

## **WEBSITE PUBLIC NOTICE**

Planning and Development Act 2005  
LOCAL PLANNING SCHEME AMENDMENT AVAILABLE FOR INSPECTION

Shire of Shark Bay  
**LOCAL PLANNING SCHEME NO. 4 – AMENDMENT NO. 1**  
**LOT 90 MONKEY MIA ROAD, DENHAM**

Pursuant to Section 75 of the Planning and Development Act 2005, notice is hereby given that the Shire has initiated Amendment No 1 for the purpose of commencing public advertising.

The Amendment proposes modifications to ‘Schedule B - Special Use Zones’ as applicable to Lot 90 Monkey Mia Road, Denham. The proposed changes will expand on the type and number of land uses that the Shire has discretion to consider on the land, include new Zone purposes and Objectives, and revised conditions.

The documents can also be viewed on the Shire website – [public notice \(sharkbay.wa.gov.au\)](https://www.sharkbay.wa.gov.au/public-notice)

Alternatively hardcopy plans and documents setting out and explaining the Scheme Amendment are available for inspection at the Shire of Shark Bay office at 65 Knight Terrace in Denham during office hours until the 1 October 2021.

Submissions on the Scheme Amendment may be made in writing and sent to the Chief Executive Officer, Shire of Shark Bay, PO Box 126, Denham WA 6537 or emailed to [admin@sharkbay.wa.gov.au](mailto:admin@sharkbay.wa.gov.au) . Submissions should be lodged on or before 1 October 2021.

This Amendment is available for inspection in order to provide an opportunity for public comment and it should not be construed that final approval will be granted.

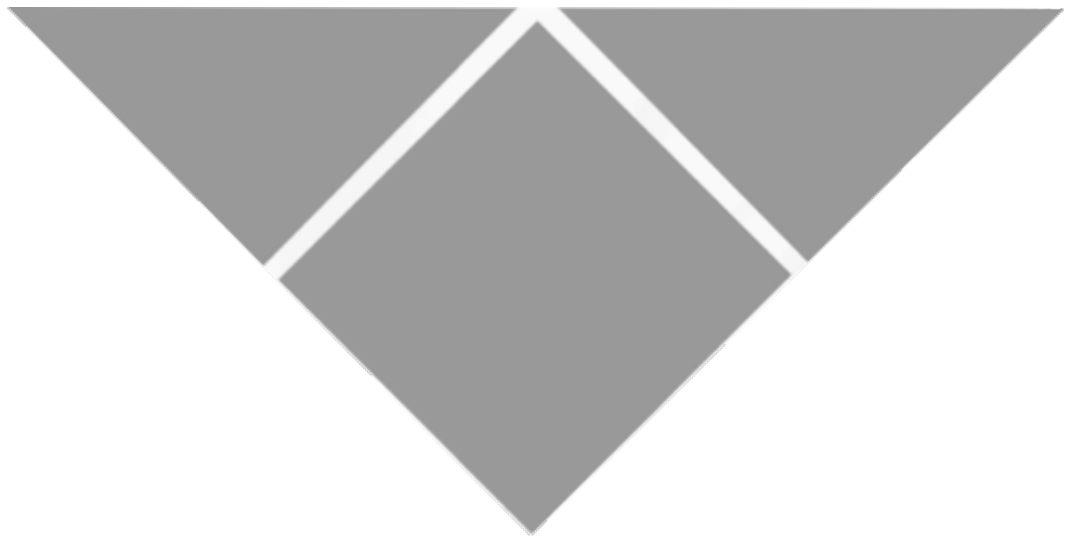
If you have any queries regarding the proposed amendment you are welcome to contact the Shires Consultant Planner, Liz Bushby, on 0488910869.




Paul Anderson  
**Chief Executive Officer**



# SCHEME AMENDMENT REPORT

SHIRE OF SHARK BAY  
LOCAL PLANNING SCHEME NO.4



-  Scheme Amendment No.1
-  Lot 90 Monkey Mia Road, Denham
-  May 2021 Version 2

<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Reviewed</b>	<b>Description</b>
1	Sept 2019	Hayley Williams	-	Preliminary Scheme Report for review
2	May 2021	Kathryn Jackson	-	FINAL Draft for review
3	June 2021	Kathryn Jackson	Brad Collard	Final for submission
4	June 2021	Kathryn Jackson	Brad Collard	Amendments after Shire review

## **Revision History**

### **DISCLAIMER**

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**PLANNING AND DEVELOPMENT ACT 2005**

**RESOLUTION TO ADOPT AMENDMENT TO LOCAL PLANNING SCHEME**

**SHIRE OF SHARK BAY**

**LOCAL PLANNING SCHEME NO. 4**

**AMENDMENT No. 1**

RESOLVED that the Council, in pursuance of Section 75 of the *Planning and Development Act 2005*, amend the above Local Planning Scheme by:

1. Amending 'Schedule B – Special Use Zones' as applicable to Lot 90 Monkey Mia Road, Denham (listed as SU10) which currently states:

No.	Description of Land	Special Use	Conditions
SU10	Lot 90 Monkey Mia Road, Denham	As 'P' use: <ul style="list-style-type: none"><li>• Single house</li></ul> As 'D' use: <ul style="list-style-type: none"><li>• Agriculture-intensive</li><li>• Tree farm</li><li>• Workforce accommodation</li></ul>	<ol style="list-style-type: none"><li>1) Development of the site shall be generally in accordance with an approved Local Development Plan, which has been prepared in accordance with Part 6, Schedule 2 of the <i>Planning and Development (Local Planning Schemes) Regulations 2015</i> and approved by the local government.</li><li>2) The local government may require lodgement of a transport impact assessment for any new development, prepared in accordance with the WAPC's <i>Transport Impact Assessment Guidelines (August 2016)</i>.</li><li>3) Notwithstanding condition (1), the local government may consider development prior to the approval of a Local Development Plan as provided for under Clause 56(2), Part 6, Schedule 2 of the <i>Planning and Development (Local Planning Schemes) Regulations 2015</i>.</li></ol>

To state as follows:

No.	Description of Land	Special Use	Conditions
SU10	Lot 90 Monkey Mia Road, Denham	<p>As 'D' Uses:</p> <ul style="list-style-type: none"> <li>• Ancillary Dwelling</li> <li>• Commercial Vehicle Parking</li> <li>• Single House</li> <li>• Second Hand Dwelling</li> <li>• Home Business</li> <li>• Home Office</li> <li>• Home Store</li> <li>• Outbuilding(s)</li> </ul> <p>As 'A' uses:</p> <ul style="list-style-type: none"> <li>• Bulky Goods Showroom</li> <li>• Carpark</li> <li>• Convenience Store</li> <li>• Fast food outlet/ lunch bar</li> <li>• Fuel Depot</li> <li>• Industry – Light</li> <li>• Industry – Primary Production</li> <li>• Marine Filling Station</li> <li>• Motor Vehicle, boat or caravan sales</li> <li>• Motor Vehicle Repair (including marine craft)</li> <li>• Motor Vehicle Wash (including marine craft)</li> <li>• Office</li> <li>• Restaurant/cafe</li> <li>• Roadhouse</li> <li>• Service Station</li> <li>• Shop</li> <li>• Transport Depot</li> <li>• Trade Display</li> <li>• Trade Supplies</li> <li>• Warehouse / Storage</li> <li>• Wind Farm</li> </ul>	<p><u>Zone Purpose:</u></p> <p>The purpose of this zone is to provide for the sale, servicing, rebuilding, storage, washing and fuelling of cars, boats and marine craft.</p> <p>The zone will also cater for a wide range of other compatible commercial, storage, light industrial and retail fuel sale uses to maximise future development opportunities.</p> <p><u>Zone Objectives:</u></p> <ul style="list-style-type: none"> <li>• To provide quality landscaping along the Monkey Mia Road frontage.</li> <li>• To cater for workforce accommodation and maximise employment opportunities within Denham townsite.</li> </ul> <p>Conditions:</p> <ol style="list-style-type: none"> <li>1) Development of the site shall be generally in accordance with an approved Local Development Plan, which has been prepared in accordance with Part 6, Schedule 2 of the <i>Planning and Development (Local Planning Schemes) Regulations 2015</i> and approved by the local government.</li> <li>2) The Local Development Plan is to address the following: <ol style="list-style-type: none"> <li>a) The purpose and objectives of this Special Use Zone;</li> <li>b) A layout that caters for a mixture of land uses with separation on site that minimises any potential for conflict between proposed uses;</li> <li>c) A Management Plan that addresses access, servicing, maintenance, waste disposal, waste water disposal, effluent disposal, service areas, potential emissions, contaminants and rubbish management;</li> <li>d) Suitable areas on site for carparking, loading, truck parking, access and traffic movements;</li> </ol> </li> </ol>

		<ul style="list-style-type: none"> <li>• Workforce Accommodation</li> <li>• Any other uses associated with the purpose and objectives of the zone (D), at the discretion of the local government.</li> <li>• Any on site infrastructure required to service development.</li> </ul>	<ul style="list-style-type: none"> <li>e) Accommodation of suitable perimeter or strategic fire breaks within the lot boundaries;</li> <li>f) A transport impact assessment prepared in accordance with the WAPC's <i>Transport Impact Assessment Guidelines (August 2016)</i>;</li> <li>g) The local government may require a Bushfire Attack Level Assessment and / or a Bushfire Management Plan as part of an application for development approval in accordance with State Planning Policy 3.7 Planning in Bushfire Prone Areas.</li> <li>h) A Bushfire Management Plan, prepared by an accredited bushfire consultant, shall be lodged with any application for development approval of a high-risk land use in accordance with State Planning Policy 3.7 Planning in Bushfire Prone Areas.</li> <li>i) Provision of quality landscaping along Monkey Mia road.</li> </ul> <ol style="list-style-type: none"> <li>3) The layout of carparking areas shall be designed with high regard for traffic circulation between developments on the same lot, and shall be integrated to allow for good on site traffic management and flow.</li> <li>4) The local government may require lodgement of a detailed landscaping plan as a condition of any development.</li> <li>5) Any external storage required as part of a proposed land use shall be adequately screened from Monkey Mia Road to the satisfaction of the local government. External storage does not include any trade display or motor vehicle, boat and caravan sales approved by the local government.</li> <li>6) The local government has discretion to consider advertisement(s) and shall have regard for the matters in Clause 32.17.3 of this Scheme.</li> </ol>
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			Notwithstanding condition (1), the local government may consider development prior to the approval of a Local Development Plan as provided for under Clause 56(2), Part 6, Schedule 2 of the <i>Planning and Development (Local Planning Schemes) Regulations 2015</i> .
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The Amendment is standard under the provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015* for the following reasons:

1. The Amendment is consistent with a local planning strategy for the scheme area that has been endorsed by the Commission; and
2. The amendment has minimal impact on land in the scheme area that is not the subject of the amendment.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20

\_\_\_\_\_  
CHIEF EXECUTIVE OFFICER



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# SCHEME AMENDMENT REPORT

<b>LOCAL GOVERNMENT:</b>	SHIRE OF SHARK BAY
<b>TYPE OF SCHEME:</b>	DISTRICT ZONING SCHEME
<b>TOWN PLANNING SCHEME:</b>	LOCAL PLANNING SCHEME NO.4
<b>AMENDMENT NO:</b>	1
<b>TYPE:</b>	STANDARD
<b>PROPOSAL:</b>	AMENDMENT TO THE PROVISIONS OF 'SPECIAL USE AREA 10'

---

## 1 INTRODUCTION

This report has been prepared in support of a proposal to amend the Shire of Shark Bay's Local Planning Scheme No.4 ('LPS No.4') to include additional use provisions for "Special Use Area 10" on Lot 90 Monkey Mia Road, Denham.

This Scheme Amendment primarily seeks to expand upon the land uses that can be considered for development upon the site alongside appropriate development and land use controls. This is intended to provide clarity to the land uses that may be considered in line with the local government's strategic intention for the lot.

This report sets out the strategic planning context and demonstrates the suitability and capability of the subject site for the proposed land uses, that will form part of the amended provisions for 'Special Use Area 10'.

### **Appendix A – Existing Zoning Plan**

## 2 SITE DETAILS

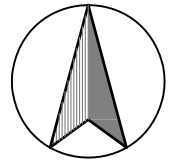
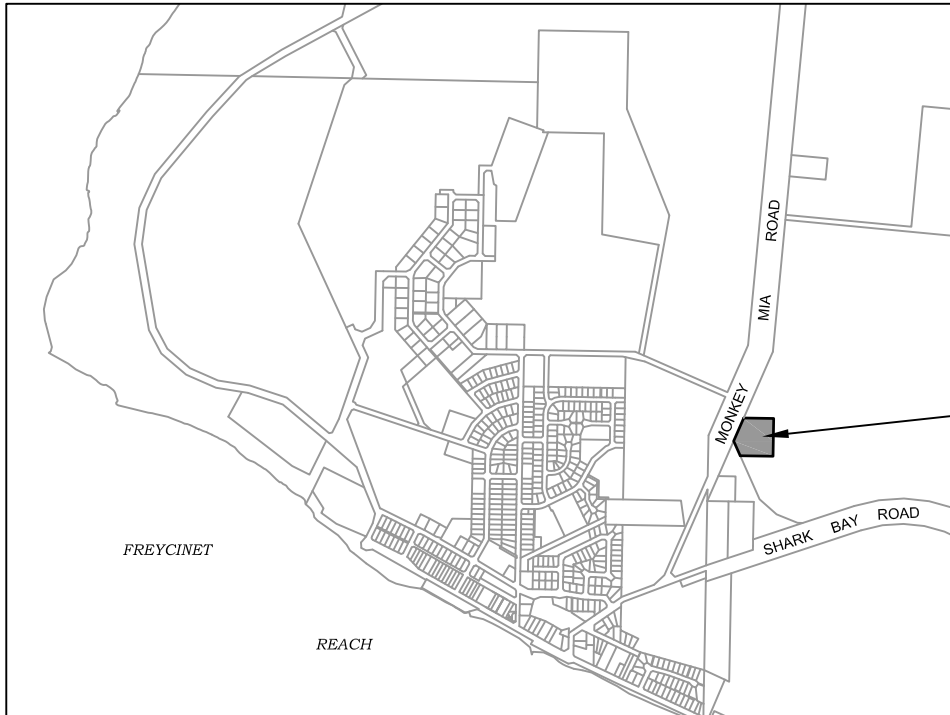
### 2.1 *Location*

The amendment area is located in the municipality of the Shire of Shark Bay within the Gascoyne region of Western Australia.

The amendment area is located in close proximity to the Denham Town Centre, approximately 600m to the north-east on Monkey Mia Road, Denham.

Refer to **Figure 1** – Location Plan

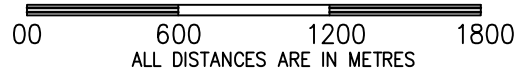
**Figure 1: Location Plan**



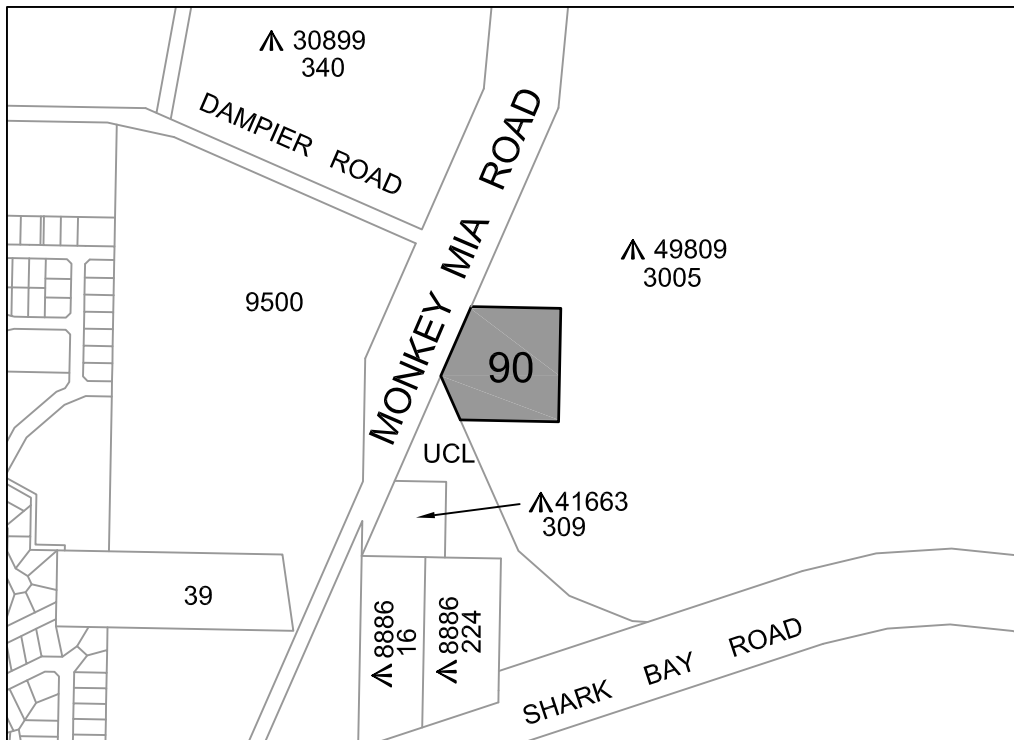
**SUBJECT LAND**  
Approx. 1.2 km to CBD

**KEY PLAN**

SCALE 1 : 30000

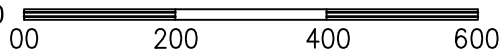


ALL DISTANCES ARE IN METRES



**LOCATION PLAN**

SCALE 1 : 10000



ALL DISTANCES ARE IN METRES



ISO 9001  
FS 520743

**REVISIONS**

DATE	DESCRIPTION	BY
12/08/16	ORIGINAL ISSUE	SL

SURV:		AREA FILE : 1079
DWN:	SL 12/08/16	CONT. INT'VAL : N/A
CHK:	15/11/17	V DATUM : N/A
APP:	15/11/17	H DATUM : MGA94 z49
		FIELD Bk :

**HTD**  
**SURVEYORS & PLANNERS**  
HILLE, THOMPSON & DELFOS

PO Box 820, GERALDTON WA 6531  
PHONE: (08) 9921 3111 FAX: (08) 9921 8072



CLIENT: JAMIE MORGAN

LOT 90 on DP 191083  
**LOCATION PLAN**  
MONKEY MIA ROAD, DENHAM - SHIRE OF SHARK BAY

SCALE : AS SHOWN Drawing No: 23616MS1-1-0

## 2.2 Ownership & Description

Lot 90 is wholly contained within Certificate of Title (refer **Appendix B**) Volume 2124, Folio 43 on Deposited Plan 191083. Lot 90 is 2.0984 hectares.

Land ownership details are provided in Table 1.

**Table 1:** Land Ownership Details

<b>Lot Number</b>	90
<b>Deposited Plan</b>	191083
<b>Volume</b>	2124
<b>Folio</b>	43
<b>Landowner details</b>	J Morgan
<b>Land Area</b>	2.25ha

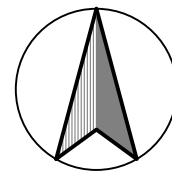
## 2.3 Existing Land Uses

The amendment area is currently zoned 'Special Use Area 10' (SU10) and contains the following land uses that are in operation upon the site:

- Single house;
- Pearl farming;
- Incidental outbuildings, sea containers and storage areas;
- Vehicle maintenance and repairs incidental to the pearl farming activities; and
- Office incidental to the pearl farming activity.

Refer to **Figure 2** for site plan of existing improvements.

**Figure 2: Site Plan Lot 90 Monkey Mia Road, Denham**



**LEGEND**

- SUBJECT BOUNDARY
- ABUTTING BOUNDARY
- VEHICLE ACCESS TRACK
- SEWER PRESSURE MAIN (SOURCED FROM ESINET)

**DISCLAIMER**

THE CONTOURS SHOWN ON THIS PLAN ARE SUITABLE ONLY FOR THE PURPOSE OF THIS APPLICATION. THE ACCURACY OF THE CONTOURS HAS NOT BEEN VERIFIED AND NO RELIANCE SHOULD BE PLACED UPON SUCH CONTOURS FOR ANY PURPOSE OTHER THAN FOR THE PURPOSE OF THIS APPLICATION FOR REZONING.

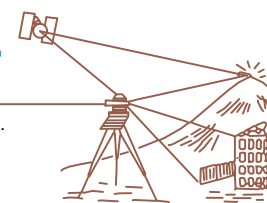
DIGITAL AERIAL IMAGE SOURCED FROM LANDGATE. CAPTURED FEBRUARY 2020.



0	25/05/21	ORIGINAL ISSUE	GT
REVISIONS			

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CHECKED BY:		26/05/21	V DATUM:	AHD
APPROVED BY:		26/05/21	H DATUM:	MGA94 z49
			FIELD BK:	N/A

**HTD**  
**SURVEYORS & PLANNERS**  
 HILLE, THOMPSON & DELFOS  
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 PHONE: (08) 9921 3111  
 EMAIL: htdsurveys@htds.com.au  
 WEBSITE: http://www.htds.com.au



CLIENT:	JAMIE MORGAN		
	LOT 90 ON DP 191083		
	<b>SITE PLAN</b>		
	MONKEY MIA ROAD, DENHAM - SHIRE OF SHARK BAY		
SCALE 1:	750	SHEET SIZE	A3
ALL DISTANCES IN METRES		DWG No.	23616SP2-1-0

## 2.4 Surrounding Land Uses

The amendment area is positioned just to the east of the Denham Townsite, located 600m north of the Monkey Mia and Shark Bay Road intersection. At present the amendment area is adjacent to an urban development area of the Denham Townsite and bordered by surrounding rural and recreational land further to the north and east.

Details of the surrounding land uses are provided in Table 2.

