contours shall be provided on the site plan

(DoP, 2016)

A treatment system is proposed for the tourist site along the western boundary of the subject site, this is located >100m from the low-lying areas in the east of the site. Refer to Figure 9 over the page. Groundwater was encountered in the entire test pits, with the highest recorded at test Pit 2 near the low-lying area in the east of the Subject Site. Other locations (north and western) across the Subject Site recorded groundwater between 1100mm BGL and 1800mm BGL. The two closest test pits to the proposed effluent disposal area (Figure 9) are Test Pit 4 and 6. Water was encountered at 1310mm BGL and 1430mm BGL respectively. It is proposed further groundwater monitoring be conducted in the proposed effluent disposal area prior to development to confirm groundwater levels in this location. Pre-development groundwater monitoring will be in accordance with the groundwater monitoring program shown in Appendix G and include two years of groundwater level monitoring prior to development. If monitoring shows the minimum 1.5m separation to groundwater requirement is not achieved the effluent disposal area will need to be built up with fill until the requirement is met.

The sandy soil profiles throughout the Subject site (moderately draining and extremely to exceedingly low PRI) indicate that traditional septic style systems for on-site effluent would not be appropriate. It is recommended that Secondary Treatment Systems with nutrient removal are to be installed. As the Wilson Inlet to the east is categorised as an “Sewerage Sensitive Area” as per the Government Sewerage Policy (2016), a secondary treatment system with nutrient removal will be required. Furthermore, a minimum setback for the effluent system of 100m is required from the high-water mark (DoP, 2016), this can be achieved as demonstrated on the limitations mapping on page 36.

Given the expected high effluent loads to be applied to the site and likely increase in nutrient loading from the proposed development, ongoing groundwater monitoring should be conducted to ensure adequate separation between groundwater and the effluent disposal system is maintained and to ensure groundwater contamination is not occurring. The proposed groundwater monitoring program is shown in Appendix G.

Figure 9 – Proposed disposal field/treatment area

e-Teq Resources have proposed a suitable effluent disposal system for the site, which is shown in Appendix F. In summary e-Teq proposes to utilize a combination of natural processes complimented with chemical assistance to achieve the desired effluent disposal outcomes. The system is based on the principles of aerated treatment, activated sludge and anaerobic digestion to provide a complete treatment solution. Chemical assistance through the addition of chlorine for sterilization and heavy metal removal will be required in order to facilitate optimal results suitable for subterranean dispersal. This system also incorporates ultrafiltration and UV sterilization to provide a multiple barrier approach to ensure minimal nutrient loading and maximum sterilization of the final treated effluent. Figure 9 outlines a 0.8ha site for the disposal field for the system which will cater for the system as proposed by e-teq Resources.

The final effluent will meet all the subterraneous disposal nutrient loading guidelines as required by DWER of 45kg TN/hectare/annum and 5kg TP/hectare/annum. The calculations and expected volume of 150L of wastewater generated per person per day to determine the suitability of our proposal for this development have been transposed from Draft Government Sewerage Policy. This allows for a maximum expected daily inflow volume of 7,200 Litres per day and a maximum yearly volume of 2.63 ML.

During periods of wet weather, a 50,000kl standby tank will be utilised. This tank will allow for seven days storage (at the maximum expected volume of 7,200 L per day).

Total proposed annual waste water generated by the development = 2.63 ML

Total Nitrogen (TN) loading = 26.3 kg / year.

Area available for dispersal = 0.8 hectares.

TN loading per hectare = 26.3/0.8 Hectare (area of shrubbery/woodland) = 32.875 kg/hectare.

Nutrient loading is well within both Class A and B Eutrophication risk categories as well as meeting the Peel Inlet Nutrient Loading Levels (Eteq Resources, 2017).

It is therefore recommended:

- On-site effluent disposal will need to be a minimum setback of 100m from any the edge of the tidal high-water mark (1.2m AHD) of the Wilson Inlet, with a recommended disposal field (0.8ha) as outlined in Figure 9;
- The discharge point for on-site effluent disposal will need to have a separation distance of 1.5m from the highest known groundwater level;
- The recommended on-site effluent is approved and certified by the Department of Health and the Shire of Denmark (Appendix F) prior to installation; and
- Ongoing groundwater monitoring is conducted consistent with the proposed groundwater monitoring program presented in Appendix G.

4.3. Vegetation Types

Desktop assessment reveals the subject lies within the Warren IBRA bioregion. This bioregion is comprised of "*Dissected undulating country of the Leeuwin Complex, Southern Perth Basin (Blackwood Plateau), South-West intrusions of the Yilgarn Craton and western parts of the Albany Orogen with loamy soils supporting Karri forest, laterites supporting Jarrah-Marri forest, leached sandy soils in depressions and plains supporting low Jarrah woodlands and paperbark/sedge swamps, and Holocene marine dunes with Agonis flexuosa and Banksia woodlands and heaths*." (Hearn et al 2002)

The vegetation has been mapped on a broad scale by Beard (Shepherd *et al* 2002) in the 1970's, where a system was devised for state-wide mapping and vegetation classification based on geographic, geological, soil, climate structure, life form and vegetation characteristics (Sandiford and Barrett 2010).

A DEC database search of Beards vegetation classification for general area places the site within 1 broad Vegetation Association for the site:

1. System Association: Denmark

- Vegetation Association number: 14
- Vegetation Description: Low forest; jarrah.) (e2Lc)
  (Source DEC Pre-European Vegetation GIS dataset).

4.4. Vegetation Assessment and Methodology

The survey area is defined as Lot 1 Ocean Beach Road, Denmark, with the whole property mapped for vegetation types and intensive flora sampling/Threatened Flora searches undertaken by K. Kinnear (Bio Diverse Solutions) in September 2013 in proposed disturbance areas. The Subject Site was traversed on foot and a list of dominant flora species present (native and exotic) was compiled as seen; samples or photographs were collected for unfamiliar species. Specimens collected were pressed, dried and identified. Specialist texts were used to identify specimens (Wheeler *et al,* 2002) with some checked against examples in the reference herbarium at the DPAW Albany Regional Herbarium for confirmation. The authority for taxonomic names was DPAW's Florabase website as of October 2013.

Intensive survey was undertaken for Threatened Flora species, with follow up identification at the DEC Regional Herbarium. Areas were searched for Threatened Flora adjacent to known populations and likely habitat for specific species. Vegetation condition was assessed during the field survey. Vegetation condition was assessed using the vegetation condition scale as per Keighery (1994).

The Subject Site supports vegetation types reflective of the underlying soil types and general native vegetation of the area. Two vegetation types were identified on site:

- Low Open Peppermint (*Agonis flexuosa*) Woodland*; and*
- Low flats of *Centella asiatica*

Disturbance is evident and throughout the Subject Site from previous grazing and agricultural pursuits. Discussion with the current owners indicates that the property has been utilised for grazing of cattle and possibly seasonal horticulture such as potato farming in low lying areas.

Vegetation condition was assessed to the criteria as outlined in *Bushland Plant Survey, A Guide to Community Survey for the Community*:

- *Pristine: Pristine or nearly so, no obvious signs of disturbance;*
- *Excellent: Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species;*
- *Very good: Vegetation structure altered, obvious signs of disturbance;*
- *Good: Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate to it; and*

- *Degraded: Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.* (Keighrey, 1994)

All of the vegetation types were generally considered to be in "Degraded" condition: "*Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management*" (Keighery, 1994).

4.5. Low Open Peppermint Woodland

This vegetation type comprises of 60% of the Subject Site and is confined to the north and western portion of the site. The Peppermint trees (*Agonis flexuosa*) comprise almost 100% of the canopy cover with Peppermints generally 3m – 5m in height. Flora survey revealed there is a lack of middle storey and a degraded understorey present. The sedge and herb storey in this vegetation complex has over 70% ground cover. The majority of species were less than 1m in height however some herbs were between 1m – 2m in height. Native species recorded within this vegetation unit included Native Wisteria (*Hardenbergia comptoniana), Tremandra stelligera, Pimelea clavata,* and Bracken Fern *(Pteridium esculentum).* Introduced (weed) species identified within this cover class including: Kikuyu grass (*Pennisetum clandestinum)*, Bridal creeper (*Asparagus asparagoides)*, Deadly nightshade (*Solanum nigrum*), water couch grass (*Paspalum distichum)*, Inkweed (*Phytolacca octandra)*, Arum lily (*Zantedeschia aethiopica),* Spear thistle (*Cirsium vulgare*) and an introduced sedge *Juncus acutus*.

Please refer to Photographs 7 and 8 below and Vegetation Mapping Appendix E.

Photograph 7 – View of Low Open Peppermint Woodland in southern portion of site.

Photograph 8 – View of Peppermint Woodland in north of Subject site.

The vegetation has sustained severe alteration from grazing and agricultural pursuits and is generally in low species diversity. It is recommended however that the trees are retained across the site to provide amenity and possible habitat for birds, reptiles and small mammals.

4.6. Low flats of *Centella asiatica*

The south/south western portion of the Subject site is predominantly low flats of *Centella asiatica* (dominant species) with a variety of sedges and rushes such as *Juncus kraussii,* Seablite *(Suaeda australis), Juncus acutus* (introduced) and occasional Saltwater paperbarks (*Melaleuca cuticularis)* in the south-eastern corner. Species surveyed indicate that this portion of the site could be subject (or was previously subject to) tidal inundation from the adjacent Wilson Inlet. Please refer to Photographs 9 and 10 below and Vegetation Mapping Appendix E.

Photograph 9 – View of Low flats of *Centella asiatica.*

Photograph 10 – View of interface of Peppermint Woodland and low flats central of Subject site.

The low lying (south eastern and eastern) portion of the site is possibly inundated with saline water in extreme flood events. This area may have once been salt water paperbark wetland vegetation type. To encourage local diversity and restore this area, revegetation/restoration is recommended. It is further recommended prior to revegetation or restoration that soil testing is undertaken to ascertain soil conditions and appropriate species selection.

It is therefore recommended:

- Trees are retained across the site where appropriate to encourage fauna habitat and site biodiversity; and
- Revegetation occurs in the low lying (wetland) areas.

4.7. Threatened Flora

Definitions of the Conservation Code (Threatened Flora listings) are defined under the *Wildlife Conservation Act 1950*, the Minister for the Environment may declare species of flora to be protected if they are considered to be in danger of extinction, rare or otherwise in need of special protection. Schedules 1 and 2 deal with those that are threatened and that are presumed extinct, respectively.

Definitions of Threatened Flora (Conservation Code) under the *Wildlife Conservation Act 1950* are as follows:

- **T: Threatened Flora (Declared Rare Flora — Extant)**
  Taxa1 which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such (Schedule 1 under the *Wildlife Conservation Act 1950).*
  Threatened Flora (Schedule 1) are further ranked by the Department according to their level of threat using IUCN Red List criteria:
  CR: Critically Endangered – considered to be facing an extremely high risk of extinction in the wild
  EN: Endangered – considered to be facing a very high risk of extinction in the wild
  VU: Vulnerable – considered to be facing a high risk of extinction in the wild.

- **X: Presumed Extinct Flora (Declared Rare Flora — Extinct)**
  Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such (Schedule 2 under the *Wildlife Conservation Act 1950*).

Taxa that have not yet been adequately surveyed to be listed under Schedule 1 or 2 are added to the Priority Flora List under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

Taxa that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Conservation Dependent species are placed in Priority 5.

- **Priority 1** - Poorly known Taxa. Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey;
- **Priority 2** - Poorly Known Taxa. Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey;
- **Priority 3 -** Poorly Known Taxa. Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey;
- **Priority 4 -** Rare Taxa. Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years; and
- **Priority 5 -** Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxon becoming threatened within five years

Based on the degraded nature of the site a DPAW database search/request was not undertaken of the site as there was a very low probability of listed species being present in the north and western portion of the site (where disturbance is proposed). A detailed site search was undertaken of proposed disturbance zones (north and western portion of site) to assess the site for possible listed flora species. Site searches did not identify evidence of Priority Flora or Declared Rare Flora pursuant to Subsection 2 of Section 23F of the *Wildlife Conservation Act 1950*, in the subject area.

4.8. Weeds and introduced species

In 1976 the Agriculture Protection Board introduced legislation to control weeds – the *Agriculture and Related Resources Protection Act 1976*. As of 1 May 2013, the *Biosecurity and Agriculture Management Act 2007 (BAM Act)* and regulations came into force. Legislation to be repealed is now covered by the BAM Act and its regulations. This legislation sets out “declared” plants and legal obligations to landowners in regards to these species. If a plant is declared then landowners are obliged to control that plant on their properties.

Environmental Weeds are defined by the "Environmental Weeds Strategy for Western Australia" (1999) as *"plants that establish themselves in natural ecosystems and proceed to modify natural processes, usually adversely, resulting in the decline of the communities they invade"*. At present there is no legislation governing management of Environmental Weeds, landowners are encouraged to control movement and restrict further spread of these species.

Any plant other than a declared plant can be prescribed as a "Pest Plant", under Section 22 of the *Biosecurity and Agriculture Management Act 2007 (BAM Act)*. Typically these are prescribed whereby the occurrence of these may adversely affect property values, comfort or convenience of the inhabitants of a particular district.

The Act states (6) (1) .*The council may serve on the owner or occupier of private land…a duly completed notice…requiring him/her to destroy eradicate, or otherwise control any pest plant on that land' (Agriculture and Related Resources Protection Act 1976).* A few environmental weeds were present across the site predominantly in the cleared and disturbed areas. A summary of the weeds located on site is shown in Table 2.

Table 2 – Weed Species identified from Site Survey

Weed species
Pennisetum clandestinum Kikuyu grass
Lagurus ovatus Hare's tail grass
Arctotheca calendula, Cape weed
Paspalum distichum, water couch
Lotus sp.
Rumex sp.
Solanum nigrum Deadly nightshade
Arum Lily
Asparagus asparagoides Bridal creeper
Cirsium vulgare Spear thistle
Juncus acutus

Of the above listed species, Bridal creeper (*Myrsiphyllum asparagoides*) is listed under the Shire of Denmark's "*Pest Plants*". Local by-laws apply to the control and movement of the species.

The Department of Agriculture and Food Western Australia (DAFWA) is in the process of updating its website and will remove references to statutes to be repealed in due course. For further information relating to control and legislation please visit the Biosecurity and agriculture management website at http://www.biosecurity.wa.gov.au**.**

It is therefore recommended:

- Declared Pest plants and Environmental Weeds should be controlled from any further spread and controlled on site.

