

Title  
**SITE PLAN  
 SEWER SERVICES**

Project No.  
 301250498

Scale  
 1:1000

Revision  
 C

Drawing No.  
**HY-1-00**

Client/Project  
**ROME GROUP**

ONSLOW TOWNSHIP VILLAGE

Client/Project Logo

**Stantec**

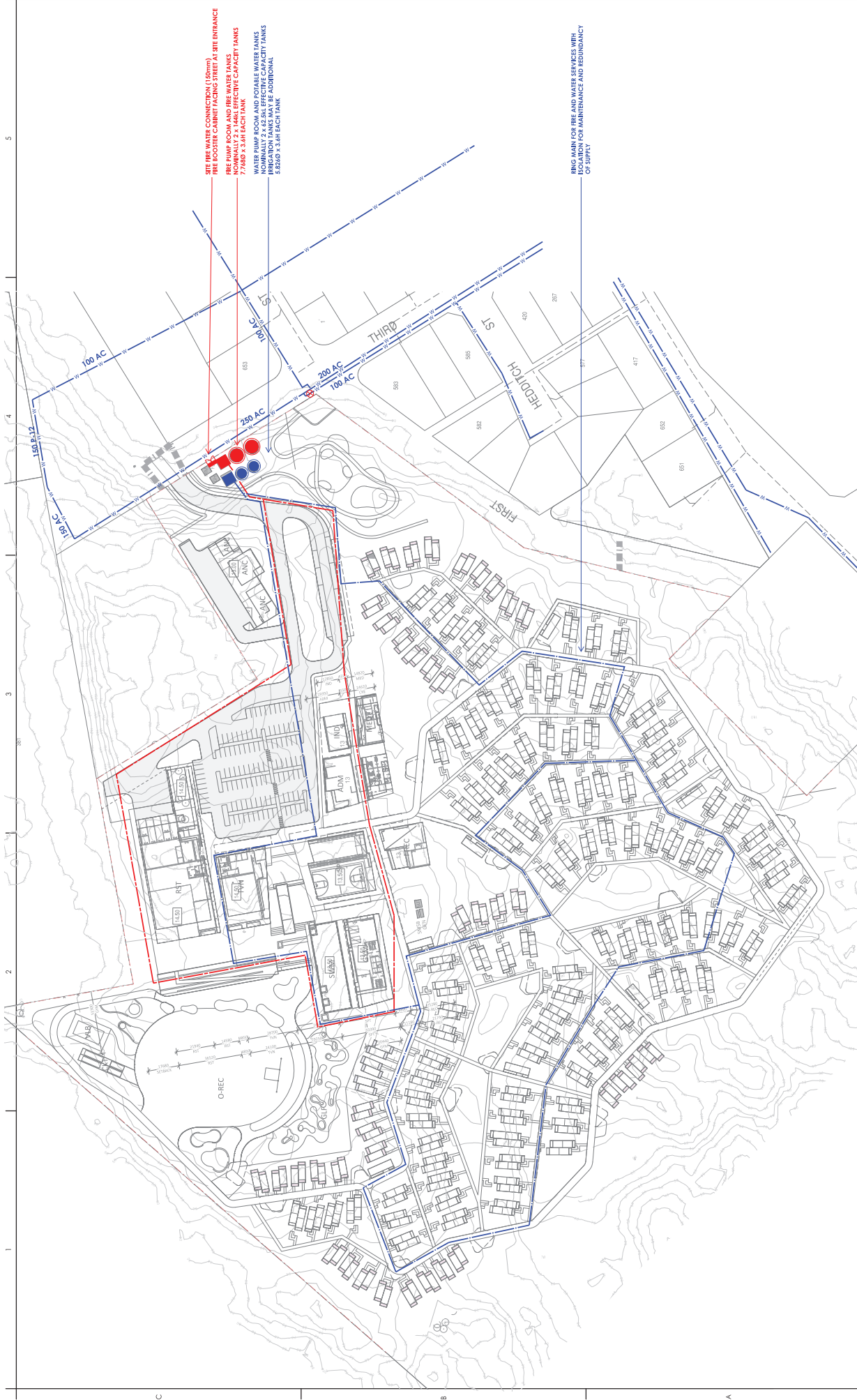
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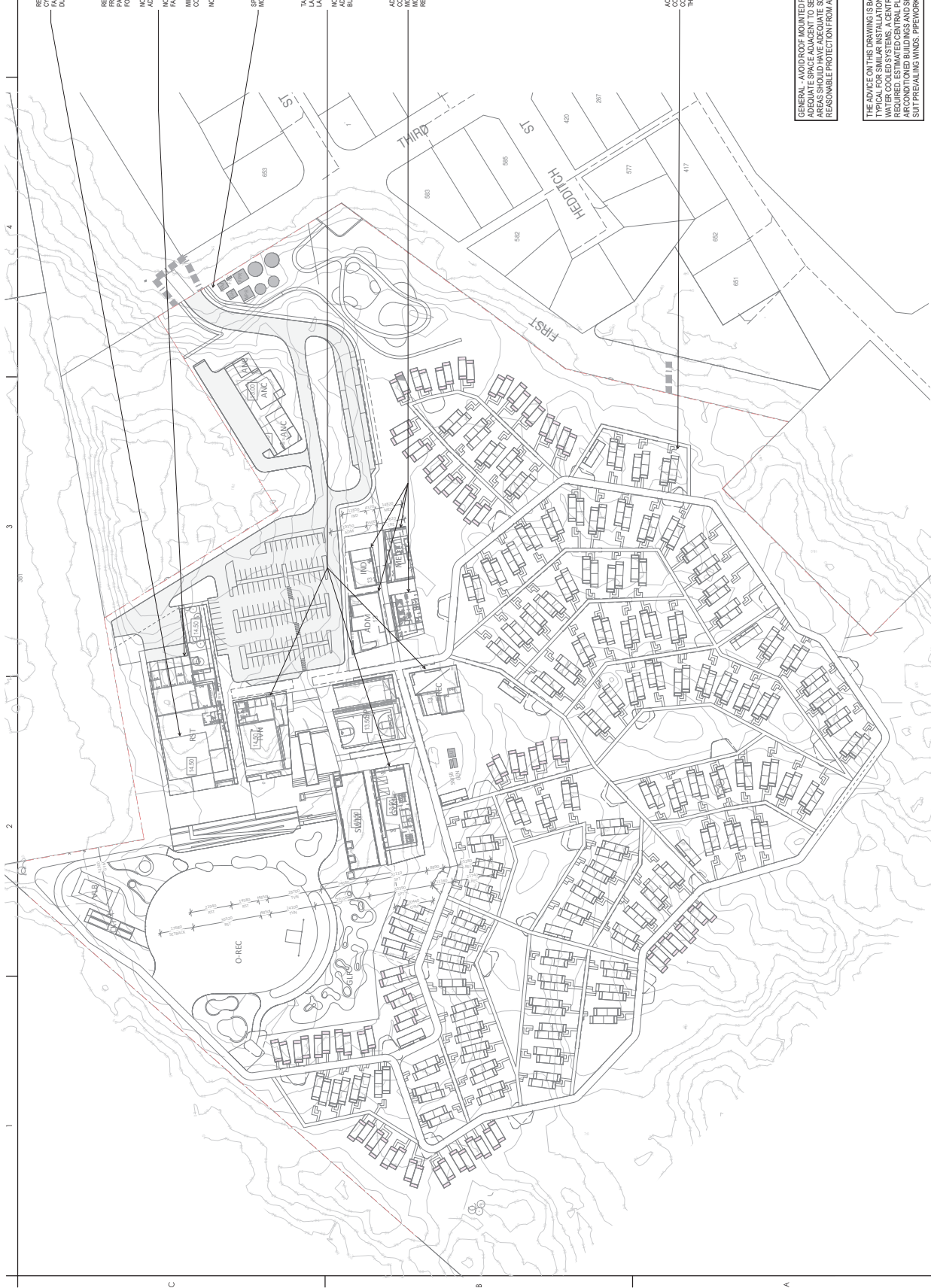
Revision  
 By:            Date:





## Appendix C – Mechanical Drawings

5



RESTAURANT FRONT OF CASE IS UNDERSTOOD TO BE THE DESIGNATED CYCLONE SHELTER. ENSURE FREE SPACE TO ALL SIDES OF THE BUILDING TO FACILITATE MANUALLY OPERABLE VENTILATION OPENINGS THAT CAN BE USED DURING A CYCLONE EVENT.

RESTAURANT BUILDING TO BE AIR CONDITIONED, LARGE HEAT LOAD AND PACKAGED PLANT. BUILDING WILL ALSO HAVE LARGE EXTRACTOR SYSTEMS FOR KITCHENS AND REFRIGERATION PLANT FOR COOLING REFRIGERATORS. NOMINAL ALLOWANCE REQUIRED FOR GROUND MOUNTED EQUIPMENT ADJACENT TO BUILDING FOR A/C. NOMINALLY 9m x 3m PLANT AREA.

NOMINAL 1M CEILING VOID ABOVE KITCHEN AREAS FOR EXTRACTION SYSTEM FANS, ATTENUATORS AND DUCTWORK. MINIMUM 27m CEILING THROUGH KITCHEN AREAS TO ACCOMMODATE COMMERCIAL KIT OPENINGS. NOMINAL 1M CEILING VOID THROUGH DINING AREA TO ALLOW FOR DUCTWORK.

SPLIT SYSTEM A/C SYSTEM SERVING GATE HOUSE. OUTDOOR A/C UNIT MOUNTED ADJACENT WITH MINIMAL PLANT AREA REQUIREMENTS.

TANKS, OIL AND REFRIGERATION BUILDINGS ASSUMED TO BE AIR CONDITIONED. LARGE HEAT LOAD AND FRESH AIR REQUIREMENTS WILL TYPICALLY REQUIRE LARGER AIR COOLED PACKAGED PLANT.

NOMINAL ALLOWANCE REQUIRED FOR GROUND MOUNTED EQUIPMENT ADJACENT TO EACH BUILDING. NOMINALLY 9m x 3m PLANT AREA FOR EACH BUILDING.

ADMIN OFFICE, TRAINING AND MEDICAL BUILDINGS ASSUMED TO BE AIR CONDITIONED. LARGE HEAT LOAD AND FRESH AIR REQUIREMENTS WILL TYPICALLY REQUIRE MOUNTED ADJACENT TO THE SIDES OF THE BUILDINGS WITH MINIMAL PLANT AREA REQUIREMENTS.

CONSIDERATION MUST BE GIVEN TO THE IMPACTS OF UNDESIRABLE WIND DIRECTION. COOLING WITH INTEGRATED MECHANICAL SYSTEMS. OUTDOOR A/C UNITS AND AIR COOLED SPLIT SYSTEMS (CONDITIONING) OUTDOOR A/C UNIT MOUNTED ON THE SIDE OF EACH MODULE WITH MINIMAL PLANT AREA REQUIREMENTS.

GENERAL - AVOID ROOF MOUNTED PLANT DUE TO CYCLONE PRONE REGION. ALLOW FOR PROTECTION OF PLANT FROM WIND DAMAGE. PROVIDE PROTECTION FOR PLANT AREAS SHOULD HAVE ADEQUATE SCREENING TO MANIPULATE WIND WHILE PROVIDING REASONABLE PROTECTION FROM AIRBORNE DEBRIS.

THE NOTICE ON THIS DRAWING IS BASED ON LOCAL BUILDING AIR COOLED A/C EQUIPMENT TYPICAL FOR SIMILAR INSTALLATIONS AROUND WA. IF ENERGY EFFICIENCY TARGETS REQUIRE WATER COOLED SYSTEMS, A CENTRAL COOLING TOWER AND PUMPING FACILITY WILL BE REQUIRED. ESTIMATED CENTRAL PLANT AREA FOOTPRINT IS 150m<sup>2</sup> BASED ON ~20,000m<sup>2</sup> OF AIR CONDITIONING. THE EXACT PLANT AREA WILL BE DETERMINED BY THE DESIGNER TO SUIT PREVAILING WINDS. PPE NETWORK REGULATIONS WOULD ALSO BE REQUIRED TO EACH BUILDING.