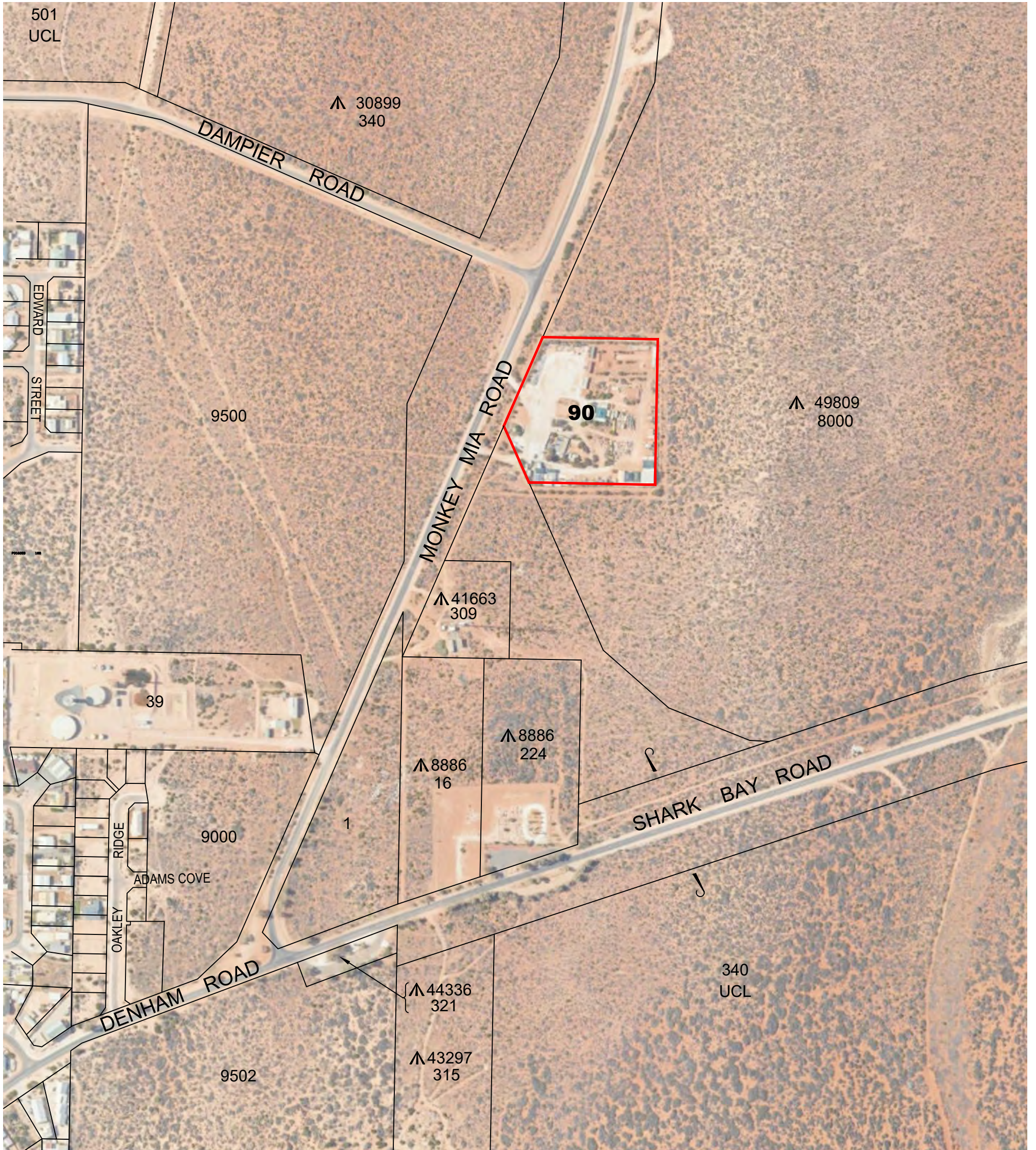
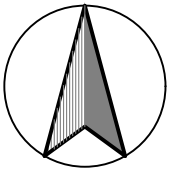
**Table 2:** Surrounding Land Uses

<b>LOT/RESERVE</b>	<b>LOCATION</b>	<b>ZONING LPS4</b>	<b>USE</b>
<b>Lot 340</b>	Small triangular portion of land adjoining Lot 90	Rural	Currently no land use but has been used for informal access to Lot 90.
<b>R49809</b>	Adjoining to north, east and south	Rural	Remnant vegetation, no land use in operation
<b>R30899</b>	100m to the north, opposite Lot 90 on Monkey Mia Road	Parks and Recreation	Recreation reserve covered in remnant vegetation
<b>R41663</b>	150m to the south-west	Public Purposes	Telecommunications tower and equipment buildings
<b>R8886</b>	315m to the south-west	Public Purposes	Local cemetery
<b>Lot 9500</b>	100m to the west opposite Lot 90 on Monkey Mia Road	Urban Development	Residential development permitted in accordance with an approved structure plan
<b>Lot 1</b>	300m to the south west on corner of Monkey Mia and Shark Bay Road	Special Use 3	Vacant land with range of discretionary commercial and industrial uses

An aerial photo of the amendment area and surrounding land is included in **Figure 3**.

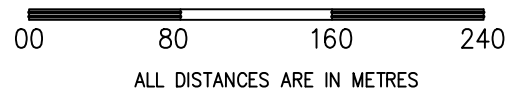


**Figure 3: Aerial View of Lot and Surrounds**



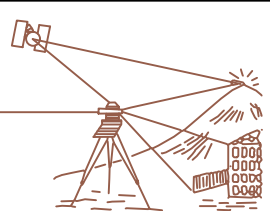
REVISIONS

REV.	DATE	DESCRIPTION	BY
	25/05/21	ORIGINAL ISSUE	GT



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DRAWN BY:	GT	25/05/21	CONT. INT'VAL: N/A
CHECKED BY:		26/05/21	V DATUM: AHD
APPROVED BY:		26/05/21	H DATUM: MGA94z49
			FIELD Bk: N/A

**HTD**  
**SURVEYORS & PLANNERS**  
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 PHONE: (08) 9921 3111  
 EMAIL: htdsurveys@htds.com.au  
 WEBSITE: http://www.htds.com.au



CLIENT:	JAMIE MORGAN		
	LOT 90 ON DP191083		
	<b>SURROUNDING LAND USE PLAN</b>		
	MONKEY MIA ROAD, DENHAM - SHIRE OF SHARK BAY		
SCALE 1 :	4000	SHEET SIZE	A3
ALL DISTANCES IN METRES		DWG No.	23616LO1-1-0

## **2.5 Infrastructure and Servicing**

A Servicing Report has been prepared by Structerre Consulting Engineers to assess the serviceability of the site as required by the Shire of Shark Bay. The Servicing Report is appended to this report (refer **Appendix C**).

The provision of service infrastructure will be addressed further during the development application process. Further consultation with the Shire of Shark Bay and service agencies will be undertaken at this time.

A summary of the results of the Servicing Report is as follows:

- The terrain does not allow for the extension of the existing gravity sewer, therefore sewer servicing of Lot 90 can only be done via a private pump station with a discharge point being located approximately 800m away to the existing access chamber. This would be subject to the approval of Water Corporation;
- A suitable water main, for a possible extension, is located in Shark Bay Road; the connection point is approximately 600m away from Lot 90;
- Lot 90 is currently being serviced by a 32mm water service pipe located close to the truncation of Lot 1. The suitability of this water service for the future development on the lot is subject to a hydraulic consultant's design and approval by the Water Corporation;
- There is no drainage infrastructure along Monkey Mia Road and all impervious runoff will need to be contained onsite;
- A Telstra communication service is connected to Lot 90 and a phone line is located along Monkey Mia Road, multiple Telstra pits have been provided along Monkey Mia Road; and
- Servicing of the site with power was recognised as a constraint in the attached Servicing Report. Since the report was completed the electricity supply to the site has been upgraded to an underground 3 phase supply with ample capacity to service the site currently and any future development of the site.

Existing Services Plan included at **Figure 4**.

**Figure 4: Existing Services Plan**








49809  
8000

MONKEY MIA ROAD

90

UCL  
340

LEGEND

-  SUBJECT BOUNDARY
-  ABUTTING BOUNDARY
-  SPM SEWER PRESSURE MAIN (SOURCED FROM ESINET)
-  UGHV U/G HIGH VOLTAGE POWER (SOURCED FROM DBYD)
-  UGLV U/G LOW VOLTAGE POWER (SOURCED FROM DBYD)
-  SALINE SALINE WATER (SOURCED FROM ESINET) NOT FOR PUBLIC CONNECTION
-  T TELSTRA (SOURCED FROM DBYD)

EXPLANATORY NOTE

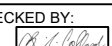

THE TITLE BOUNDARIES AS SHOWN HEREON WERE NOT MARKED AT THE TIME OF SURVEY AND HAVE BEEN DETERMINED FROM LANDGATE DIGITAL DATABASE ONLY AND NOT BY FIELD SURVEY.

SERVICES HAVE BEEN PLOTTED FROM THE RECORDS OF RELEVANT AUTHORITIES WHERE AVAILABLE AND HAVE BEEN NOTED ACCORDINGLY ON THIS PLAN.

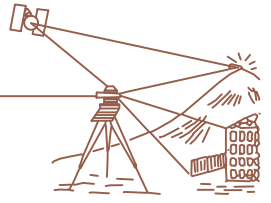
PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE, THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR POSSIBLE LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES.



0	25/05/21	ORIGINAL ISSUE	GT
REVISIONS			

SURVEYED BY:		AREA FILE:	1079
DRAWN BY:	GT	25/05/21	CONT. INT'VAL: N/A
CHECKED BY:		26/05/21	V DATUM: AHD
APPROVED BY:		26/05/21	H DATUM: MGA94 z49
		FIELD BK:	N/A

**HTD**  
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PHONE: (08) 9921 3111  
EMAIL: ht dsurveys@htds.com.au  
WEBSITE: http://www.htds.com.au



CLIENT:	JAMIE MORGAN		
	LOT 90 ON DP 191083		
	<b>EXISTING SERVICES PLAN</b>		
	MONKEY MIA ROAD, DENHAM - SHIRE OF SHARK BAY		
SCALE 1: 750 ALL DISTANCES IN METRES	SHEET SIZE A3	DWG No.	23616SA1-1-0

### 3 PROPOSAL CONTEXT

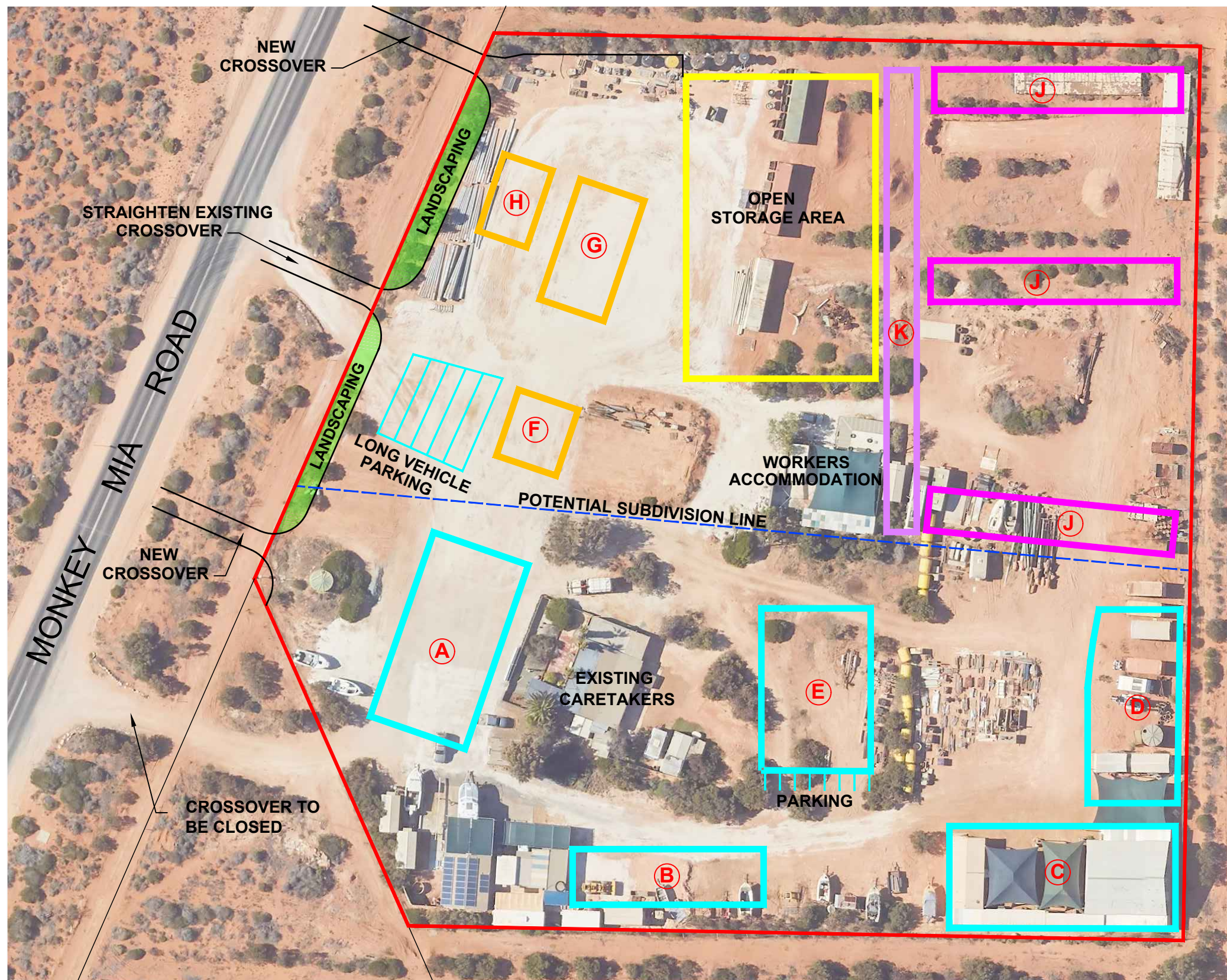
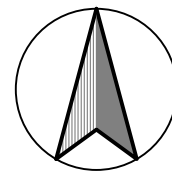
The Scheme Amendment primarily seeks to expand upon the land uses that can be considered for development upon the site, alongside appropriate development and land use controls.

The key land uses proposed for the subject site are of a service commercial nature. The owner proposes to develop the site as a marine facility, including maintenance, servicing and fuel storage associated with the storage of boats. It is also proposed to include the use class of 'Motor vehicle, boat or caravan sales' to enable an extension of the marine facility to provide sales, where necessary. Overall, the range of uses provide an opportunity for a service commercial operation within close proximity to the Denham townsite.

The proposal to include a range of uses relating to the storage, maintenance and servicing of boats, amongst other incidental and supportive commercial/service uses, is considered to have planning merit due to the highly accessible location, along Monkey Mia Road between the townsites of Monkey Mia and Denham. This location provides an advantageous position, as boats will be able to easily access the site. There is ample space available for entry and exit crossovers on the site without being intrusive to the existing residence. This proposal assists in meeting the amenity needs of residents and tourists of Shark Bay and Denham.

An indicative Local Development Plan has been included as **Figure 5**.

**Figure 5: Proposed Local Development Plan**



### INDEX

A	BOAT OFFICE/SALES
B	PRIVATE WORKSHOP EXTENSION
C	STORAGE
D	OPEN BOAT STORAGE
E	BOAT WORKSHOP, REPAIRS & MAINTENANCE
F	CAR/BOAT WASH
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H	BOWSERS
J	SEA CONTAINER STORAGE (BOATS)
K	SEA CONTAINER STORAGE (GENERAL GOODS)

EXPLANATORY NOTE  
 THE TITLE BOUNDARIES AS SHOWN HEREON WERE NOT MARKED AT THE TIME OF SURVEY AND HAVE BEEN DETERMINED BY DIGITAL CADASTRE ONLY AND NOT BY FIELD SURVEY.  
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<p>ALL DISTANCES ARE IN METRES</p>		SURVEYED BY: DRAWN BY: SL 16/03/20	AREA FILE: 1079 CONT. INT'VAL: N/A V DATUM: AHD H DATUM: MGA94z49 FIELD Bk:	<p><b>HTD</b>          SURVEYORS &amp; PLANNERS          HILLE, THOMPSON &amp; DELFOS</p> <p>24 Durlacher Street, GERALDTON W.A.          PHONE: (08) 9921 3111          EMAIL: htdsurveys@htds.com.au          WEBSITE: http://www.htds.com.au</p>		CLIENT: JAMIE MORGAN LOT 90 on DP 191083 <b>INDICATIVE DEVELOPMENT PLAN</b> MONKEY MIA ROAD, DENHAM - SHIRE OF SHARK BAY SCALE 1: 750 ALL DISTANCES IN METRES												
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### **3.1 Risk Management**

Any proposed land uses will be required to be lodged as a planning approval, at which time an assessment of risk based on the merits of the given application and proposed land use can be undertaken. Supporting documentation provided by suitably qualified consultants will be required to demonstrate any potential areas of risk, emissions, impact, level of compliance with legislation etc.

The land uses proposed as part of this amendment are in keeping with current onsite activities or are considered incidental or complimentary to each other.

For example, for the development of a fuel depot, a bushfire management plan, emergency and evacuation plan and risk management plan is required at the application stage.

Risk management for a fuel depot proposal will be covered through the Dangerous Goods Licencing process through the Department of Mines. Regarding risk of the proposal, the following justifications are relevant:

- The fuel depot will be an unmanned site, there will be no persons to evacuate;
- The entire lot will be cleared of vegetation therefore it is unlikely there will be any risk to the fuel equipment;
- It is only possible to obtain a Dangerous Goods Licence if it is known in advance that fuel will be stored onsite. It is not known at this stage whether the landowner will seek an arrangement with a fuel supplier to provide equipment and hold the licence. In this instance the fuel supplier will be in possession of their own licence. The type and size of tanks and the piping system are required before an application for a licence can be made. The landowner cannot make any further plans for these details on the site until the site has been rezoned;
- There is no uncertainty with the Dangerous Goods Licencing process. A Dangerous Goods Licence will always be issued if a facility is compliant. If the facility design complies with Western Australian Regulation and the Australian Standards, a license is issued. A DMP Accredited Consultant, that is engaged in this proposal, will assess the design of the facility for compliance and assess the application for compliance and if it is deemed to be compliant the design and application will be endorsed by the Accredited Consultant and a licence will be issued without scrutiny by the Department. An Accredited Consultant will not endorse a Dangerous Goods Licence application if the site is not correctly zoned for the purpose.

### **3.2 Bushfire Hazard Level Assessment**

A Bushfire Hazard Level Assessment has been prepared for the proposal as required under State Planning Policy 3.7 Planning in Bushfire Prone Areas. The Bushfire Hazard Level Assessment is appended to this report (refer **Appendix D**).

A summary of the results of the Bushfire Hazard Level Assessment is as follows:

- Pre-development, the assessment area contains areas of moderate bushfire hazard levels as shown in Figure 2A;
- It is envisaged that the bushfire hazard level across the site will decrease to a low hazard level as future development occurs and the vegetation is either managed or removed. However, it should be noted that where areas of low hazard level vegetation are located within 100 metres of any moderate level vegetation, they are to adopt a moderate hazard level;
- Areas of moderate bushfire hazard level located external to the site boundaries are to be considered during future subdivision/ development to ensure the BAL ratings from this vegetation are not prohibitive of development;
- A Bushfire Management Plan will be required to support any application for future subdivision or development of the land pursuant to *State Planning Policy 3.7 (SPP3.7)*;
- In summary, the bushfire hazard level is not prohibitive of any proposed development, when appropriate development design takes into consideration these risks, given the size of the developable area and ability to implement appropriate bushfire management strategies.

### **3.3 Geotechnical Investigation Report**

A Geotechnical Investigation Report has been prepared by Structerre Consulting Engineers for the proposal as required by the Shire of Shark Bay. The Geotechnical Investigation is appended to this report (refer **Appendix E**).

A summary of the results of the Geotechnical Investigation Report is as follows:

- The subsurface soil profile encountered comprised medium dense natural silty sand to the investigated depth of 2.3m. The natural layers were overlain at parts by very loose to loose natural silty sand layers, sand with silt, and sand platforms;
- The water table was not encountered during and after the site investigation;
- The site can be classified as an equivalent Class “A” in accordance with AS 2870-2011 provided the recommended earthworks are undertaken;
- It is considered that the site is suitable for on-site drainage;
- Recommended earthworks for effluent disposal area include stripping of unsuitable materials and fill placement within disposal area;
- Recommended earthworks for building envelope include stripping of unsuitable materials, excavating and stockpiling of loose materials, proof compaction of the base, placement of engineered fill and compaction to final levels;
- Allowable bearing capacity for pad footings range from 130kPa to 330kPa and from 100kPa to 255kPa for strip footings. The estimation of settlement of the footings is limited to 20mm.

## **4 STATE PLANNING FRAMEWORK**

### **4.1 State Planning Strategy 2050 (2014)**

The State Planning Strategy is a land use planning strategy for Western Australia's development up to 2050. The Strategy is not fixed but provides a vision to assist strategic decision-making and a set of principles by which coordinated, sustainable development will be implemented.

The State Planning Strategy's vision for the future planning of Western Australia is:

*"By 2050, Western Australia will have a diverse range of interconnected and vibrant local communities and regional centres. The people in these communities will be healthy, resilient, active, prosperous, respectful of cultural difference and participate in the public domain. Standards of living will continue to be amongst the highest in the world. Improved connections and smarter technologies will enhance the State's ability to attract global and domestic investment capital where and when it is most needed. A 'can do' attitude will prevail, inspiring new ways of thinking and working, which will deliver optimal outcomes for the economy and communities of Western Australia (2014)."*

The strategy has been designed to, among other things, plan for a growing population in urban settlements which are more responsive to community needs.

This Scheme Amendment aims to provide locals and visitors to the Denham/Monkey Mia area services that are not otherwise available or adequate within the Townsite areas. The land uses that this Scheme Amendment proposes generally require a larger land holding size or are of a form that can benefit from a more screened and isolated position, such as that which can be achieved upon Lot 90. It is considered that the land uses proposed by this Scheme Amendment enables range of development opportunities to address the unique demands of the tourism and fishing industries and local community.

### **4.2 Gascoyne Regional Planning and Infrastructure Framework (2015)**

This framework was adopted in order to provide an overall regional context for land-use planning for the region and identifies priorities for further planning and infrastructure projects in order to facilitate growth and development. This Scheme Amendment is considered to only be locally significant in relation to its development potential with no specific references to Lot 90 or any specific initiatives that will impact upon the site.