4.9. Fauna

Native animal populations have generally been in decline since European settlement (CALM 2005). This is primarily due to native vegetation habitat loss and the introduction of pest animals. A reconnaissance search was undertaken on site and revealed little to no indication of native animal habitat.

The Subject site supports possible habitat trees for the Western Ringtail Possum (*Pseudocheirus occidentalis*) Listed as "Threatened" *WA Wildlife Conservation Act* 1950 Notice September 2013,

Listed as Vulnerable IUCN Red List of Threatened Species, and Commonwealth: Vulnerable (*Environment Protection and Biodiversity Conservation Act 1999*).

No signs of drays, feed and habitat trees (in the Peppermint trees, *A. flexuosa*) were noted during the assessment during the site assessment. The ground underneath all of the Peppermint trees within the Subject site was checked for possible feeding signs and no signs were noted for possible breeding habitat. In an effort to possibly provide future habitat it is recommended that the Peppermint trees are retained where possible for possible future habitat of the Western Ringtail Possum.

As the site is predominantly degraded in nature there was little evidence to support other threatened fauna may be present within the Subject Site.

It is therefore recommended that:

- In an effort to possibly provide future habitat it is recommended that the Peppermint trees are retained where possible for possible future habitat of the Western Ringtail Possum.

4.10. Waterways and wetlands

The Wilson Inlet is directly adjacent to the Subject Site. The Wilson Inlet is connected to the Denmark Inlet, a much larger body of water that feeds to the Southern Ocean. The Denmark inlet system is geologically recent, having only attained its present form during the Holocene sea level changes of approximately 7000 years before present. The inlet system was created by the isolation of flooded embayments of relatively old river valleys by the formation of dunes. Subsequent and highly dynamic processes, such as a fall in sea level, longshore drift of coastal sand, the infilling of estuaries with catchment sediments and highly seasonal water flows, have increasingly isolated these estuaries from the ocean. The opening and closing regimes of the estuaries depend on the degree of exposure of the inlet mouth to onshore sediment transport by swell and the flow characteristics of waterways that enter the system (DEC, 2009).

The Walpole and Denmark inlet system is a basin estuary that formed in association with geologically ancient river channels. This system remains one of only three permanently open estuarine systems on the south coast of Western Australia. An undulating landscape of forested laterite hills and low-lying peat swamp surrounds the inlet basins and the catchments.

Consideration to drainage and storm water will need to be given across the Subject Site due to moderately draining sandy soils with an extremely low PRI ability.

Ongoing management of water quality and prevention of pollution or contamination to the Wilson Inlet catchment should be carefully considered. As the drainage of the Wilson Inlet catchment system is downslope from the Subject Site, the proposed development requires appropriate on-site effluent disposal systems installed and maintained as per manufacturers recommendations (See Section 4.2.6 for more detail).

It is recommended that a 100m buffer/setback apply form the high-water mark (1.2m AHD) of the Wilson Inlet for this development. Any storm water treatments should not be located in or adjacent to the Wilson Inlet 100m buffer/setback area. The subject area is not located within a Public Drinking Water Source Area (PDWSA).

It is therefore recommended:

- Stormwater is retained on site and careful consideration given to moderately draining subsoils in stormwater design stages;
- All stormwater is treated within the lots and not in the 100m Buffer/setback Wilson Inlet foreshore area.

4.11. Ecologically Threatened Areas

A search for Threatened Ecological Communities (TECs) within the Warren IBRA bioregion on the DECs database found that there are no TECs present on the Subject Site.

4.12. Disease Management

Phytophthora cinnamomi, otherwise known as dieback, is a soil borne water fungus which causes large scale death of vegetation, particularly the Jarrah trees and Banksia species. A survey for the presence of *P. cinnamomi* was not conducted for the purposes of this report. The spread of *P. cinnamomi* is through the movement of soil as a result of human activities which cause the translocation of soil sediments, be it a large scale (i.e. soil brought in for infill) or small scale (i.e. soil brought in unknowingly on machinery, shoes etc.) incidents. To maintain a disease-free site, it is suggested that all machinery operating during the proposed works be cleaned of accumulated soil and plant material prior to commencing any work. If such a case arises where the pathogen was found to be present on the lot or surrounding areas, then it is the developer's responsibility to ensure that the pathogen does not spread further.

It is therefore recommended:

- All machinery operating on site is to be cleaned of all accumulated soil and plant material from other sites prior to commencing work and on re-entry to site. This can be done via brush down or wash-down of soil and plant materials.

4.13. Drainage and storm water

To enable implementation of Water Sensitive Urban Design principles, planning consideration should be given at design stage to effectively manage drainage across the site. Nutrients from storm water should be treated prior to entering the Wilson Inlet. According to the indicative permeability of each soil category with regard to AS/NZS 1547:2000 permeability results for the site indicate that the sands are moderate draining soils. Storm water from each dwelling should be contained on site through "Point of Source Infiltration", this can be undertaken through the capture of rainwater for use and consumption, soak wells and swales. All storm water structures should be located within the lot.

It is therefore recommended that:

- On-site infiltration is encouraged and installation of rain water tanks for capture of excess water; and
- Stormwater will need to be treated before entering creek systems, with stormwater infrastructure located within the development (lot) footprint and not in foreshore or buffer areas.

4.14. Constructability

This report does not include any engineering assessment. The site is conducive to ease of excavation due to the development areas not having encountered rock. The proposed development areas (north and western areas) would most likely be classified as an *A Class Sites – Most sand and rock sites with little or no ground movement from moisture changes.* Prior to any building construction, this would need to be assessed by a structural engineer.

Any building below 3.5m AHD is not recommended and increasing the floor levels may need to occur via imported fill (e.g. proposed chalet 5).

It is therefore recommended that:

- A structural engineer is engaged prior to building construction to ascertain structural ratings for any buildings on site.

4.15. Fire Management

A Bushfire Management Plan in consultation with Department of Fire and Emergency Services (DFES) and the Shire of Denmark has not been prepared as part of this assessment. Bushfire Hazard Level Assessment is undertaken for residential areas and aligned to the Guideline's for Planning in Bushfire Prone Areas (WAPC, 2015a). The dwelling sites proposed are primarily in Low Open Woodland areas on flat ground.

Preliminary hazard assessment of the Subject Site revealed that there is a Moderate- Extreme Bushfire Hazard Level (BHL) predominantly of remnant Peppermint trees (Vegetation Type B) with the site. Adjacent to the site to the south and west are grasslands (low BHL), and remnant woodland vegetation to the north and west along the Wilson Inlet foreshore (moderate – Extreme BHL).

Preliminary assessment suggests that housing will need to be constructed to AS 38959-2009 as 100m separation cannot be achieved from continuous vegetation. If a BAL-29 was applied to the buildings, this would require between 14m and 20m setback from any building wall to remnant vegetation (as per AS3959-2009). The BAL rating and building to AS3959-2009 is not retrospective to existing dwellings. The BAL 29 setback (14-20m) and a 20 metre Asset Protection Zone (APZ) should be contained within the property for ease of maintenance from the lot owner.

For each individual dwelling the APZ area must meet the following requirements:

a) Width: 20 metres measured from any external wall of the building or building envelope (or BAL 29 or less);
b) Location: within the boundaries of the lot on which the building is situated;
c) Fine fuel load: reduced to and maintained at 2 tonnes per hectare;
d) Trees (crowns) are a minimum of 10 metres apart;
e) Trees are low pruned at least to a height of 2 metres;
f) No tall shrub or tree is located within 2 metres of a building;
g) No tree crowns overhang the building;
h) Fences and sheds within the APZ are constructed using non-combustible materials (e.g. colour bond iron, brick, limestone, metal post and wire); and
i) Sheds within the APZ should not contain flammable materials.

Refer to Limitations Mapping page 33, indicating possible APZ around proposed and existing residences. The proposed new residences are located in the previously cleared areas, however some Peppermint trees may need thinned to achieve the BAPZ. This will be subject to further survey and confirmed in a detailed Bushfire Management Plan for the site. A detailed Bushfire Management Plan prepared by a Level 3 accredited Bushfire practitioner will be required as the tourist development is classified as a “Vulnerable Land Use” under State Planning Policy (SPP) 3.7 (WAPC, 2015b).

It is therefore recommended that:

- A BAL Rating and AS3959-2009 is to be applied to any new buildings on site;
- Setbacks associated with BAL 29 and APZ areas are located within the individual lot to ensure that these can be maintained by the individual lot owners; and
- A detailed Bushfire Management Plan prepared by a Level 3 accredited Bushfire practitioner will be required as the tourist development is classified as a “Vulnerable Land Use” under State Planning Policy (SPP) 3.7 (WAPC, 2015b).

4.16. Access and infrastructure

The proposed dwellings are to be accessed via a newly constructed and sealed road from Ocean Beach Road. Power and telecommunications are available to service each new lot. Sewer is not available to the site. Potable water is to be collected from roof catchment areas from both dwellings and outbuildings limiting excess storm water through retention. Landowners should further be encouraged to minimise water usage and reuse household water where able for household and garden use.

It is therefore recommended that:

- Water wise initiatives are implemented at lots;
- Water recycling, reuse and water reduction is encouraged for the development; and
- Potable water via rainfall collection from dwellings to reduce stormwater runoff.

5. Land Use Requirements

Areas of land for sub-division approval are assessed through Land Capability to analyse the sustainability of the particular activity and the environmental effects the proposed use may have on the land. This determines the attributes the land contains which can affect the proposed land use for the area. The land use proposed for this Subject Site is '*Rural - Residential'* as defined by the assessment process in *the State Planning Commission (1989) Land Capability Assessment for Local Rural Strategies.* This definition is not reflective of any zoning or Shire designations and is the Land Capability assessment criteria definition.

5.1. Rural - Residential

To assess the capability of the land, the WAPC Land Capability Assessment guideline does not have a tourism category, therefore the site has been assessed as "Rural Residential with on-site effluent disposal" (as per the State Planning Commission (1989) Land Capability Assessment definition not any other planning instrument) and is aligned to the Department of Agriculture and Food standards and State Planning Commission Land Capability Assessment for Local Rural Strategies (1989).

"Rural Residential is a multiple form of land use where land is utilised primarily for residential purposes, but often also for some form of agricultural uses. Individual lot sizes range from 1 hectare upwards, but are generally 2 and 5 hectares in size. One standard residential dwelling (i.e. not for hotel, guesthouse etc.) is permitted.

State Planning Commission Policy requires that Scheme water be provided to each residence on lots smaller than 2 hectares but households on larger lots may not necessarily be provided with Scheme water. In this case, water for domestic purposes is obtained from rainfall stored in rainwater tanks and/or surface storage dams or groundwater supplies.

Deep sewerage is generally not provided to the residence and domestic sewerage and sullage are disposed of in on-site septic tank systems. Telephone and electricity connections are provided to each residence. Roads are often constructed to a lesser standard than in urban areas and are sometimes narrow, gravel rather than bitumen sealed and unkerbed.

Domestic gardens are usually established around the dwelling for file protection purposes. The possible range of agricultural uses include dryland grazing (sheep, horses, goats, cattle), annual horticulture (market gardens) and perennial horticulture (orchards, vines) and are generally determined by the available of water for irrigation purposes, soil factors which affect production, and by the potential to pollute water resources.

Agriculture use on the balance of the lot is generally of a non-commercial nature and is often promoted as an integral part of the rural-residential lifestyle. However, the use may supplement the income of the household. Land use requirements are divided into two groups; requirements relating to residential use and requirements relating to agriculture use.

<u>Land Use requirements – residential use</u>

- *The land should provide stable surface and stable soil conditions for housing construction;*
- *The land should be capable of being trenched to approximately 1m deep;*
- *The land should be capable of being relatively easily excavated to a maximum depth of 1.5 metres to allow installation of septic tank system;*
- *Soil should be capable of absorbing the effluent efficiently and purifies water stream percolating through the soil;*
- *Soils should be capable of absorbing storm water discharge;*
- *Soils should not be subject to waterlogging; and*
- *Dwelling and septic tank should not be threatened by flooding, wind erosion, soil erosion or bushfires.*

<u>Note: the quote of "Rural Residential" does not relate to any planning instrument, and is the category used for the land capability assessment process.</u>

5.2. Land Resource Characteristics

The Land Resource Characteristics have been overlaid to determine the mapping units assessed at the subject site. The mapping units were determined by the following information:

- Soil and Landscape characteristics, including texture, depth, soil profile, aspect, slope and water table;
- Site soil testing;
- Laboratory testing of soils;
- Environmental/vegetation mapping; and
- Historical land use.

The 2 Mapping Units are defined in Table 3 below and shown diagrammatically over the page.

Table 3 – Mapping Units Proposed Rural Residential Lot 1 Ocean Road Denmark

Map Unit	Characteristics
Map Unit A	Sandy topsoil grading to silty sands, predominantly Peppermint woodland. Slopes <5° PRI extremely low to exceedingly low.
Map Unit B	Low flat areas, possibly seasonally inundated. Low flats of *Centella asiatica*

Legend

- Subject Site
- Test pits
- 5m Contours
- Map Unit A
- Map Unit B

Scale
1:1,000@A3
MGA GDA 94 Zone 50

0 12.5 25 50 75 100 Meters

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Map Units

STATUS	FILE	DATE
Final	DSM002	24/10/2013

6. Land Resource Survey

The Department of Agriculture and State Planning Commission utilise a five-class system of assessing Land Capability, these five classes rate the degree of physical limitations associated with land use and management needed for these. Please refer to Table 4.

Table 4 - Land Capability Classes

CAPABILITY CLASS	DEGREE OF LIMITATION	GENERAL DESCRIPTION
I	Very low	Areas with a very high capability for the proposed activity or use. Very few physical limitations to the specified use are present or else they are easily overcome. Risk of land degradation under the proposed use is negligible.
II	Low	Areas with a high capability for the proposed activity or use. Some physical limitations to the use do occur affecting either its productive use or the hazard of land degradation. These limitations can however, be overcome through careful planning.
III	Moderate	Areas with a fair capability for the proposed activity or use. Moderate physical limitations to the land use do occur which will significantly affect its productive use or result in moderate risk of land degradation unless careful planning and conservation measures are undertaken.
IV	High	Areas with a low capability for the proposed activity or use. There is a high degree of physical limitations which are either not easily overcome by standard development techniques or which result in a high risk of land degradation without extensive conservation requirements.
V	Very High	Areas with a very poor capability for the proposed activity or use and the severity of physical imitations is such that its use is usually prohibitive in terms of either development costs or the associated risk of land degradation.