Client/Project Logo  
**mitel** CREATIVE  
 COMMUNICATIONS

Client/Project  
**ROWE GROUP**  
 ONSLOW TOWNSHIP VILLAGE

Title  
 SITE PLAN  
 MECHANICAL SERVICES

Project No.  
 1300 250498

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 1:1000 @ A1

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Stantec  
 1000 West Broadway, Suite 1000  
 Vancouver, BC V6C 3R8  
 Canada  
 Tel: 604.681.2222  
 Fax: 604.681.2223  
 www.stantec.com

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Revision  
 By:            Date:           

Approved By:            Date:





# Onslow Township Village



## Revision

Revision	Date	Comment	Prepared By	Approved By
001	30/07/2021	Draft Update Issue DA	AL	PDS
002	04/08/2021	DA Issue	AL	PDS
003	25/08/2021	Revised DA Issue	AL	PDS

<b>1.</b>	<b>Executive Summary</b>	<b>1</b>
<b>2.</b>	<b>Sustainability Requirements</b>	<b>2</b>
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# 1. Executive Summary

This document has been prepared for Rowe Group to identify the recommended sustainability initiatives and requirements at Development Application, considered for inclusion in the proposed Onslow Township Resort.

The sustainability strategies for this site address the following:

- Onslow LandCorp Sustainability Framework
- Onslow Townsite Expansion Structure PLAN

For this early stage the preliminary analysis for building fabric and sustainability initiatives to be considered has been completed, with high level recommendations for consideration by the client.

We note due to the early nature of the project further detail assessment is required and further feedback from the client will be required to finalise the options

## 2. Sustainability Requirements

The following sections provide a response to the sustainability obligations as applicable for this development. It is noted that the project responses are all preliminary considerations only and are subject to further refinement and development throughout the coming phases.

### 2.1 Energy Efficiency Strategy

- Requirements

Sustainability Theme	Objective	Quantitative Objective
Environmental Leadership	To increase renewable energy production and offset carbon emissions.	40% of energy requirements from renewable sources 40% of annual CO2 emissions offset Implement measures that would optimise energy reduction and achieve a 20% reduction in greenhouse gas (GHG) production across the development over and above current regulatory requirements.

- **Project Response**
  - Onsite energy generation and storage:
    - Large Scale Solar PV system
    - Batteries storage
  - Building Fabric Improvement:
    - Double glazing throughout
    - Air tightness testing
  - DHW system: Air source heat pump
  - High efficiency lighting throughout
  - Electric vehicle charging stations (5% of total car parking spaces)



## 2.2 Water Efficiency Strategy

- **Requirements**

Sustainability Theme	Objective	Quantitative Objective
Environmental Leadership	To reduce overall water use through efficiency measures and by maximising the use of alternative water sources.	All (100%) POS and public areas (verges, parks and nature strips etc) with xeriscape or waterwise landscapes and irrigation systems 100% of POS and public areas irrigated using recycled water or harvested stormwater 100% of residential buildings and private open space to achieve 100kl/person/year efficiency 80% of commercial buildings and private open space to achieve 32L/person/day efficiency Implement measures that would achieve at least a 20% reduction in potable water use beyond regulatory measures and have no potable water irrigation requirements.

- **Project Response**

- Rainwater collection and reuse has been determined to be not feasible due to Onslow's rainfall patterns and possible maintenance issues.
- Wastewater Reuse has been identified as an alternative to be considered by the client.
- Greywater systems are recommended to be assessed in further detail. Given the early stage of the project development, no calculations can be provided.
- Sanitary fixture efficiency:
  - i Taps – WELS 6 Star
  - ii Toilets – WELS 4 Star (3.5 L/min)
  - iii Urinals – WELS 5 Star 0.8L/flush or Waterless
  - iv Showers – 3 Stars <= 7.5 L/min
- Installation of high efficiency White Goods:
  - i Dishwashers – 5 Star
  - ii Clothes Washing Machines - 4 Star
- Ultra-low shower heads
- Landscape irrigation by drip irrigation and moisture sensors where practical.
- Water sensitive landscape design and native drought tolerant planting selection

## 2.3 Material Improvements

- **Requirements**

Sustainability Theme	Objective	Quantitative Objective
Environmental Leadership	To encourage efficient resource use and low or non-toxic materials.	<p>Evidence of 20% of materials chosen from an Ecoslector/Ecospecifier (or equivalent).</p> <p>Ensure the use of a minimum 20% of construction materials (by volume) are made from either (or a combination of):</p> <ul style="list-style-type: none"> <li>• Materials with a recycled content</li> <li>• Reused materials</li> <li>• Renewable materials</li> <li>• Total lifecycle energy</li> <li>• Responsibly Manufactured Materials</li> </ul> <p>To meet this criteria, at least 60% of the environmentally responsible materials requirement (i.e. 12% of total materials used for construction) must be used in built form – i.e. in house / building construction.</p>

- **Project Response**

- Cement reduction in concrete (pending availability in Onslow)
- Reduction in reinforcement steel
- Use of responsible product for steel, timber and PVC
- Selection of material based on Environmental certificates
- Ultra-Low VOC paints and mattresses
- Low VOC internal finishes

## 2.4 Waste Improvements

- **Requirements**

Sustainability Theme	Objective	Quantitative Objective
Environmental Leadership	To decrease volume of waste output to landfill.	75% reduction of waste output (by mass) to landfill as outlined in the site waste management plan. Demolition, land clearing and site preparation phase: Recycle or reuse a minimum of 60% of demolition, land clearing or civil works materials/products on site. Construction phase: Recycle or reuse at least 60% (by mass) of all civil and built form construction waste.

- **Project Response**

- Target 90 % diversion from landfill for all demolition and construction works

## 2.5 Indoor Environmental Quality Strategy:

- Increased ventilation rates and natural ventilation
- High levels of Daylight in regularly occupied spaces
- UV lamps for infection control
- High efficiency air filtration options
- Increased acoustic performance of building fabric and services
- Indoor plants.
- Green cleaning policy

## 2.6 Sustainability Accreditations

In addition to the above-mentioned initiatives, there are a number of sustainability accreditations which could be sought for this project.

The sustainability accreditations recommended for the Onslow project are listed below:

- 6-star Green Star 'Design and As-built' V1.3 Certification
- WELL Platinum Certification

The above performance levels would represent "World Leadership" standard of performance and may align with the clients ESG aspirations and enhance and recognise the efforts put towards making the Onslow project a flagship project for MRL.

If these objectives are selected for the project, they may have impacts on the spatial allocation for services and infrastructure and advice would be recommended.

## Appendix A Section J Compliance Analysis

Based on our preliminary design review, the following façade performance requirements are recommended in order to demonstrate compliance with the Deemed-to-Satisfy provisions of the NCC 2019 Section J. It is noted that these are likely performance values only and will be further refined in the next phase of the project.

### Building Fabric

Overall thermal performance of the building fabric is shown below.

**Table 1 Building fabric thermal performance requirements.**

Roof Type	Cavity Type	Total R-value (m <sup>2</sup> K/W)	Frame Material Allowance	Frame Percentage Allowance (%)	Thermal Break Included	Thermal Break R-value (m <sup>2</sup> K/W)	Minimum Typical Insulation (m <sup>2</sup> K/W)	Example insulation requirement
Metal with ceiling space	Non Ventilated	3.7	Steel	Frame 17%	Yes	0.2	3.3	e.g. 60mm anticon + 90mm glasswool batts
Concrete Slab with ceiling space	Non Ventilated	3.7	Steel	Frame 17%	Yes	0.2	3.7	e.g. 75mm insulation board

*Note: Roof solar absorptance must be less than 0.45 (i.e. light coloured)*

External Wall Type	Cavity Type	Total R-value (m <sup>2</sup> K/W)	Frame Material Allowance	Frame Percentage Allowance (%)	Thermal Break Included	Thermal Break R-value (m <sup>2</sup> K/W)	Minimum Typical Insulation (m <sup>2</sup> K/W)	Example insulation requirement
Lightweight	Airspace (reflective)	1.4	Steel	Frame 13%	No	0.29	2.5	e.g. 90mm glasswool batts
Heavyweight	Airspace (reflective)	1.4	Steel	Frame 13%	No	0.2	2.4	e.g. 50mm insulation board

Internal Wall Type	Cavity Type	Total R-value (m <sup>2</sup> K/W)	Frame Material Allowance	Frame Percentage Allowance (%)	Thermal Break Included	Thermal Break R-value (m <sup>2</sup> K/W)	Minimum Typical Insulation (m <sup>2</sup> K/W)	Example insulation requirement
Lightweight	Airspace (reflective)	1.4	Steel	Frame 13%	No	0.29	2.5	e.g. 90mm glasswool batts

Floor Type	In-slab / Screed system	Total Floor R-Value (m <sup>2</sup> K/W)	Typical Insulation R-value (m <sup>2</sup> K/W)	Example insulation requirement
Slab on Ground*	No in-slab heating or cooling	2.0	1.0	e.g. 20 mm rigid board
Suspended Slab above enclosed space	No in-slab heating or cooling	2.0	1.8	e.g. 40 mm rigid board or 80mm glasswool blanket

\*JV3 solution may be able to reduce the requirement for insulation in CSOG.

When selecting insulation types, the fire properties of the product shall comply with the NCC Deemed-to-Satisfy Provisions for fire hazard properties and a non-combustible material, as required and as nominated by the Building Surveyor.

**Table 2 Glazing thermal performance requirements.**

Window Type	Location	U-value (W/m <sup>2</sup> K)	SHGC
Double Low e Glazing, tinted in standard Aluminium frame including consideration of thermal broken frames	All orientations	2.70	0.25

This glazing specification is dependent on the design of the facades, this is the highest available double glazing.

**Table 3 Glazing thermal performance requirements for Roof lights if applicable.**

Skylight Type	Location	Total system U-value (W/m <sup>2</sup> K)	SHGC
Double Low e Glazing, tinted in standard Aluminium frame	All areas*	<3.9	<0.29

\* Total roof light area of not more than 5% of the floor area of the room or space served.







# ATTACHMENT 7

## WASTE MANAGEMENT PLAN





waste less, achieve more

# ONSLOW Township Village Lot 300 Back Beach Rd, Onslow

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## Waste Management Plan

25 August 2021

Rev\_1

Mineral Resources Limited



waste less, achieve more

**Encycle Consulting Pty Ltd**

ABN 41 129 141 484

Level 1, 76 Roberts St  
Osborne Park WA 6017  
PO Box 6044  
East Perth WA 6892

t: +61 8 9444 7668

[jcampbell@encycle.com.au](mailto:jcampbell@encycle.com.au)

[www.encycle.com.au](http://www.encycle.com.au)

Revision	Drafted	Reviewed	Date issued
Rev_0	J Campbell	A Bremner	03 August 2021
Rev_1	J Campbell	A Bremner	25 August 2021

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## Glossary of terms and acronyms

Cart	Wheeled, open top bin often used for bulky items such as cardboard
Clinical & Related Waste	Clinical waste is waste that has the potential to cause disease, sharps injury or public offence and includes sharps, human tissue waste, laboratory waste, animal waste, and any other relevant waste specific to an establishment.
Commingled recycling	Common recyclables, mostly packaging; such as glass, plastics, aluminium, steel, liquid paper board (milk cartons). Commingled recycling may include paper but often, and particularly in offices, paper and cardboard are collected separately.
General Waste	Material that is intended for disposal to landfill (or in some States, incineration), normally what remains after the recyclables have been collected separately.
MGB	Mobile Garbage Bin – A wheeled bin with a lid often used for kerbside collection of waste or recyclables. (Often called a 'wheelie bin').
MRB	Mobile Recycling Bin – A wheeled bin ("wheelie" bin) with a lid often used for kerbside collection of recyclables (similar to an MGB). Generally have a different colour body and/or lid to MGBs.
Organic waste	Separated food and/or 'green' material (e.g. grass clippings or vegetation prunings).
Recyclable	Material that can be collected separately from the general waste and sent for recycling. The precise definition will vary, depending upon location (i.e. systems exist for the recycling of some materials in some areas and not in others).
Recycling	Where a material or product undergoes a form of processing to produce a feedstock suitable for the manufacture of new products.
Reuse	The transfer of a product to another user, with no major dismantling or processing required. The term "reuse" can also be applied in circumstances where an otherwise disposable item is replaced by a more durable item hence avoiding the creation of waste (e.g. using a ceramic coffee mug in place of disposable cups).