As a general statement about Denham Section 3.8 of the Strategy states:

*"Denham is the administrative centre and primary settlement in the Shire of Shark Bay. Its local economy is principally focused on tourism and fishing. Surrounded by the Shark Bay World Heritage Area, it is located in close proximity to various conservation reserves that support tourism activity, including the regionally significant Tourist Centre of Monkey Mia."*

The proposal to widen the range of possible uses for 'Special Use Area 10' is considered to support the primacy of the Denham Townsite as the administrative centre and primary settlement of Shark Bay, whilst also supporting the local economy which is principally focussed on tourism and fishing.

#### **4.3 Draft Gascoyne Coast Sub-Regional Strategy (draft 2017)**

Produced to provide further planning direction for the region, this Strategy seeks to inform the development and review of strategic documentation. Of relevance to Lot 90 the following strategic directions are listed in relation to tourism within the region:

- Encourage the expansion and diversification of the tourism sector.
- Supporting the development of strategic and sustainable tourism and recreation infrastructure and services to cater for an anticipated increase in demand.
- More intensive, higher-impact tourism development should be concentrated in the existing regional and sub-regional centres of Carnarvon, Exmouth and Denham; and to a lesser degree in the tourism centres of Coral Bay and Monkey Mia.

The Strategy identifies the subject site as an investigation area, however it does not provide any specific direction for the property but to state that the Shire of Shark Bay Local Planning Strategy *"identifies the site for potential service commercial or tourist uses in the longer term"*.

The Scheme Amendment is an opportunity to further the development potential of the lot in a way that compliments those tourism activities that already occur within the region and an opportunity for new businesses and services that cannot necessarily be catered for within the Denham Townsite given land area and development constraints (i.e. built form, access, compatibility with surrounding land uses).

#### **4.4 Shark Bay Regional Strategy (1997)**

The first Regional Plan for Shark Bay was released in 1988. In 1991, Shark Bay was subsequently included on the World Heritage List which recognised it as one of the most remarkable places on earth. A review of the 1988 Shark Bay Region Plan was undertaken by the Western Australian Planning Commission and adopted in 1997.

The primary purpose of the strategy is to:

*"Provide a link between State and local planning for land and water use and development which is based on a balance of economic, social and environmental considerations."*

There are no specific recommendations or initiatives that would directly impact upon the amendment area.

#### **4.5 State Planning Policy No. 3: Urban Growth and Settlement (2006)**

This policy sets out the principles and considerations which apply to planning for urban growth and settlement in Western Australia. It is a broad policy that is to be implemented by more detailed policies.

The aim of the policy is to facilitate sustainable growth of urban areas by setting out requirements for sustainable settlements and communities. The objectives of this policy are:

- To promote a sustainable and well planned pattern of settlement across the State, with sufficient and suitable land to provide for a wide variety of housing, employment, recreation facilities and open space;
- To build on existing communities with established local and regional economies, concentrate investment in the improvement of services and infrastructure and enhance the quality of life in those communities;
- To manage the growth and development of urban areas in response to the social and economic needs of the community and in recognition of relevant climatic, environmental, heritage and community values and constraints;
- To promote the development of a sustainable and liveable neighbourhood which reduces energy, water and travel demand while ensuring safe and convenient access to employment and services by all modes, provides choice and affordability of housing and creates an identifiable sense of place for each community;
- To coordinate new development with the efficient, economic and timely provision of infrastructure and services.

The Scheme Amendment is considered to address the abovementioned policy objectives as it proposes to incorporate new development with existing infrastructure, as well as provide assistance to support the growth and development of the surrounding urban area. The proposal also provides safe and convenient access to new services that can't otherwise be provided for within the town centre due to existing land uses, built form and small land parcel size constraints.

One of the key requirements listed for sustainable communities is to ensure that there is:

*“sufficient and suitable serviced land in the right locations for housing, employment, commercial, recreational and other purposes, coordinated with the efficient and economic provision of transport, essential infrastructure and human services”*

It is considered that the location of amendment area is suitable for its rezoning and associated land uses as it is situated on the main tourism route and is easily accessible

from the townsite by locals and tourists alike.

The size and site characteristics of the amendment area are considered to provide an appropriate context for siting land uses that are larger in scale and may require screening or control measures for potential emissions.

Given its relatively remote position, surrounded by vacant land to the north, east and south, the site provides a unique opportunity to allow land uses that are service commercial and light industrial in nature as there is a low impact on any adjoining private land and with appropriate development controls applied at development application stage, will not impact upon the surrounding reserve land and environment.

#### **4.6 State Planning Policy 3.7: Planning in Bushfire Prone Areas (2015)**

The Bushfire Policy Framework for Western Australia requires compliance with State Planning Policy 3.7: Planning in Bushfire Prone Areas (SPP 3.7), a Policy which seeks to guide the implementation of effective risk-based land use planning and development to preserve life and reduce the impact of bushfire on property and infrastructure.

In accordance with Section 6.2 of SPP 3.7 this Scheme Amendment is required to be accompanied by an assessment of bushfire risk. SPP 3.7 is strongly informed by the *Guidelines for Planning in Bushfire Prone Areas* (the 'Guidelines') and AS3959: Construction of buildings in bushfire-prone areas (AS3959) which provides the basis for assessment and implementation for the formulation of Bushfire Management Plans.

A Bushfire Hazard Level Assessment has been included as **Appendix D** to this report.

This report demonstrates that the bushfire hazard level is not prohibitive of any proposed development, when appropriate development design takes into consideration these risks, given the size of the developable area and ability to implement appropriate bushfire management strategies.

#### **4.7 Separation Distances between Industrial & Sensitive Land Uses No. 3 (2005)**

This document provides advice on the use of generic separation distances (buffers) between industrial and sensitive land uses to avoid conflicts between incompatible land uses. As a guide the following land uses along with their potential impacts and recommended setbacks have been included:

**Table 3:** Potential Impacts and Separation Distances

Land Use	Potential Impacts / Separation Distances
Bulky Goods Showroom	-
Carpark	-
Fuel Depot	Odour & Risk 200-1000m* buffer recommended by the EPA if storage exceeds 2000 tonnes

<b>Marine Filling Station</b>	Odour & Risk 200-1000m buffer recommended by the EPA if storage exceeds 2000 tonnes
<b>Motor Vehicle, boat or caravan sales</b>	-
<b>Motor Vehicle Repair</b>	Noise, Dust & Odour 200m buffer recommended by the EPA
<b>Motor Vehicle Wash</b>	50m buffer recommended by the EPA
<b>Transport Depot</b>	200m buffer recommended by the EPA
<b>Trade Display</b>	-
<b>Trade Supplies</b>	-
<b>Warehouse / Storage</b>	-

The size of the amendment area and its location enable suitable buffers to be established for the land uses proposed to be included as 'A' uses within SU10.

## 5 LOCAL PLANNING FRAMEWORK

### 5.1 *Shire of Shark Bay Local Planning Strategy (2013)*

Lot 90 is identified as 'Area 13' within the Strategy and states the following in relation to the potential for future development and rezoning:

*"The subject land has excellent road exposure and in the longer term may cater for some form of service commercial zone, or special use zone with adequate landuse controls to ensure commercial uses do not compete with the Town Centre zone..."*

*"The Shire is prepared to support a future Scheme Amendment to facilitate either 'service commercial' uses or 'tourist uses' on the site where the uses will not adversely impact on the role and function of the Town Centre, and the combination of landuses are compatible."*

Planning implications that are listed for this area relevant to this Scheme Amendment include:

*"- The Shire has identified a need to earmark land for future service commercial uses, and cater for new development not suited to the Industrial zone or Town Centre zone.*

*- The Shire sees benefits in planning for a Composite Enterprise zone to allow for colocation of a dwelling and small business on the same lot."*

The expansion of the land uses within 'Special Use Area 10' to include a limited range of commercial and service use classes, is not considered to adversely impact on the role and function of the Town Centre. Instead, the inclusion of land uses such as, warehouse/storage, trade supplies, boat vehicle repairs and wash are considered to provide additional opportunities to support the growth of the townsite and tourism industry.

## 5.2 Denham Townsite Plan (2014)

The role of the Denham Townsite Plan is to provide a framework for implementing the vision and strategies of the Shire of Denham Local Planning Strategy and Local Planning Scheme No. 4 within the Denham Townsite.

Lot 90 is identified as 'potential strategic development or redevelopment'.

## 5.3 Shire of Shark Bay Local Planning Scheme No.4 (2018)

Lot 90 is zoned 'Special Use' (SU10) under the Shire of Shark Bay Local Planning Scheme No. 4 (LPS No. 4). The Scheme includes a set of objectives for Special Use zones:

- To facilitate special categories of land uses which do not sit comfortably within any other zone.
- To enable the Council to impose specific conditions associated with the special use.
- To provide the appropriate development control to a land use or combination of land uses that are consistent with the character and amenity of the locality but by their nature require specific consideration.

Schedule B – Special Use Zones of the Scheme identifies Lot 90 as 'SU 10' and lists the following special uses:

Use classification	Land use
'P' permitted	Single house
'D' discretionary	Agriculture – intensive Tree farm* Workforce accommodation

*\*It is noted that the use 'Tree Farm' is being removed entirely from the list of Special Uses as part of the amendment.*

The following conditions are also included in the Schedule for 'Special Use Zone 10':

1. Development of the site shall be generally in accordance with an approved Local Development Plan, which has been prepared in accordance with Part 6, Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015* and approved by the local government.
2. The local government may require lodgement of a transport impact assessment for any new development, prepared in accordance with the WAPC's *Transport Impact Assessment Guidelines* (August 2016).
3. Notwithstanding condition (1), the local government may consider development prior to the approval of a Local Development Plan as provided for under Clause 56(2), Part 6, Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

Clause 21 of LPS No. 4 sets out the operating provisions for the Special Use zones:

- (1) Schedule B – Special Uses sets out:



- (a) special use zones for specified land that are in addition to the zones in the zoning table; and
  - (b) the classes of special use that are permissible in that zone; and
  - (c) the conditions that apply in respect of the special uses.
- (2) A person must not use any land, or any structure or buildings on land, in a special use zone except for a class of use that is permissible in that zone and subject to the conditions that apply to that use.
- (3) The local government may exempt certain development in the Special use zone in accordance with Schedule A.

The existing special uses have enabled the use of the site for establishment of a pearl farm however, the limitations of special uses to single house, agriculture intensive, tree farm and workforce accommodation do not allow for the expansion of supporting commercial and service industries in line with the strategic recommendations for the site. The amendment proposes to expand the special uses to include a broader range of commercial and service uses that would not sit comfortably within any other zone. The inclusion of objectives and conditions for SU10 will also provide appropriate development control for a combination of land uses that is considered to be consistent with the character and amenity of the locality. The amendment is considered to accord with the objectives of the Special Use zone.

## 6 JUSTIFICATION FOR AMENDMENT

In conclusion, the proposed amendment seeks to expand the range of land uses, with appropriate conditions. The amendment is considered to, facilitate opportunities to develop the amendment area with suitable commercial and service industry related development and reflects key strategic recommendations at both the State and Local level.

As demonstrated within this report, the proposed amendment is considered to be justified and appropriate for the following reasons:

- The proposal accords with the objectives and recommendations of contained within the State and Local Planning Framework for the amendment area;
- An expansion of service commercial land uses in the amendment area is appropriate given the strategic location;
- The proposed uses are considered to be compatible with the surrounding area, however any uses that may require some form of buffer are to be included as 'A' uses within the 'Special Use' zone;
- The proposal will not adversely impact on the role and function of the Town Centre, instead it will allow for uses that require more space to be accommodated for outside of the Town Centre;
- It shall allow for the immediate development, and future redevelopment, thus contributing to the areas effective service commercial operational capabilities;
- It facilitates the maximum potential utilisation of the land for service commercial and residential (single house and associated uses) purposes;
- Maximises the development potential of the land with more suitable land uses permissible within the Monkey Mia Road area; and
- The proposed amendment acknowledges the existing land uses and allows for the amendment area to be developed in accordance with LPS No. 4.

## 7 REFERENCES

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## LEGISLATION

Planning & Development Act 2005

Australian Standard 3959: Construction of buildings in bushfire-prone areas (2009)

***Statutory Pages***

**PLANNING AND DEVELOPMENT ACT 2005**

**SHIRE OF SHARK BAY**

**LOCAL PLANNING SCHEME NO. 4**

**AMENDMENT No. 1**

The Shire of Shark Bay, 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:

1. Amending 'Schedule B – Special Use Zones' as applicable to Lot 90 Monkey Mia Road, Denham (listed as SU10) which currently states:

No.	Description of Land	Special Use	Conditions
SU10	Lot 90 Monkey Mia Road, Denham	As 'P' use: <ul style="list-style-type: none"><li>• Single house</li></ul> As 'D' use: <ul style="list-style-type: none"><li>• Agriculture-intensive</li><li>• Tree farm</li><li>• Workforce accommodation</li></ul>	<ol style="list-style-type: none"><li>1) Development of the site shall be generally in accordance with an approved Local Development Plan, which has been prepared in accordance with Part 6, Schedule 2 of the Planning and Development (Local Planning Schemes) Regulations 2015 and approved by the local government.</li><li>2) The local government may require lodgement of a transport impact assessment for any new development, prepared in accordance with the WAPC's Transport Impact Assessment Guidelines (August 2016).</li><li>3) Notwithstanding condition (1), the local government may consider development prior to the approval of a Local Development Plan as provided for under Clause 56(2), Part 6, Schedule 2 of the Planning and Development (Local Planning Schemes) Regulations 2015.</li></ol>

To state as follows:

No.	Description of Land	Special Use	Conditions
SU10	Lot 90 Monkey Mia Road, Denham	<p>As 'D' Uses:</p> <ul style="list-style-type: none"> <li>• Ancillary Dwelling</li> <li>• Commercial Vehicle Parking</li> <li>• Single House</li> <li>• Second Hand Dwelling</li> <li>• Home Business</li> <li>• Home Office</li> <li>• Home Store</li> <li>• Outbuilding(s)</li> </ul> <p>As 'A' uses:</p> <ul style="list-style-type: none"> <li>• Bulky Goods Showroom</li> <li>• Carpark</li> <li>• Convenience Store</li> <li>• Fast food outlet/ lunch bar</li> <li>• Fuel Depot</li> <li>• Industry – Light</li> <li>• Industry – Primary Production</li> <li>• Marine Filling Station</li> <li>• Motor Vehicle, boat or caravan sales</li> <li>• Motor Vehicle Repair (including marine craft)</li> <li>• Motor Vehicle Wash (including marine craft)</li> <li>• Office</li> <li>• Restaurant/cafe</li> <li>• Roadhouse</li> <li>• Service Station</li> <li>• Shop</li> <li>• Transport Depot</li> <li>• Trade Display</li> <li>• Trade Supplies</li> <li>• Warehouse / Storage</li> </ul>	<p><u>Zone Purpose:</u></p> <p>The purpose of this zone is to provide for the sale, servicing, rebuilding, storage, washing and fuelling of cars, boats and marine craft.</p> <p>The zone will also cater for a wide range of other compatible commercial, storage, light industrial and retail fuel sale uses to maximise future development opportunities.</p> <p><u>Zone Objectives:</u></p> <ul style="list-style-type: none"> <li>• To provide quality landscaping along the Monkey Mia Road frontage.</li> <li>• To cater for workforce accommodation and maximise employment opportunities within Denham townsite.</li> </ul> <p>Conditions:</p> <ol style="list-style-type: none"> <li>1) Development of the site shall be generally in accordance with an approved Local Development Plan, which has been prepared in accordance with Part 6, Schedule 2 of the <i>Planning and Development (Local Planning Schemes) Regulations 2015</i> and approved by the local government.</li> <li>2) The Local Development Plan is to address the following: <ol style="list-style-type: none"> <li>g) The purpose and objectives of this Special Use Zone;</li> <li>h) A layout that caters for a mixture of land uses with separation on site that minimises any potential for conflict between proposed uses;</li> <li>i) A Management Plan that addresses access, servicing, maintenance, waste disposal, waste water disposal, effluent disposal, service areas, potential emissions, contaminants and rubbish management;</li> </ol> </li> </ol>

		<ul style="list-style-type: none"> <li>• Wind Farm</li> <li>• Workforce Accommodation</li> <li>• Any other uses associated with the purpose and objectives of the zone (D), at the discretion of the local government.</li> <li>• Any on site infrastructure required to service development.</li> </ul>	<ul style="list-style-type: none"> <li>j) Suitable areas on site for carparking, loading, truck parking, access and traffic movements;</li> <li>k) Accommodation of suitable perimeter or strategic fire breaks within the lot boundaries;</li> <li>l) A transport impact assessment prepared in accordance with the WAPC's <i>Transport Impact Assessment Guidelines (August 2016)</i>;</li> <li>g) The local government may require a Bushfire Attack Level Assessment and / or a Bushfire Management Plan as part of an application for development approval in accordance with State Planning Policy 3.7 Planning in Bushfire Prone Areas.</li> <li>h) A Bushfire Management Plan, prepared by an accredited bushfire consultant, shall be lodged with any application for development approval of a high-risk land use in accordance with State Planning Policy 3.7 Planning in Bushfire Prone Areas.</li> <li>i) Provision of quality landscaping along Monkey Mia road.</li> <li>3) The layout of carparking areas shall be designed with high regard for traffic circulation between developments on the same lot, and shall be integrated to allow for good on site traffic management and flow.</li> <li>4) The local government may require lodgement of a detailed landscaping plan as a condition of any development.</li> <li>5) Any external storage required as part of a proposed land use shall be adequately screened from Monkey Mia Road to the satisfaction of the local government. External storage does not include any trade display or motor vehicle, boat and caravan sales approved by the local government.</li> <li>6) The local government has discretion to consider advertisement(s) and shall have regard for the matters in Clause</li> </ul>
--	--	--	---

			<p>32.17.3 of this Scheme.</p> <p>Notwithstanding condition (1), the local government may consider development prior to the approval of a Local Development Plan as provided for under Clause 56(2), Part 6, Schedule 2 of the <i>Planning and Development (Local Planning Schemes) Regulations 2015</i>.</p>
--	--	--	---



**ADOPTION**

Adopted by resolution of the Council of the Shire of Shark Bay at the ordinary meeting  
of the Council held on the

\_\_\_\_\_ day of \_\_\_\_\_ 20

\_\_\_\_\_  
SHIRE PRESIDENT

\_\_\_\_\_  
CHIEF EXECUTIVE OFFICER

**FINAL APPROVAL**

Adopted for Final Approval by Resolution of the Shire of Shark Bay at the ordinary meeting of the Council held on the

\_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_ and the Common Seal of the Shire of Shark Bay was hereunto affixed by the authority of a resolution of the Council in the presence of:



\_\_\_\_\_  
SHIRE PRESIDENT

\_\_\_\_\_  
CHIEF EXECUTIVE OFFICER

Recommended/Submitted for Final Approval

\_\_\_\_\_  
DELEGATED UNDER S.16  
OF THE PD ACT 2005

\_\_\_\_\_  
Date

Final Approval Granted

\_\_\_\_\_  
MINISTER FOR PLANNING

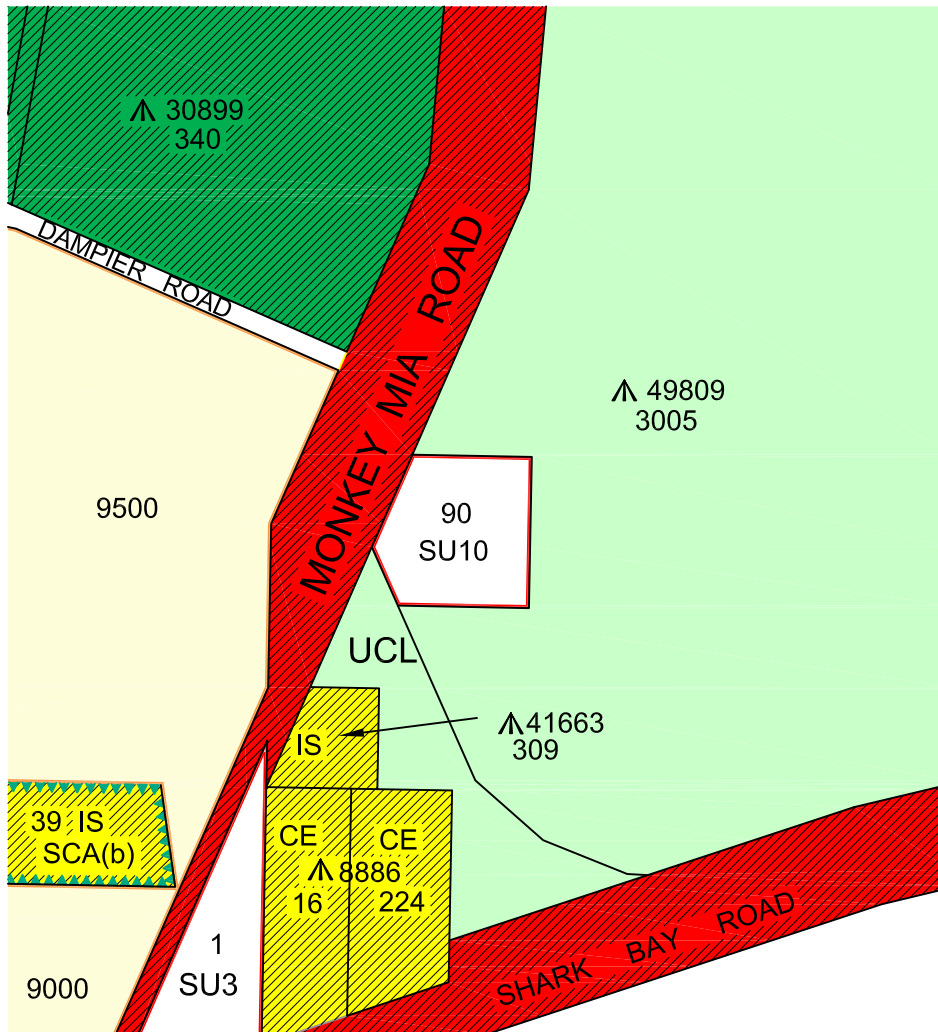
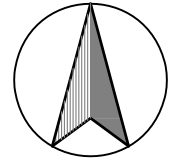
\_\_\_\_\_  
Date