6.1. Qualities and limitations

The proposed land use has a set of qualities for which the Land Capability Assessment will be considered. Table 5 below outlines the landscape qualities and the overall Capability rating for septic tanks in rural residential and this Subject Site. The alphabet symbol given to each quality (e.g. Ease of excavation, "x") represents the WAPC Guidelines (1989) reference to that same characteristic. Note that for Rural Residential there are land qualities for each of the separate uses; residential, annual and perennial horticulture, and hobby farm grazing. This report focuses on the land use of Residential Use in Rural Areas (detailed at Table 9 of the WAPC Guidelines). The main qualities required in assessing land capabilities for this Subject Site are:

- Ease of excavation;
- Foundation stability;
- Water logging hazard;
- Water erosion hazard;
- Soil nutrient retention capacity;
- Soil microbe disinfectant ability;
- Soil absorption;
- Flood hazard;
- Water pollution;
- Acid Sulphate Soils, and
- Bushfire hazard.

The following table is the land capability classification system for Rural Residential from the State Planning Commission (1989) Land Capability Assessment for Local Rural Strategies.

Table 5 – Land Capability for Residential Use in Rural Areas

Landscape Qualities Rural Residential					
Ease of excavation, x	Very high	Moderate	Low	Low	
Foundation stability, b	Very high	High	Moderate	Low	Very Low
Water logging hazard, i	Low	Moderate	High	Very High	
Water erosion hazard, e	Low	Moderate	High	Very High	
Wind erosion hazard, w	Low	Moderate		High	Very High
Wave erosion hazard, u				High	Very High
Soil absorption ability, a	High	Moderate	Low	Very Low	
Flood hazard, f				High	Very High
Water pollution hazard, s	Low	Moderate	High		
Bushfire hazard, z	Very low	Low	Moderate	High	Very High
Soil Salinity, y	Very low	Low	Moderate	High	
Overall capability rating	**I**	**II**	**III**	**IV**	**V**

Utilising the above table, the following assessment for limitations to the Subject Site is made for Map Units A and B, please refer to Tables 6 and 7 over the page.

Table 6 – Land Capability Rating Map Unit A

Landscape Qualities Rural Residential	Map Unit A	Comments
Ease of excavation, x	High	Sandy soils
Foundation stability, b	High	Sandy soils
Water logging hazard, i	Low	Most water tables >1100m BGL, Test pit 2 marginal.
Water erosion hazard, e	Low	Low slopes <5°
Wind erosion hazard, w	Low	Site not exposed to prevailing winds, woodlands and vegetation cover
Wave erosion hazard, u	Nil	Site not subject to
Soil absorption ability, a	Very Low	Low PRI's with extremely low permeability, Phosphate ATU's recommended.
Flood hazard, f	Moderate	Above the 4-5m Contour
Water pollution hazard, s	Moderate	Setbacks from Wilson Inlet and low areas to 100m achievable
Bushfire hazard, z	Moderate	BAL 29 recommended, 20m APZ located within the lot.
Soil Salinity, y	Low	Grey sands, nil to low salinity expected and site well drained
Acid Sulphate Soils, as	Low	Grey sands low risk of ASS expected and site moderately drained
Overall capability rating	**II**	**Areas with a High capability for the proposed activity or use.**

Utilising Table 5 the following assessment is made for Map Unit B, please refer to Table 7 below.

Table 7 – Land Capability Rating Map Unit B

Landscape Qualities Rural Residential	Map Unit B	Comments
Ease of excavation, x	High	Sandy soils expected
Foundation stability, b	High	Sandy soils
Water logging hazard, i	High	Area closest to Inlet
Water erosion hazard, e	Low	Low slopes
Wind erosion hazard, w	Low - Moderate	Site subject not exposed to prevailing winds, vegetated
Wave erosion hazard, u	Low	Site not subject to
Soil absorption ability, a	Very low	Sandy soils, low PRIs, waterlogged
Flood hazard, f	High	Water logged and within 100m of Wilson Inlet, seasonal inundation.
Water pollution hazard, s	High	Setbacks from Wilson Inlet cannot be achieved to 100m
Bushfire hazard, z	Low	Predominantly cleared
Soil Salinity, y	Low	Sandy soils, possible salinity from flooding from Inlet
Acid Sulphate Soils, as	High	High risk of ASS expected and site poorly drained
Overall capability rating	**IV**	**Areas with a Low capability for the proposed activity or use.**

Limitations: The Map Units each present specific limitations due to the particular soil or landform conditions.

1) Map Unit A – Sandy grey soils: This unit is limited by the extremely low ability of the soils to purify effluent and retain nutrients (Secondary Treatment Systems with nutrient removal are recommended), retain the vegetation (peppermint trees) where possible, and bushfire hazard setbacks; and

2) Map Unit B – Water logged sands. This unit is limited by the proximity to the Wilson Inlet and the subsequent waterlogging.

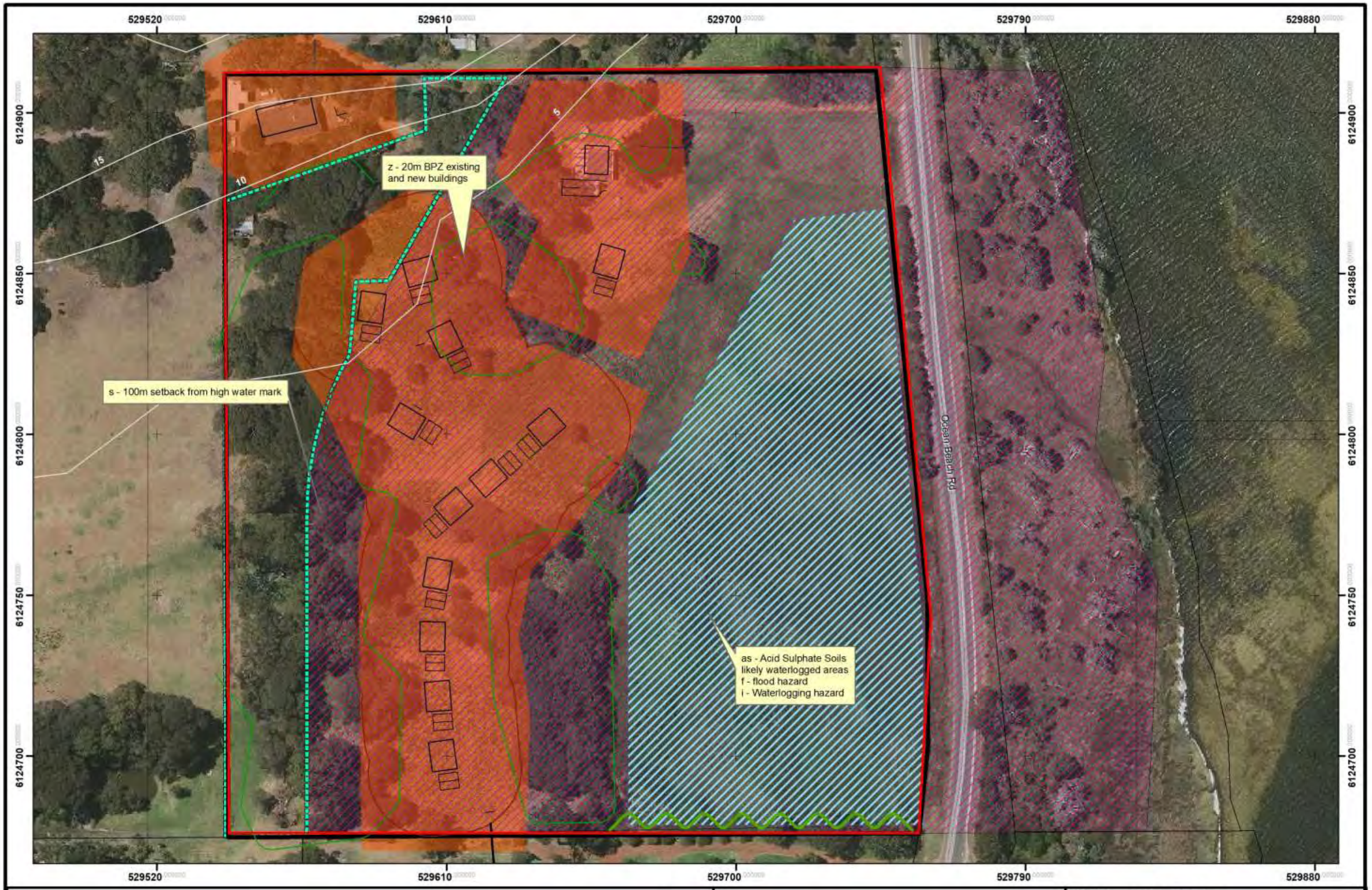
Map Unit A areas are most suited to Secondary Treatment Systems with nutrient removal for wastewater management.

Map Unit B is most suited to buffers, building exclusion zones and remain as remnant native vegetation areas, with possible revegetation.

The overall capability of the subject area to sustain the proposed developments is summarised as **Map Unit A –** ***areas with a High capability (Land Capability Class II) of supporting the land use and limitations can be overcome by design and management inputs.***

Map Unit B - ***Low (Land Capability Class IV) of supporting the land use. There is a high degree of physical limitations which are either not easily overcome by standard development techniques or which result in a high risk of land degradation without extensive conservation requirements.***

Please refer to Limitations Mapping over the page.



Legend

- Subject Site
- 100m setback
- Water logging
- 20m BPZ

Scale
1:1,100@A3
MGA GDA 94 Zone 50

0 12.5 25 50 75 100 Meters

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Limitations Mapping

STATUS	FILE	DATE
FINAL	DSM013	16/10/2017

7. Planning and Management Considerations

The following recommended planning and land management considerations arise from the Environmental and Land Capability Assessment.

Acid Sulphate Soils

- When the nature of the disturbances are known for the development (i.e. cut fill etc.), a Department of Environment and Regulation (DER, formerly part of DEC) "ASS Self-Assessment" form is completed, and if required, an ASS Investigation and reporting occur as required by the DER.

Vegetation

- Trees are retained across the site where appropriate to encourage fauna habitat and site biodiversity; and
- Revegetation occurs in the low lying (wetland) areas.

Weed Management

- Declared Pest plants and Environmental Weeds should be controlled from any further spread and controlled on site.

Fauna

- In an effort to possibly provide future habitat it is recommended that the Peppermint trees are retained where possible for possible future habitat of the Western Ringtail Possum.

Storm water, Waterways and Wetlands

- Stormwater is retained on site and careful consideration given to moderately draining subsoils in stormwater design stages;
- All stormwater is treated within the lots and not in the 100m Buffer/setback Wilson Inlet foreshore area; and
- On-site infiltration is encouraged and installation of rain water tanks for capture of excess water.

Disease Management

- All machinery operating on site is to be cleaned of all accumulated soil and plant material from other sites prior to commencing work and on re-entry to site. This can be done via brush down or wash down of soil and plant materials.

On-site effluent Disposal

- On-site effluent disposal will need to be a minimum setback of 100m from any the edge of the tidal high-water mark (1.2m AHD) of the Wilson Inlet, with a recommended disposal field (0.8ha) as outlined in Figure 9;
- The discharge point for on-site effluent disposal will need to have a separation distance of 1.5m from the highest known groundwater level;
- The recommended on-site effluent is approved from the Department of Water and the Shire of Denmark (Appendix F) prior to installation; and
- Ongoing groundwater monitoring will be conducted consistent with the proposed groundwater monitoring program presented in Appendix G.

Fire Management

- A BAL Rating and AS3959-2009 is to be applied to any new buildings on site;
- Setbacks associated with BAL 29 and APZ areas are located within the individual lot to ensure that these can be maintained by the individual lot owners; and
- A detailed Bushfire Management Plan prepared by a Level 3 accredited Bushfire practitioner will be required as the tourist development is classified as a "Vulnerable Land Use" under State Planning Policy (SPP) 3.7 (WAPC, 2015b).

- **Constructability**
- A structural engineer is engaged prior to building construction to ascertain structural ratings for any buildings on site.
- All buildings to be located above the 3.5m AHD contour or imported fill to increase finished floor heights.

Access and Infrastructure

- Water wise initiatives are implemented at lots;
- Water recycling, reuse and water reduction is encouraged for the development; and
- Potable water via rainfall collection from dwellings to reduce stormwater runoff.

8. Conclusions

Mark and Steve Allen commissioned Bio Diverse Solutions (Environmental Consultants) to undertake an Environmental and Land Capability Assessment of Lot 1 Ocean Beach Road, Denmark. The Land Capability Assessment compares the physical requirements for a particular land use with the qualities of the land. The analysis determines the ability of the land to sustain a particular land use without resulting in significant environmental degradation.

To assess the capability of the land, the WAPC Land Capability Assessment does not have a tourism category, therefore the site has been assessed as "*Rural Residential with on-site effluent disposal*" (as per the State Planning Commission (1989) Land Capability Assessment definition not any other planning instrument) and is aligned to the Department of Agriculture and Food standards and State Planning Commission Land Capability Assessment for Local Rural Strategies (1989).

The assessment of the subject site involved desktop analysis of climate, site history, vegetation, river systems and geology of the site. Site assessment was undertaken of soils, remnant vegetation, and spring flora survey. Assessment of the Subject Site included laboratory analysis of soils for permeability and PRI.

The soils were generally of a sandy nature in the A Horizon and B Horizon. The soil testing found soils with low PRIs and moderate permeability. The site is also in close proximity to the Wilson Inlet and setbacks of >100m are required. The soils are deemed capable of Residential use with the use of Department of Health/Shire of Denmark approved systems. A proposed design system is provided in Appendix F. The waterlogged (low areas) closer to the Wilson Inlet are not deemed suitable for Rural Residential Land use.

The site testing and environmental assessment revealed two Map Units – Map Unit A (Sands) and Map Unit B (Sands, waterlogged areas). Map Unit A revealed a Land Capability Rating of II-Areas with a High Capability for the proposed activity or use. The Map Unit B revealed a Land Capability Class Rating IV- Areas with a low capability for the proposed activity or use.