## 1 Introduction

This high-level Waste Management Plan (WMP) has been prepared for Mineral Resources Limited for the Development Application for the proposed Onslow Township Village at Lot 300 Back Beach Rd, Onslow. The WMP sets out the broad intention for waste management at the village.

The proposed development will consist of 500 accommodation pods, a full commercial restaurant with internal and external dining areas, tavern, mobile coffee station and shop, entertainment zones, village shop, juice bar, administration areas, training, medical, physiotherapy, wellness centre, gymnasium, swimming pool, multipurpose area, indoor cricket, golf simulation, recreation and gaming, cinema, library, computer area and external BBQ areas. This WMP has been prepared based on the following information:

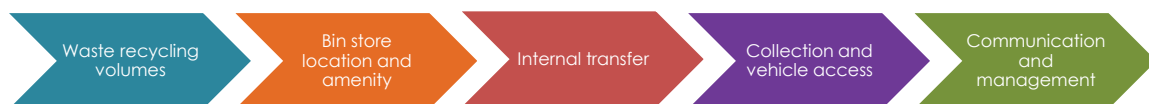
- Site Master Plan\_D dated 20 August 2021 and floor plan of the Restaurant and Tavern (DA200) dated 20 August 2021
- ONS Functional brief Rev B dated 26/07/21
- Project Definition Plan Rev A (Milieu Creative) 25/06/21
- MRL Onslow Iron Project Facilities Requirements (OIP-0000-GE-SOW-0001 dated 12/02/2021)
- WALGA Commercial and Industrial Waste Management Plan Guidelines (2018)
- Conversation with representatives at the following organisations regarding waste and recycling services in the Shire (15/07/21):
  - Waste Officer at Shire of Ashburton
  - Operations Manager, Cleanaway Industrial Waste Services, Karratha
  - Owner, North West Recycling

### 1.1 Context

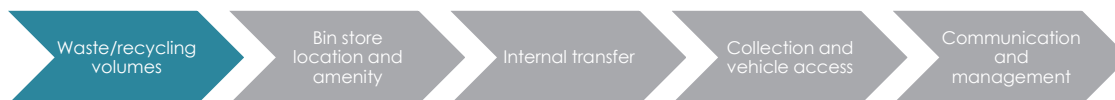
For efficient and effective waste management, the collection and centralisation of waste and recyclables should be carefully considered at the building design phase. Key factors to consider at the design phase include:

- The volumes of waste and recyclables likely to be generated during operation
- Safety for all operatives involved in waste management
- Access to bins and storage areas from within the relevant buildings
- Access for trucks for waste collection
- Local council requirements
- The ongoing management of waste and recycling services

### 1.2 Key components of the WMP



## 2 Estimated waste and recycling volumes



### 2.1 Local government requirements for waste volumes and bin type

The Shire of Ashburton do not have published waste generation rates to apply to new developments. Therefore, the WALGA waste generation rates are used here as a guide in addition to Encycle's experience and knowledge of other similar FIFO accommodation facilities to calculate the generation of waste, recyclables and organic waste.

Waste generation has been calculated for the accommodation and facilities within the village based on best practice waste management initiatives to avoid as much waste as possible from going to landfill.

Encycle have taken into consideration the availability of local recycling services when determining the recycling streams, bin systems and equipment to be incorporated into the design.

### 2.2 Waste and recycling services and assumptions

Cleanaway are the main contractor providing waste services in Onslow. They typically only provide general waste services but are also able to provide a cardboard collection service for this site. North West Recycling are able to undertake other recycling services (in partnership with Cleanaway).

#### 2.2.1 General waste

Cleanaway currently only provide the collection of general waste using front-lift vehicles or using open skips collected by flat-bed or hook-lift vehicles. Cleanaway are able to service 1100 L general waste bins that have been modified for collecting by front-lift vehicles. Cleanaway do not currently have a rear-lift collection vehicle, but are hoping to add one to their fleet in the future.

#### 2.2.2 Cardboard

Cardboard will be baled using a bale press in the restaurant/tavern bin store. Bales will either be collected directly from this bin store or transferred to the bin store in the maintenance area using a pallet jack. The bales would be serviced using a flat-bed truck and a fork lift will be load the bales onto the truck. Cardboard would be transported to Cleanaway's Karratha facility for consolidation before being shipped to Perth for recycling.

### 2.2.3 Container Deposit Scheme containers (not glass)

The WA Container Deposit Scheme (CDS) was introduced to allow consumers to take empty eligible beverage containers to a refund point. The Scheme is aimed at consumers to primarily reduce litter. Eligible containers include aluminium, glass (excluding wine/spirit bottles), plastic, steel and liquid paperboard beverage containers between 150 ml and 3 L.

North West Recycling (NWR)<sup>1</sup> operate Containers for Change<sup>2</sup> refund points in the Pilbara Region and are able to facilitate a commercial arrangement<sup>3</sup> for the collection of eligible containers from commercial venues and the funds raised can be donated to a local charity.

NWR will establish a commercial Refund Point at the MRL village for capturing eligible containers. Cleanaway would service these bins on a fortnightly basis. NWR provide the following types of bins: 240 L or wire cages (1.2 m<sup>3</sup>) and these are serviced by swapping the whole bin or wire cage with an empty one using a flat-bed truck and trailer (with ramps).

### 2.2.4 CDS (eligible glass containers)

Glass will be generated by the restaurant, café and function rooms. 240 L bins will be used for the collection of glass as larger bins will become too heavy to move and service. Glass is collected and taken to Karratha for sorting and transfer.

### 2.2.5 Soft plastics (Redcycle)

Soft plastics will be generated at the loading dock from deliveries. NWR can provide 240 L bins for the collection of soft plastics that are accepted by the [RedCycle website](#)). Soft plastics are taken to Karratha for consolidation before being shipped to on-shore markets.

### 2.2.6 Food waste

There is potential for large quantities of food waste generated from the restaurant and tavern.

Food waste will be treated on-site at the village using a dehydration machine (e.g. 'GaiaRecycle' dehydration machine). The dehydrator heats the food waste to high temperatures and the steam is condensed (which can be collected for reuse on-site) and the dehydrated, pasteurised solid material can be blended with other organic materials such as live compost and used as a soil conditioner for use on landscaped areas. The volume of food waste treated by the machine is reduced by up to 85%. The food waste dehydrator would be located in the restaurant/tavern bin store.

### 2.2.7 Cooking oil

A 800 L storage unit for used cooking oil will be provided in the restaurant/tavern bin store.

<sup>1</sup> <https://www.nwrecycling.com.au/>

<sup>2</sup> <https://www.containersforchange.com.au/wa/>

<sup>3</sup> <https://www.nwrecycling.com.au/commercial-opportunities>



### **2.2.8 Clinical and Related Waste**

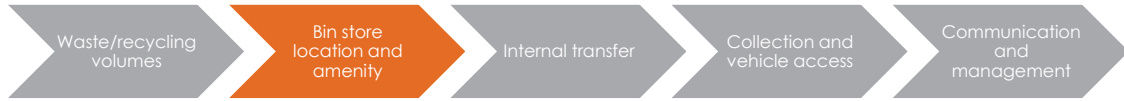
A small amount of clinical waste (sharps) will be produced in the medical/first aid room. A small (20 L) container will be located in this room and serviced directly by a controlled waste service provider.

### **2.2.9 Maintenance Waste**

The waste streams expected to be generated by the activities in the maintenance shed include: general waste, oils/hydrocarbons/chemicals, grass/green waste, cardboard/plastic packaging, pallets, etc.

Any hazardous wastes will need to be stored separately at the maintenance shed. Green waste (clippings and prunings) will be disposed of in a front lift bin. Other waste streams can be transferred to the relevant bins in the bin store at the maintenance area.

### 3 Bin store locations and design



#### 3.1 Bin store locations

The site will have three bin stores for the purposes of:

1. Storing full waste and recycling bins prior to collection (at the maintenance area)
2. Restaurant and Tavern waste and recycling (to store several days' worth of waste and recycling) prior to recycling bins being transferred to the bin store in the maintenance area
3. A temporary bin store near the recreation centre for cleaners to use for containing waste and recycling from the accommodation pods, prior to being transferred to the bin store in the maintenance area

Figure 1 shows the broad location of where the 3 bin store areas will be located. Figure 2 shows the location of the bin store at the restaurant.

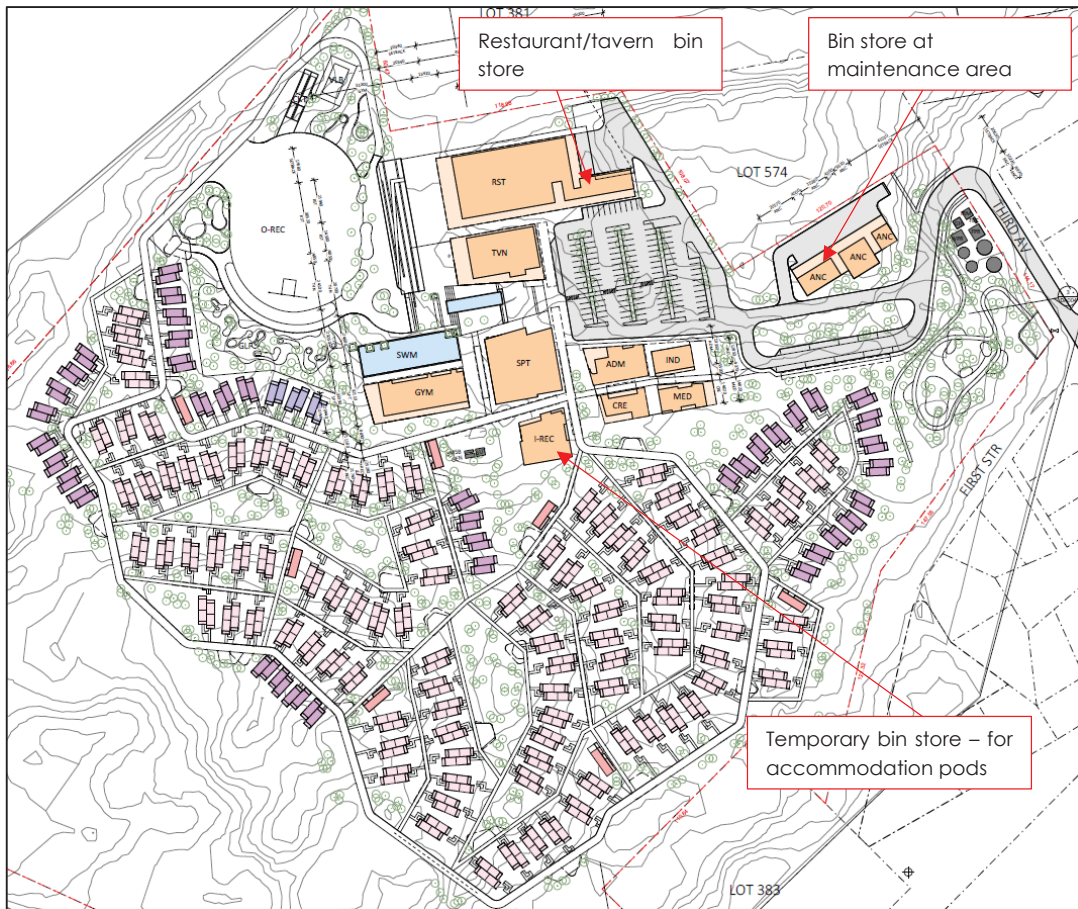


Figure 1: Master plan showing location of the 3 bin store areas



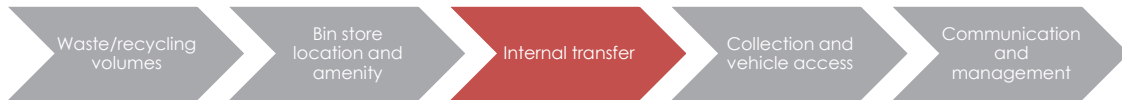
Figure 2: Location of the restaurant/tavern bin store

### 3.2 Bin store design

All bin stores will be fully enclosed with a roof and lockable doors. A fully enclosed design prevents access to rain and wind to minimise release of wind-blown litter and bins becoming filled with rainwater. Enclosed bin stores also prevent access to birds, vermin and other pests.