## 8 APPENDICES

***Appendix A – Existing Zoning Plan***

# SHIRE OF SHARK BAY

## LOCAL PLANNING SCHEME No.4 (DISTRICT SCHEME)



### LOCAL SCHEME RESERVES

- LOCAL ROADS
- PRIMARY DISTRIBUTOR ROAD
- PUBLIC OPEN SPACE
- CEMETERY
- INFRASTRUCTURE SERVICES

### LOCAL SCHEME ZONES

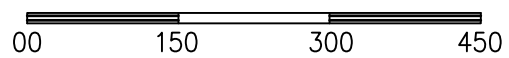
- SPECIAL USE
- RURAL
- URBAN DEVELOPMENT

### OTHER CATEGORIES

- SCA(b) SPECIAL CONTROL AREA - ENVIRONMENT
- SU1 SPECIAL USE AREA

### REVISIONS

1	08/08/19	AMEND TO REFLECT LOCAL PLANNING SCHEME No.4	SL
0	12/08/16	ORIGINAL ISSUE	SL



ALL DISTANCES ARE IN METRES



SURV:		AREA FILE : 1079
DWN:	SL 12/08/16	CONT. INTVAL : N/A
CHK:		V DATUM : N/A
APP:		H DATUM : MGA94 z49
		FIELD Bk :

**HTD**  
SURVEYORS & PLANNERS  
HILLE, THOMPSON & DELFOS  
PO Box 820, GERALDTON WA 6531  
PHONE: (08) 9921 3111 FAX: (08) 9921 8072



CLIENT:	JAMIE MORGAN
LOT 90 on DP191083 <b>EXISTING ZONING PLAN</b> MONKEY MIA ROAD, DENHAM - SHIRE OF SHARK BAY	
SCALE 1 : 7500 (A4)	Drawing No: 23616ZS1-1-1

***Appendix B – Certificate of Title***

WESTERN



AUSTRALIA

REGISTER NUMBER <b>90/DP191083</b>	
DUPLICATE EDITION <b>2</b>	DATE DUPLICATE ISSUED <b>15/9/2003</b>

**RECORD OF CERTIFICATE OF TITLE**  
UNDER THE TRANSFER OF LAND ACT 1893

VOLUME 2124 FOLIO 43

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

*BGRoberts*  
REGISTRAR OF TITLES



**LAND DESCRIPTION:**

LOT 90 ON DEPOSITED PLAN 191083

**REGISTERED PROPRIETOR:**  
(FIRST SCHEDULE)

JAMIE NELSON MORGAN OF POST OFFICE BOX 437, DENHAM

(T I612930 ) REGISTERED 3/9/2003

**LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:**  
(SECOND SCHEDULE)

1. I612931 MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD REGISTERED 3/9/2003.
2. I612932 MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD REGISTERED 3/9/2003.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.  
\* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.  
Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

**STATEMENTS:**

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 2124-43 (90/DP191083)  
PREVIOUS TITLE: 2124-43  
PROPERTY STREET ADDRESS: LOT 90 MONKEY MIA RD, DENHAM.  
LOCAL GOVERNMENT AUTHORITY: SHIRE OF SHARK BAY

- NOTE 1: A000001A LAND PARCEL IDENTIFIER OF EDEL LOCATION 90 (OR THE PART THEREOF) ON SUPERSEDED PAPER CERTIFICATE OF TITLE CHANGED TO LOT 90 ON DEPOSITED PLAN 191083 ON 28-SEP-02 TO ENABLE ISSUE OF A DIGITAL CERTIFICATE OF TITLE.
- NOTE 2: THE ABOVE NOTE MAY NOT BE SHOWN ON THE SUPERSEDED PAPER CERTIFICATE OF TITLE OR ON THE CURRENT EDITION OF DUPLICATE CERTIFICATE OF TITLE.

***Appendix C – Infrastructure and Servicing Report***



# SERVICING REPORT

**For:** Hille Thompson & Delfos

**Project Address:** Lot 90 Monkey Mia Road, Denham

**Project Number:** D183635

**Job Number:** J193898

**Revision Number:** B

**Author:** Farhad Silwanagh

**Date:** 23/02/2018

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## 1 INTRODUCTION

### 1.1 Purpose of this report

Structerre Consulting Engineers have been engaged to undertake a feasibility study of the authority infrastructure services associated with the proposed development located at Lot 90 Monkey Mia Road, Denham.

The following report provides the findings from the existing services plans received from the Dial Before You Dig (DBYD) and Water Corporation Esinet Mapping.



Figure 1: Location Plan

## 1.2 Available Documents

Services findings and advice herein this report, are based on the following available information:

- DBYD searches carried out.
- Esinet, Water Corporation Mapping.

### **1.3 Proposed Development**

This report provides for an assessment of authority services infrastructure requirements for the proposed fuel station and commercial/tourism infrastructure.

## 2 SERVICES

---

### 2.1 Existing Water Corporation Infrastructure Services:

Based on the Dial Before You Dig information received and Water Corporation Esinet mapping, we advise the following available infrastructure:

- Existing gravity sewer is located on the western side of Oakley Ridge. An existing access chamber (0159) is located at the intersection of Oakley Ridge and Denham Road. The existing terrain does not allow for a gravity sewer extension; sewer servicing to this lot can only be done via a private pump station with a discharge point being located approximately 800m away to the existing access chamber (0159) – subject to Water Corporation approval (see Figure 2).
- Suitable Water Main for a possible extension is located in Shark Bay Road; the connection point is approximately 600m away from Lot 90 (see Figure 3).
- As advised by the Developer, Lot 90 is currently being serviced by a 32mm water service pipe located close to the truncation of Lot 1. The suitability of this water service for the future development on the lot is subject to a hydraulic consultant's design and approval by the Water Corporation.

### 2.2 Existing Drainage Services

Based on the Dial Before You Dig information received, near-map service and council information, we advise the following available infrastructure:

- There is no drainage infrastructure along Monkey Mia Road and all impervious runoff will need to be contained onsite.

### 2.3 Existing Gas Services

Based on the Dial Before You Dig information received, we advise the following available infrastructure:

- There is no gas infrastructure along Monkey Mia Road.

### 2.4 Existing Power Services

Based on the information we obtained from Western Power Network Capacity Mapping Tool, we advise the following available infrastructure:

- There is no high voltage transmission line along Monkey Mia Road, but pole mounted high voltage distribution and low voltage distribution line is provided on Monkey Mia Road.



- High voltage transmission line is located at Shark Bay Road and Denham Road.
- Pole top mounted transformer is located at first junction of Monkey Mia Road.



- There is high voltage 3 phase underground power line at Knight Terrace.
- The site is powered by Horizon Power Low voltage network (see Figure 4).

## 2.5 Existing Telecommunication Services

Based on the information we obtained from Dial Before You Dig service, we are advised the below:

- Although there is no NBN asset in this area , but NBN commenced their work nearby(see Figure 5), we are unable to provide the advice about when NBN will be ready for this site when we document this report. It is recommended to provide lead in conduit in accordance with NBN requirements in the property to cater for future NBN connection.
- The Telstra communication service is connected to site, the phone line is located along Monkey Mia Road, multiple Telstra pits have been provided along Monkey Mia Road.

## 2.6 Power incoming connection for the new development

Lot 90 is intended for use as a fuel station and some tourism and commercial uses. Servicing has been recognised as a constraint for the site, there is no ability / capacity to extend the current power service within the lot without Horizon incoming power upgraded.

A site main switchboard shall be supplied and installed by the developer for the future developments reticulation.

## **2.7 Budget Estimates**

We are unable to provide any firm preliminary budget estimates for water, sewer and electrical services infrastructure, until applications are made to Water Corporation and Horizon Power, as each development is individually assessed.



### APPENDIX A – SEWER AND WATER CONCEPT PLANS

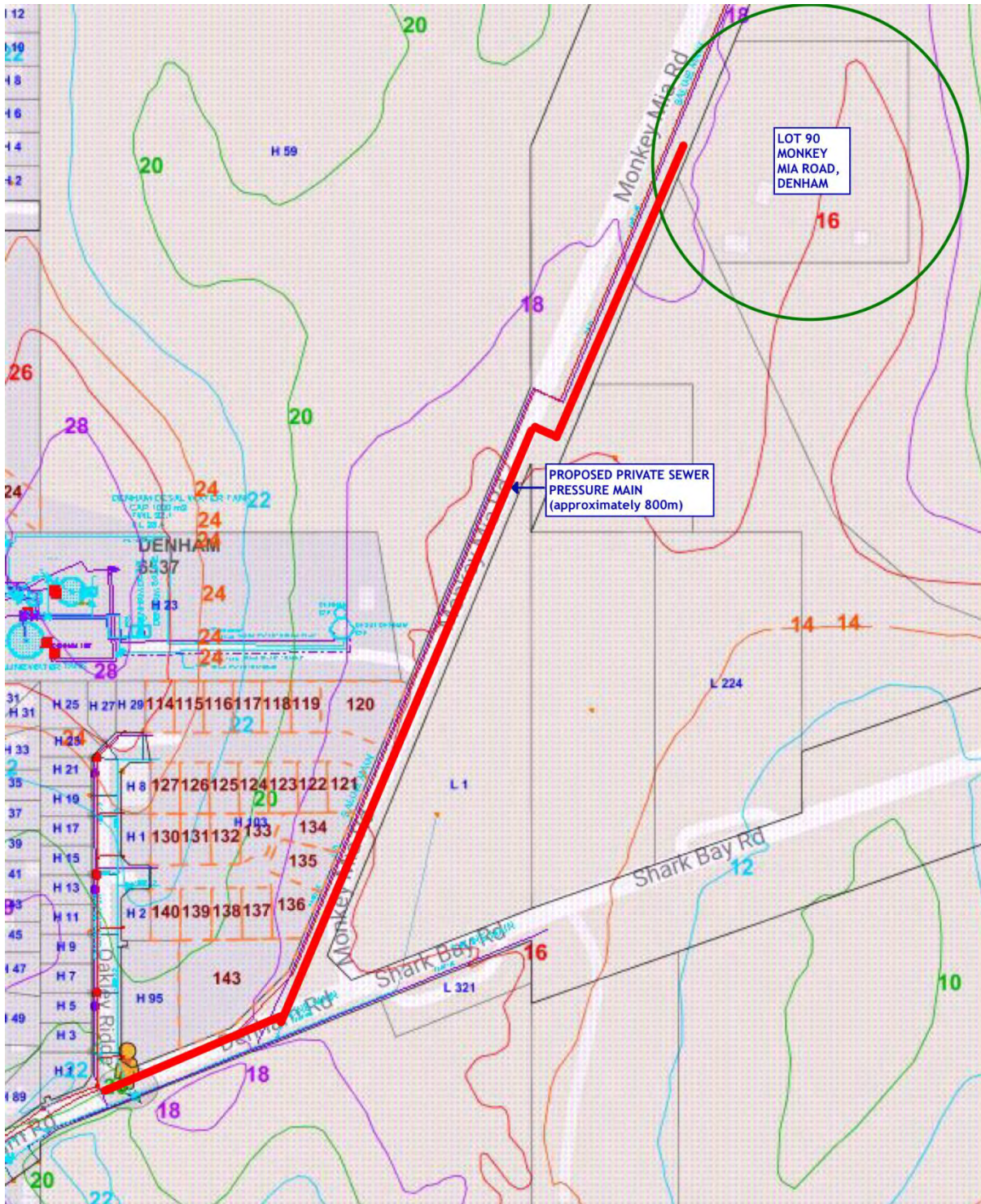


Figure 2: Sewer Pressure Main Concept Plan

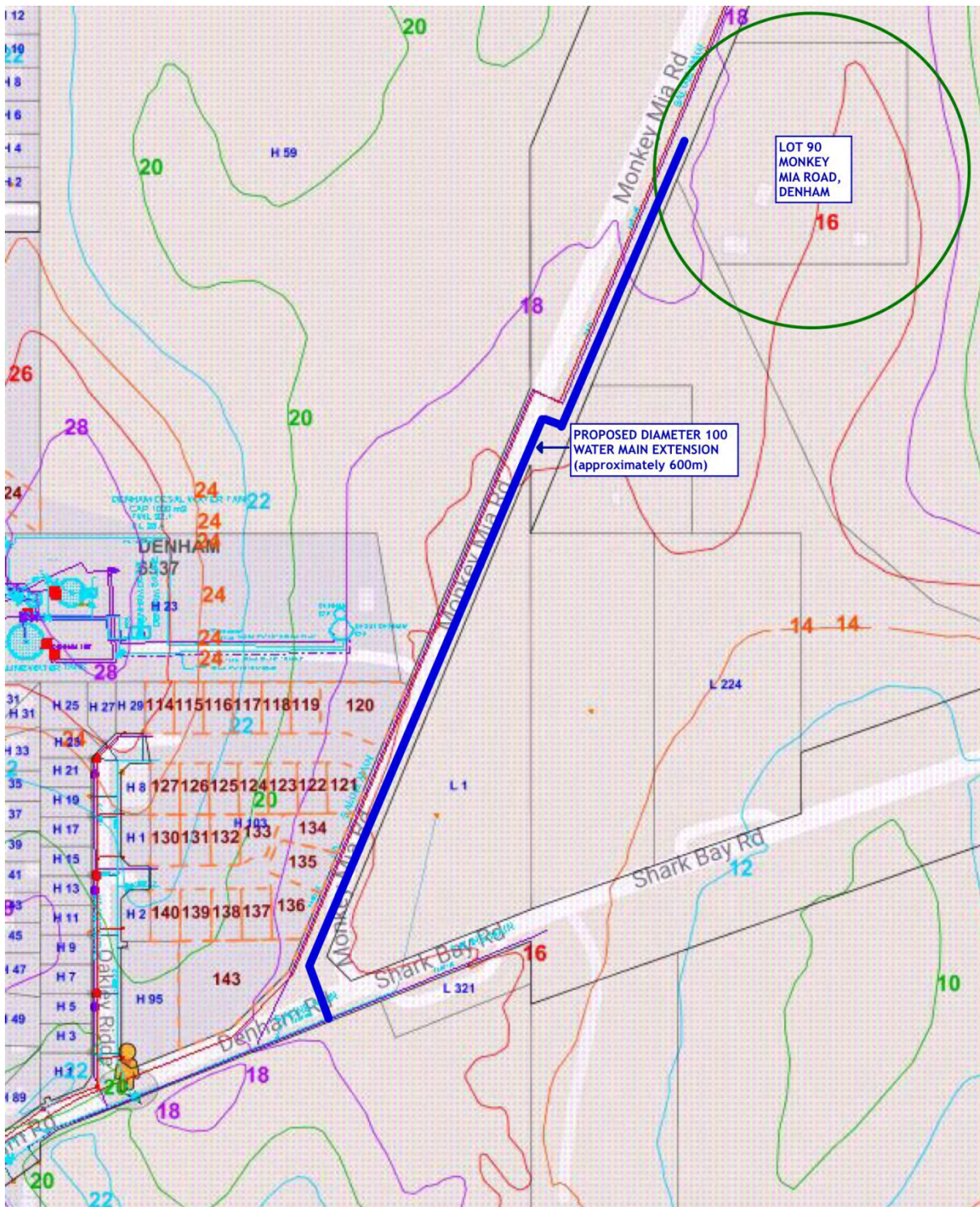


Figure 3: Water Main Concept Plan

APPENDIX B – POWER AND NBN PLANS

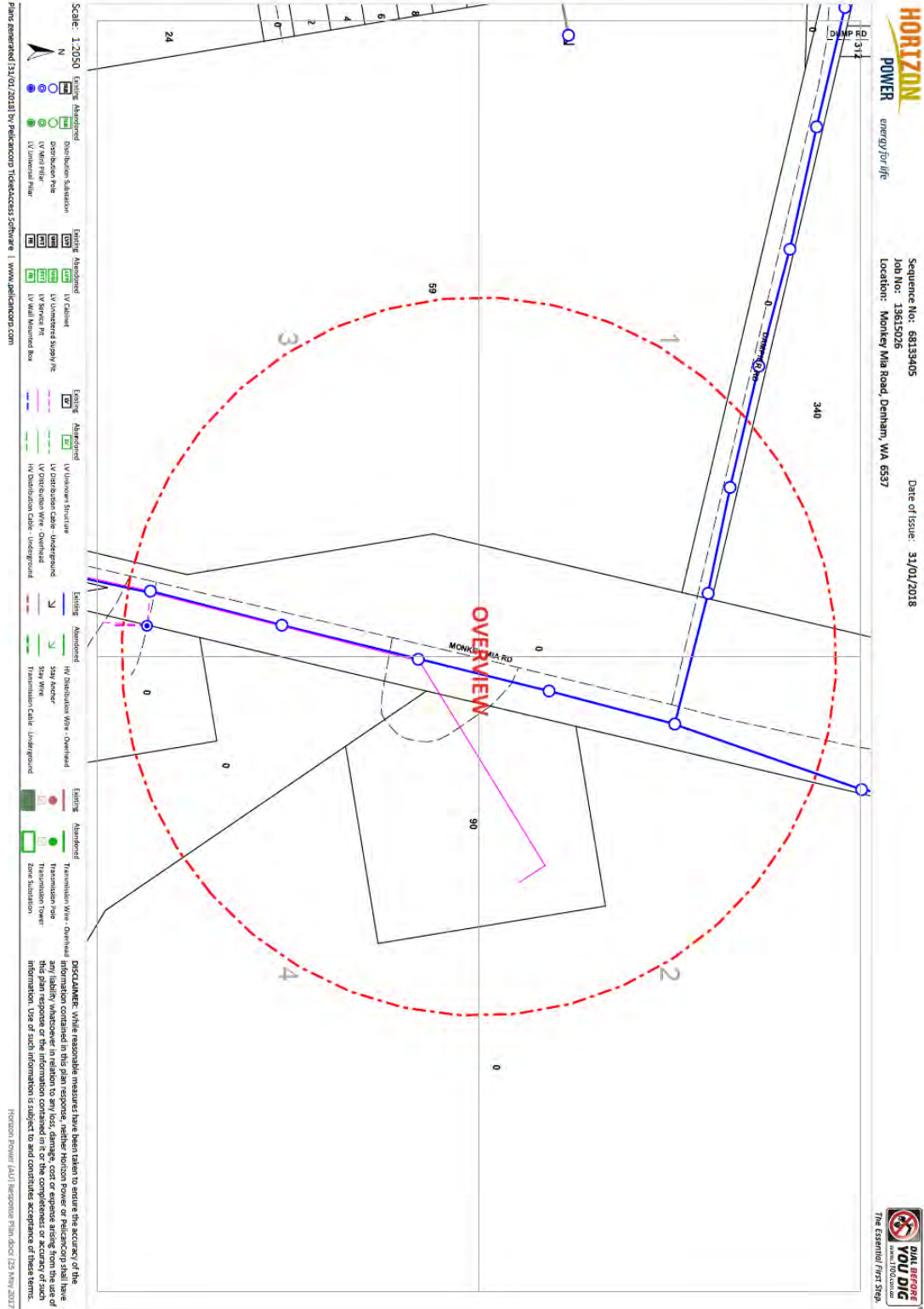



Figure 4: Horizon Power Connection Plan

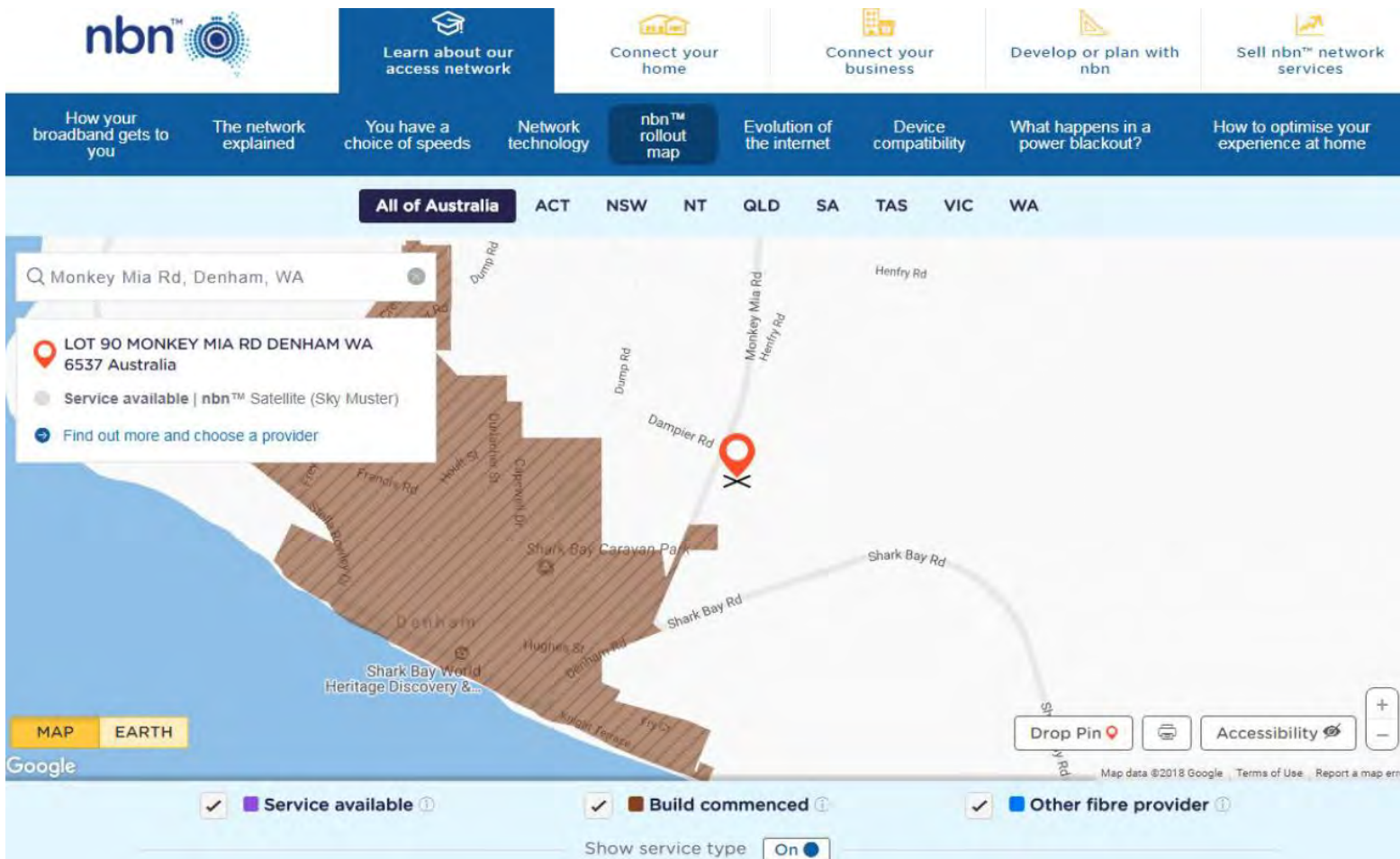
<b>Dial before you dig Job #:</b>	13615026	
<b>Sequence #</b>	68133406	
<b>Issue Date:</b>	31/01/2018	
<b>Location:</b>	Monkey Mia Road, Denham, WA-6537	<div style="background-color: #0070C0; color: white; padding: 5px; text-align: center;"> <b>Some impact.</b>  <b>No onsite action required.</b> </div>

### Information

The area of interest requested by you contains one or more assets.

nbn Assets	Search Results
Communications	No asset
Electricity	No asset

In this notice **NBN Facilities** means *underground fibre optic, telecommunications and/or power facilities, including but not limited to cables, owned and controlled by nbn*



The screenshot shows the nbn rollout map interface. At the top, there are navigation tabs for 'All of Australia' and various states (ACT, NSW, NT, QLD, SA, TAS, VIC, WA). Below this is a search bar containing 'Monkey Mia Rd, Denham, WA'. A search result popup shows 'LOT 90 MONKEY MIA RD DENHAM WA 6537 Australia' with a red location pin and a status of 'Service available | nbn™ Satellite (Sky Muster)'. The map below shows the coastal region of Denham, WA, with a red pin and an 'X' mark at the specific location. The map includes various street names like 'Monkey Mia Rd', 'Dampier Rd', and 'Shark Bay Rd'. At the bottom, there are map controls for 'MAP', 'EARTH', 'Drop Pin', 'Accessibility', and a legend for service types: 'Service available' (purple), 'Build commenced' (brown), and 'Other fibre provider' (blue). A 'Show service type' dropdown is set to 'On'.