Some planning considerations are required for Map Unit A, particularly Phosphate Removing ATU's, setbacks from the Wilson Inlet and Bushfire hazard setback. Further engineering is required to ascertain flood susceptibility of the site and Structural Engineering ratings for any proposed dwellings. Imported fill can assist with increasing finished floor heights of proposed chalets. It is considered these requirements would form the conditions of approval.

Map Unit B does not have site soils and conditions which support the proposed Rural Residential land use, and it is not recommended that any development occurs in these areas. These areas are suitable for maintaining buffer zone from Wilson Inlet and restoring diversity with revegetation.

Bio Diverse Solutions conclude that if the listed Planning and Management recommendations are implemented by the client, the development of tourism on the Subject Site, can be implemented sustainably and in an environmentally sound manner.

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Appendices

Appendix A – Location Mapping & Development Plan

Appendix B – Aboriginal Heritage Site Report

Appendix C - Soil Profile Sampling Results and Test Pit Mapping

Appendix D – Soil Laboratory Results

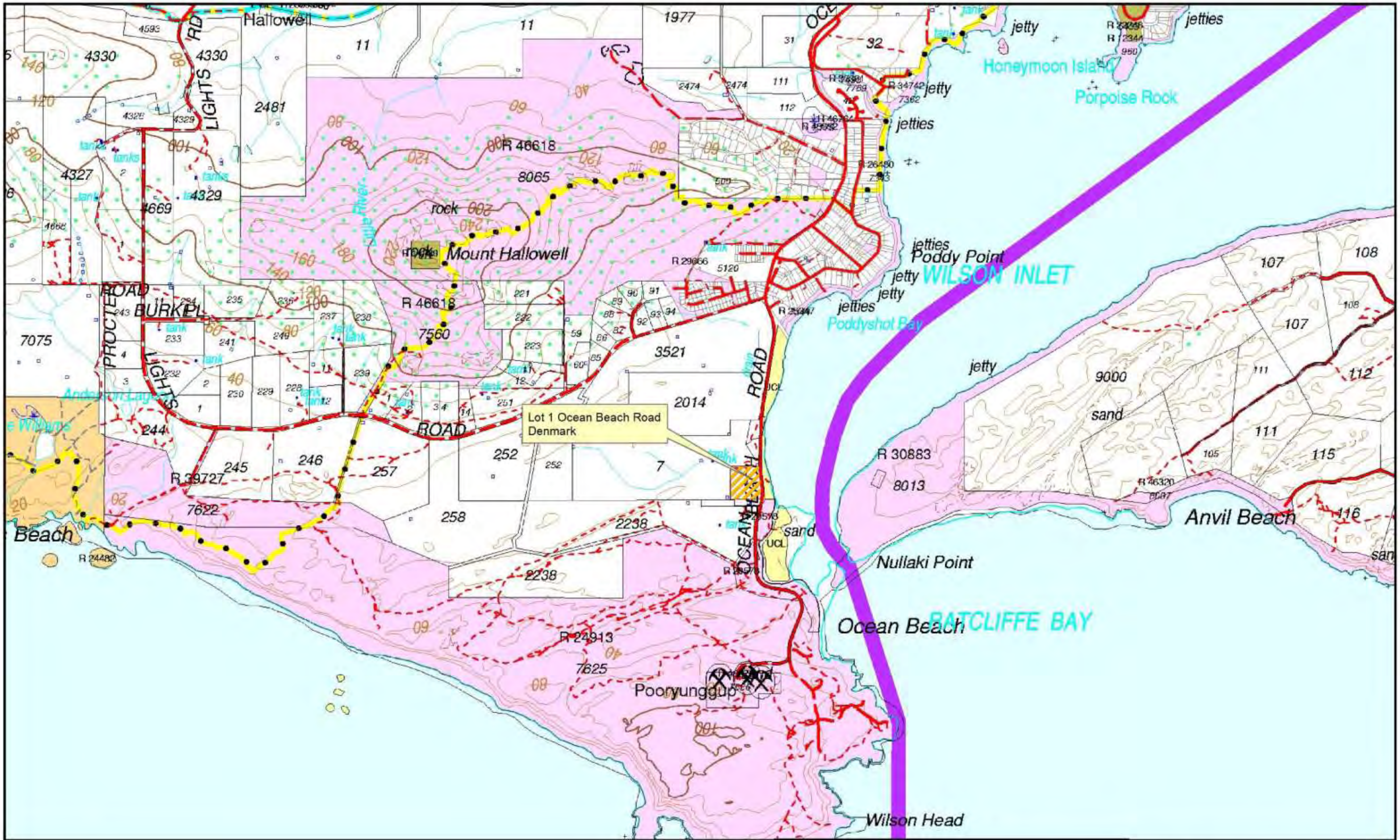
Appendix E – Vegetation Mapping

Appendix F – Proposed Effluent Disposal System

Appendix G – Groundwater Monitoring Program

Appendix A

Location Mapping & Development Plan



Legend

Subject Site

Scale
1:24,000@A3

0 250 500 1,000 1,500 2,000 Meters

Bio Diverse Solutions

29 Hercules Crescent
Albany WA 6330
Australia

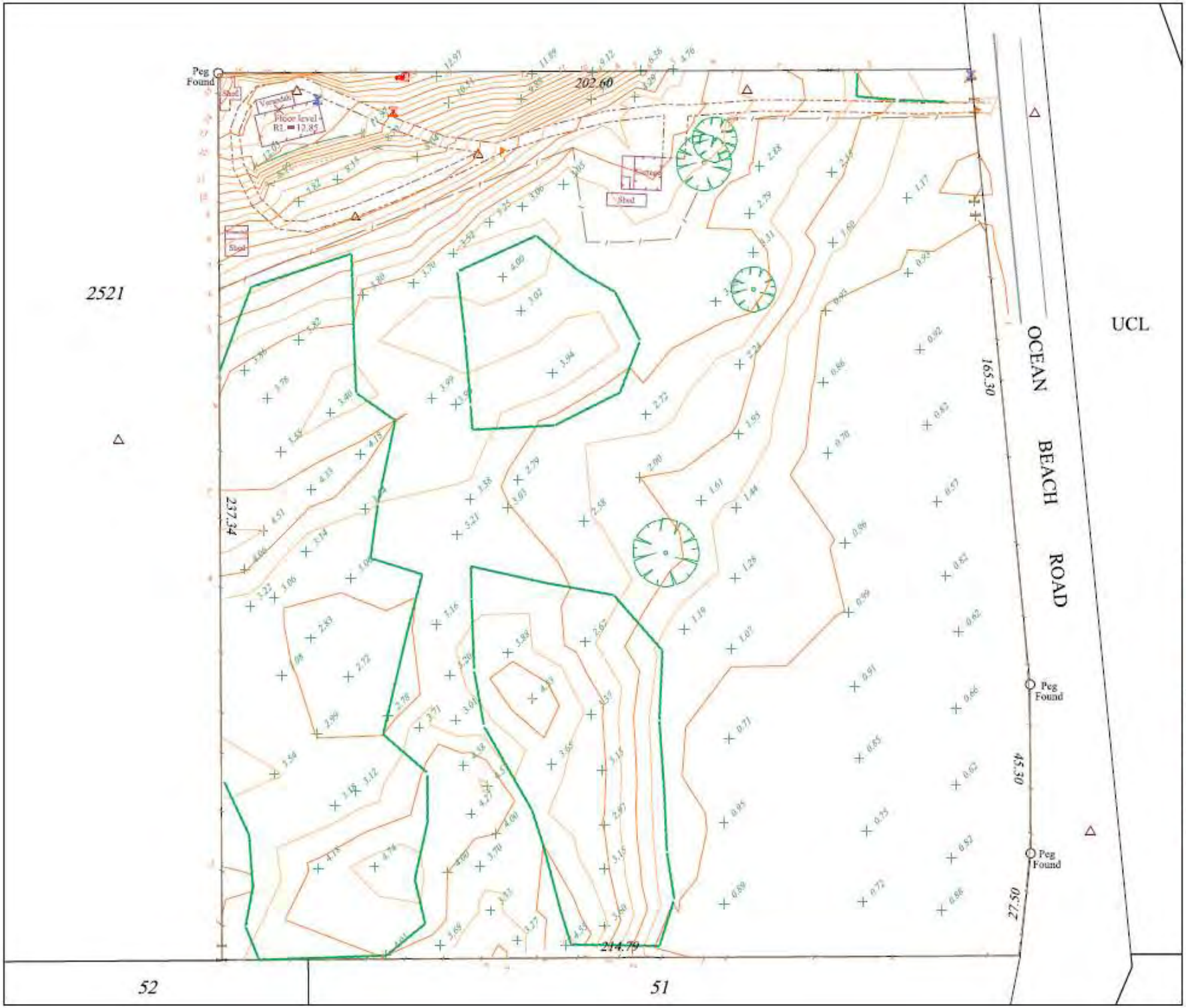
Tel: 08 9842 1575
Fax: 08 9842 1575

CLIENT
Mark Allen
Lot 1 Ocean Beach Road
Denmark WA 6333

Location Mapping

STATUS	FILE	DATE
Final	DSM002	24/09/2013

FEATURE & CONTOUR SURVEY
LOT 1 OCEAN BEACH ROAD
DENMARK WA 6333



ORIGINAL PLANNED:	N/A
ORIGINAL DRAFTED:	AH
DRAFTED DATE:	17/12/2013
AERIAL DATA:	N/A
CADASTRAL DATA:	SCDB
TOPOGRAPHIC DATA:	Survey 17/12/2013

0 10 20 30 40 50

1 : 1000 @ A1
ALL DISTANCES ARE IN METRES

REVISION	DESCRIPTION	DRAFTER	DATE
A	ORIGINAL	AH	17/12/2013

LEGEND

Gate	Top of Bank
Tree	Bottom of Bank
Double transformer	Track
Power dome	Bush line
Power Meter	Fence
Telstra marker	Top of Bank
Water Meter	Bottom of Bank
	Edge of Bitumen

This plan has been prepared from a field survey for the purpose of showing the physical features of the land to assist in designing future developments, and should not be used for any other purpose.

The title boundaries shown hereon were not verified or marked at the time of survey but were determined by the SCDB July 2013, not by field measurement. As such, these dimensions could be out of date and inaccurate by modern standards. This plan should not be used for building to boundary, or to prescribed subdivision, without further boundary survey.

Only surface features have been located. Underground services have been plotted from service authority records. All services shown from records only will need verification prior to, or during, work on site.

Before starting any excavation, excavation or construction on the site, the relevant person should make an independent and updated enquiry of 'dial before you dig' and any relevant service providers to ascertain the existence of further services (if any) and the accurate location of those not able to have been surveyed at the time of preparing this plan (or date).

Ref : 1804-01A

Denmark Survey & Mapping
PO Box 339
1 / 55 Strickland St, Denmark 6333
(08) 9848 2262

LEGEND

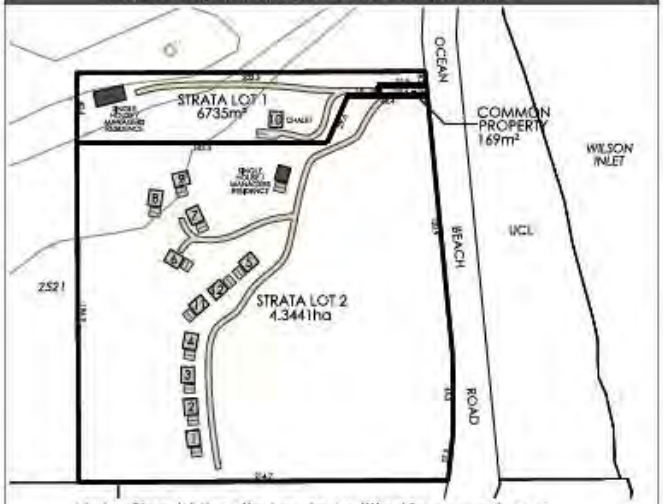
- SUBJECT SITE
- EXISTING VEGETATION
- SINGLE HOUSE / MANAGERS RESIDENCE
- 6 INDICATIVE LOCATION OF HOLIDAY ACCOMMODATION
- INTERNAL SEALED ACCESSWAY
- INDICATIVE PARKING LOCATIONS
- 20m BUILDING PROTECTION ZONE
- FLOOD HAZARD AREA - WATERLOGGING
- 100m SETBACK FROM HIGH WATER LINE
- DEVELOPMENT EXCLUSION ZONE
- GATE FOR EMERGENCY ACCESS TO LOT 51 FOR EGRESS TO OCEAN BEACH ROAD
- TREE RETENTION AREAS
- 2.5m AHD CONTOUR
- LANDSCAPING SCREENING