The bin stores will be designed with impermeable walls and floors, and have running water to allow for cleaning.

## 4 Internal transfer



### 4.1 Transfer of waste/recycling from accommodation pods

Cleaners will service the accommodation pods and keep waste segregated from recycling. Waste and recycling will be placed in bins located in the temporary bin store near the recreation centre. When bins are full, they will be transferred to the bin store in the maintenance area for storage and collection.

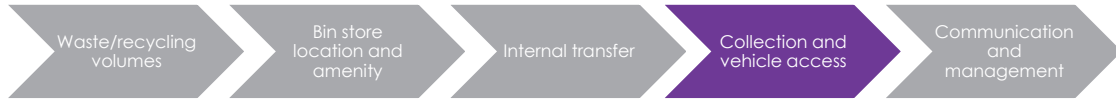
### 4.2 Transfer of waste from restaurant/tavern bin store to bin store in the maintenance area

Facilities Management staff from the village will transfer cardboard bales and full recycling bins from the restaurant/tavern bin store to the bin store at the maintenance area for collection.

### 4.3 Waste/recycling from other areas

Cleaners will transfer waste and recycling from other areas such as the administration and wellness/recreation facilities to bins in the maintenance area bin store.

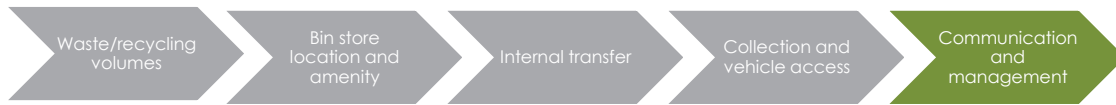
## 5 Collection and vehicle access



A private service provider (likely to be Cleanaway) will service the full range of bins. Unless a rear-lift vehicle is available, a front-lift vehicle will service the general waste bins on a daily basis. Flat-bed vehicles will collect baled cardboard and recycling bins on a fortnightly basis and separate tanker vehicles will service the used cooking oil storage unit and grease traps on an as-required basis.

Please refer to the Traffic Impact Statement for further details regarding vehicle access to the site.

## 6 Ongoing communication and management



### 6.1 Management

The village operator will be responsible for overseeing the waste management systems. Facilities Management personnel will be trained and informed about their responsibility to work closely with the private service provider regarding the schedule for collection and presentation of bins. The staff member will be responsible for maintaining the bin stores in a clean and tidy condition at all times and ensuring bins are washed regularly.

### 6.2 Communication

All operational staff will be made aware through an Operational Waste Management Plan (OWMP) of the waste and recycling systems and how they should be used. The OWMP will be suitable for presenting to building users, including how the plan should be communicated will be developed and implemented during both the initial occupation and ongoing management of the village.

The operator will be responsible for the continuing education of FIFO workers and village staff and contractors on correct segregation of waste and recyclables and usage of bins and dehydration machine to ensure successful performance of the systems at the village.





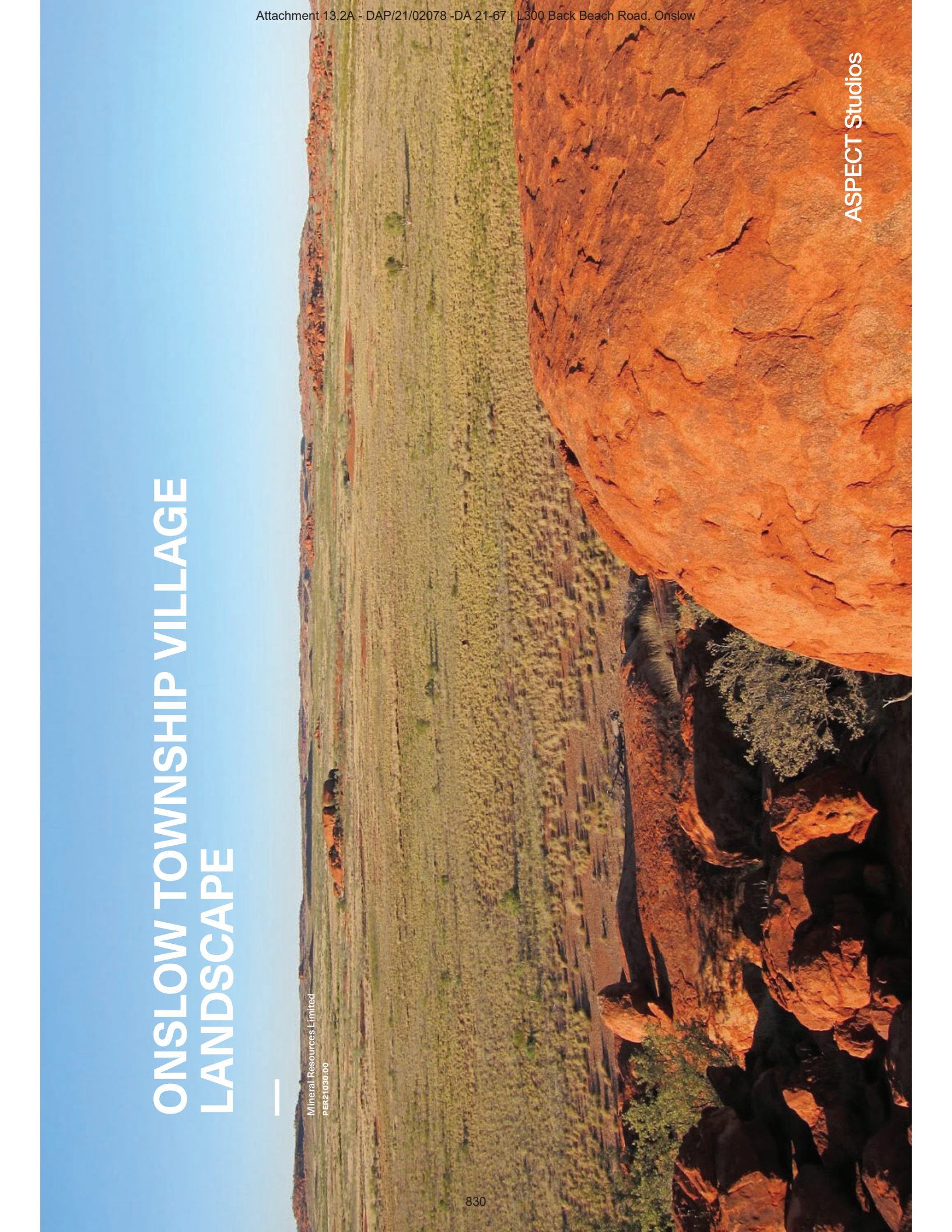
# ATTACHMENT 8

## LANDSCAPING PLANS



# ONSLOW TOWNSHIP VILLAGE LANDSCAPE

Mineral Resources Limited  
PER21030.00





# ON SLOW TOWNSHIP VILLAGE

Prepared by:  
**ASPECT Studios**  
L1 / 191 St Georges Tce  
Perth, WA, 6000

Prepared with:  
**Millieu Creative**  
L1 / 488 Stirling Highway  
Peppermint Grove, WA, 6011

Prepared for:  
**Mineral Resources Limited**  
1 Sleaf Rd,  
Applecross WA 6153

## Document Control

Job Number: PER21030.00  
Report Title: Onslow Iron Ore Project  
Revision: B  
Date Issued: 24.08.2021

## ASPECT Team

Nicola Marunczyn  
Tom Lucey  
Jonathon Marshall  
Tom Griffiths  
Michael Rowlands

**‘We design  
places where  
people want  
to be.’**

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- 01. Introduction
- 02. Landscape Plans
- 03. Landscape Quality - Materials and Finishes
- 04. Planting Strategy





# 1.0 Introduction

The landscape design for the Onslow Township Village, has been prepared by ASPECT Studios in collaboration with Milieu Creative. The design responds to the scale, form and function of the architecture and local context in order to create a dynamic and engaging sequence of landscape spaces.

With the striking Pilbara landscape as a backdrop, the landscape design will showcase a mix of natives, exotic, and sensory plant species to support the proposed accommodation, sports fields, play, recreation and amenity spaces.

The landscape concept responds to the site's larger contextual relationship to the coastal landscape situated adjacent to Onslow Township, celebrating the vibrant, textured tones and layered vegetation.

The public landscape spaces have been designed to provide a place where the community can gather for play and recreation catering for the needs of residents, visitors and the broader community.

The following general principles form the landscape approach to the site:

- Use high quality landscape design to integrate the proposed sporting development with broader active and passive recreational offerings;
- Develop a legible network of spaces that fully integrate with and connect to the surrounding context;
- Create spaces with varying characters and identities.
- Design spaces that will become activated and vital.
- Maximise opportunities for social interaction through arrangement of seating and views.
- Create a robust landscape made from proven materials and planting species, integrating bold forms that can be managed and maintained.
- Selection of local and native plant species that benefit surrounding ecologies.
- Ensure structural elements read as an extension of the architectural material palette and are integrated with the planting compositions.

The design of landscape considers the architectural design by Milieu Creative in both concept and materiality, with the intention of creating a cohesive transition from internal to external spaces.

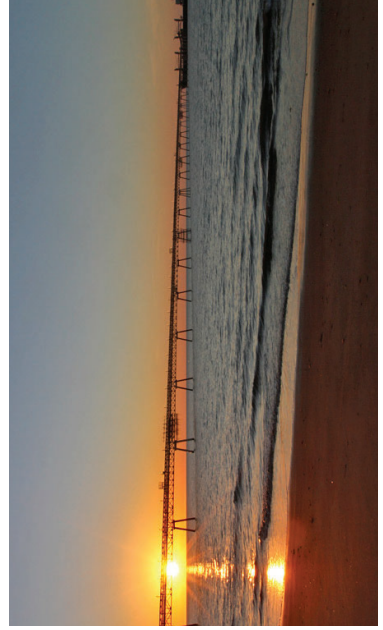
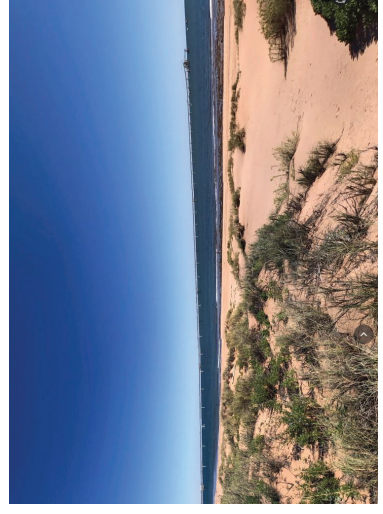


## 1.1 Vision

Set on the western edge of Australia, Onslow Township Village will be a world class accommodation facility that contributes to the community and economic growth of the region.

The village will be designed as a high quality facility that sets a new benchmark for accommodation that promotes a healthy, active and sustainable lifestyle for workers and the local community.

Inspired by the unique coastal landscape and sense of place the village will be designed to respond to the future vision of Onslow Town Centre and leave a lasting legacy for future generations.





## 1.3 Landscape Principles

The following design principles have been developed to guide the design of the village and surrounding landscape. Throughout the design process these principles will continue to inform and develop the landscape response.