Figure 5: NBN Service Plan

***Appendix D – Bushfire Hazard Level Assessment***

# Bushfire management plan/Statement addressing the Bushfire Protection Criteria coversheet

Site address:

Site visit: Yes  No

Date of site visit (if applicable): Day  Month  Year

Report author:

WA BPAD accreditation level (please circle):

Not accredited  Level 1 BAL assessor  Level 2 practitioner  Level 3 practitioner

If accredited please provide the following.

BPAD accreditation number:  Accreditation expiry: Month  Year

Bushfire management plan version number:

Bushfire management plan date: Day  Month  Year

Client/business name:

	Yes	No
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?		
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the bushfire protection criteria elements)?		

Is the proposal any of the following (see [SPP 3.7 for definitions](#))?

	Yes	No
Unavoidable development (in BAL-40 or BAL-FZ)		
Strategic planning proposal (including rezoning applications)		
Minor development (in BAL-40 or BAL-FZ)		
High risk land-use		
Vulnerable land-use		


None of the above

**Note:** Only if one (or more) of the above answers in the tables is yes should the decision maker (e.g. local government or the WAPC) refer the proposal to DFES for comment.

Why has it been given one of the above listed classifications (E.g. Considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?

The information provided within this bushfire management plan to the best of my knowledge is true and correct:

Signature of report author



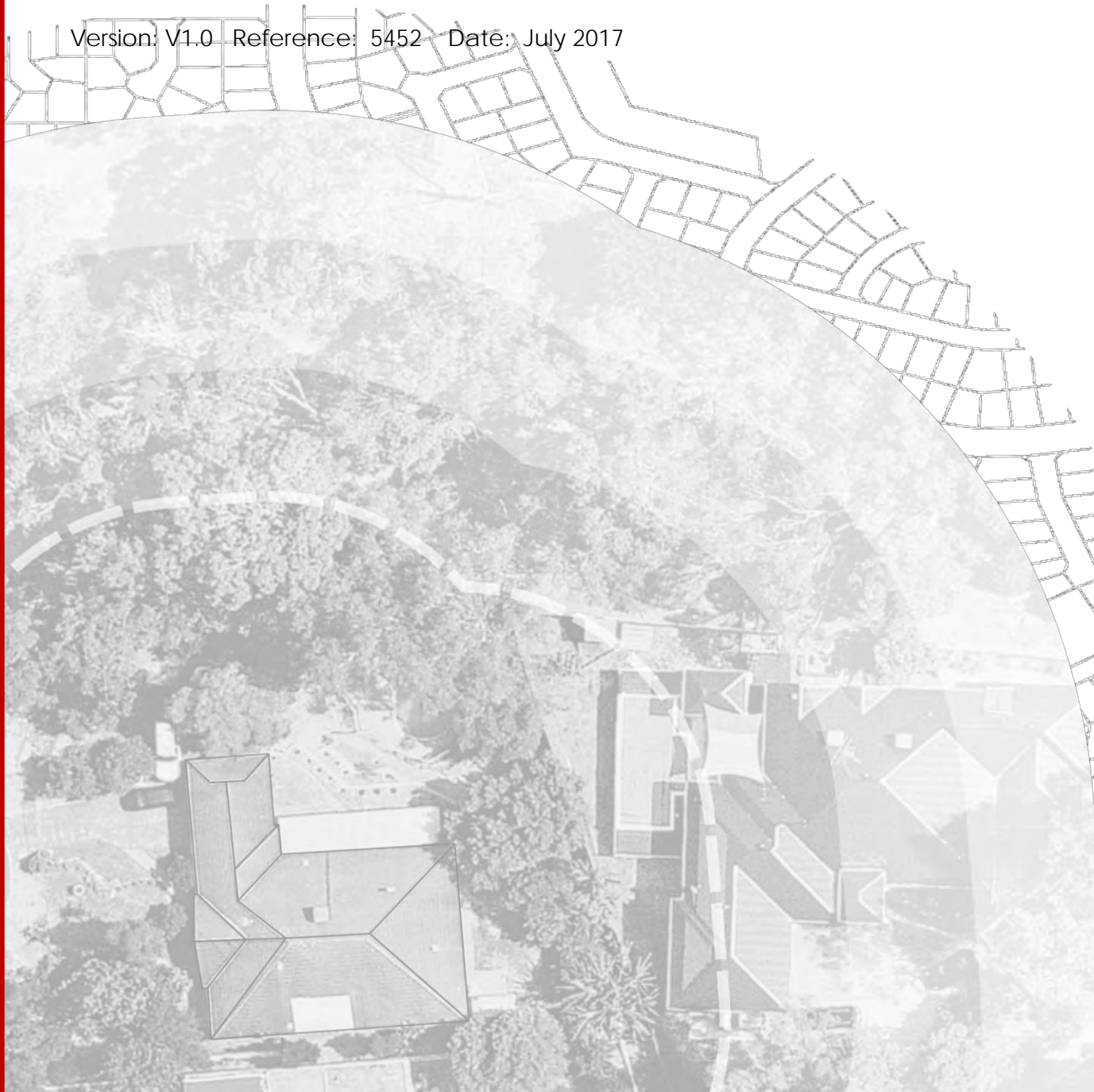
Date



# BUSHFIRE HAZARD LEVEL ASSESSMENT

Lot 90 Monkey Mia Road, Denham  
(Scheme Amendment)

Version: V1.0 Reference: 5452 Date: July 2017



Project Number: 5452  
Project Name: Lot 90 Monkey Mia Rd, Denham  
Author: Jeremy Durston, Grad Cert Development Planning, BPAD36525 Level 1  
Reviewed by: Darrel Krammer, Grad Cert Bushfire Protection, BPAD33412 Level 1  
Version: V1.0  
Date of issue: 02<sup>nd</sup> July 2017



Author: Jeremy Durston  
Date: 7<sup>th</sup> June 2017



Reviewed by: Darrel Krammer  
Date: 02<sup>nd</sup> July 2017

In the signing the above, the author declares that this Bushfire Hazard Level Assessment meets the requirements of State Planning Policy 3.7.



## DISCLAIMER AND LIMITATION

This report is prepared solely for Jamie Morgan (the 'proponent') and any future residents of the proposed development. This report is not for the benefit of any other person and may not be relied upon by any other person.

This Bushfire Hazard Level Assessment is limited to the Bushfire Hazard Assessment scope and methodology as identified in the *Guidelines for Planning in Bushfire Prone Areas* Appendix Two. It is expressly stated that RUIC Fire and the writer do not guarantee that if such standards are complied with or if a property owner exercises prudence, that a building or property will not be damaged or that lives will not be lost in a bush fire.

Fire is an extremely unpredictable force of nature. Changing climatic factors (whether predictable or otherwise) either before or at the time of a fire can also significantly affect the nature of a fire and in a bushfire prone area it is not possible to completely guard against bushfire.

To the maximum extent permitted by the law, RUIC Fire, its employees, officers, agents and the writer ("RUIC Fire") excludes all liability whatsoever for:

1. claim, damage, loss or injury to any property and any person caused by fire or as a result of fire or indeed howsoever caused;
2. errors or omissions in this report except where grossly negligent; and

the proponent expressly acknowledges that they have been made aware of this exclusion and that such exclusion of liability is reasonable in all the circumstances.

If despite the provisions of the above disclaimer RUIC Fire is found liable then RUIC Fire limits its liability to the lesser of the maximum extent permitted by the law and the proceeds paid out by RUIC Fire's professional or public liability insurance following the making of a successful claim against such insurer.

RUIC Fire accepts no liability or responsibility whatsoever for or in respect of any use or reliance upon this report and its supporting material by any third party.

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## 1.0 Introduction

### 1.1 Subject Site

The site the subject of this Bushfire Hazard Level (BHL) assessment is comprised of Lot 90 Monkey Mia Road, Denham. The site is located within the municipality of the Shire of Shark Bay. The subject site is approximately 2.1 hectares.

Figures 1A & 1B illustrate the subject site and its immediate surrounds.

The site is identified as being Bushfire Prone on the *Map of Bush Fire Prone Areas 2017* (OBRM, 2017).

The site has been identified as having natural vegetation that is subject to a designated Local Natural Area (LNA) for land use planning purposes. The lots surrounding the subject site, including Crown Reserve, are also within the designated LNA. The LNA is identified within Figure 1C (WALGA, 2017).

The proponent has not identified any other relevant environmental considerations, including Bush Forever sites, environmentally sensitive areas, remnant vegetation, threatened species, ecological communities, nature reserves or coastal reserves located within the site or being affected by the development.

### 1.2 Proposal Description

The subject site is currently zoned Special Use. The proposal involves the rezoning of the site to Service Commercial zoning under the Shire of Shark Bay Town Planning Scheme No.3 (SoSB, 2015). Subject to the proposed rezoning, planning consent may be sought in future for potential land uses including Tourist facilities and a Service / Fuel Filling Station.

### 1.3 Purpose of Report

This BHL assessment has been carried out in accordance with Appendix Two of *Guidelines for Planning in Bushfire Prone Areas V1.1* (the Guidelines) (WAPC, 2017b).

The purpose of this BHL assessment is to:

- Determine the Bushfire Hazard Level at a strategic (pre-development) level affecting the site,
- Identify Bushfire Hazard Issues to determine whether the Bushfire Hazard Level (pre-development) will be prohibitive of future development, and
- Provide consideration of the Bushfire Protection Criteria.

This report is not a Bushfire Management Plan. A Bushfire Management Plan is required in future planning stages.



Figure 1A: Site Overview



Figure 1B: Site Overview (Client, 2017)

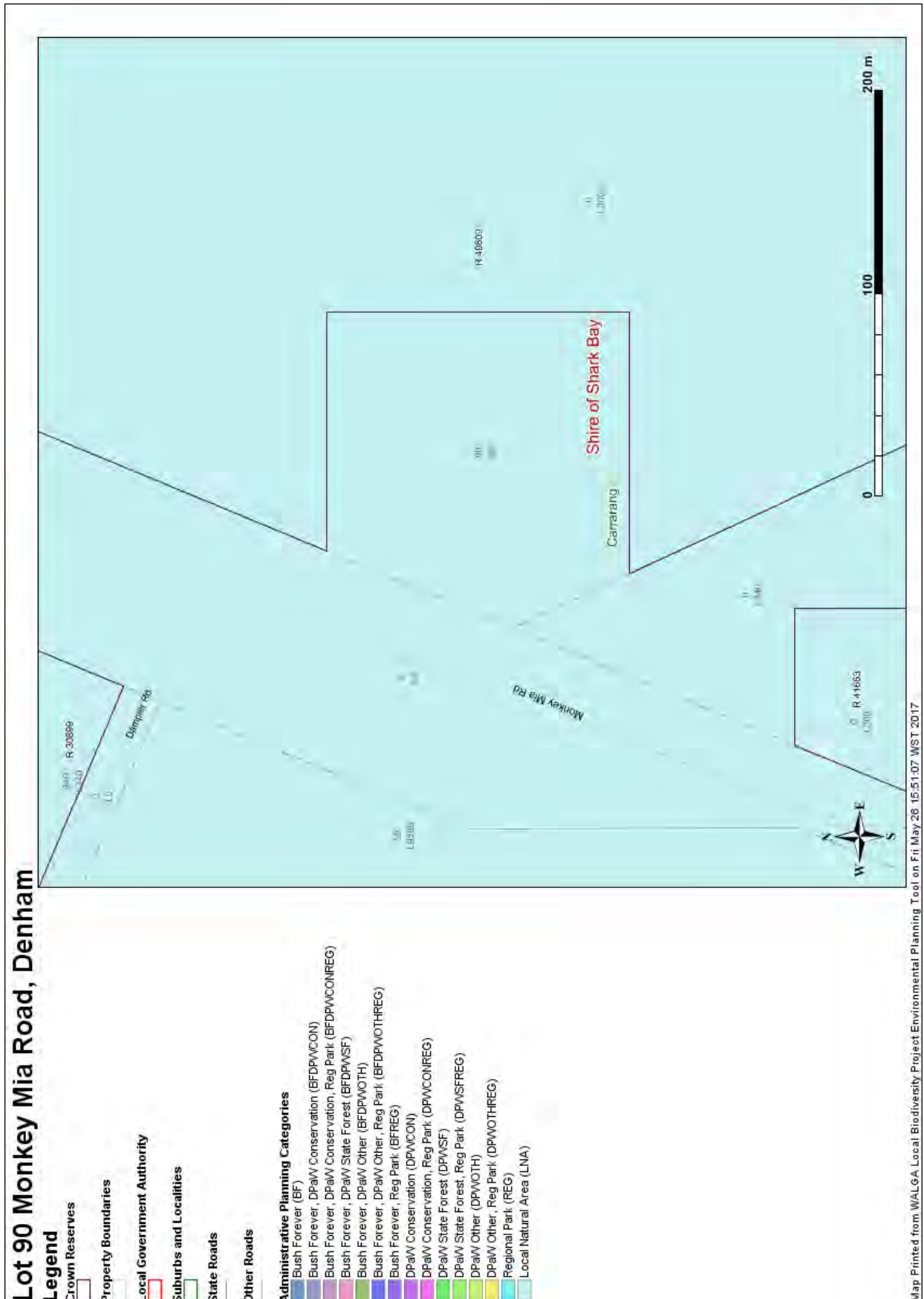


Figure 1C: Environmental Constraints

## 2.0 Strategic Bushfire Hazard Level Assessment

### 2.1 Assessment Methodology

The strategic Bushfire Hazard Level (BHL) assessment was carried out in accordance with the *Guidelines Appendix Two*.

### 2.2 Vegetation Characteristics and Hazard Levels

The BHL assessment classifies vegetation into three potential hazard levels: low, medium or extreme.

Table 2A details the vegetation characteristics and associated hazard levels identified in the *Guidelines*.

*Table 2A: Vegetation characteristics and associated hazard levels*

Vegetation Characteristics	Hazard Level
<ul style="list-style-type: none"> <li>devoid of standing vegetation (less than 0.25ha cumulative area);</li> <li>areas which, due to climatic conditions or vegetation (e.g. rainforest), do not experience bushfires;</li> <li>inner urban or suburban areas with maintained gardens and very limited standing vegetation (less than 0.25ha cumulative area);</li> <li>low threat vegetation, including grassland managed in a minimal fuel condition (i.e. to a nominal height of 100mm), maintained lawns, vineyard and orchards; and</li> <li>pasture or cropping areas with very limited standing vegetation that is shrubland, woodland or forest with an effective up slope*, on flat land or an effective down slope* of less than 10 degrees, for a distance greater than 100 metres.</li> </ul>	Low
<ul style="list-style-type: none"> <li>areas containing pasture or cropping with an effective down slope* in excess of 10 degrees for a distance greater than 100 metres;</li> <li>unmanaged grasslands;</li> <li>open woodlands;</li> <li>open shrublands;</li> <li>low shrubs on areas with an effective up slope*, on flat land or an effective down slope* of less than 10 degrees, for a distance greater than 100 metres or flat land;</li> </ul>	Moderate

Vegetation Characteristics	Hazard Level
<ul style="list-style-type: none"> <li>suburban areas with some tree cover; and</li> <li>forest and woodlands with a permanent grass understorey or at most, a scrub understorey structure consisting of multiple areas of &lt;0.25ha and not within 20 metres of each other or single areas of &lt;1ha and not within 100 metres of other scrub areas.</li> </ul>	
<ul style="list-style-type: none"> <li>forests with a scrub understorey which is multi-tiered;</li> <li>woodlands with a scrub understorey which is multi-tiered;</li> <li>tall shrubs; and</li> <li>any area of vegetation not otherwise categorised as low or moderate.</li> </ul>	Extreme
<p>*NOTE Effective slope refers to the slope under the classified vegetation in relation to the subject site. Distances less than 100 metres will be deemed to be undulating land, rather than a nominated slope.</p>	

### 2.3 Assessment Area

The BHL assessment was carried out over the subject site as well as all land within 100 metres of the external boundary of the subject site (the assessment area). The assessment area is shown in Figure 2A by the 100 metre buffer.

### 2.4 Site Topography

Effective slope under each vegetation plot within the assessment area was assessed in accordance with the methodology detailed in AS 3959-2009 (AS 3959). Slope data was determined using the WALGA Environmental Planning Tool (EPT) elevation data.

Slope throughout the assessment area was found to be flat with minimal variation in relief.

### 2.5 Site Vegetation Classes & Hazard Levels

All vegetation within the assessment area was classified according to the vegetation characteristics detailed in Table 2A through a physical site assessment. Where access to areas of the assessment area was unable to be achieved, vegetation has been based on high definition satellite imagery. Section 2.5.1 provides photos of each vegetation plot.

The vegetation class applicable to each vegetation plot and the associated hazard level are listed in Table 2B.

The BHL assessment map is provided in Figure 2A. This map illustrates the location of each vegetation plot identified within the assessment area and the hazard level applicable to each plot. An additional map, Figure 2B, includes photo location details and AS3959 vegetation classification comparison.



Table 2B: Vegetation class and hazard level

Vegetation Plot	Vegetation Class	Hazard Level
Plot 1	Low Shrublands	Moderate
Plot 2	Low Shrublands	Moderate
Plot 3	Low Shrublands	Moderate
Plot 4	Low Shrublands	Moderate
Plot 5	Low Threat Vegetation	Moderate*

\*NOTE: Vegetation that would normally have a Low Bushfire Hazard Level has been classified as having a Moderate Hazard Level as the vegetation plot is within 100 metres of Moderate or Extreme Hazard Level vegetation.

### 2.5.1 Vegetation Plot Photos

Plot 1		
BHL Assessment	Vegetation Class	Low Shrublands
	Hazard Level	Moderate

AS3959	Vegetation Classification	Class C Shrubland
	Effective Slope	Flat/Upslope
	Post Development vegetation classification	Class C Shrubland

*Plot 1 consists of the unmanaged vegetation located to the east of Monkey Mia Road and external to the subject site. Canopy cover is greater than 30% and the vegetation consists predominately of coastal shrubs below 1m height, with some grass understorey.*



Photo ID: 1A



Photo ID: 1B



Photo ID: 1C



Photo ID: 1D



Photo ID: 1E

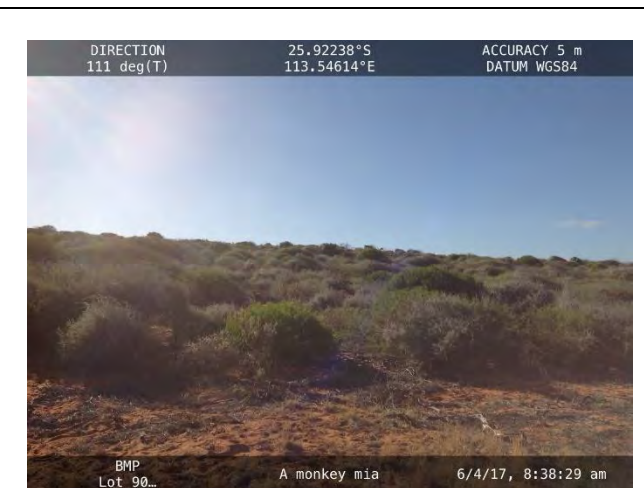


Photo ID: 1F



Photo ID: 1G



Photo ID: 1H



Photo ID: 1I



Photo ID: 1J



Photo ID: 1K



Photo ID: 1L

Plot 2		
BHL Assessment	Vegetation Class	Low Shrublands
	Hazard Level	Moderate

AS3959	Vegetation Classification	Class C Shrubland
	Effective Slope	Flat/Upslope
	Post Development vegetation classification	Class C Shrubland

Plot 2 consists of the unmanaged vegetation located to the west of Monkey Mia Road and south of Dampier Road. Canopy cover is greater than 30% and the vegetation consists predominately of coastal shrubs below 1m height, with some grass understorey.