APPROVAL OF LOCAL DEVELOPMENT PLAN

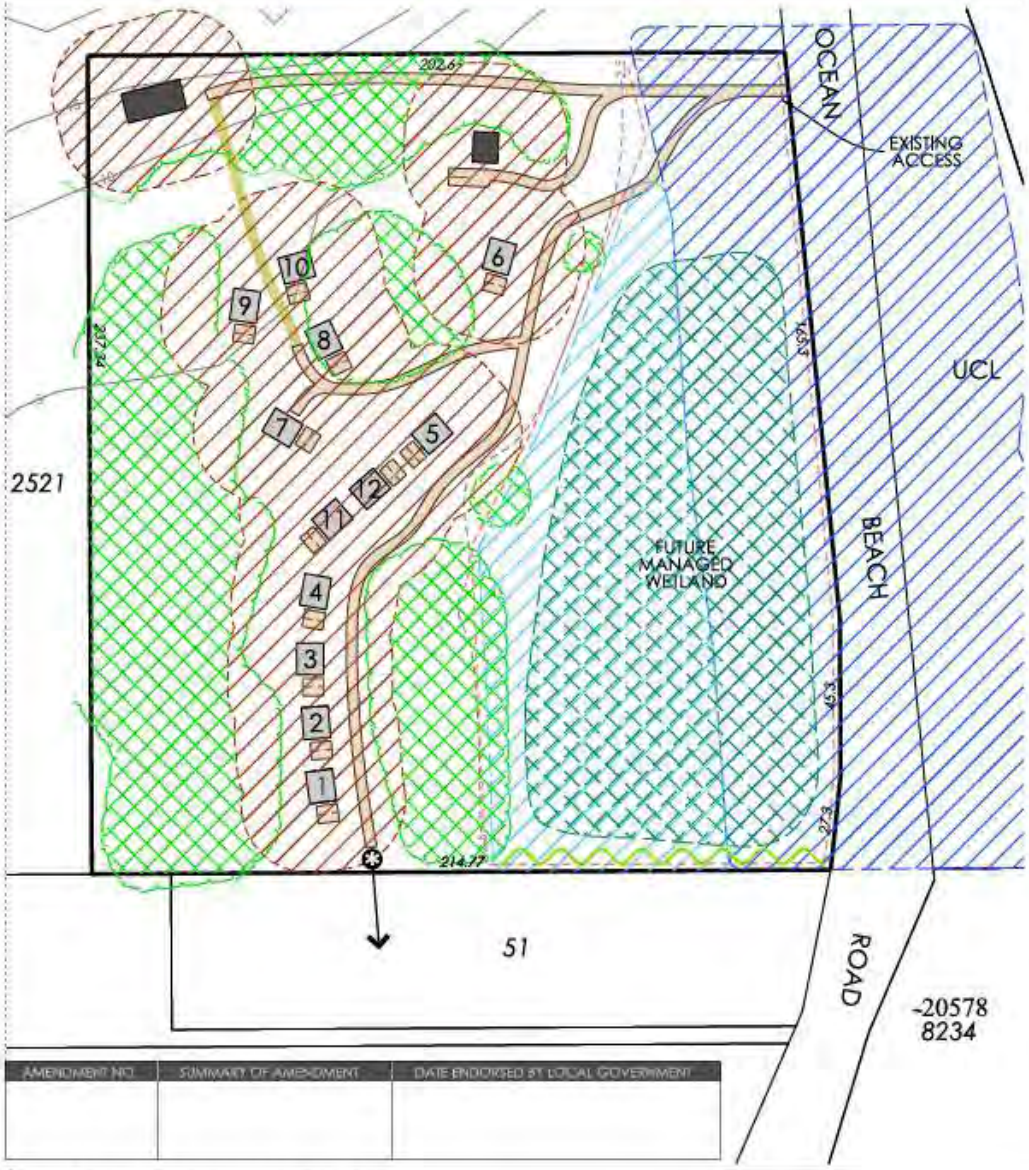
This LDP has been adopted by the Shire of Denmark

CEO Signature Date

HOLIDAY ACCOMMODATION INDICATIVE STRATA LOT SIZES



Note: Should the site be strata titled in accordance with the Local Development Plan, the holiday accommodation shown as '6' on the plan opposite will become a single house/managers residence



AMENDMENT NO	SUMMARY OF AMENDMENT	DATE ENDORSED BY LOCAL GOVERNMENT

DEVELOPMENT GUIDELINES

- Development and subdivision shall generally be in accordance with the Local Development Plan (Ref: 14-001-001D) dated 7 Sept 2015 or any minor variation to that plan approved by Council. Subdivision of Lot 1 shall be by way of strata title only.
- All development shall be connected to an on-site effluent disposal system installed to the satisfaction of the Health Department of WA and Council, and shall utilise multiple Alternative Treatment Units (ATU) or a central ATU(s) treatment system. All effluent disposal systems shall be situated a minimum of 100m from the Wilson Inlet high water mark.
- All development shall be connected to a reticulated potable water supply source to the satisfaction of Council.
- All new development shall be setback a minimum of:
  - 50m from the front boundary
  - 20m from all other boundaries.
- All buildings within the zone shall be designed and constructed to be sympathetic to the existing landscape in terms of colour finishes, location and height, to the satisfaction of Council. Zincalume, white and off-white colours are prohibited.
- All buildings heights are limited to single storey.
- The development of all new buildings shall be undertaken to comply with the requirements of AS:3959 -2009 Construction of Buildings in Bushfire Prone Areas (as amended).
- No development shall be permitted within the Development Exclusion Area(s), Tree Retention Area(s) or on land below 2.5m AHD as shown on the Local Development Plan with the exception of a boardwalk/pathway proposed in accordance with the recommendations of any Council approved Wetland Management Site for the site.
- All fencing (internal and boundary) shall be of rural construction such as pine/steel posts and wire to the satisfaction of Council.

LOCAL DEVELOPMENT PLAN
LOT 1 OCEAN BEACH ROAD, DENMARK

SAM WILLIAMS | TOWN PLANNER
ph: 0418 116216 | email: samwilliams@westnet.com.au

N

scale - 1:1500 @ A3 | date - 22 AUG 2017
plan no.14-001-001D(G)

0m 10 20 30m

ALL AREAS, DIMENSIONS & CONTOUR LEVELS DEPICTED ARE SUBJECT TO DETAIL SURVEY

SM PLANNING

Appendix B

Aboriginal Heritage Site Report

Search Criteria

1 Registered Aboriginal Sites in Custom search area (3): 529438.61mE, 6124600.66mN (zone 50) : 529922.73mE, 6125017.07mN (zone 50)

Disclaimer

The *Aboriginal Heritage Act 1972* preserves all Aboriginal sites in Western Australia whether or not they are registered. Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist.

Copyright

Coordinate Accuracy

Accuracy is shown as a code in brackets following the site coordinates.

Terminology (NB that some terminology has varied over the life of the legislation)

ID/Site ID: This a unique ID assigned by the Department of Aboriginal Affairs to the place

Status:

- **Registered Site**: The place has been assessed as meeting Section 5 of the *Aboriginal Heritage Act 1972*
- **Other Heritage Place which includes:**
  - **Stored Data:** The place has been assessed as not meeting Section 5 of the *Aboriginal Heritage Act 1972*
  - **Insufficient Information:** There is not enough information presented to determine if the place meets Section 5 of the *Aboriginal Heritage Act 1972*
  - **Lodged:** Information has been received in relation to the place, but an assessment has not been completed at this stage to determine if it meets Section 5 of the *Aboriginal Heritage Act 1972*

Access and Restrictions:

- **Open:** Availability of information that the Department of Aboriginal Affairs holds in relation to the place is not restricted in any way
- **Closed:** Some of the information that the Department of Aboriginal Affairs holds in relation to the place is restricted if it is considered culturally sensitive. This information will only be made available if the Department of Aboriginal Affairs receives written approval from the informants who provided the information. Download the Request to Access Restricted Information letter and form.
  The Department of Aboriginal Affairs maps the locations of all sites and heritage places, including Closed sites, as accurately as the information lodged with the Registrar allows. However, to preserve the confidentiality of Closed sites their locations are published in reports from the Register and displayed on the Aboriginal Heritage Inquiry System within one or more two-kilometre-square boxes. These 2 km boxes act as indicators for the presence of sites or heritage places rather than the exact location of the place.
- **Restriction:**
  - **No Restrictions:** Anyone can view the information.
  - **Male Access Only:** Only males can view restricted information.
  - **Female Access Only:** Only females can view restricted information

Reliability:

- **Reliable:** The spatial information recorded about the place is deemed to be reliable, due to methods of capture.
- **Unreliable:** The spatial information recorded about the place is deemed to be unreliable due to errors of spatial data capture and/or quality of spatial information recorded.

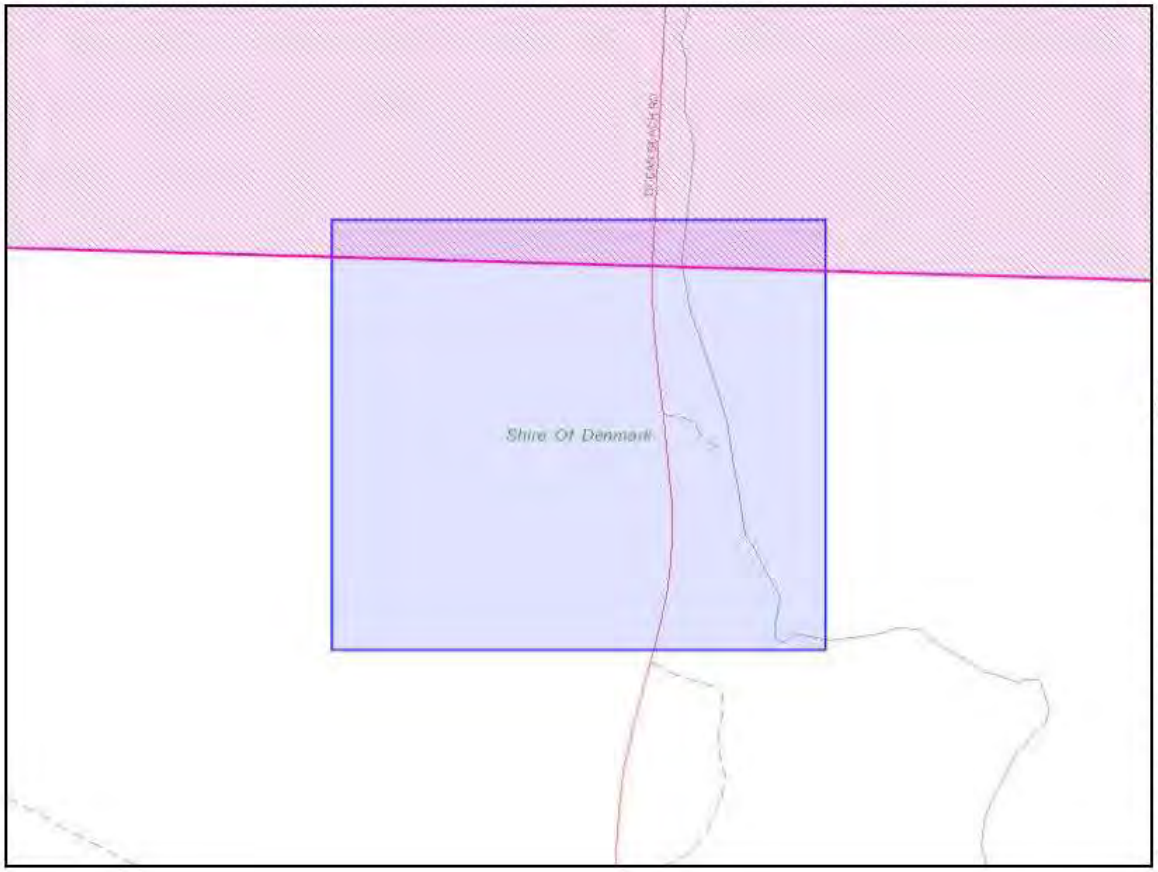
Number/No./Site No: This is the former unique number that the former Department of Aboriginal Sites assigned to the place. This has been replaced by the ID/SiteID

List of Registered Aboriginal Sites with Map

Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
4436	Registered Site	Closed	No Gender Restrictions	PODDY POINT BURIAL	Skeletal material/Burial			Not available for closed Sites	S02820

Aboriginal Heritage Inquiry System

Aboriginal Sites Database



Legend

Selected Heritage Sites

- Registered Sites
- Aboriginal Community Occupied
- Aboriginal Community Unoccupied
- Town
- Search Area

Appendix C

Soil Profile Sampling Results and

Soil Test Pit Mapping

Legend

- Subject Site
- Test pits
- 5m Contours

Scale
1:1,000@A3

0 12.5 25 50 75 100 Meters

BIO DIVERSE SOLUTIONS

29 Hercules Crescent
Albany WA 6330
Australia

Tel: 08 9842 1575
Fax: 08 9842 1575

CLIENT
Mark Allen
Lot 1 Ocean Beach Road
Denmark WA 6333

Test Pit Locations

STATUS	FILE	DATE
Final	DSM002	16/10/2017

Soil Profile Sampling

Location: Lot 1 Ocean Beach Road, Denmark, Western Australia

Date tested: 5th September 2013

Sampled by: K. Kinnear of Bio Diverse Solutions (Environmental Consultants)

Weather: Overcast showers 16°C

Location	Site description	Depth of profile (mm)	Soil Description	Laboratory Sample ID
Test Pit 1 0529663 6124851	North central south of existing house	0-350 350-650 650-1100 1100-1500 1500-2000	Dark brown sandy peat (organic matter), moist Dark grey sand, moist Brown coarse sand, moist Light brown coarse sand, moist Cream sand, wet Water Table 1300mm BGL 	Sample 1 (S1)
Test Pit 2 0529661 6124812	Mid-block east near wet area	0-180 180-650 650-900 900-1100 1100-2000	Dark grey sandy peat (organic matter), moist Dark grey sand, moist Brown coarse sand, wet Dark brown sandy silt, wet Dark brown sandy silt, wet Water Table 510mm BGL 	

Location	Site description	Depth of profile (mm)	Soil Description	Laboratory Sample ID
Test Pit 3 0529625 6124788	Mid-block higher ground, near proposed lodge	0-100 100-650 650-1000 1000-1600 1600-2000	Dark grey sandy peat (organic matter), moist Dark grey sand, moist Brown sand, moist Light brown coarse sand wet Brown silty sand, wet Water table 1130mm BGL 	
Test Pit 4 0529590 6124735	South west of lot mid lower	0-50 50-650 650-1100 1100-1800 1800-2000	Dark grey sand (organic matter), moist Dark grey sand, moist Brown coarse sand, moist Light brown sand, moist grading to wet Brown silty sand, wet Water Table 1310mm BGL 	Sample 1 (S1)

Location	Site description	Depth of profile (mm)	Soil Description	Laboratory Sample ID
Test Pit 5 0529609 6124705	South end of block 20m from boundary	0-150 150-1000 1000-1300 1300-1500 1500-2000	Dark grey sand (organic matter), moist Dark grey sand, moist Grey sand, moist Brown coarse sand, moist Light brown/cream sand, wet Water Table 1840mm BGL 	Sample 1 (S1) PRI only
Test Pit 6 0529592 6124825	North east of block	0-150 50-650 650-850 850-1300 1300-2000	Dark grey sand (organic matter), moist Dark grey sand, moist Grey sand Brown sand Light brown/cream sand, wet Water Table 1430 BGL 	

Appendix D

Soil Laboratory Results

Permeability & Phosphorus Retention Index (PRI)

Customer Bio Diverse Solutions

Job Lot 1 Ocean Beach Road Denmark

Date Rec'd 6/09/2013

Lab Number	Name	Code	Customer	Depth	Phosphorus Retention Index
F6S13086	TP1 S1`	03/09/13	Bio Diverse Solutions	65-110	2.5
F6S13087	TP 4 S1	03/09/13	Bio Diverse Solutions	5-65	0.0
F6S13088	TP 5 S1	03/09/13	Bio Diverse Solutions	150-200	1.0

coffey

Welshpool Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
26/6 Tarasero Road
Welshpool Western Australia 6106
Telephone +61 8 6458 2400
Facsimile +61 8 6458 2450