- Celebrate the unique character of the site.
- Maximise visual, physical and symbolic connectivity to the local context.
- Touch the ground lightly



- Create strong connections to community and the environment.
- Design to support social interaction and relationship building.



- Design comfortable and safe connections to promote incidental physical activity and access to nature.
- Provide formal or informal, natural and man-made landscape areas to support recreational, sporting and social activities.



- Contribute to the " ... Community vision that Onslow be a vibrant, sustainable and prosperous place for work, living and leisure - for both residents and visitors."
- Future proof the site for the next generation of users.

## 1.4 Landscape Approach

The landscape approach responds to the immediate context of the development area. A series of strategies have been developed that focus the development of the landscape design around key views, local character, the existing topography and integrating the architecture into the landscape.

### Celebrate the Views

- Maximise the sites' existing topography to retain the best views out to the horizon.
- Develop a strategy to ensure the accommodation and the common-use amenity retain views to significant vistas

### Respond to the Local Character

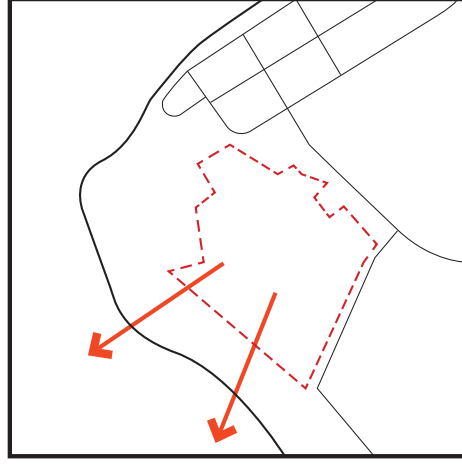
- Respond to the immediate social and environmental influences surrounding the site. Including the beach, Onslow townsite and cultural histories.

### Touch the ground lightly

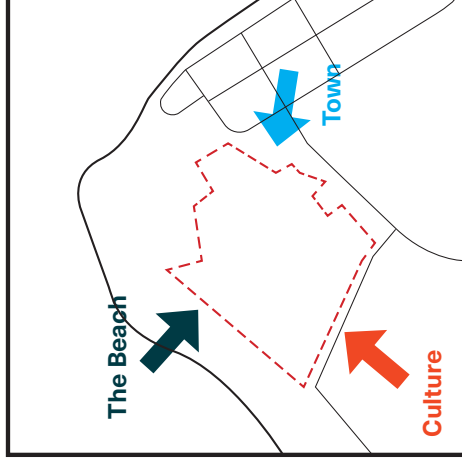
- Develop a strategy for pedestrian networks, accommodation pods and built amenity to minimize disturbance to the existing natural topography and ecologies of the site.

### Integrate Landscape and Architecture

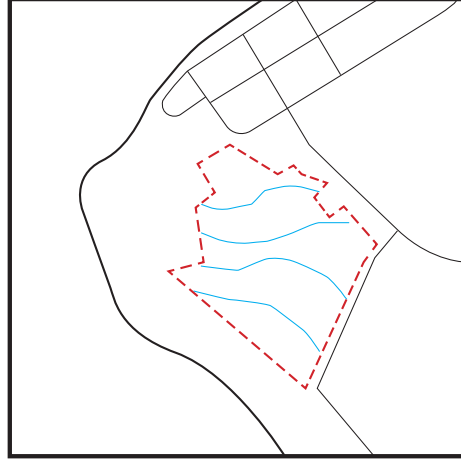
- Create a landscape-driven site response that informs the siting and location of proposed built infrastructure within the site.



Celebrate the views



Respond to local character



Touch the ground lightly



Integrate landscape and Architecture





## 2.0 Landscape Plan

PROGRAM	
1	Bus Stand (Pickup/Dropoff)
2	Sheltered Community Playground
3	Dedicated Dropoff (Small Vehicles, Short Term)
4	Terraced Entry Plaza
5	Water Feature
6	Recreation Turf
7	Outdoor Gym
8	Cricket Nets & Beach Volley Ball
9	Relax Zone (BBQ, Hammocks, Furniture, Shade Structure)
10	Mini Golf
11	Alfresco Deck With Terraced Embankment
11	Pedestrian / Maintenance Vehicle Access (with shade structures and comfort nodes)
12	Pedestrian Access (Boardwalk with shade structures and comfort nodes)
13	Security Fence
14	Entry Statement Wall

GENERAL	
	Site Boundary

SURFACES	
	Pedestrian Access Paving
	Plaza Paving
	Asphalt (Carpark)
	Asphalt (Maintenance Access)
	Composite Timber Boardwalk
	Fibre Reinforced Plastic Boardwalk
	Stabilised Gravel
	Pool

PLANTING	
	Lawn
	Native Dune Mix Planting - Managed Sparse
	Native Swale Mix - Managed Sparse
	Native Shrub Mix - Managed
	Proposed Native Tree

- Refer to Civil Engineers drawings for grading plan



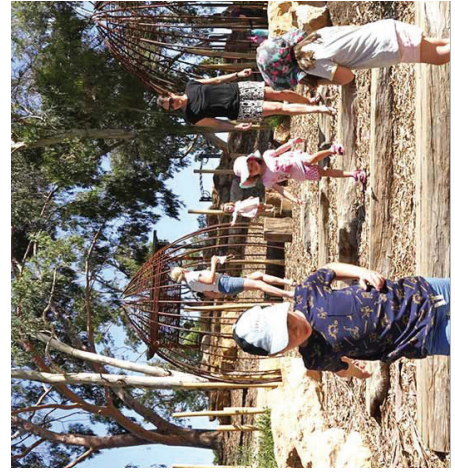
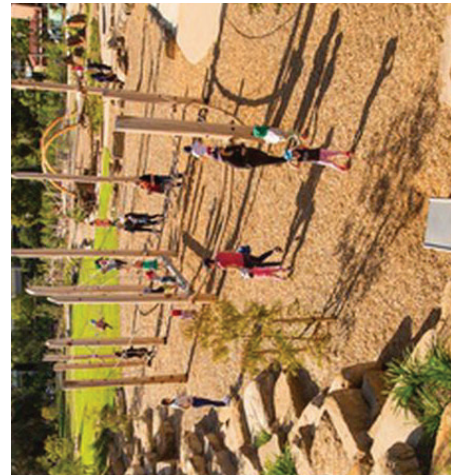
## 2.1 Community Playground & Entry

The entry road to the Onslow Township Village provides staff and guests with a high quality landscaped experience as they enter through a tree lined road. Water Sensitive Urban Design (WSUD) principles are incorporated into the design of the entry landscape, capturing water runoff into the filtration garden beds and surrounding landscape.

South of the entry road and interfacing with the Onslow Townsite is the Community Playground. This space provides a publicly accessible parkland within the Onslow townsite. The park provides shaded recreation and play opportunities for locals and visitors to enjoy.

**LEGEND**

1	Treed Arrival Plaza With Furniture
2	Universal Access Ramp
3	Footpath
4	Play Area
5	Entry Statement
6	Security fence / Entry Wall



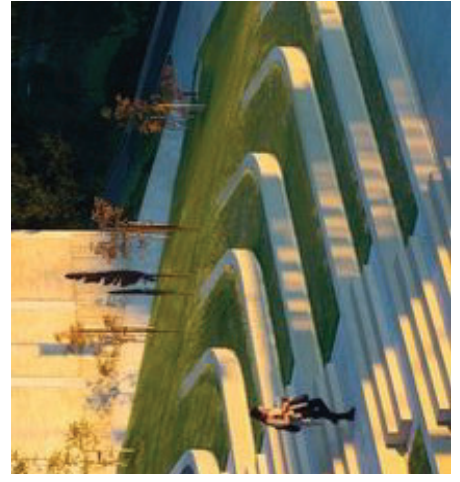
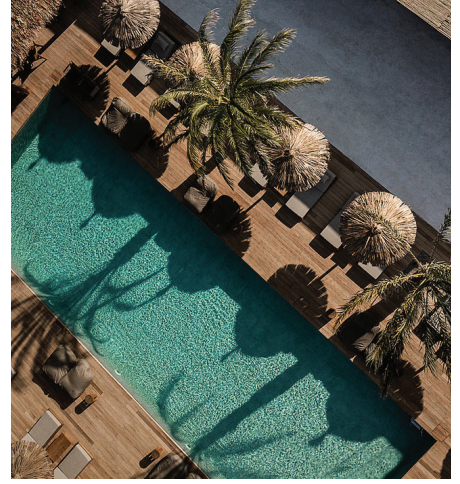
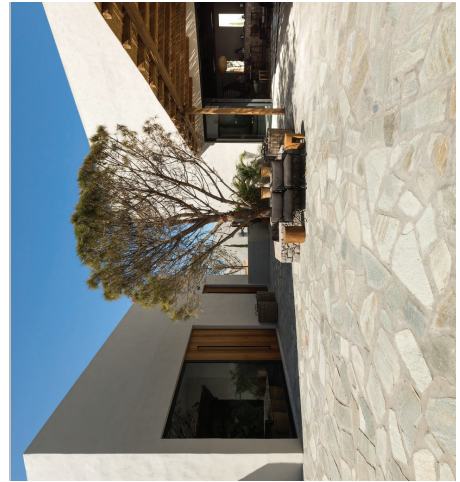
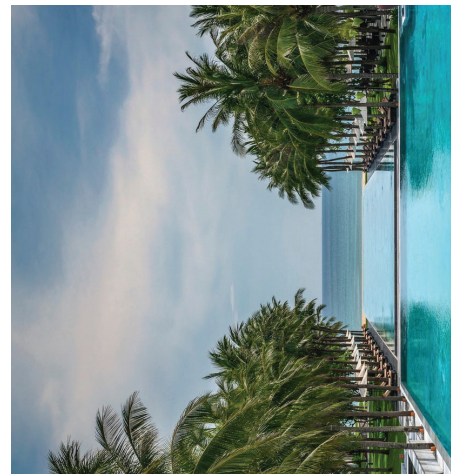


## 2.2 Amenity and Recreation Areas

The Amenity and Recreation Areas are characterised by a mix of high quality landscape surface treatments and softscape palette that lead guests and staff through the main amenities areas. Key vistas out to the ocean are celebrated through elevated landscape terracing, alfresco areas and the entry plaza. The design of the carpark incorporates WSUD principles to ensure large planted areas with tree planting occurs.

### LEGEND

1	Carpark (Designed to Water Sensitive Urban Design principles)
2	Dropoff/Pickup Bays
3	Entry Plaza With Water Feature
4	Pool
5	Terraced Embankment With Universal Access
6	Alfresco Dining
7	Access To Accommodation





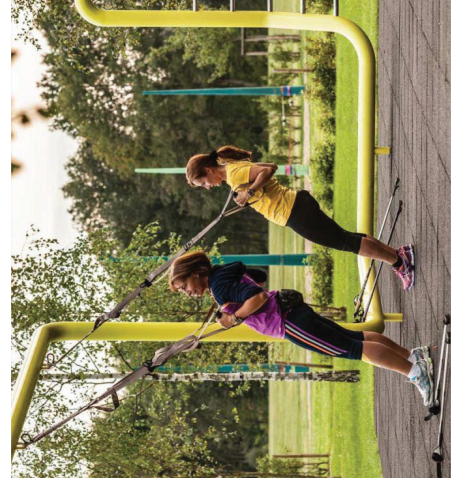
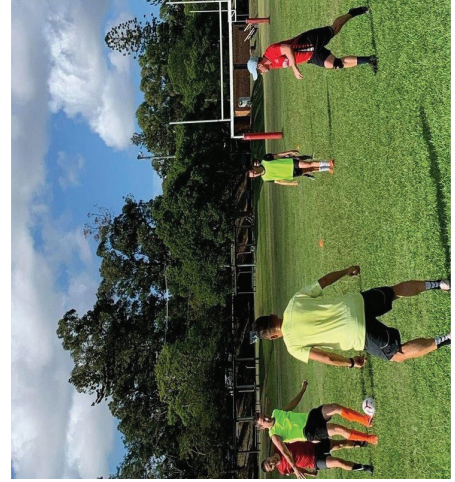
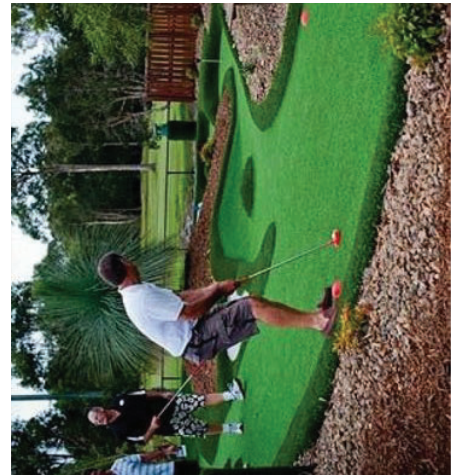
## 2.3 Outdoor Amenity Areas

The outdoor amenities area provides guests and staff with a range of health and fitness opportunities in an outdoor setting. Universal access is provided through a network of high quality paved surfaces that link to the accommodation and administration areas.