Photo ID: 2A



Photo ID: 2B



Photo ID: 2C

Plot 3		
BHL Assessment	Vegetation Class	Low Shrublands
	Hazard Level	Moderate

AS3959	Vegetation Classification	Class C Shrubland
	Effective Slope	Flat/Upslope
	Post Development vegetation classification	Class C Shrubland

*Plot 3 consists of the unmanaged vegetation located to the west of Monkey Mia Road and north of Dampier Road. Canopy cover is greater than 30% and the vegetation consists predominately of coastal shrubs below 1m height, with some grass understorey.*



Photo ID: 3A

Plot 4		
BHL Assessment	Vegetation Class	Low Shrublands
	Hazard Level	Moderate

AS3959	Vegetation Classification	Class C Shrubland
	Effective Slope	Flat/Upslope
	Post Development vegetation classification	Class C Shrubland

Plot 4 consists of the unmanaged vegetation located within the boundaries of Lot 90. Canopy cover is greater than 30% and the vegetation consists predominately of coastal shrubs below 1m height, with some grass understorey.



Photo ID: 4A



Photo ID: 4B



Photo ID: 4C



Photo ID: 4D



Photo ID: 4E



Photo ID: 4F



Photo ID: 4G



Photo ID: 4I

Plot 5		
BHL Assessment	Vegetation Class	Low Threat Vegetation
	Hazard Level	Moderate

AS3959	Vegetation Classification	Excluded 2.2.3.2 (f&e)
	Effective Slope	N/A
	Post Development vegetation classification	Excluded 2.2.3.2 (f&e)

*Plot 5 consists of the existing developed area of Lot 90, which includes managed vegetation and grounds surrounding buildings, driveways and hard stand areas.*



Photo ID: 5A



Photo ID: 5B



Photo ID: 5C



Photo ID: 5D





Photo ID: 5E



Photo ID: 5F



Photo ID: 5G



Photo ID: 5H



Photo ID: 5I



Photo ID: 5J



Photo ID: 5K



Photo ID: 5L



Photo ID: 5M



Photo ID: 5N



Photo ID: 5O



Photo ID: 5P



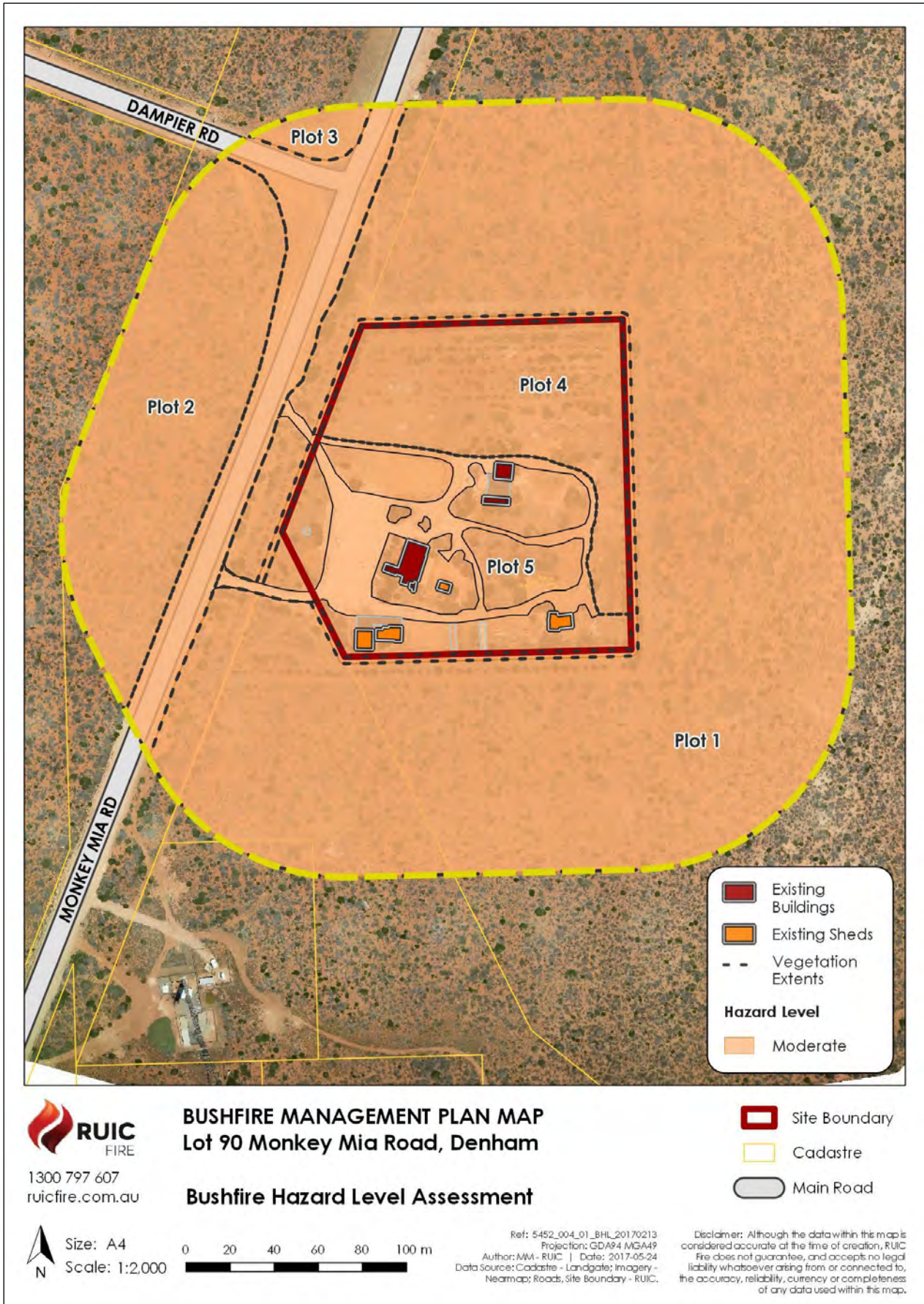


Figure 2A: Bushfire Hazard Level assessment map

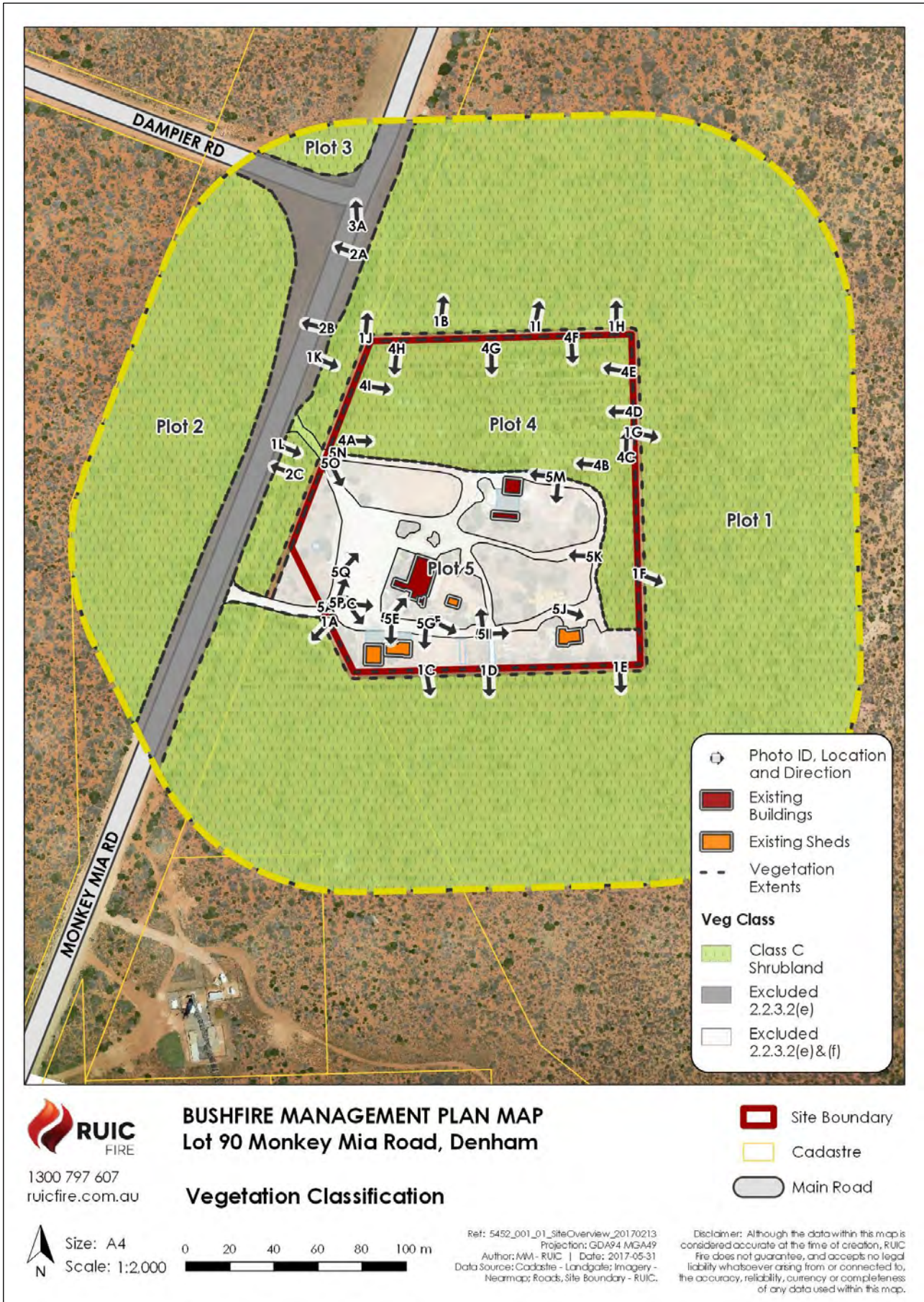


Figure 2B: Vegetation Plots and AS3959 classifications with photo locations

## 2.6 Bushfire Hazard Issues

The Bushfire Hazard Level assessment has identified the following potential bushfire hazard issues:

- The subject site is exposed to a Moderate Bushfire Hazard Level, and the hazard results from the combination of internal and external vegetation.
- Any future development proposal must consider the Local Natural Area designation that includes internal vegetation and external vegetation within 100m of the site.
- The retention of any internal site vegetation (i.e. Plot 4) requires consideration of the bushfire risks and applicable hazard separation is required to achieve BAL-29 or lower.
- The external vegetation, and in particular Plot 1, has the potential to impact any future development, and adequate hazard separation is required to achieve BAL-29 or lower.
- As the subject site is proposed to be rezoned 'Service Commercial', consideration of any vulnerable or high-risk land uses will be required at future planning stages.
- A Bushfire Management Plan is required for future planning stages to demonstrate compliance with the Guidelines when detailed design is known.
- Table 3A details compliance with the bushfire protection criteria of the Guidelines to address the potential bushfire hazard issues.

## 3.0 Proposal Compliance and Justification

### 3.1 State Planning Policy 3.7 – Planning in Bushfire Prone Areas (SPP 3.7)

SPP3.7 applies to all development applications in designated bushfire prone areas.

#### 3.1.1 Objectives

Policy Measure 5 contains the objectives of SPP 3.7. The following demonstrates how the proposed development meets each of the objectives.

*Objective 1: Avoid any increase in the threat of bushfire to people, property, and infrastructure. The preservation of life and management of bushfire impact is paramount.*

Development Response

Objective 1 is satisfied through the compliance of the proposed development with all required Policy Principles as detailed below and all Performance Principles of the Guidelines as detailed in Section 4 of this report.

*Objective 2: Reduce vulnerability to bushfire through the identification and consideration of bushfire risks in decision-making at all stages of the planning and development process.*

Development Response

Objective 2 is satisfied through the appropriate identification and assessment of all relevant bushfire hazards as detailed in Section 2.6 of this report.

*Objective 3: Ensure that higher order strategic planning documents, strategic planning proposals, subdivision and development applications take into account bushfire protection requirements and include specified bushfire protection measures.*

Development Response

Objective 3 is satisfied through the compliance of the proposed development with all required Policy Principles as detailed below and all Performance Principles of the Guidelines as detailed in Section 4 of this report.

*Objective 4: Achieve an appropriate balance between bushfire risk management measures and, biodiversity conservation values, environmental protection and biodiversity management and landscape amenity, with consideration of the potential impacts of climate change.*

Development Response

Objective 4 is satisfied through the appropriate consideration of all biodiversity and environmental assets as detailed in Section 1 of this report in the development of bushfire related risk mitigation strategies detailed in Section 4 of this report.

### 3.1.2 Policy Measures

#### 3.1.2.1 Strategic Planning Proposals

Policy Measure 6.2 requires that strategic planning proposals within designated bushfire prone areas and that have a Bushfire Hazard Level above low are to comply with Policy Measure 6.3.

#### 3.1.2.2 Information to Accompany Strategic Planning Proposals

Policy Measure 6.3 applies to strategic planning proposals. It requires certain information to be provided with such applications. The following Table (Table 3A) outlines where the required information has been provided.

Table 3A: Compliance of the proposed development with the Policy Measures of SPP 3.7

Policy Measure	Description	Development Response
a	(i) the results of a BHL assessment determining the applicable hazard level(s) across the subject land, in accordance with the methodology set out in the Guidelines. BHL assessments should be prepared by an accredited Bushfire Planning Practitioner; or (ii) where the lot layout of the proposal is known, a BAL Contour Map to determine the indicative acceptable BAL ratings across the subject site, in accordance with the Guidelines. The BAL Contour Map should be prepared by an accredited Bushfire Planning Practitioner; and	Figure 2A provides the BHL assessment map.
b	The identification of any bushfire hazard issues arising from the relevant assessment; and	Section 2.6 addresses the bushfire hazard issues.
c	Clear demonstration that compliance with the bushfire protection criteria in the Guidelines can be achieved in subsequent planning stages.	Section 4 provides an assessment of the proposed rezoning against the bushfire protection criteria.

#### 3.1.2.3 Vulnerable or High Risk Land Uses

The proposed development, at this stage, is not known to contain any vulnerable land uses and will be considered at later planning stages if required.

As the development is proposed to be rezoned 'Service Commercial', consideration of high risk land uses may be required at future planning stages.



### 3.1.2.4 Applications in BAL-40/BAL-FZ Areas

This will be addressed during subdivision/ development application approval at a later stage to locate the development outside of BAL-40 and BAL-FZ areas.

### 3.1.2.5 Advice of State/Relevant Authority/s for Emergency Services to be Sought

The proposed strategic planning proposal:

- Complies with the SPP3.7 Policy measures;
- Is a strategic planning proposal;
- Does not propose any additional/alternative measures; and
- Does not contain any known unavoidable development, vulnerable or high risk land uses.

Therefore, the advice of State/Relevant Authorities for Emergency Services is required to be sought for this application.

### 3.1.2.6 Advice of State/Relevant Agencies/Authorities for Environmental Protection to be Sought

The proposed rezoning:

- Is not known to propose clearing of vegetation within environmentally sensitive areas protected under State or Federal legislation;
- Is not known to propose clearing of locally significant native vegetation; and
- Does abut vegetated land managed by that authority.

Therefore, the advice of State/Relevant Agencies/Authorities for Environmental Protection is required to be sought for this application.

## 3.2 Guidelines for Planning in Bushfire Prone Areas V1.1 (the Guidelines)

The Guidelines apply to strategic planning proposals located within designated bushfire prone areas. The Guidelines provide supporting information for implementation of SPP 3.7. Specifically, they provide the bushfire protection criteria to be addressed for all applications. The bushfire protection criteria are addresses in Section 4 of this report.

This report has also been developed in order to comply with the requirements of all referenced and applicable documents. No non-compliances have been identified at this strategic assessment stage.

## 4.0 Bushfire Risk Management Measures

Table 4A provides an assessment against the bushfire protection criteria detailed in Appendix 4 of *Guidelines for Planning in Bushfire Prone Areas Version 1.1* (the Guidelines).

Table 4A: Compliance with bushfire protection criteria of the Guidelines

Element	Acceptable Solution (A) or Performance (P) Solution	Notes
1. Location	A1.1 Development location	The site contains areas of moderate bushfire hazard levels. The site also abuts areas of moderate bushfire hazard level. Adequate hazard separation is required for any future development. Through appropriate permanent vegetation modification and development design, the applicable hazard separations would be achievable, given the size of the site.
2. Siting and Design of Development	A2.1 Asset Protection Zone	Any areas of remaining classified vegetation within 100m of any future subdivisions/developments will need to establish APZs. Future lot layout / developments are to be designed to ensure APZs can be accommodated to ensure max. BAL-29 rating.
3. Vehicular Access	A3.1 Two access routes	Any future development/subdivision design is to include two access routes, including during all stages of development. This will be addressed at later planning stages. Direct access to Monkey Mia Road provides at least two access routes.
	A3.2 Public road	Future public roads are to be constructed to applicable standards. This will be addressed at later planning stages. Public roads should be designed along the perimeter of the lots, where bushfire hazards exist, to create hazard separation and allow fire service vehicle access to the bushfire threats.
	A3.3 Cul-de-sac	Cul-de-sacs are to be avoided in future design. This will be addressed at later planning stages.
	A3.4 Battle-axe	Battle-axe lots to be avoided in any future design. This will be addressed at later planning stages.
	A3.5 Private driveway longer than 50 metres	Required at DA stage if buildings are greater than 50m from public roads.
	A3.6 Emergency access way	N/A - Appropriate public road network design shall negate the need for an Emergency Access Way.
	A3.7 Fire service access routes	N/A - Public roads should be designed along the perimeter of the lots, where bushfire hazards exist, to create hazard separation and allow fire service vehicle access to the bushfire threats. In this

		regard separate Fire Service Access Routes would not be required. If public roads are not utilised in future applications, a perimeter FSAR is to be installed.
	A3.8 Firebreak width	In accordance with Shire of Shark Bay Firebreak notice, where applicable.
4. Water	A4.1 Reticulated areas	N/A
	A4.2 Non-reticulated areas	N/A
	A4.3 Individual lots within non-reticulated areas	Single lots above 500 square metres need a dedicated static water supply on the lot that has the effective capacity of at least 10,000 litres.

---

## 5.0 Conclusion

Conclusions of the Bushfire Hazard Level assessment are:

1. Pre-development, the assessment area contains areas of moderate bushfire hazard levels as shown in Figure 2A.
2. It is envisaged that the bushfire hazard level across the site will decrease to a low hazard level as future development occurs and the vegetation is either managed or removed. However, it should be noted that where areas of low hazard level vegetation are located within 100 metres of any moderate level vegetation, they are to adopt a moderate hazard level.
3. Areas of moderate bushfire hazard level located external to the site boundaries are to be considered during future subdivision/ development to ensure the BAL ratings from this vegetation are not prohibitive of development.
4. A Bushfire Management Plan will be required to support any application for future subdivision or development of the land pursuant to *State Planning Policy 3.7* (SPP3.7).
5. In summary, the bushfire hazard level is not prohibitive of any proposed development, when appropriate development design takes into consideration these risks, given the size of the developable area and ability to implement appropriate bushfire management strategies.

---

## 6.0 References

- SoSB. (2015). Town Planning Scheme 3, 35. Shire of Shark Bay.
- OBRM. (2017). Map of Bush Fire Prone Areas 2017. Office of Bushfire Risk Management, Perth, WA.
- Standards Australia. (2009). AS 3959-2009 Construction of buildings in bushfire prone areas. SAI Global.
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- WAPC. (2016). Planning Bulletin 111/2016 Planning in Bushfire Prone Areas. Western Australian Planning Commission.
- WAPC. (2017a). Guidelines for Planning in Bushfire Prone Areas Version 1.1. Western Australian Planning Commission, Department of Planning & Department of Fire and Emergency Services.
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***Appendix E – Geotechnical Investigation Report***

# GEOTECHNICAL INVESTIGATION

**For:** Jamie Morgan

**Project Address:** Lot 90 Monkey Mia Road, Denham

**Project Number:** D158891

**Job Number:** J171902

**Revision Number:** 0

**Author:** Prasudi Atmajaya

**Date:** 15 February 2017

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## 1. PROJECT DETAILS

### 1.1. Introduction

At the request of Jamie Morgan (The Client), Structerre Consulting Engineers (Structerre) have conducted a Geotechnical Investigation at Lot 90 Monkey Mia Road, Denham. The purpose of the investigation was to provide the following:

- Desk top study including a summary of geology, groundwater, and site history (obtained from historical photographs)
- Summary of encountered ground and groundwater conditions
- Site Classification in accordance with AS2870
- Earthquake site factor in accordance with AS1170.4
- Wind Classification in accordance with AS4055
- Recommendations for stormwater drainage design
- Comments on the capability of on-site effluent disposal in accordance with AS1547
- Site preparation requirements (earthworks), including site traffic, excavation, reuse of materials and batter slopes
- Ground bearing capacity and estimated settlements for pad and strip footings founded at 0.5m and 1.0m
- Preliminary pavement design parameter, indicative California Bearing Ratio (CBR) values determined from penetrometer results and ground conditions encountered

This report details the scope of the geotechnical investigation, presents an interpretation of ground conditions and material properties across the site, provides geotechnical design parameters for the design of the proposed development, and evaluates the suitability of materials for use in earthworks. Interpretation of site conditions is based on the subsurface lithology revealed during the investigation programme, visual assessments of the in situ materials and the results of in situ field tests.

Terms of reference for this investigation were presented in a Structerre Consulting Engineers proposal reference Q65345 (dated 27 October 2016), which was submitted to and accepted by The Client.

### 1.2. Field Investigation – Scope of Works

The field investigation was carried out on 31 January 2017 and comprised:

- A walkover survey of the site to assess features that may pose a geotechnical issue;
- 12x excavation test pits (TP) to depths of 2.3m and 3x hand auger boreholes (BH) to depths of 1.0m, over the site for material assessment and soil profiling;
- 3x In situ percolation tests to determine the permeability of the materials within the upper 1.0m; and
- 12x Dynamic Cone Penetrometer (DCP) tests in accordance with AS 1289.6.3.2 (1997) to depths of 2.1m for evaluation of relative densities of the upper layers.

The excavation pit and borehole logs, percolation and DCP test locations are shown on the attached site plan in Appendix 1. A geotechnical engineer from Structerre supervised the fieldwork and all fieldwork, interpretation and terminology used in this report are in accordance with the guidelines presented in AS1726-1993 Geotechnical Site Investigations.

## 2. SITE DESCRIPTION

### 2.1. Features

The site is located at Lot 90 Monkey Mia Road, Denham in the Shire of Shark Bay. Monkey Mia Road lies to the west of the site with vacant bushland to the north, south and east. It has an area of 20,984 m<sup>2</sup>, and is located approximately 1km away from the ocean shoreline.