Report No.: WELS13S-403953FH

Issue No.: 1

This report replaces all previous issues of report no. WELS13S-403953FH

Test Report

Client:	Albany Soil and Concrete Testing
Client Address:	39 Hill Street Albany WA 6330
Principal:	-
Project:	Submitted Samples
Project No.:	INFOWELS01564AA
Work Order No.:	WELS13W40805
Location:	-

Reported By:
Thomas Stevenson
Laboratory Manager

Date of Issue: 15-10-13

Sample Details

Sample No.:	WELS13S-403953
Sample ID:	Lot 1 Ocean Beach Dr Denmark TP1 S1 @ 650 - 1100mm
Date of Test	15-10-13

Other Sample Details:

Test Results

Falling Head Permeability

AS 1289 6.7.2

Compactive Effort: AS1289.5.2.1

Maximum Dry Density:	1.73	t/m³
Optimum Moisture Content:	14.0	%

Material Retained and discarded	Sieve Size (mm)	-
	% Retained	-
Surcharging Applied (kg)		None applied
Hydraulic Pressure Applied (kPa)		NA
Head Height (mm)		NA
Achieved Dry Density (t/m^3):		1.64
Achieved Dry Density Ratio (%):		94.6
Achieved Moisture Content (%):		14.5
Achieved Moisture Content Ratio (%):		104

Average Coefficient of Permeability: **4.3E-06** m/sec

Comments:
Sample supplied by client
The material passing 19.00mm sieve was remoulded to 95% MOD.MDD & 100% OMC as requested by client

Form Number R/5003, Issue 4, Date 04/07/2013

Welshpool Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 [illegible]
20/9a Tonneson Road
Welshpool Western Australia 6106
Telephone: +61 8 9458 2400
Facsimile: +61 8 9458 2450

coffey

Test Report

Report No.: WELS13S-403954FH

Issue No.: 1

This report replaces all previous issues of report no. [illegible]

Client:	Albany Soil and Concrete Testing
Client Address:	39 Hill Street Albany WA 6330
Principal:	-
Project:	Submitted Samples
Project No.:	INFOWELS01564AA
Work Order No.:	WELS13W40805
Location:	-

Reported By:
Thomas Stevenson
Laboratory Manager

Date of Issue: 10-10-13

Sample Details

Sample No.:	WELS13S-403954
Sample ID:	Lot 1 Ocean Beach Dr Denmark TP4 S1 @ 50 - 650mm
Date of Test	03-10-13

Other Sample Details:

Test Results

Falling Head Permeability
AS 1289 6.7.2

Compactive Effort: AS1289.5.2.1

Maximum Dry Density:	1.70	t/m³
Optimum Moisture Content:	13.0	%

Material Retained and discarded	Sieve Size (mm)	-
	% Retained	-
Surcharging Applied (kg)		None applied
Hydraulic Pressure Applied (kPa)		NA
Head Height (mm)		NA
Achieved Dry Density (t/m^3):		1.62
Achieved Dry Density Ratio (%):		95.1
Achieved Moisture Content (%):		12.7
Achieved Moisture Content Ratio (%):		97.6

Average Coefficient of Permeability: **2.0E-07** m/sec

Comments:
Sample supplied by client
The material passing 19.00mm sieve was remoulded to 95% MOD.MDD & 100% OMC as requested by client

Appendix E

Vegetation Mapping

Legend

- Subject Site
- 5m Contours
- Low Flats
- Peppermint Woodland

Scale
1:1,000@A3
MGA GDA 94 Zone 50

0 12.5 25 50 75 100 Meters

BIO DIVERSE SOLUTIONS

29 Hercules Crescent
Albany WA 6330
Australia

Tel: 08 9842 1575
Fax: 08 9842 1575

CLIENT
Mark Allen
Lot 1 Ocean Beach Road
Denmark WA 6333

Vegetation Mapping

STATUS	FILE	DATE
Final	DSM002	16/10/2017

Appendix F

E-TEQ Resources proposed on-site effluent disposal system

December 13, 2017

ACTIVATED TREATMENTUNIT (E-TEQ-ATU-50 WETLANDS WITH SUBTERRANNEOUS DISPERSAL SYSTEM) SUPPLY, INSTALL AND SERVICE

PREPARED FOR: **BIO DIVERSE SOLUTIONS**
REF NO: **E-TEQ ATU 50 WETLANDS**

E-TEQ RESOURCES

PO BOX 1406, ALBANY, WA 6331

TEL: 08 9841 1404

INFO@E-TEQ.COM.AU

Statement of Confidentiality and Non-Disclosure

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e-Teq Resources retains all title, ownership and intellectual property rights to the material and trademarks contained herein, including all supporting documentation, files, marketing material and multimedia.

BY ACCEPTANCE OF THIS DOCUMENT, THE RECIPIENT AGREES TO BE BOUND BY THE AFOREMENTIONED STATEMENT.

Project Outline

It is our understanding that an effluent treatment system is required for a proposed temporary accommodation development for Lot 1, Ocean Beach Road, Denmark , Western Australia.

The proposed development site is situated near the Wilson Inlet wetland area and is subject to stringent regulations as well as effluent treatment and discharge quality requirements.

The subject soil has a poor Phosphorus Retention Index (PRI) factor with a high groundwater table.

The original proposal was for a development of 10 units, accommodating up to 4 persons per unit and a 30 bed Hostel, equating to a maximum potential population of 70 persons per night. This proposal has been amended to accommodate new subterraneous disposal nutrient loading guidelines as required by the Department of Water of 45kg TN /hectare/annum and 5kg TP/hectare/annum. Further, the development has been scaled back to incorporate a 12 chalet (4persons each) development with a maximum occupancy of 48 persons.

Using the estimated daily volume of 150L of waste generated per person as detailed in the raft Government Sewerage Policy the total effluent generated will be as follows;

48 persons	x	150 Litres daily	=	7,200 Litres daily
7,200 Litres daily	x	365 days	=	2.63Mega Litres annually

We understand that the accommodation is temporary and seasonal therefore will result in a fluctuating population which will require an effluent treatment system capable of treating varying waste volumes.

Treated wastewater is to be dispersed via a subterraneous dispersal system over a 0.8-hectare area of shrubbery and woodland.

e-Teq Resources Proposal

e-Teq ATU 10,000L Domestic Wastewater Treatment System

e-Teq Resources proposes to utilize a combination of natural processes complimented with chemical assistance to achieve the desired outcomes. The system is based on the principles of aerated treatment, activated sludge and anaerobic digestion to provide a complete treatment solution.

Chemical assistance through the addition of chlorine for sterilization and heavy metal removal will be required in order to facilitate optimal results suitable for subterranean dispersal.

This system also incorporates ultrafiltration and UV sterilization to provide a multiple barrier approach to ensure minimal nutrient loading and maximum sterilization of the final treated effluent.

Low subsoil PRI index rating

As indicated the subject sites subsoil has a poor PRI index rating. By utilizing chemical addition within the treatment process all phosphorous is removed and as a result negates the need for any additional soil amendment. The system is designed to achieve a Total Phosphorous (TP) of <1 mg/L. With such minimal TP the poor PRI rating would not be relevant or pose any risk.

High Groundwater Table

To counter the high-water table factor and satisfy the surrounding environment safety from contamination e-Teq proposes to utilize a concrete, plastic lined collection pit with the septic and anaerobic components to be sited above ground. Effluent generated by the development will be transferred from the accommodation units via 100mm sewer pipe to a 1.2m deep by 1.8m diameter concrete, plastic lined sump. High volume pumps will then transfer the waste to the above ground treatment plant. The pit will be designed to incorporate level sensors with 2 transfer pumps (duty and standby pump) in case of breakdown combined with high level alarms.

Periods of wet weather

With a daily maximum expected volume of 7,500 a 50,000 KL standby tank will be included. This would allow for approximately 7 days storage at peak occupancy.

Treated Wastewater Quality and Dispersal

The final effluent will meet all necessary parameters in accordance with the Draft Government Sewerage Policy.

Further to the above the system will also meet the necessary requirements and parameters as stipulated by the Department of Water - 45kg TN /hectare/annum and 5kg TP/hectare/annum.

Proposed Make and Model – e-Teq ATU 50 Wetland with filtration, chemical addition and subterraneous dispersal.

Max Daily Sewerage Treatment	10 kL per day
Final Effluent Quality	
Total Nitrogen (TN)	<10 mg/L
Total Phosphorus (TP)	0
Bio Oxygen Demand (BOD)	<10 mg/L
Total Suspended Solids (TSS)	<5 mg
eColi	0-5 mg/L *

** expected to be 0 with UF and UV multiple sterilization barriers.*

Total proposed annual waste water generated by the development = 2.63 ML

Total Nitrogen (TN) loading = 26.3 kgs / year.

Area available for dispersal equals 0.8 hectares.

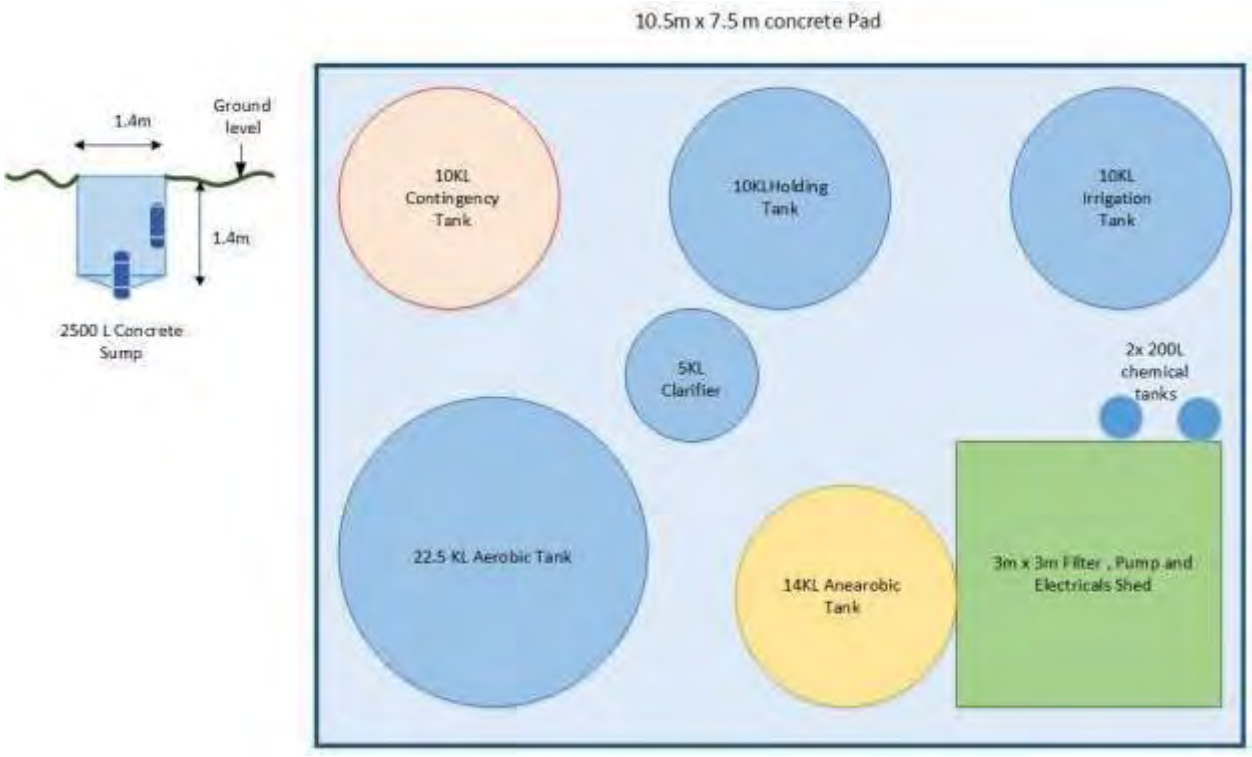
TN loading per hectare = 26.3/0.8 Hectare (area of shrubbery/woodland)

= 32.875 Kgs/Hectare

e-Teq Resources again provides a multiple barrier approach for sterilization;

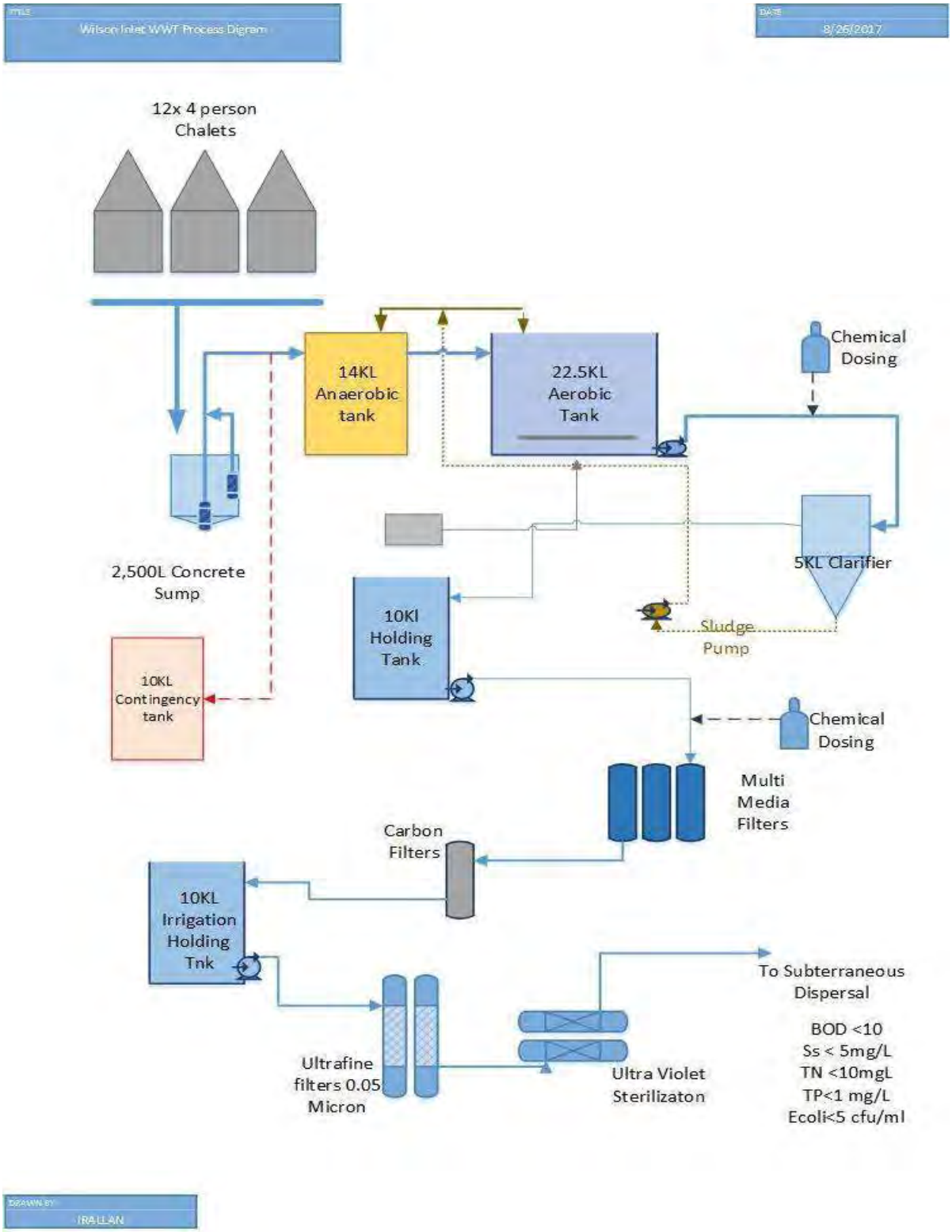
- Chlorination – a universally recognized sterilization method
- Ultrafiltration – recognized to remove all particles to a size smaller than all known viruses, bacteria and pathogens.
- UV sterilization- a universally recognized sterilization process for potable drinking water as a final assurance of water quality.