The landscape design provides the following list of outdoor amenity:

**LEGEND**

- 1 Outdoor Gym
- 2 Beach Volley Ball
- 3 Relax Zone (including hammocks and furniture in a garden setting)
- 4 BBQ and Shade Structures
- 5 Turf Kick-About Area
- 6 Cricket Nets
- 7 Mini-Golf
- 8 Pool





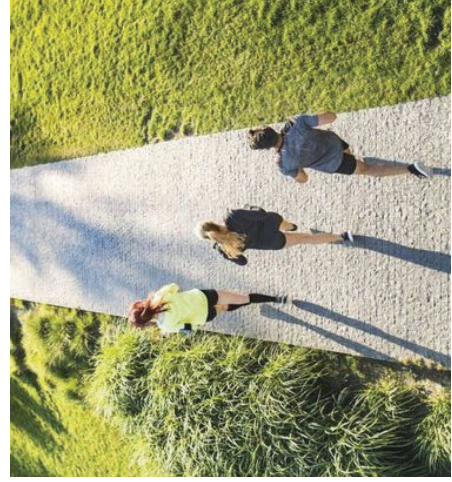
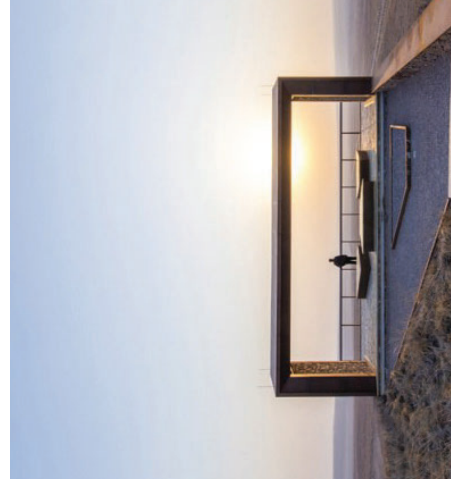
## 2.4 Accommodation Areas

The accommodation area has been designed to respond to the existing topography and ecology of the site. Minimising disturbance to the existing levels through a considered architectural and landscape response. An elevated boardwalk system extends through the area forming pedestrian circulation route that touches the ground lightly. Along the boardwalk network a series of comfort nodes are included to provide social spaces to experience the raw landscape in comfort. A hierarchy of boardwalks are achieved through primary access routes that provide direct linkages to the key extents of the accommodation. Secondary boardwalks provide more intimate linkages to guests accommodation.

A service and maintenance track doubles as a fitness and well-being loop for guests and staff to exercise by running or walking through the landscape.

### LEGEND

- 1 Pod Accommodation
- 2 Primary Boardwalk With Shade Structures (3m wide)
- 3 Secondary Boardwalk With Shade Structures (2.5m wide)
- 4 Comfort Node with Furniture and Shade Structure
- 5 Laundry Service dropoff/pickup
- 6 Maintenance / Exercise Loop





### 3.1 Landscape Materials

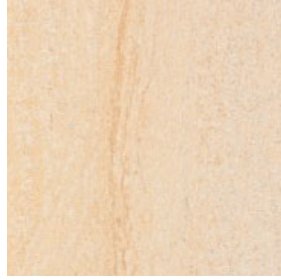
#### Materials Strategy

A refined palette of robust and low maintenance materials are proposed that are in keeping with the project context and Architecture. The proposed landscape scheme will use a palette of high quality materials, selected to reinforce the identity of the spaces.

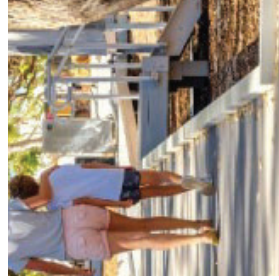
Materials have been selected that are sympathetic to the local context and are appropriate to their location and use. The materials detailed here form a structured palette that are coordinated to create visual unity and integrity within the landscape and the surrounding the Onslow neighbourhood.

The Material strategy will:

- Use materials that are sympathetic to the local context and are appropriate to their location and use.
- Create visual unity and integrity within the landscape but allow for variations in texture and colour that can be used to define function and character.
- Give consideration to long-term performance, durability and maintenance requirements.
- Consider impact on the environment and sourcing, cost and project sustainability.



Large format stone paver



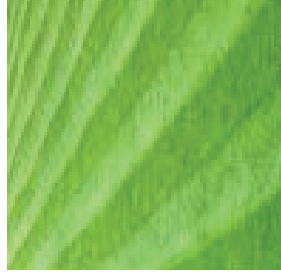
Composite timber



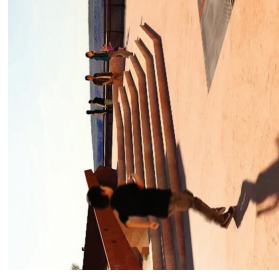
Concrete paving



Stone boulders



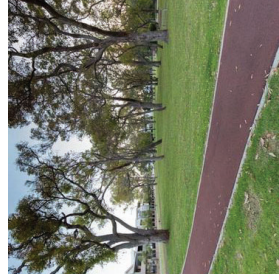
Turf



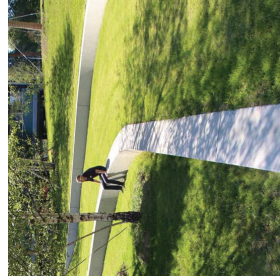
Concrete steps



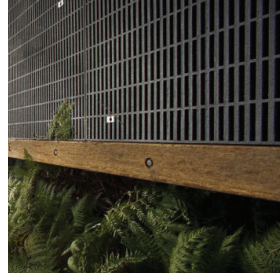
Stabilised pindan gravel



Asphalt



Concrete walls



RFP mesh boardwalk



Concrete inlay



Informal Seating

## 3.2 Planting Strategy

### Planting Strategy

The planting scheme for the project is designed to add a strong well-vegetated character to the site and present a response that interfaces with neighbouring frontages and contributes to greater site ecologies. Landscape will be used to create identity through a series of contextually appropriate planting palettes. Guests and Staff will be able to experience the harshness and fragility of the Pilbara Coastal landscape through considered planting design.

Endemic plants will feature throughout the village which will help to restore and improve the health of degraded landscape areas within the development.

#### Entry and Recreation Areas

As guests enter the village they will be greeted with a tree lined access route that leads them to the arrival point at the administration and recreation area. Water Sensitive Urban Design principles are used throughout the entry and Recreation Areas and will feature low water demanding irrigated landscape areas. Bush fire Asset Protection Zones are strategic placed around the perimeter of the site with densities of trees, shrubs and ground covers in the locations designed to reduce the effect of bush-fires.

#### Accommodation Areas

The Accommodation areas are characterised by a mix of dunal vegetation that is characteristic of the immediate ecologies of the site. The planting intent is to restore the local vegetation complexes that exist within the dunal systems surrounding Onslow. This area will be irrigated with a mix of drip and spray irrigation. Other incentives within the accommodation areas include swale planting within the low points of

the site to maximise the filtration of overland water-flows

Low to mid-level planting to the perimeter of the site within the bush fire Asset Protection Zone will be designed to reduce the effect of bushfires while also blending the visual appearance between the development and the surrounding vegetation.

### Water Efficient Irrigation System

Trees and plants will be irrigated by a water efficient irrigation system. The irrigation water demand volumes will not be excessive, however, a constant and uninterrupted supply must be maintained especially during dry and hot periods.

Where possible, plants will be hydro-zoned according to water requirements. This allows the reticulation to the endemic plantings to be separately controlled and greatly reduced following their establishment period. The automated irrigation system can be designed to include monitors to detect malfunctions so that rapid response rectification can be programmed before the planting is detrimentally affected by a disruption to water supply.

A holistic irrigation strategy will be prepared for the project that aims to include the following initiatives:

- Aqua monitoring to record and display water usage
- Hydro-zoning of plants
- Waterwise planting and use of local species
- High quality and improved soils with good moisture and nutrient holding capacity

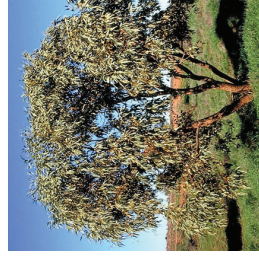
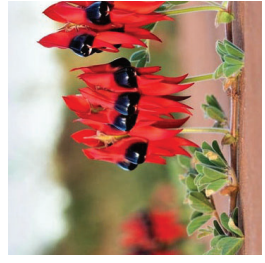




### 3.3 Planting

#### Indicative Species List

Endemic Key	Botanical Name	Common Name	
TREES Taller than 10m	<i>Acacia conracea</i>	Wirewood	
	<i>Adansonia gregorii</i>	Boab	
	<i>Brechychiton obtusifolia</i>	River Gum	
	<i>Eucalyptus camadulensis</i>	Smooth Bark Coolbair	
	<i>Eucalyptus xerodermica</i>		
TREES Up to 10m	<i>Acacia ampliceps</i>	Salt Wattle	
	<i>Acacia citrinoviridis</i>	Mulga Tree	
LARGE SHRUBS Up to 4m	<i>Bauhinia cunninghamii</i>	Jigal Native Bauhinia	
	<i>Grevillea wickhamii</i>	Wickham's Holly Grevillea	
	<i>Pitsopteron phyllaeoides</i>	Native Olive	
	<i>Acacia anictrocarpa</i>	Fitzroy Wattle	
	<i>Acacia bivenosa</i>	Two Vein Wattle	
	<i>Acacia dictyophleba</i>	Sandpaper Wattle	
	<i>Acacia trachycarpa</i>	Mini Ritchii	
	<i>Capparis lasiantha</i>	Spat Jack	
	<i>Capparis spinosa</i>	Caper Bush	
	<i>Crotalaria cunninghamii</i>	Green Bird Flower	
<i>Eremophila fraseri</i>	Vamish Bush		
<i>Eremophila maculata</i>	Spotted Emu Bush		
SMALL SHRUBS Less than 2m	<i>Acacia hilliana</i>	Tabletop Wattle	
	<i>Acacia gregori</i>	Gregory's Acacia	
	<i>Eremophila cuneifolia</i>	Phyruu	
	<i>Eremophila microtheca</i>	Heath-like Eremophila	
	<i>Indigofera monophylla</i>	Indigo Plant	
	<i>Ipomoea yendensis</i>	Yardie Morning Glory	
	<i>Philotus exaltatus</i>	Tall Mulla Mulla	
	<i>Philotus obovatus</i>	Cotton Bush	
	<i>Scaevola crassifolia</i>	Thick leaved Fan Flower	
	<i>Solanum lasiophyllum</i>	Bush Tomato/ Flannel Bush	
	<i>Senna notabilis</i>	Cockroach Bush	
	GROUND COVERS Less than 600mm	<i>Gomphrena canescens</i>	Bachelors' Buttons
		<i>Ipomoea pes-caprae</i>	Coastal Morning Glory
		<i>Erchlydena tomentosa</i>	Baner Saltbush
		<i>Philotus clementii</i>	Tassel Top
<i>Solanum horridum</i>		Wild Gooseberry	
<i>Swainsonia formosa</i>		Sturt Desert Pea	
<i>Swainsonia maccullochiana</i>		Ashburton Pea	
Climbers	<i>Canavalia rosa</i>	Wild Jack Bean	
	<i>Ipomoea costata</i>	Bush Potato	
	<i>Ipomoea pes-caprae brasiliensis</i>	Goat's Foot Morning Glory	
Grasses	<i>Ipomoea muelleri</i>	Poison Morning Glory	
	<i>Arctida contorta</i>	Wind Grass	
	<i>Pennisetum decompositum</i>	Native Millet	







# ATTACHMENT 9

## TRAFFIC IMPACT ASSESSMENT



# Onslow Township Village - Lot 300 Back Beach Road, Onslow

## TRANSPORT IMPACT STATEMENT



Revised 1 September 2021

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## 1. INTRODUCTION

Mineral Resources Limited is preparing for the Onslow Iron Project, which is located within the existing Pilbara Port Authority boundaries at the Port of Ashburton, approximately 12 kilometres south-west of Onslow. To accommodate the workers required for the proposed project, a 500-bed 'Resort Style FIFO Accommodation' facility is also proposed, at Lot 300 Back Beach Road, Onslow, which is located at the north-western end of the Onslow Townsite as shown in the Locality Plan in Figure 1.