The site is considered to have high exposure to sun and wind. At the time of the field investigation, no water bore, dam or watercourse was present on or near the site. A roadside small v-ditch water drain, noted to be dry to moist after a period of high rainfall, lies across Monkey Mia Road to the east; the road slopes gently to the north.

### 2.2. Property

At the time of the field investigation an existing house, a transportable accommodation, two sheds and two containers occupied the site. The rest of the property was covered in vegetation with generally small sized trees. The existing parking area and access driveways have at surface covered by blend of silty sand and sand trace shell fragments; the latter understood from The Client to have been locally sourced.

We also understand from The Client that the site is to be used for the construction of a fuel station, comprising an area for underground tanks and a new single-storey store. Final plan for the remainder of the site is yet to be finalised at the time of this report.

### 2.3. Topography

The site generally slopes downwards towards the south and southeast, with a slope gradient of approximately  $\leq 10\%$ . The highest point of site was located at the southeast corner, with the lowest point at the southwest.

### 2.4. Geological Setting

The Shark Bay – Edel sheet 1: 250,000 Environmental Geology Series (Sheets SG 49-8 and SG 49-12, 1983) prepared by the Geological Survey of Western Australia indicates that the following geological layers underlie the site:

- Tamala Limestone (Q<sub>t</sub>); unconsolidated to strongly lithified, locally quartzose calcarenite, large-scale eolian cross-bedding;
- Sandplain and dune deposits (Q<sub>e</sub>); reddish-brown to yellowish sand.

## 2.5. Hydrogeology & Ground Levels

The Perth Groundwater Atlas (Waters & Rivers Commission) indicates the ground surface level at this site was approximately 15m-20m Australian Height Datum (AHD). No historical groundwater information is available however it should be noted that the groundwater levels could vary significantly due to seasonal variation.

## 2.6. Site History

Historical aerial photographs dating back to 2002 are publically available through Landgate Map Viewer were assessed and a summary is presented in Table 1.

**Table 1 – Historical Site Information**

<b>Date</b>	<b>Description</b>
2002	The property has been built
2017	Site remains relatively unchanged to the current day

### 3. RESULTS OF THE INVESTIGATION

#### 3.1. Subsurface Soil Profile

The subsurface soil profile presented below was determined from the ground conditions encountered within the pits and boreholes, and through the interpretation of the DCP test results:

**Table 2 – Subsurface Soil Profile**

Depth to Base of Strata (m)	Material Description
0.1 – 0.2 (Ave. 0.15)	FILL: SAND, with silt, trace shell fragments, locally encountered at TP8, TP9, TP11 and BH13 locations.
0.3 – 0.8	FILL: SAND, locally encountered at TP12 and BH14 locations.
Not Penetrated (>2.3m)	NATURAL: Silty SAND (fine to medium grained), locally trace gravel, medium dense with loose layers near surface.

The soils encountered are consistent with the expected site conditions as predicted from the Environmental Geology Map. It is important to note that there may be pockets of fill on site that are deeper than that encountered by the investigation pits and boreholes. The subsurface soil conditions encountered are presented in the bore logs, within Appendix 4.

#### 3.2. Groundwater

Groundwater was not encountered in any of the pits and boreholes during or immediately after excavation. Based on the findings, the groundwater is expected at  $\geq 2.3\text{m}$  below the existing ground levels.

#### 3.3. Percolation Testing

Percolation testing of the in situ soils was undertaken in three locations. Results of the testing are summarised below:

**Table 3 – In Situ Percolation Test Results**

Test Location	Testing Depth (m)	Soil Type	Permeability (m/day)
PERC1-BH13	1.0	SAND – Silty SAND	2.7
PERC2-BH14	1.0	SAND – Silty SAND	2.2
PERC3-BH15	1.0	Silty SAND	0.7

### 3.4. Laboratory Test Results

#### 3.4.1. Atterberg Limits

Selected representative soil sample were tested by Structerre’s in-house NATA accredited laboratory for Atterberg Limits, and the results are attached in Appendix 5. The summary as follow:

**Table 4 – Atterberg Limit Test Results**

Test Hole	Depth (m)	Soil Description	Liquid Limit % AS1289 3.1.2	Plastic Limit % AS1289 3.2.1	Plasticity Index % AS1289 3.3.1	Linear Shrinkage % AS1289 3.4.1
SRP2	0.7 – 1.2	Silty SAND	Not Obtainable	13	Non Plastic	1

Test results indicate that the natural silty sand has no shrink swell capacity or degree of expansion.

#### 3.4.2. Phosphorus Retention Index

A representative soil sample was taken from depth of 0.2m-0.5m below the existing ground surface. The sample was submitted to CSBP Soil & Plant Analysis Laboratory for analysis of phosphate retention and calculation of Phosphorus Retention Index (PRI). The date of analysis was 10/2/17. The result of which is summarised in Table 5 with the certificate provided in Appendix 6.

**Table 5 – Chemical Laboratory Results**

Sample No.	Soil Type	PRI (mL/g)
TP4 – 0.2m-0.5m	Silty SAND	24.5

## 4. GEOTECHNICAL CONSTRUCTION CONSIDERATIONS

### 4.1. Site Classification

AS 2870-2011 Residential Slabs and Footings provide guidance on site classification for residential slabs and footing design based on the expected ground surface movement and depth of expected moisture changes.

Although the proposed development falls outside the scope of AS 2870, site classification can be used to assist in the design of foundations. The foundation design should be undertaken by a Structural Engineer, taking into consideration ground bearing capacity and the acceptable total and differential settlements of the proposed foundation system.

Based on results of this investigation the site can be classified as an equivalent Class “A” provided that all unsuitable materials are removed and replaced with engineer-controlled sand fill materials in accordance with earthwork recommendations outlined in Section 4.4 in this report. The site in its current condition is classified as Class “P”.

### 4.2. Drainage

The site is suitable for on-site disposal of stormwater runoff subject to the proposed development. For on-site disposal of stormwater runoff, soakwells of sufficient sizes are required, and should be positioned a minimum of 1.2m or the depth of soakwell (whichever is greater) from any proposed or existing foundations (including those beyond the boundaries of the site) to minimise the risk of differential settlement.

To aid with the design of on-site stormwater drainage, groundwater levels and field permeability results are presented in Section 3 of this report.

### 4.3. Seismic Site Subsoil Class

The seismic subsoil site class has been assessed in accordance with AS 1170.4-2007, using the results of this investigation and published information.

**Table 6 – Summary of Seismic Parameters**

Hazard Factor	Site Sub-soil Class
0.09	Class C <sub>e</sub> –shallow soil site

### 4.4. Phosphorus Retention Index

Based on the subsurface soil profile encountered during the site investigations and the natural geological setting as per the Geological Survey of Western Australia, and the absence of water body within 100m radius, the natural soil layers can be described as strongly adsorbing (reference Method for Analysis of Phosphorus in Western Australia Soils, DG Allen & RC Jeffery, March 1990, Chemistry Centre, Agricultural Chemistry Laboratory).

## 4.5. Effluent Disposal

The requirements and recommendations outlined in this section are based on the assumption that the proposed effluent disposal system will be a soil absorption system – trenches, beds and mounds (i.e. leach drain). Should an alternative effluent disposal system be proposed, Structerre should be notified, as alternative requirements may be applicable due to the actual proposed system.

Based on the findings of the site investigation, the site in its current condition is not suitable for on-site effluent disposal using absorption trench and bed systems, due to presence of permeable layer (i.e. sand) to depths. To facilitate on-site effluent disposal using mounds system the following site requirements, based on AS1547-2012 and the Code of Practice for On-site Sewage Management, are considered appropriate:

- The surface gradient of the disposal area should be less than 15%.
- The disposal system should maintain a minimum distance of:
  - 100m from Public Water Supply Production Bores located in Public Drinking Water Source Areas;
  - 30m from potable private bore;
  - 20m from non-potable private bore;
  - 1.8m downslope and 3.0m upslope from property boundaries (maybe more dependent on local authority guidelines);
  - 3.0m downslope from building boundaries and 6.0m upslope from building boundaries;
  - 1.2m from driveways and paved surfaces;
  - 6.0m from sub-soil / open drains;
  - 3.0m downslope and 6.0m upslope from a swimming pool; and
  - 50m from surface water.
- The distance between the base of the disposal system and the groundwater table should not be less than 1.5m.
- On completion of the proposed disposal area, appropriate landscaping should be undertaken (i.e. planting of shallow rooted grasses / shrubs).

## 4.6. Earthworks

### 4.6.1. Effluent Disposal Area

Based on the requirements outlined in Section 4.5, on-site effluent disposal could be achieved through the implementation of the following earthworks:

- The topsoil and vegetation should be stripped from the disposal area.
- The exposed surface gradient should be 15% or less.
- The disposal area should ensure a minimum of 1.5m distance or greater from the base of the disposal system to the groundwater.
- On completion of the proposed disposal area appropriate landscaping should be undertaken (i.e. planting shallow rooted grasses / shrubs).



Category 2 – 3 soils were encountered on site. It is recommended that the permeability of the construction materials be verified, to enable an appropriate design irrigation rate to be determined.

#### 4.6.2. Building Envelope

All earthworks shall be undertaken in accordance with AS 3798-2007 Guidelines on Earthworks For Commercial and Residential Developments and are to include the following:

- All unsuitable materials to be stripped and removed from the site. Unsuitable materials include topsoil, deleterious and organic materials.
- It is considered that the near surface loose sand materials require improvement. Therefore, it is proposed to excavate and stockpile the materials for reuse, provided it is dry, free from clay/silt (i.e. <5%), organic and deleterious materials. The depth of excavation may vary depending on conditions encountered (i.e. presence of unsuitable materials) and is subject to inspection.
- Excavations should not exceed 2.0m and / or undermine surrounding structures. A 1V:2H slope should be maintained for temporary excavations. If excavation is required closer than the 1V:2H slope would allow, it is recommended that this office be contacted for retaining design.
- Proof compact the exposed base. The compaction requirements are set out in the table below, as per AS 3798-2007:

**Table 7 – Compaction Requirements**

Item	Application	Minimum relative compaction, %	
		Minimum density ratio (Standard Compaction Effort) (Cohesive soils)	Minimum density index (Cohesionless soils)
1	Residential - lot, fill, house, sites	95	70
2	Commercial – fills to support minor loadings, including floor loading of up to 20kPa and isolated pad or strip footings to 100kPa	98	75
3	Fill to support pavements		
	a) General fill	95	70
	b) Subgrade (to a depth of 0.3m)	98	75

- After excavation and proof compaction, the excavated base is to be inspected and approved by a representative from this office prior to backfilling. At this stage it can be assessed whether any further materials need to be removed or whether further compaction of the base is required.
- The ground level should be built up to design levels with the stockpiled sand materials and imported fill. If required, the imported fill should consist of free draining sand with not more than 5% passing a 75 $\mu$ m sieve and be free of organic matter and other deleterious materials. The fill sand materials should be placed in layers not exceeding 300mm loose thickness and compacted to achieve a minimum 8 PSP blows over the interval 150 – 450mm, 9 PSP blows over the interval 450 – 750mm and 11 PSP blows over the interval 750 – 1050mm.
- After remedial earthworks have been completed, the earthworks should be inspected and approved by a representative from this office.

The near surface ground was generally competent and should not pose an issue to site traffic movements. The material encountered near surface can be deemed as 'easy' to excavate with medium sized earthwork equipment (i.e. a 20t excavator).

Given the proposed development, it is considered that shallow excavations are likely therefore it is unlikely that groundwater will be encountered, based on the estimated depth of the groundwater.

#### **4.7. Wind Classification**

In accordance with AS 4055 (2012) Wind loads for housing, wind classification of this site falls within the non-cyclonic "N3" category.

#### **4.8. Shallow Footings – Allowable Soil Bearing Capacities**

Based on the findings of the current preliminary geotechnical investigation, shallow pad and strip footings are considered appropriate for the proposed development. Allowable bearing capacities for shallow footings at the site have been calculated under the following assumptions:

- The site preparation procedures specified in Section 4.5 have been carried out;
- The specified level of compaction has been achieved below the base of each footing;
- Loads are vertical and not eccentric;
- Isolated footings (i.e. interaction of foundations has not been considered);
- The foundations are flexible;
- A factor of safety (FoS) of 3.0 against bearing capacity failure;
- Maximum allowable settlement of 20mm.

The following tables present the allowable bearing pressures for pad and strip footings of various dimensions, with embedment depths of 0.5m and 1.0m below finished surface levels.

**Table 8 – Allowable Bearing Capacities for Pad Footings**

Minimum Depth of Embedment (m)	Minimum Plan Dimension (m)	Allowable Bearing Capacities (kPa)	Settlement (mm)
0.5	0.5	130	< 20
	1.0	165	
	1.5	195	
	2.0	230	
1.0	0.5	270*	< 20
	1.0	295*	
	1.5	320*	
	2.0	330*	

**Table 9 – Allowable Bearing Capacities for Strip Footings**

Minimum Depth of Embedment (m)	Minimum Plan Dimension (m)	Allowable Bearing Capacities (kPa)	Settlement (mm)
0.5	0.5	100	< 20
	1.0	155	
	1.5	215	
1.0	0.5	210	< 20
	1.0	240	
	1.5	255*	

\* Note: it is recommended to limit these values to 250kPa.

The recommended allowable bearing capacities are dependent on the site being dry and well drained, so that the foundation material does not become saturated.

The actual allowable bearing capacity of a particular foundation will be dependent on its location, geometry and founding depth, as well as the founding horizon. Therefore, once specific foundation geometries have been determined and the earthworks completed, it is recommended that the allowable bearing capacity and associated settlements be verified.

Additionally, should undermining issue prevent the excavation of the near surface loose materials, it is recommended that the allowable bearing capacity be reviewed. However, this will likely result in lower allowable bearing capacities.

#### 4.9. Indicative California Bearing Ratio (CBR)

The indicative California Bearing Ratio (CBR) value of the subgrade material, following earthworks can be estimated from the site investigation results and would be appropriate for preliminary design purposes. The indicative value is shown in the below table:

**Table 10 – Indicative CBR Values**

Material	Indicative CBR (%)	Compaction
Silty SAND (In situ or Imported Fill)	15	95% of MMDD*

\* Implies the maximum dry density ratio using Modified compaction in accordance with AS 1289 5.2.1-2003.

For detailed design of the pavements, it is recommended that the CBR values be verified with laboratory Soaked CBR testing on the anticipated subgrade material.

#### 4.10. Conclusions

A site investigation was carried out at the proposed commercial development site to assess the geotechnical conditions. Parameter and design recommendations are incorporated in the body of the report. The following conclusions have been drawn from the site investigation:

- The subsurface soil profile encountered comprised medium dense natural silty sand to the investigated depth of 2.3m. The natural layers were overlain at parts by very loose to loose natural silty sand layers, sand with silt, and sand platforms.
- The water table was not encountered during and after the site investigation.
- The site can be classified as an equivalent Class “A” in accordance with AS 2870-2011 provided the recommended earthworks are undertaken.
- It is considered that the site is suitable for on-site drainage.
- Recommended earthworks for effluent disposal area include stripping of unsuitable materials and fill placement within disposal area.
- Recommended earthworks for building envelope include stripping of unsuitable materials, excavating and stockpiling of loose materials, proof compaction of the base, placement of engineered fill and compaction to final levels.
- Allowable bearing capacity for pad footings range from 130kPa to 330kPa and from 100kPa to 255kPa for strip footings. The estimation of settlement of the footings is limited to 20mm.

## 5. LIMITATION OF FIELD INVESTIGATIONS

This report has been prepared in accordance with generally accepted consulting practice for Jamie Morgan using information supplied at the time and for the project specific requirements as understood by Structerre. To the best of our knowledge the information contained in this report is accurate at the date of issue, however it should be emphasised that any changes to ground conditions and/or the proposed structures may invalidate the recommendations given herein.

The conclusions and recommendations in this report are based on the site conditions revealed through selective point sampling, representing the conditions of the site in total, although the area investigated represents only a small portion of the site. The actual characteristics may vary significantly between successive test locations and sample intervals other than where observations, explorations and investigations have been made.

The materials and their geotechnical properties presented in this report may not represent the full range of materials and strengths that actually exist on site and the recommendations should be regarded as preliminary in nature. Allowances should be made for variability in ground conditions and any consequent impact on the development. Structerre accepts no responsibility and shall not be liable for any consequence of variations in ground conditions.

If ground conditions encountered during construction are different to that described in this report, this office should be notified immediately.

For and behalf of

STRUCTERRE CONSULTING ENGINEERS



Author: Prasudi Atmajaya

Title: Geotechnical Engineer

Credentials: BE Civil (Hons), MIEAust

### Disclaimer

This report is at the request of the addressee and no liability is accepted by Structerre Consulting Engineers to any third person reading or relying upon the report, notwithstanding any rule of law and/or equity to the contrary and that this report is strictly confidential and intended to be read and relied upon only by the addressee.

Job #	Revision	Authored
J171902	0	PA

## 6. REFERENCES

Department of Water – Perth Groundwater Atlas

Geological Survey of Western Australia 1:250,000 Environmental Geology Series

AS 1170.4-2007 Structural design actions – Earthquake actions in Australia

AS 1289.3.1.2-2009 Methods of testing soils for engineering purposes – Soil classification tests  
– Determination of the liquid limit of a soil

AS 1289.3.2.1-2009 Methods of testing soils for engineering purposes – Soil classification tests  
– Determination of the plastic limit of a soil

AS 1289.3.3.1-2009 Methods of testing soils for engineering purposes – Soil classification tests  
– Calculation of the plasticity index of a soil

AS 1289.3.4.1-2009 Methods of testing soils for engineering purposes – Soil classification tests  
– Determination of the linear shrinkage of a soil

AS 1289.6.3.2-1997 Methods of testing soils for engineering purposes – Soil strength and  
consolidation tests – Determination of the penetration resistance of a soil – 9kg dynamic cone  
penetrometer test

AS 1547-2012 On-site domestic wastewater management

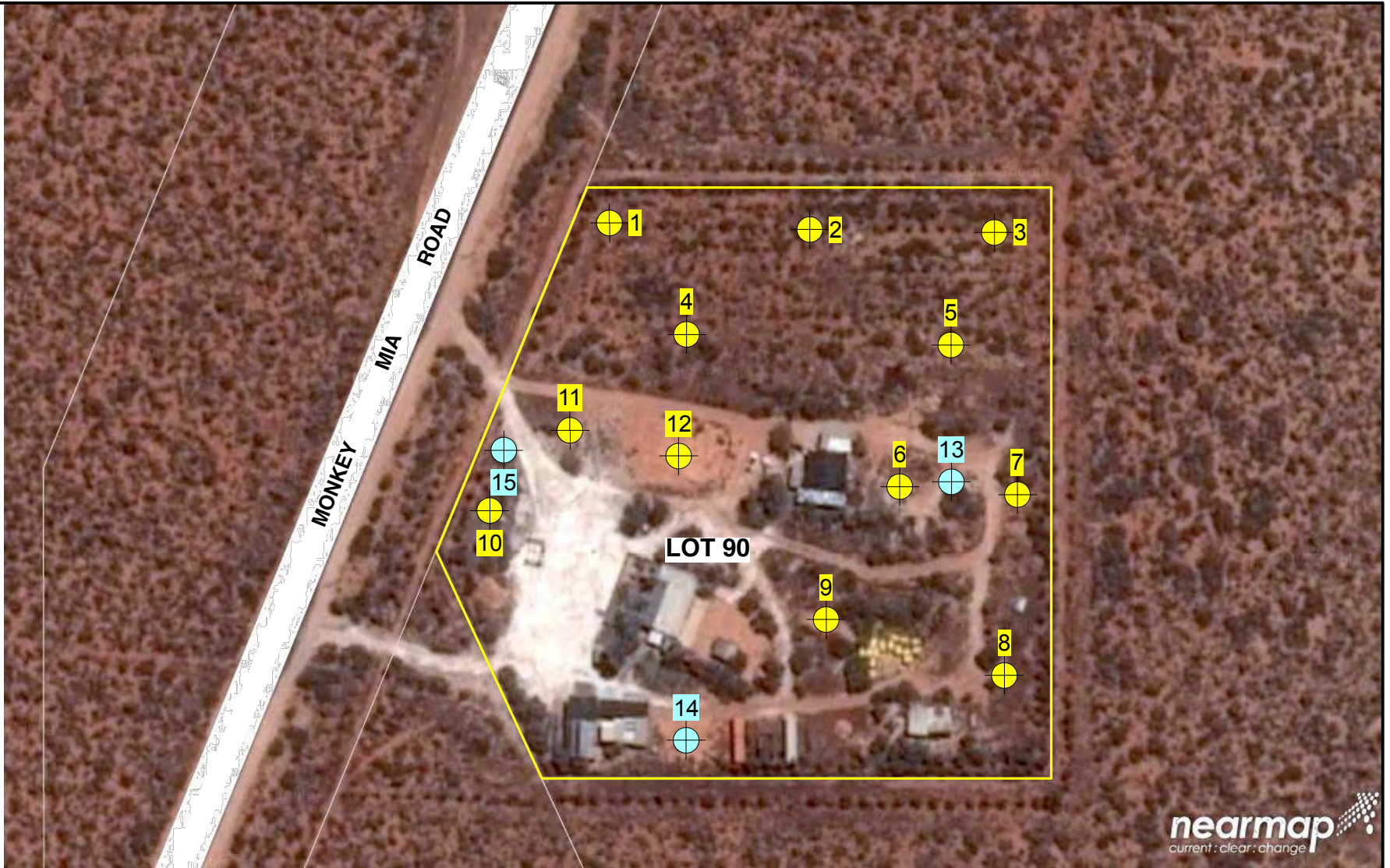
AS 1726-1993 Geotechnical site investigation

AS 2870-2011 Residential slabs and footings





AS 3798-2007 Guidelines on earthworks for commercial and residential developments

AS 4055-2012 Wind loads for housing

## APPENDIX 1 – SITE PLAN



**LEGEND**

-  TP: Test Pit
-  DCP: Dynamic Cone Penetrometer Test
-  BH: Borehole
-  PERC: Percolation Test