Layout



*Note – Wet weather storage tanks not included in layout.

Process Flow Diagram



E-TEQ RESOURCES PTY LTD
STANDARD TERMS AND CONDITIONS OF SALE

The Purchaser acknowledges that all goods purchased by it from O.S.I.B. Pty Ltd A.B.N. 65 654 250 040, trading as e-Teq Resources ("the Goods") are sold subject to the following terms and conditions. No variation of these terms and conditions shall bind e-Teq Resources unless agreed in writing by e-Teq Resources. These terms and conditions supersede and override any terms and conditions contained in any order or other communication whenever such order or communication is given unless agreed in writing by e-Teq Resources. If an e-Teq Resources quote contains provisions (the "Special Conditions"), which are inconsistent with any term or condition herein, the Special Conditions shall prevail to the extent of the inconsistency:

Quotation Withdrawal

Unless previously withdrawn, e-Teq Resources quotation is open for acceptance within the period stated in the quotation or, where no period is stated, within 30 days only after its date. e-Teq Resources reserves the right to refuse any order based on this quotation within 7 days after the receipt of the order.

Order Variation

Orders cannot be varied or cancelled by the Purchaser without the prior written consent of e-Teq Resources.

e-Teq Resources may accept Part of order

E-Teq Resources reserves the right to accept or decline any order for the supply of goods in whole or in part. Where e-Teq Resources makes delivery in respect of part only of an order these terms and conditions shall apply to the Goods actually delivered.

Confidentiality

The Purchaser must treat all information in connection with this quotation confidential and must not disclose the information to any third party.

Retention of Title

Legal and equitable title to the Goods does not pass from e-Teq Resources to the Purchaser until:

- The full purchase price of the Goods and any other outstanding debt has been paid by the Purchaser to e-Teq Resources;
- The Goods are re-sold and delivered bona fide for value to a third party (“Sub-Purchaser)”; or
- The Purchaser uses the Goods in the manufacture or construction of other goods (“Manufactured Goods”) so that the identity of the Goods is lost.

While the legal and equitable title in the Goods remains with e-Teq Resources, the Purchaser shall:

- Hold the Goods at their own risk;
- Insure the Goods for their full replacement value;
- Not assign, bail, pledge, mortgage, charge, grant a lien over, lease, or grant any other security over or interest in the Goods;
- Notify E-Teq Resources in writing of any intended sale of the Purchaser’s business which includes or purports to include the Goods;
- Store the Goods separately so as to identify the Goods as the property of E-Teq Resources; and
- Notify potential Sub-Purchasers that title to the Goods remains with E-Teq Resources by displaying a notice to that effect.

While the legal and equitable title in the Goods remains with e-Teq Resources, the Purchaser authorises e-Teq Resources to enter the premises where the goods are stored by any reasonable means and take possession of the goods.
If the Purchaser sells the Goods to a Sub-purchaser, before the full purchase price of the Goods and any other outstanding debt is paid by the Purchaser to e-Teq Resources, the Purchaser holds:

- The debt owed by the Sub-purchaser to the Purchaser in respect of the re-sale on trust for E-Teq Resources; and
  The proceeds of the re-sale on trust for E-Teq Resources.

If the Purchaser:

- Uses the Goods in a manufacturing process so that the identity and title of the Goods merges in the Manufactured Goods; and
- Sells the Manufactured Goods to a Sub-purchaser before the full purchase price of the Goods and any other outstanding debt is paid by the Purchaser to E-Teq Resources,

Then the Purchaser holds:

- Such part of the debt owed by the Sub-purchaser to the Purchaser in respect of the sale of the Manufactured Goods, as is attributable to the price of the Goods, on trust for E-Teq Resources; and
- Such part of the proceeds of the sale of the Manufactured Goods, as is attributable to the price of the Goods, on trust for ETeq Resources.

The Purchaser must pay e-Teq Resources the purchase price of the Goods immediately that the proceeds of the sale are received from the Sub-purchaser.

Assignment

This agreement is a personal one between e-Teq Resources and the Purchaser and the Purchaser has no interest assignable in equity or at law in this agreement.

Packing

The cost of any special packing and packing materials used in relation to the Goods shall be at the Purchasers expense notwithstanding that such cost may have been omitted from the quotation.

Purchaser to pay freight charges

The Purchaser shall take delivery of all goods supplied to it by e-Teq Resources and unless expressly provided to the contrary the Purchaser shall pay all freight and delivery charges in respect of them and if any such charges are paid by e-Teq Resources the Purchaser shall reimburse e-Teq Resources on demand.

Payment Terms

Unless otherwise specified in the quotation payment terms are fourteen (14) days from the date of invoice. All overdue amounts shall, at the option of e-Teq Resources, incur interest at a rate of 2% above the Commonwealth Bank of Australia corporate overdraft reference rate. If any cheque issued by the Purchaser in payment for goods is dishonoured, the vendor may refuse any further goods, until satisfactory payment is received in full. All costs associated with recovery of any debt will be borne by the Purchaser.

Government Taxes

GST means any tax, levy, charge or impost generally pursuant to the New Tax System (Goods and Services Tax) Bill 1998 or any other Bill or Act of the Parliament of the Commonwealth of Australia which e-Teq Resources is obliged to pay in respect of the sale or supply of the subject matter of this agreement.

Unless stated to the contrary, sales tax, GST and other like Government imposts borne or payable by e-Teq Resources are additional to the price. If sales tax, GST and other like imposts are included in the price and specified as such in the quotation, the Purchaser agrees to pay any increase borne or payable by e-Teq Resources.

Reduction of Purchaser's debt

The Purchaser's debt (if any) shall be reduced to the extent of the proceeds actually received by e-Teq Resources and to the extent (if any) that the proceeds received by e-Teq Resources exceed the Purchaser's debt e-Teq Resources shall be indebted to the Purchaser in the amount of the surplus but e-Teq Resources shall not be a trustee or mortgagee in respect of the surplus proceeds.

Purchaser may supply to sub-purchaser

While no event of default specified in the paragraphs above has occurred the Purchaser is at liberty to supply and deliver goods to a sub-purchaser pursuant to any bona fide transaction in the normal course of the business of the Purchaser. In the event of such a supply and delivery of goods to a sub-purchaser the Purchaser shall remain liable to e-Teq Resources for all payments and for the fulfilment of all obligations under the terms and conditions of this agreement.

Power of Attorney

The Purchaser irrevocably appoints e-Teq Resources as the Purchaser's true and lawful attorney to recover any proceeds from any sub-purchaser and/or to exercise the Purchaser's right under any contract between the Purchaser and any sub-purchaser including rights of repossession and resale of the Goods.

Events of default

On the happening of any one or more of the following events, namely:

- The Purchaser fails to pay to e-Teq Resources as and when due and payable any moneys comprised in the Purchaser's debt;
- A receiver, receiver and manager, liquidator, provisional liquidator or official manager is appointed over all or any of the assets of the Purchaser or a scheme of arrangement is proposed or approved with respect to the Purchaser; or
- A petition is presented for the winding up of the Purchaser, e-Teq Resources may at its option exercise all or any of the following rights (notwithstanding any prior failure to exercise such rights):

Demand payment of the whole of the Purchaser's debt then outstanding, and the Purchaser agrees to immediately pay the same.
Cease to supply goods to the Purchaser under the terms hereof or otherwise.
Take possession of all goods title to which has not passed to the Purchaser and for that purpose the Purchaser authorises e-Teq Resources by its servants or agents to use all necessary force to enter any premises where the Goods may be situated and to take possession thereof. With or without possession of the Goods sell the same by public auction or by private treaty by retail or wholesale for cash or on terms and generally as e-Teq Resources thinks fit and apply the proceeds actually received by e-Teq Resources after defraying expenses of sale and enforcement in or towards reduction of the Purchaser's debt.

Specification

The Purchaser warrants that any design or drawings submitted to e-Teq Resources are the absolute property of the Purchaser. eTeq Resources accepts no responsibility for the suitability or efficiency of any drawings or specifications submitted by the Purchaser.

The Purchaser acknowledges that he has not made known to e-Teq Resources any particular purpose for which the Goods are required unless the same is included in written specifications. All drawings, specifications and other information supplied by the Purchaser to e-Teq Resources and marked or otherwise identified as confidential shall not be disclosed to a third party except with the prior agreement of the Purchaser.

Delivery e-Teq Resources shall endeavour to meet times quoted for delivery. Where no time is specified for delivery e-Teq Resources shall endeavour to deliver the Goods specified in the quotation within a reasonable time. However time shall not be of the essence in respect of the delivery of Goods. e-Teq Resources shall not be liable for any loss or damage to any Purchaser due to late delivery and/or the failure of e-Teq Resources to notify the Purchaser of any late delivery.

Quantity

Shortage or loss or damage in delivery must be reported to e-Teq Resources in writing within seven (7) days of delivery of the Goods otherwise delivery in full shall be deemed to have been made. If the Purchaser fails to accept delivery e-Teq Resources may retain or take possession of the Goods at the cost and risk of the Purchaser.

Storage e-Teq Resources reserves the right to make a reasonable charge for storage if delivery instructions are not provided by the Purchaser within 7 days of a request by e-Teq Resources for such information.

Returned goods e-Teq Resources shall not be under any obligation to accept goods returned by the Purchaser and will do so only on terms to be agreed in writing in each individual case.

Force Majeure

Failure to perform by e-Teq Resources will not constitute default under this agreement nor give rise to any claims if such failure is caused by reasons outside the control ("force majeure") of e-Teq Resources. e-Teq Resources shall immediately notify the Purchaser of any event of force majeure, its estimated duration and the steps being taken to alleviate it.

All additional costs and expenses incurred by the Purchaser due to the force majeure shall be borne by the Purchaser. The delivery dates shall be extended by the duration of any period of force majeure, as such period is determined by e-Teq Resources.

Warranty

E-teq Resources warrants that:

- Goods shall be in accordance with the drawings and specifications and as detailed in the quotation or as otherwise varied with the prior written consent of the customer and shall comply with the current, relevant standard codes and statutory requirements;
- Component warranties apply as specified by individual component suppliers.
- Warranty of the system is dependent upon the customer adhering to the Operations Manual and is only available when the Purchaser has engaged E-teq Resources services for the maintenance of the Goods. The Fee for maintenance services shall be specified in the quote or agreed between the parties prior to delivery of the Goods.

Service Agreement

All service agreements are CPI indexed after the first 24 months. Any price variation in consumables will be notified at a minimum of 30 days prior to the alteration.

Exclusions e-Teq Resources warranties shall not apply where:

- the defect arises from materials, designs, plans and specifications supplied by the Purchaser; or
- the defect arises from the ordinary wear and tear, neglect or misuse by the Purchaser, accidents, lack of care, insufficient or faulty maintenance or improper storage or use of the Goods; or
- The Purchaser has in any way modified or repaired the Goods without e-Teq Resources prior written consent;

Where the Goods are found within twelve (12) months of delivery, to be defective due to faulty manufacturer, materials or workmanship then E-Teq Resources may, at its option either repair, modify or replace Goods to the condition both quoted by e-Teq Resources and ordered by the Purchaser, in normal working hours or repay to the Purchaser any sum of money paid by the Purchaser to e-Teq Resources in respect of the defective Goods or part thereof.

Exclusion of Negligence

e-Teq Resources shall not be liable to the Purchaser in contract or in tort arising out of, or in connection with, or relating to, the performance of the Goods or any breach of these terms and conditions or any fact, matter or thing relating to the Goods or error (whether negligent or a breach of contract or not) in information supplied to the Purchaser or a user before or after the date of the Purchasers or users use of the Goods.

Consequential Loss e-Teq Resources excludes all warranties, statements, representations, conditions, promises, undertakings, covenants and other provisions expressed or implied (and whether implied by law including an Act of Parliament or otherwise) relating to the quotation and the Goods including provisions that might otherwise form part of these terms and conditions or be collateral to these terms and conditions. e-Teq Resources shall not be liable to the Purchaser for any special, consequential, direct or indirect loss, damage, harm or injury suffered by the Purchaser or any other person including without limiting the generality of the foregoing, loss of market, loss of profits and loss of contract.

Third Party Loss

The Purchaser shall indemnify e-Teq Resources in respect of any claims, demands, damages, proceedings, costs, charges and other expenses, caused by, arising out of or in any way connected with any special consequential direct or indirect loss, damage, harm or injury suffered by any other person.