A Development Application for the proposed 'Onslow Township Village' is currently being prepared by a project team including Milieu Creative architects and Rowe Group town planners, and Uloth and Associates has been appointed to review the various traffic and access issues associated with the proposal.

### 1.1 STUDY OBJECTIVES

The overall study objective is to identify the existing situation in the immediate vicinity of the proposed development site and to prepare a Transport Impact Statement to address the various traffic access, parking, and servicing requirements in support of the development application.



SOURCE: NEARMAP PTY LTD

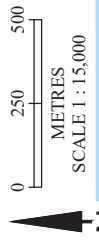


FIG. 1  
**Locality Plan and Proposed Development Site**  
 LOT 300 BACK BEACH ROAD, ONSLOW

## 2. EXISTING SITUATION AND PROPOSED DEVELOPMENT SITE

Onslow is located approximately 1,400 kilometres north of Perth in the Pilbara region, within the Shire of Ashburton. The existing situation within and around the Onslow Townsite is described in this chapter, together with additional detail in the vicinity of the proposed development.

- It can be seen in the Locality Plan in Figure 1 (in Chapter 1) that access for the Onslow Townsite is to/from the south via Onslow Road (which links to North West Coastal Highway approximately 75 kilometres to the south-east). It can also be seen that Onslow Road continues north to the western end of the Townsite (along the Onslow ring road, which was constructed in around 2016), with the former alignment of Onslow Road (now McAullay Road) providing access to the eastern end of the Townsite.
- Onslow Road is a 2-lane undivided road, which is identified as a Primary Distributor Road under the Main Roads WA functional road hierarchy up to the intersection of Back Beach Road where it continues as Simpson Street, a local Access Road. It has a speed limit of 80 kilometres per hour from south of McAullay Road to approximately 400 metres south of Back Beach Road where it drops to the default built-up area limit of 50 kilometres per hour.
- Traffic counts obtained from the Main Roads WA Traffic Map website show that Onslow Road carried up to 500 vehicles per day in 2019, approximately 10 kilometres south of McAullay Road.
- McAullay Road is also a 2-lane undivided road, which was downgraded to an Access Road under the Main Roads WA functional road hierarchy after the continuation of Onslow Road. It has an initial speed limit of 80 kilometres per hour from Onslow Road but drops to 60 kilometres per hour as it approaches the Townsite once past Onslow Airport.
- Second Avenue, the main street through the commercial area of the townsite, is identified as a Local Distributor road under the Main Roads WA road hierarchy, while all other roads in Onslow are identified as Access Roads, with a speed limit of 50 kilometres per hour (except for Seaview Drive which has a speed limit of 70 kilometres per hour).
- The existing road network within the overall Townsite is then shown in the aerial photograph in Figure 2, while further detail in the vicinity of the proposed development is shown in Figures A.1 and A.2 in the Technical Appendix.
- It can be seen in Figure 2 that the proposed development site is conveniently located at the northern end of the Townsite, within walking distance of commercial and local community facilities. The site is currently vacant and is bordered by Back Beach Road at the southern end, Simpson Street, First Street and Third Avenue on the eastern end, and by coastline along the remaining property boundary. The site is currently classed as Conservation, Recreation and Nature Landscape Land Use under Shire of Ashburton's Local Planning Scheme No.7.
- Figure A.1 then shows that most roads in the vicinity of the site are sealed roads. However, First Street west of Third Avenue and Third Avenue north of First Street, are both currently unmade, as also shown in Figure A.2.
- Onslow is not serviced by regular public transport. However, there are footpaths on at least one side of most roads in the vicinity of the proposed development, as shown in Figure A.3 in the Technical Appendix, providing good walking connectivity throughout the Townsite and convenient access to local amenities.



SOURCE: NEARMAP PTY LTD

FIG. 2  
Existing Road Network  
OVERALL ONSLOW TOWNSITE



### 3. **ONSLow TOWNSITE EXPANSION STRUCTURE PLAN**

The Onslow Townsite Expansion Structure Plan was prepared in 2016, around the time of construction of the Onslow ring road (now Onslow Road), to facilitate a strategic long-term population target of 3,500 people.

- The overall Structure Plan is shown in Figure A.4 in the Technical Appendix, identifying growth areas for residential development between Onslow Road and McAullay Road, together with the proposed road hierarchy and pedestrian/cyclist paths throughout the overall Townsite.
- It can be seen in Figure A.4 that the currently proposed development site, at the northern end of the Structure Plan area, is identified as ‘Area Subject to Further Investigation’.
- The plan also identifies the full length of Onslow Road plus Simpson Road up to Second Avenue as an Arterial/Primary Distributor Road, while McAullay Road and Second Avenue are both identified as Neighbourhood Connectors.
- It can also be seen that both Onslow Road - Simpson Street and Second Avenue are identified as part of the ‘Shared Path Network’, ensuring good pedestrian and cyclist accessibility throughout the Townsite.

### 4. **PROPOSED DEVELOPMENT**

- The proposed Masterplan for the Onslow Township Village is shown in Figure A.5 in the Technical Appendix, as prepared by architects Milieu Creative. Figure 3 then shows the proposed development plan superimposed on an aerial photograph, identifying the proposed development in the context of the adjacent road network. The proposal includes construction of 500 accommodation pods, plus Administration and Training facilities (including a Creche), a Medical Centre, a Restaurant and a Tavern, as well as recreational facilities including a Swimming Pool, Gym and Sports Hall.
- It can be seen in both Figure 3 and Figure A.5 that the accommodation pods are primarily located in the southern part of the site, while the administration and other facilities are located in the northern part adjacent to the proposed car park. Access for the site is proposed at the north eastern corner of the property, from the currently unmade extension of Third Avenue.
- It can also be seen that on entering the site, the main access driveway curves around to provide direct access to the proposed car park, or to allow buses to proceed into the bus pick-up/drop-off area which then loops back onto the main access driveway. Paved walkways are then proposed throughout the various facilities, providing access also for motorised carts and maintenance vehicles (as well as for fire access), with elevated boardwalks providing further access into the accommodation areas.
- It is also important to note that to align with the Onslow Townsite Expansion Plan, it is proposed that facilities within the development will be made available to the local community, including the Restaurant, Tavern, Gym, Multi-Purpose Sports Hall, and Outdoor Pool.
- It is expected that the development will remain as Transient Workforce accommodation for an estimated 20 years, for the duration of the mining project. Post operation, there is potential to convert the site into a permanent resort, reducing the number of accommodation pods to perhaps 100 units (with public access to on-site facilities continuing as currently proposed).



- Details of the proposed facilities are provided below in Table 1, together with calculations of Planning Scheme parking requirements and applied reductions to reflect the expected usage of each component. Initial parking requirements are based on the Table in Appendix 8 of Shire of Ashburton's Local Planning Scheme No. 8, except for the Public Recreation land uses, which have been based on the detailed individual requirements specified by City of Stirling.
- Parking calculations for the Restaurant and Tavern are both based on the Shire of Ashburton's requirement of 1 space per 6 square metres of Dining Space. However, taking into account the indicative seating arrangements shown in the floor plans, it is conservatively estimated that the indoor seating areas (for parking calculation purposes) equate to approximately 40 percent of the indoor 'Dining' areas and 50 percent of the outdoor 'Alfresco' areas (due to the layout of walkways, buffet tables, pool tables, etc).
- It can be seen in Table 1 that an overall parking provision of 107 spaces is recommended, allowing for a 90 percent reduction for the accommodation units (to account for buses being used to transport most workers), and a 70 percent reduction for Medical Centre, Restaurant, Tavern and Public Recreation, to account for the extent of use of each by the on-site workforce population. It is also assumed that the Creche will not contribute to any additional parking requirements, based on 100 percent usage by workers, staff and visitors to other facilities.
- On the basis that the mining operation will continue 24 hours per day, 7 days per week, with two 12-hour shifts and a maximum on-site workforce occupation of 400 units, half of these workers are assumed to work from 6 am to 6pm, with the remaining half working night shift from 6pm to 6am.
- It is proposed to utilise up to 16 Buses to transport workers to the work site for the start of each shift, before returning to the village with workers that just completed their shift. Together with a small number of workers driving ancillary vehicles, it is therefore estimated that perhaps up to 100 vehicle trips per day will be generated by this component of the proposed development, with a proposed travel route via Third Avenue, Simpson Road and Onslow Road, as indicated in Figure 4.
- Even with members of the public utilising the proposed on-site facilities, it is therefore reasonable to expect that the proposed development will generate no more than perhaps 850 vehicles per day, which will have no significant impact on the surrounding road network.

TABLE 1  
PARKING REQUIREMENT CALCULATIONS  
PROPOSED ONSLOW TOWNSHIP VILLAGE

PROPOSED LAND USE	PLANNING SCHEME REQUIREMENTS		PARKING REQUIREMENTS	
	Parking Ratio	No. of Spaces	Assumed Operations	No. of Spaces to be provided
<ul style="list-style-type: none"> <li>Accommodation Units - 500 Units, but max. 400 occupied at one time</li> </ul>	2 per 3 units + 1 Oversize Veh. per 10 units	267 car spaces + 40 oversize spaces	90 percent to travel only by Bus	27 car spaces + Bus/Coach spaces <sup>1)</sup>
<ul style="list-style-type: none"> <li>Administration and Training - 453m<sup>2</sup> <sup>2)</sup></li> </ul>	1 per 30m <sup>2</sup> NLA	15 spaces	No Reduction applied	15 spaces
<ul style="list-style-type: none"> <li>Medical Centre - Assume 5 Rooms, with 8 employees</li> </ul>	4 per Room for 1 <sup>st</sup> 2 Rooms + 1 per Room thereafter + 1 per max. employees on-site	19 spaces	70 percent reduction for on-site operations	6 spaces
<ul style="list-style-type: none"> <li>Restaurant - 437m<sup>2</sup> Dining Area <sup>3)</sup></li> </ul>	1 per 6m <sup>2</sup> of Dining area	73 spaces	70 percent reduction for on-site operations	22 spaces
<ul style="list-style-type: none"> <li>Tavern - 261m<sup>2</sup> Dining Area <sup>3)</sup></li> </ul>	1 per 6m <sup>2</sup> of Dining area	44 spaces	70 percent reduction for on-site operations	13 spaces
<ul style="list-style-type: none"> <li>Public Recreation <sup>4)</sup> - Swimming Pool: 250m<sup>2</sup> - Gym: 560m<sup>2</sup> - Sports Hall: 708m<sup>2</sup></li> </ul>	1 per 4 Swimmers <sup>5)</sup> + 1 per 20m <sup>2</sup> public gym area + 1 per 20m <sup>2</sup> Sportshall GFA	82 spaces	70 percent reduction for on-site operations	24 spaces
Total Parking Requirements				
				107 car spaces + Bus/Coach spaces

Notes: 1) Assumed combination of 50-seat coaches and 22-seat buses, as advised by Mineral Resource Limited  
2) Includes Reception, Managers Offices, Open Plan Office, Meeting Room and Kitchen/Staff Break Room, plus Training Rooms.  
3) Dining Area equals 40 percent of Indoor Areas plus 50 percent of Outdoor Areas.  
4) Car parking calculations based on City of Stirling requirements.  
5) Assumes 1 swimmer per 3.5m<sup>2</sup> pool area (72 swimmers maximum at any one time).