Note:  
 - TP12 was started on a sand platform ~0.8m deep  
 - BH14 was started on a sand platform ~0.5m deep



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PROJECT:		Lot 90 Monkey Mia Road, DENHAM	
PROJECT #:	D158891	CLIENT:	Jamie Morgan
JOB #:	J171902		
SCALE:	NTS	TITLE:	Geotechnical Investigation Site Plan
DATE:	30 Jan '17	DRAWN BY:	PA



## **APPENDIX 2 – SITE PHOTOGRAPHS**



PHOTO 1 - Viewing North from the existing Northwest entry to The Site



PHOTO 2 - Viewing Northeast from the existing Northwest entry to The Site



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PROJECT:		Lot 90 Monkey Mia Road, DENHAM	
PROJECT #:	D158891	CLIENT:	<b>Jamie Morgan</b>
JOB #:	J171902		
SCALE:	NTS	TITLE:	Site Photographs
DATE:	30 Jan '17	TAKEN BY:	PA



PHOTO 3 - Viewing Southwest from the existing Northwest entry to The Site



PHOTO 4 - Viewing South from the existing Northwest entry to The Site



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PROJECT:		Lot 90 Monkey Mia Road, DENHAM	
PROJECT #:	D158891	CLIENT:	<b>Jamie Morgan</b>
JOB #:	J171902		
SCALE:	NTS	TITLE:	Site Photographs
DATE:	30 Jan '17	TAKEN BY:	PA



PHOTO 5 - Viewing Southeast from the existing Northwest entry to The Site



PHOTO 6 - Viewing East from the existing Northwest entry to The Site, Note the Sand Platform where TP12 was located



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PROJECT:		Lot 90 Monkey Mia Road, DENHAM	
PROJECT #:	D158891	CLIENT:	<b>Jamie Morgan</b>
JOB #:	J171902		
SCALE:	NTS	TITLE:	Site Photographs
DATE:	30 Jan '17	TAKEN BY:	PA



PHOTO 7 - Viewing Southeast, from the Southeast corner of the Sand Platform where TP12 was



PHOTO 8 - Viewing West from TP6 Location



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PROJECT #:	D158891	CLIENT:	<b>Jamie Morgan</b>
JOB #:	J171902		
SCALE:	NTS	TITLE:	Site Photographs
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PHOTO 9 - Viewing Northeast from BH13 Location



PHOTO 10 - Viewing South from BH13 Location



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JOB #:	J171902		
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PHOTO 11 - Viewing Northwest from TP8 Location



PHOTO 12 - Viewing North from BH14 Location



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PROJECT:		Lot 90 Monkey Mia Road, DENHAM	
PROJECT #:	D158891	CLIENT:	<b>Jamie Morgan</b>
JOB #:	J171902		
SCALE:	NTS	TITLE:	Site Photographs
DATE:	30 Jan '17	TAKEN BY:	PA

## **APPENDIX 3 – DCP CERTIFICATE**



## DYNAMIC CONE PENETROMETER (DCP) TEST CERTIFICATE

Project-Job No.: D158891 – J171902  
 Project: Lot 90 Monkey Mia Road,  
 Denham

Client: Jamie Morgan  
 Tested by: P. Atmajaya  
 Date: 30 January 2017

DCP Test Results in accordance with AS1289 6.3.2  
 Locations as marked on site plan dated 30/01/17

Depth (mm)	Test Location					
	DCP 1	DCP 2	DCP 3	DCP 4	DCP 5	DCP 6
0 - 150	1	0	1	1	1	1
150 - 300	1	1	1	1	2	7
300 - 450	5	3	5	5	5	16
450 - 600	6	3	6	5	5	7
600 - 750	7	5	7	6	5	7
750 - 900	8	7	7	7	6	8
900 - 1050	8	8	8	7	7	9
1050 - 1200	8	9	10	9	9	11
1200 - 1350	9	10	12	10	11	11
1350 - 1500	10	11	13	13	13	13
1500 - 1650	11	13	14	15	14	14
1650 - 1800	11	12	12	16	13	14
1800 - 1950	12	13	12	15	12	12
1950 - 2100	12	12	11	15	11	12
2100 - 2250	Target Depth	Target Depth	Target Depth	Target Depth	Target Depth	Target Depth

## DYNAMIC CONE PENETROMETER (DCP) TEST CERTIFICATE

Project-Job No.: D158891 – J171902  
 Project: Lot 90 Monkey Mia Road,  
 Denham

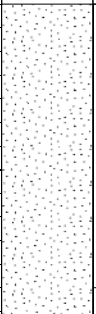
Client: Jamie Morgan  
 Tested by: P. Atmajaya  
 Date: 30 January 2017

DCP Test Results in accordance with AS1289 6.3.2  
 Locations as marked on site plan dated 30/01/17

Depth (mm)	Test Location					
	DCP 7	DCP 8	DCP 9	DCP 10	DCP 11	DCP 12
0 - 150	2	1	1	1	2	5
150 - 300	8	2	2	3	9	12
300 - 450	7	4	4	5	12	7
450 - 600	5	8	5	6	11	7
600 - 750	5	10	6	7	10	6
750 - 900	6	8	7	7	10	6
900 - 1050	8	8	8	9	11	6
1050 - 1200	9	10	10	11	11	6
1200 - 1350	10	10	10	13	14	7
1350 - 1500	10	12	10	11	16	7
1500 - 1650	11	13	9	10	15	7
1650 - 1800	11	15	9	9	16	7
1800 - 1950	12	15	8	8	17	8
1950 - 2100	12	15	8	9	17	8
2100 - 2250	Target Depth	Target Depth	Target Depth	Target Depth	Target Depth	Target Depth

## **APPENDIX 4 – EXCAVATION & BOREHOLE LOGS**

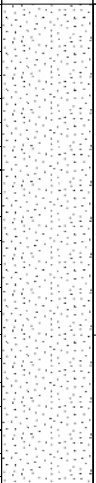
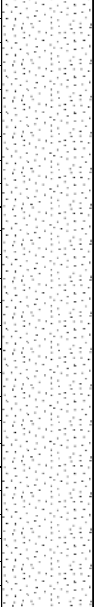
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**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.4 x 3.00m    **Northing** 7130533

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
1		SM: Silty SAND: fine to medium grained, trace gravel, trace organic material (roots, fine roots), pale red / pale brown (Sand derived from Tamala Limestone)	VL							D to M	
		<i>no organic material</i>	MD							D	
2		Terminated at 2.30 m	MD-D								
3											

**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84

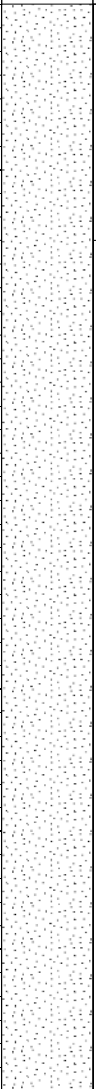
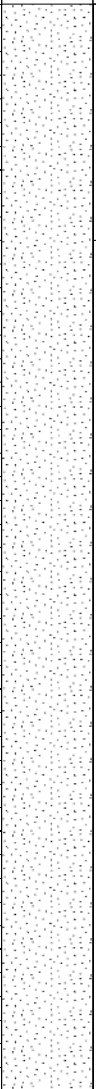
**Project No.** D158891    **Logged By** Prasudi Atmajaya    **Machine** Excavator    **Easting** 754967  
**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.4 x 3.00m    **Northing** 7130527

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
1		SM: Silty SAND: fine to medium grained, trace gravel, trace organic material (roots, fine roots), pale red / pale brown (Sand derived from Tamala Limestone)	VL							D to M	
			L								
2		no organic material	MD							D	
				MD-D							
3		Terminated at 2.30 m									

**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84

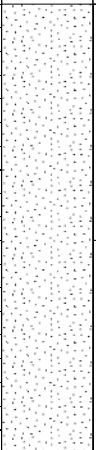
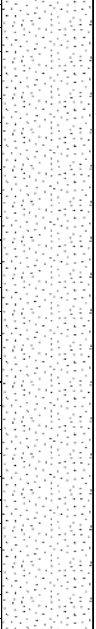
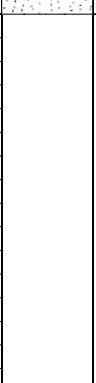
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**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.4 x 3.00m    **Northing** 7130529

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
1		SM: Silty SAND: fine to medium grained, trace gravel, trace organic material (roots, fine roots), pale red / pale brown (Sand derived from Tamala Limestone)	VL							D to M	
2		no organic material	MD							D	
			MD-D								
			MD								
3		Terminated at 2.30 m									

**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84

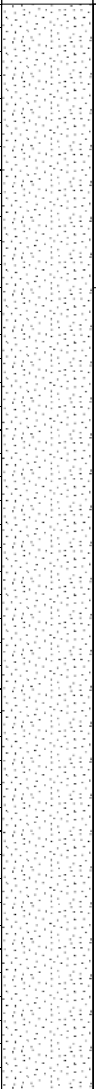
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**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.4 x 3.00m    **Northing** 7130504

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
1		SM: Silty SAND: fine to medium grained, trace gravel, trace organic material (roots, fine roots), pale red / pale brown (Sand derived from Tamala Limestone)	VL					0.2 - 0.5	B	D to M	
		<i>no organic material</i>						0.5 - 1.0	B		
2			MD							D	
			MD-D								
3		Terminated at 2.30 m									

**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: As indicated
4. Co-ordinate system: WGS 84

**Project No.** D158891    **Logged By** Prasudi Atmajaya    **Machine** Excavator    **Easting** 755011  
**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.4 x 3.00m    **Northing** 7130502

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
1		SM: Silty SAND: fine to medium grained, trace gravel, trace organic material (roots, fine roots), pale red / pale brown (Sand derived from Tamala Limestone)	VL							D to M	
			VL-L								
										D	
2		no organic material	MD								
			MD-D								
			MD								
3		Terminated at 2.30 m									

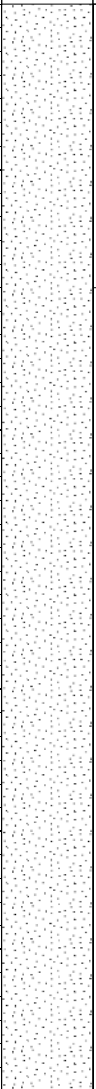
**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84





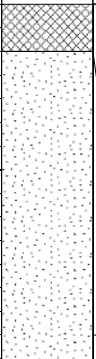
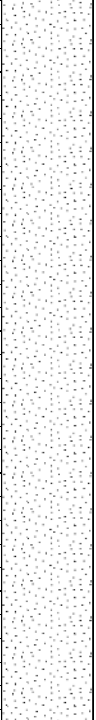
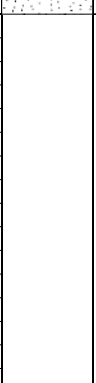
**Project No.** D158891    **Logged By** Prasudi Atmajaya    **Machine** Excavator    **Easting** 755021  
**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.4 x 3.00m    **Northing** 7130464

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level		
				5	10	15	20	Depth	Type				
1		SM: Silty SAND: fine to medium grained, trace gravel, trace organic material (roots, fine roots), pale red / pale brown (Sand derived from Tamala Limestone)	VL-L							D to M			
2		no organic material	MD							D			
3		Terminated at 2.30 m	MD-D										

**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84

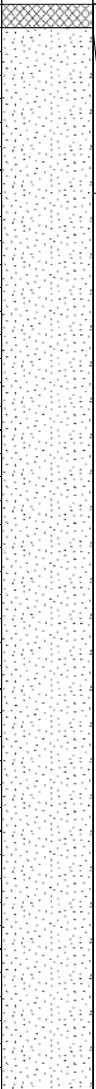
**Project No.** D158891    **Logged By** Prasudi Atmajaya    **Machine** Excavator    **Easting** 755018  
**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.4 x 3.00m    **Northing** 7130412

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
1		SP-SM: SAND: fine to medium grained, with silt, pale red / pale brown / patchy white, trace organic material (shell fragments) (FILL)	VL							D to M	
		SM: Silty SAND: fine to medium grained, trace gravel, trace organic material (roots, fine roots), pale red / pale brown (Sand derived from Tamala Limestone)	VL-L								
2		<i>no organic material</i>	L							D	
			MD								
3			MD-D								
		Terminated at 2.30 m									

**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84

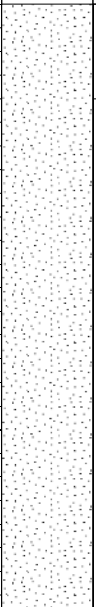
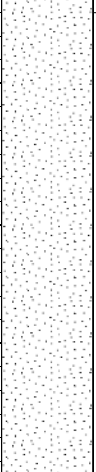
**Project No.** D158891    **Logged By** Prasudi Atmajaya    **Machine** Excavator    **Easting** 754973  
**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.4 x 3.00m    **Northing** 7130432

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
1		SP-SM: SAND: fine to medium grained, with silt, pale red / pale brown / patchy white, trace organic material (shell fragments) (FILL)	VL							D to M	
		SM: Silty SAND: fine to medium grained, trace gravel, trace organic material (roots, fine roots), pale red / pale brown (Sand derived from Tamala Limestone)	VL-L								
		<i>no organic material</i>	L								
2			MD							D	
3		Terminated at 2.30 m									

**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84

**Project No.** D158891    **Logged By** Prasudi Atmajaya    **Machine** Excavator    **Easting** 754888  
**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.4 x 3.00m    **Northing** 7130466

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
1		SM: Silty SAND: fine to medium grained, trace gravel, trace organic material (roots, fine roots), trace rubble, pale red / pale brown (Sand derived from Tamala Limestone) <i>no rubble</i>	VL							D to M	
			L								
2		<i>no organic material</i>	MD							D	
3		Terminated at 2.30 m									

**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84

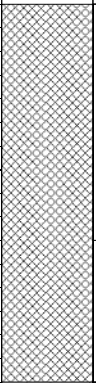
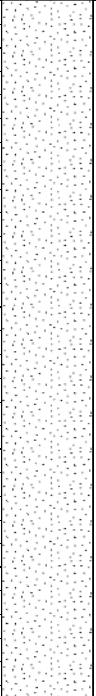
**Project No.** D158891    **Logged By** Prasudi Atmajaya    **Machine** Excavator    **Easting** 754909  
**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.4 x 3.00m    **Northing** 7130481

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
		SP-SM: SAND: fine to medium grained, with silt, pale red / pale brown / patchy white, trace organic material (shell fragments), trace gravel (blue metals) (FILL)	VL-L								
		SM: Silty SAND: fine to medium grained, trace gravel, trace organic material (roots, fine roots), pale red / pale brown (Sand derived from Tamala Limestone) <i>no organic material</i>	MD							D to M	
1			MD-D							D	
2											
		Terminated at 2.30 m									
3											

**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84


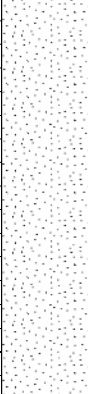
**Project No.** D158891    **Logged By** Prasudi Atmajaya    **Machine** Excavator    **Easting** 754936  
**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.4 x 3.00m    **Northing** 7130475

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
		SP-SM: SAND: fine to medium grained, with silt, pale red / pale brown (FILL)	MD								
		<i>trace organic material (shell fragments)</i>	MD-D							D to M	
1		SM: Silty SAND: fine to medium grained, trace gravel, trace organic material (roots, fine roots), pale red / pale brown (Sand derived from Tamala Limestone) <i>no shell fragment</i>	MD							D	
2		Terminated at 2.30 m									
3											

**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84

**Project No.** D158891    **Logged By** Prasudi Atmajaya    **Machine** Hand Auger    **Easting** 755006  
**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.1 x 0.07m    **Northing** 7130470

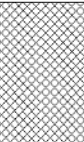


Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
		SP-SM: SAND: fine to medium grained, with silt, pale red / pale brown / patchy white, trace organic material (shell fragments) (FILL)								D to M	
		SM: Silty SAND: fine to medium grained, trace gravel, pale red / pale brown (Sand derived from Tamala Limestone)								D	
1		Terminated at 1.00 m									
2											
3											

**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84



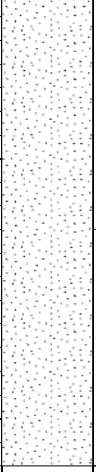
**Project No.** D158891    **Logged By** Prasudi Atmajaya    **Machine** Hand Auger    **Easting** 754938  
**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.1 x 0.07m    **Northing** 7130404

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
		SM: Silty SAND: fine to medium grained, pale red / pale brown (FILL)								D to M	
		SP-SM: SAND: fine to medium grained, trace silt, brown / red (FILL)									
		SM: Silty SAND: fine to medium grained, trace gravel, pale red / pale brown (Sand derived from Tamala Limestone)								D	
1		Terminated at 1.00 m									
2											
3											

**Remarks**

1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84

**Project No.** D158891    **Logged By** Prasudi Atmajaya    **Machine** Hand Auger    **Easting** 754890  
**Job No.** J171902    **Date** 30/01/2017    **Hole Size** 0.1 x 0.07m    **Northing** 7130476

Depth	Graphic	Stratum Description	Consistency	DCP Blows/150mm				Samples		Moisture	Water Level
				5	10	15	20	Depth	Type		
1		SM: Silty SAND: fine to medium grained, trace gravel, trace organic material (roots, fine roots), pale red / pale brown (Sand derived from Tamala Limestone)  <i>no organic material</i>								D to M	
		Terminated at 1.00 m									
2											
3											

**Remarks**

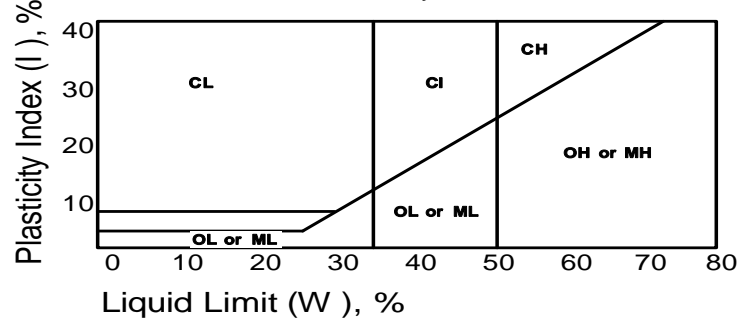
1. Termination reason: Target depth
2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: WGS 84

### BORELOG TERMINOLOGY

Particle Size Distribution

Major Division	Subdivision	Size
Boulders		>200mm
Cobbles		200 - 63mm
Gravel	Coarse	63 - 20mm
	Medium	20- 6mm
	Fine	6 - 2.36mm
Sand	Coarse	2.36 - 0.6mm
	Medium	0.6 - 0.2mm
	Fine	0.2 - 0.075mm

Plasticity



Consistency of Cohesive Soils

Term	Undrained Strength $S_u$ (kPa)	Field Guide
Very Soft	< 12	Exudes between the fingers when squeezed in hand
Soft	12 - 25	Can be moulded by light finger pressure
Firm	25 - 50	Can be moulded by strong finger pressure
Stiff	50 - 100	Cannot be moulded by Fingers. Can be indented by thumb.
Very Stiff	100 - 200	Can be indented by thumb nail
Hard	> 200	Can be indented with difficulty by thumb nail.
Friable	-	Crumbles or powders when scraped by thumbnail

Consistency/Density of Non-Cohesive Soils

Term	Density Index (%)	SPT "N" Value Comparison	Moisture Content
Very Loose	< 15	0 - 4	D Dry
Loose	15 - 35	4 - 10	M Moist
Medium Dense	35 - 65	10 - 30	W Wet
Dense	65 - 85	30 - 50	S Saturated
Very Dense	> 85	> 50	

Minor Components

Term	Assessment Guide	Proportion of Minor Component In:
Trace	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component	Coarse grained soils: < 5 % Fine grained soils: <15%
With	Presence easily detected by feel or eye, soil properties little different to general properties of primary component	Coarse grained soils: 5 - 12 % Fine grained soils: 15 - 30%

Soil Legend

FILL	CLAY	GRAVEL	CONCRETE
TOPSOIL	SILT	LIMESTONE	COMBINATIONS
PEAT	SAND	BEDROCK	eg: Clay, Silty, Sandy

USCS

GW Well graded gravel	SC Clayey sand	OL Organic low plasticity silt	CL Low plasticity clay
GP Poorly graded gravel	SM Silty sand	ML Low plasticity silt	CI Intermediate plasticity clay
SW Well graded sand		MH High plasticity silt	CH High plasticity clay
SP Poorly graded sand		OH Organic high plasticity silt	PT Peat

Doc: GE 2.2.3

### WA | QLD | NSW | VIC

## **APPENDIX 5 – PSD-ATTERBERGS TEST RESULTS**

**Sample No.** 29172 **Client** Geotechnical  
**Job No.** J171902 **Project** Lot 90 Monkey Mia Road, Denham

**SAMPLE DETAILS**

BH No. / Depth : TP04 0.5-1.0m **Sampling Method** Client  
 Sample History : Air Dried  50°C Oven Dried  **Sample Preparation** AS 1289 1.1

**ATTERBERG LIMITS**

Description	Method	Result (%)
Liquid Limit	AS 1289.3.1.2	NO
Plastic Limit	AS 1289.3.2.1	13
Plasticity Index	AS 1289.3.3.1	NP
Linear Shrinkage	AS 1289.3.4.1	1
Nature of Shrinkage		Flat

**PARTICLE SIZE DISTRIBUTION**

**Method:** AS 1289.3.6.1  
**Description:** Particle size distribution by sieve analysis

Sieve Size (mm)	% Passing
19.0	100
2.36	100
0.425	78
0.075	21

**Material Description:** Silty SAND  
**AS 1726 Appendix A Section A2:** SM



Wayne Rozmianiec   
 \_\_\_\_\_  
 Authorised Signatory

**Date:** 09-Feb-17

## **APPENDIX 6 – PRI TEST RESULT**

88282  
Structerre Consulting Engineers



# Soil & Plant Analysis Laboratory

## ANALYSIS REPORT

Generated: 10/02/2017 2:15:18 PM

Lab No	HVS17177
Name	TP04_0.2-0.5m
Code	J171902
Customer	Structerre
Depth	20-50
Phosphorus Retention Index	24.5