Purchaser to insure

The Purchaser agrees to insure the Goods and all containers of e-Teq Resources in which the Goods are supplied (at the Purchaser's expense) under an enforceable comprehensive policy or policies of insurance in both e-Teq Resources's and the Purchaser's names for an amount equal to the full insurable value of the Goods against accident malicious damage and theft and such other risks as eTeq Resources may from time to time require and the Purchaser shall pay on the due date all premiums payable in respect of such policy or policies of insurance and upon request produce proof of payment to e-Teq Resources within 7 days of such date provided that by written agreement between the Purchaser and e-Teq Resources with respect to any goods or any class of goods such insurance may be arranged by e-Teq Resources for a consideration to be agreed upon.

Third Party Warranty

Where e-Teq Resources is not the manufacturer of the Goods but has the benefit of any warranty from the manufacturer of the Goods, then e-Teq Resources will to the extent that it is able to do so assign to the Purchaser the benefit of that warranty.

Notices

Any notice demand or other communication to be given made or sent under this agreement shall be deemed to have-been duly given made or sent if delivered or sent by prepaid post telecommunication or facsimile addressed to the other party at such address as such party may from time to time notify the other. Any notice demand or other communication sent by post shall be deemed to have been received 1 day after the date on which it was posted and any telecommunications or facsimiles shall be deemed to have been received on the day it was sent.

Arbitration

Any dispute or difference between the Purchaser and e-Teq Resources arising out of or in connection with this contract or the constitution thereof of any agreed amendment or variation thereof shall, in the absence of mutual agreement, be referred to and settled by the decision of a single arbitrator if the parties can mutually agree upon one and if they cannot agree then by arbitration pursuant to the provisions of the Arbitration Act of the State from which e-Teq Resources has issued this quotation.

Contract

The Purchaser acknowledges and agrees the Purchaser has not entered into the contract to purchase Goods from e-Teq Resources in reliance on, or as a result of any statement or conduct of any kind (including without limitation, any representation, warranty, advice or undertaking).

Department of Environment Regulation / Local Government Authority / Water &/or Health Department Approvals:

The Purchaser acknowledges and agrees that e-Teq Resources will not be held liable for any delays caused by delays in approvals. eTeq Resources will ensure to expedite approvals and may seek purchaser's approval to modify a system to gain more expedient approvals. If the purchaser authorises construction prior to approvals e-Teq Resources will not be held liable for any costs incurred arising from extra project costs, fines, or litigation. e-Teq Resources will not charge any interest charges if a project is delayed as long as payment schedule is adhered to.

Appendix G

Groundwater Monitoring Program

Groundwater Monitoring Program

Given the expected high effluent loads to be applied to the site and likely increase in nutrient loading from the proposed development, groundwater monitoring should be conducted to ensure adequate separation between groundwater and the effluent disposal system is achieved (>1.5m) and to ensure groundwater contamination is not occurring. The groundwater monitoring program will be aligned to the "Water monitoring guidelines for better urban water management strategies and plans" (DoW, 2012). Two years of pre-development monitoring will be required. At the completion of this monitoring period all data will be reviewed to determine the sites suitability for the proposed development. If assessed as suitable, a development monitoring plan will be required detailing trigger values, contingency plans and reporting details. Trigger levels and contingency plans for exceedance of these trigger levels will be determined based upon the pre-development monitoring findings.

Groundwater Target Criteria

The Department of Water has advised to use the nutrient loading targets developed for the Peel Harvey catchment. These rates have been developed to address the eutrophication problems in the Peel–Harvey estuary. These target loads are for nitrogen 45kg/ha/year and phosphorous 6.5 kg/ha/year. As these rates were developed using the *ANZECC* guidelines, it is suitable to use the Peel Harvey targets in this situation. These target loads are considered to be environmentally acceptable rates of nutrient loss, understanding the existing (and allowing for future) land uses in the catchment. The Department is currently undertaking research in the Wilson Inlet catchment and estuary that will lead to the development of specific guidelines for catchment nutrient targets.

Sampling Locations

Three groundwater monitoring bores will be established within the proposed effluent disposal area. The approximate location of the three bores are shown on the Figure over the page.

Sampling Frequency

The bores should be sampled biannually (April/May and September/October) and include two years of sampling (late summer and late winter annually) prior to development commencement to collect baseline data and ensure adequate separation between groundwater and the proposed effluent disposal system.

Water quality parameters

Depth to groundwater will be sampled monthly. Physical parameters (temperature, pH, dissolved oxygen, and EC) and chemical parameters (TN, TP, ammonia, nitrate/nitrite and orthophosphate bacteria) will be sampled quarterly. All sampling is to be conducted according to Australian Standards and all water quality sample testing will be conducted by a NATA approved laboratory. Refer to Table 1 below.

Table 1 Water quality parameters and monitoring frequency

Parameter	**Frequency**
Standing water level	Monthly
Physical – temperature, pH, DO, EC	Quarterly – i.e. January, April, July, October
Chemical – Total nitrogen, total phosphorous, ammonia, nitrate/nitrite, orthophosphate bacteria	Quarterly – i.e. January, April, July, October

Reporting

Monitoring results will be submitted to the Shire of Denmark and the Department of Water and Environmental Regulation on an annual basis, the Client will be responsible for coordinating the annual monitoring reports and implementing. If the monitoring results exceed a defined limit (to be determined, based on pre-development conditions) a contingency plan will be devised and implemented by the Client.

Reference

Department of water (2012). *Water monitoring guidelines for better urban water management strategies and plans.* Government of Western Australia.

Legend

- Subject Site
- Proposed Effluent Disposal Area
- Proposed Groundwater Monitoring Bores
- Proposed Test Pit
- Cadastre
- 5m Contours

Scale
1:1,250@A3
MGA GDA 94 Zone 50

0 12.5 25 50 75 100 Meters

BIO DIVERSE SOLUTIONS
29 Hercules Crescent
Albany WA 6330
Australia
Tel: 08 9842 1575
Fax: 08 9842 1575

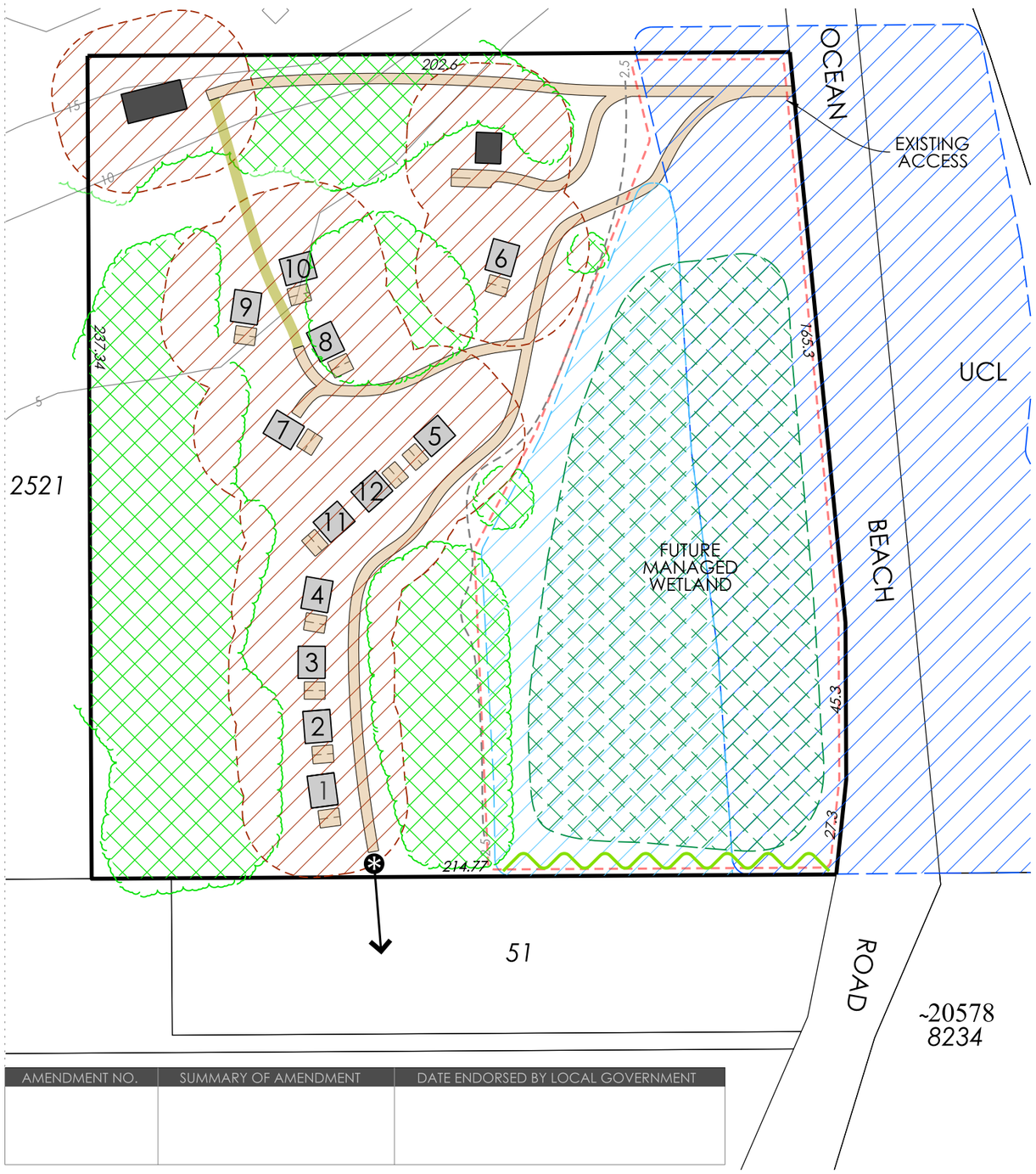
CLIENT: Mark & Steve Allen
Lot 1 Ocean Beach Road
Denmark WA 6333

Proposed Effluent Disposal

STATUS	FILE	DATE
FINAL	DBM013	13/12/2017

LEGEND

- SUBJECT SITE
- EXISTING VEGETATION
- SINGLE HOUSE / MANAGERS RESIDENCE
- 6 INDICATIVE LOCATION OF HOLIDAY ACCOMMODATION
- INTERNAL SEALED ACCESSWAY
- INDICATIVE PARKING LOCATIONS
- 20m BUILDING PROTECTION ZONE
- FLOOD HAZARD AREA - WATERLOGGING
- 100m SETBACK FROM HIGH WATER LINE
- DEVELOPMENT EXCLUSION ZONE
- GATE FOR EMERGENCY ACCESS TO LOT 51 FOR EGRESS TO OCEAN BEACH ROAD
- TREE RETENTION AREAS
- 2.5m AHD CONTOUR
- LANDSCAPING SCREENING



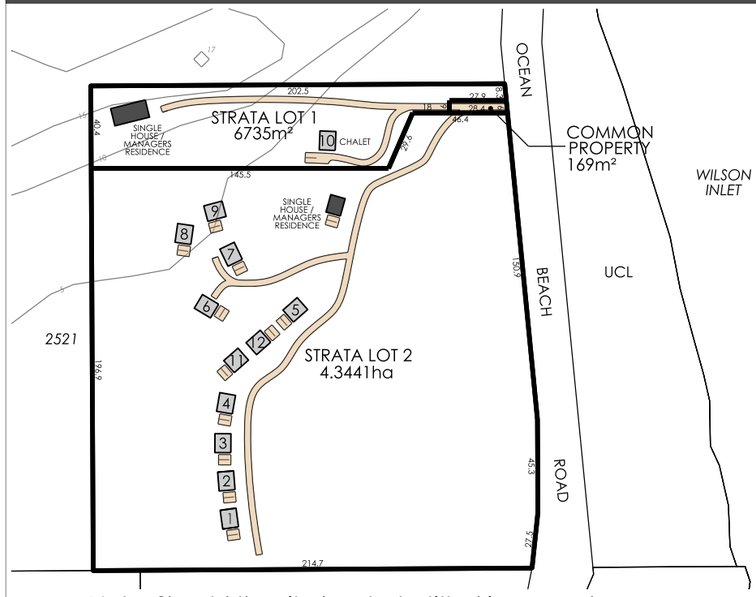
AMENDMENT NO.	SUMMARY OF AMENDMENT	DATE ENDORSED BY LOCAL GOVERNMENT

APPROVAL OF LOCAL DEVELOPMENT PLAN

This LDP has been adopted by the Shire of Denmark

CEO Signature Date

HOLIDAY ACCOMMODATION INDICATIVE STRATA LOT SIZES



Note: Should the site be strata titled in accordance with the Local Development Plan, the holiday accommodation shown as '6' on the plan opposite will become a single house/managers residence

DEVELOPMENT GUIDELINES

- Development and subdivision shall generally be in accordance with the Local Development Plan (Ref: 14-001-001D) dated 7 Sept 2015 or any minor variation to that plan approved by Council. Subdivision of Lot 1 shall be by way of strata title only.
- All development shall be connected to an on-site effluent disposal system installed to the satisfaction of the Health Department of WA and Council, and shall utilise multiple Alternative Treatment Units (ATU) or a central ATU(s) treatment system. All effluent disposal systems shall be situated a minimum of 100m from the Wilson Inlet high water mark.
- All development shall be connected to a reticulated potable water supply source to the satisfaction of Council.
- All new development shall be setback a minimum of:
  - 50m from the front boundary
  - 20m from all other boundaries.
- All buildings within the zone shall be designed and constructed to be sympathetic to the existing landscape in terms of colour finishes, location and height, to the satisfaction of Council. Zincalume, white and off-white colours are prohibited.
- All buildings heights are limited to single storey.
- The development of all new buildings shall be undertaken to comply with the requirements of AS:3959 -2009 Construction of Buildings in Bushfire Prone Areas (as amended).
- No development shall be permitted within the Development Exclusion Area(s), Tree Retention Area(s) or on land below 2.5m AHD as shown on the Local Development Plan with the exception of a boardwalk/pathway proposed in accordance with the recommendations of any Council approved Wetland Management Site for the site.
- All fencing (internal and boundary) shall be of rural construction such as pine/steel posts and wire to the satisfaction of Council.

LOCAL DEVELOPMENT PLAN
LOT 1 OCEAN BEACH ROAD, DENMARK

N

SAM WILLIAMS | TOWN PLANNER
ph: 0418 116216 | email: samwilliams@westnet.com.au

scale - 1:1500 @ A3 | date - 22 AUG 2017
plan no.14-001-001D(G)

0m 10 20 30m

ALL AREAS, DIMENSIONS & CONTOUR LEVELS DISPLAYED ARE SUBJECT TO DETAIL SURVEY

SW PLANNING