Source: Uloth and Associates



SOURCE: MILIEU CREATIVE  
NEARMAP PTY LTD

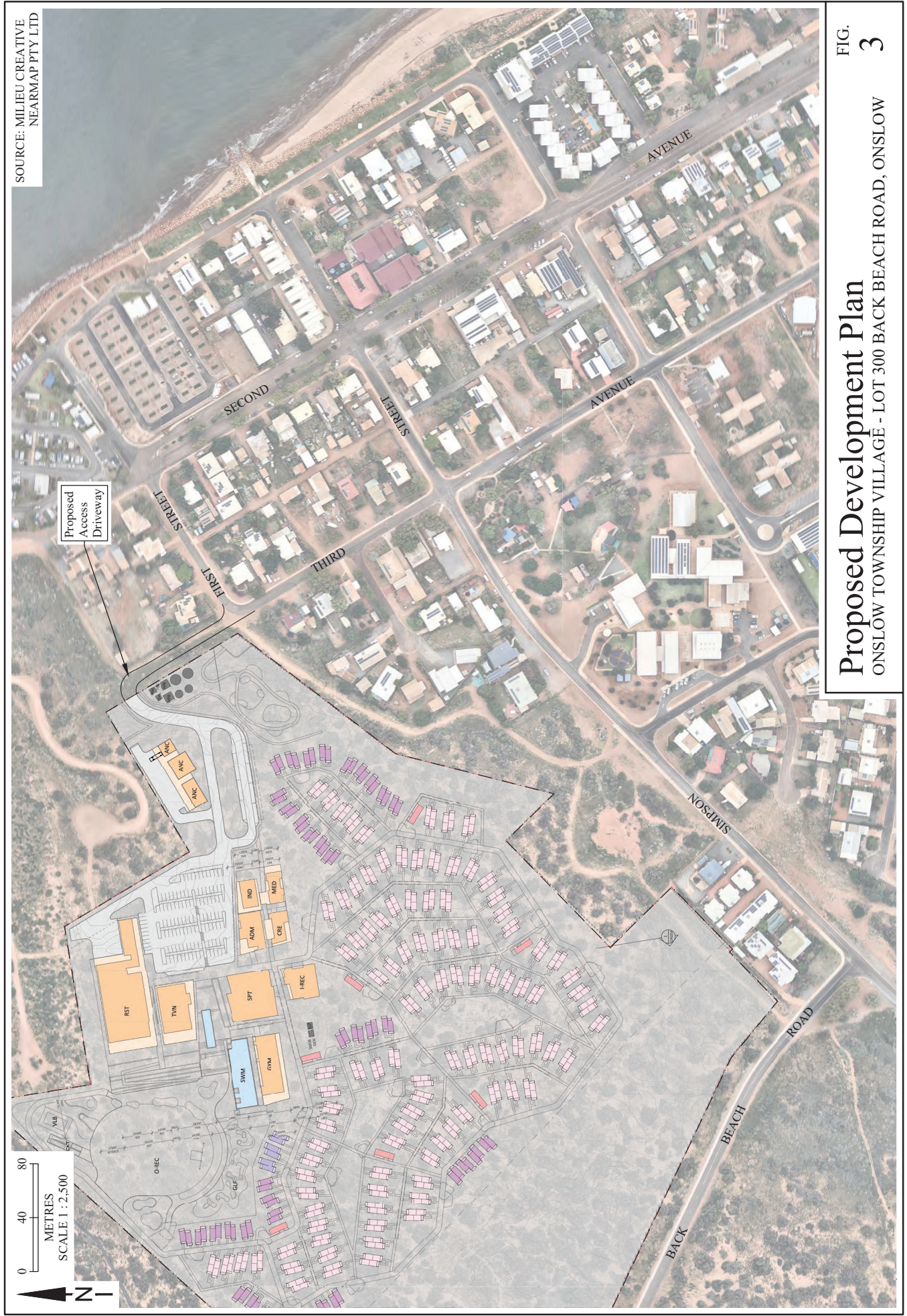
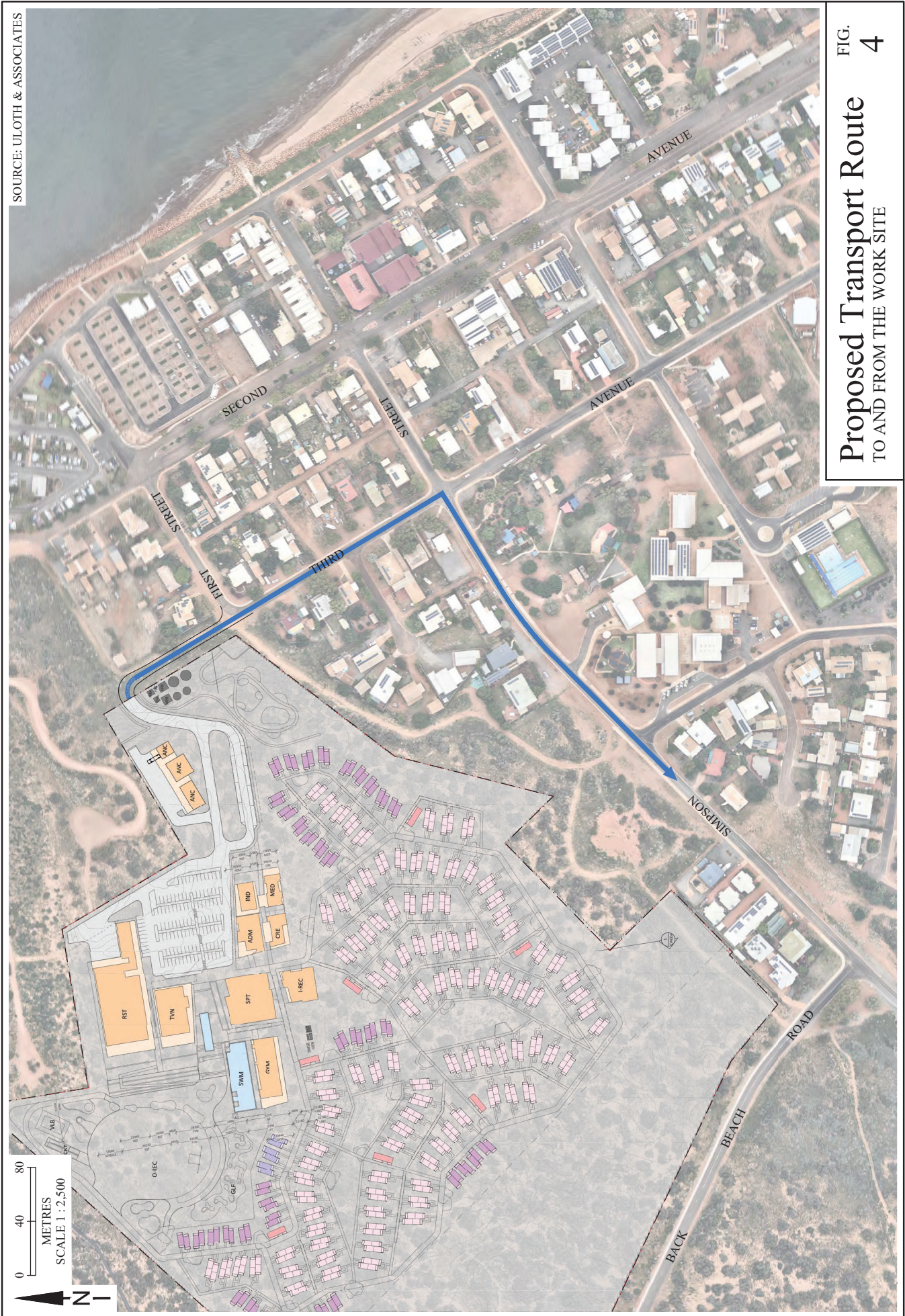


FIG. 3  
**Proposed Development Plan**  
 ONSLOW TOWNSHIP VILLAGE - LOT 300 BACK BEACH ROAD, ONSLOW



SOURCE: ULOTH & ASSOCIATES

FIG. 4  
Proposed Transport Route  
TO AND FROM THE WORK SITE





## 5. ACCESS ARRANGEMENT, PARKING AND SERVICING

The recommended car park layout and access arrangement is shown in Figure 5 in Chapter 7 Overall Conclusions and Recommendations, while the recommended concept plan for access off Third Avenue is shown in Figure 6.

- Access to the development site is proposed via an extension of Third Avenue within the existing road reserve at the eastern edge of the development site. A 2-way internal road will then provide access to/from the centrally located parking area (with 117 car bays proposed), as well as to a 1-way bus pick-up/drop-off area (on the south side) and a maintenance area (on the north side), as shown in Figure 5.
- Access to the proposed service yard, adjacent to the proposed restaurant at the northern end, is then also provided via the car park access road, which will also provide access to the proposed ambulance bay (adjacent to the Medical Centre), while also catering for Fire and Emergency Services access to the paved pathways that extend throughout the site.
- The recommended concept plan for access off Third Avenue (as shown in Figure 6 in Chapter 7) shows the layout required to accommodate a 12.5 metre Heavy Rigid Vehicle accessing the site at the same time as passing a B99 Car, as confirmed by the swept path diagrams in Figure A.6 in Chapter A.4 in the Technical Appendix.
- Figure A.7 in the Technical Appendix then shows the swept paths for Buses accessing the proposed pick-up/drop-off area, while Figure A.8 shows the swept path for a 12.5 metre Heavy Rigid Vehicle accessing the proposed service yard next to the restaurant, and Figure A.9 shows the swept paths for a 10-metre rubbish truck accessing the Bin Stores within both the service yard (next to the Restaurant) and the maintenance yard. Figure A.10 then confirms the swept paths for a Medium Rigid Vehicle accessing the proposed Maintenance Area and the Fire Access route via the internal pathways.

## 6. PEDESTRIANS AND CYCLISTS

To take advantage of the proposed developments proximity to the Onslow townsite, it is recommended to provide footpaths along the main access roadway and the extension of Third Avenue to connect with existing footpaths as identified in Figure A.3 (in Chapter A.1 in the Technical Appendix). It is also proposed to provide a footpath from the recreational buildings and accommodation areas to an alternative access at the corner of First Street and Third Avenue. The recommended future pedestrian/cyclist path network is therefore as shown in Figure 7 in Chapter 7, including connections to the ‘future Shared Paths’ identified within the Townsite Expansion Structure Plan.

## 7. OVERALL CONCLUSIONS AND RECOMMENDATIONS

The overall conclusions and recommendations regarding the proposed development are detailed in this chapter, on the basis of the study findings and conclusions presented and discussed above in Chapters 2 to 6, and the additional information in the Technical Appendix, as follows:

- It is recommended to provide a minimum of 107 car parking spaces for the proposed operation of the Onslow Township Village as calculated in Table 1 in Chapter 4, in addition to parking for Buses transporting workers to and from the worksite.
- The recommended car park layout and internal access roads are as shown in Figure 5, including the proposed Bus pick-up/drop-off area, and the proposed service yard and maintenance area.
- It is recommended to provide access to/from the site via an extension of Third Avenue north of First Street, as also indicated in Figure 5, with a more detailed layout as shown in the concept plan in Figure 6.
- It is recommended to also construct footpaths along the proposed extension of Third Avenue, to provide connections to the existing and proposed paths within the adjacent areas, resulting in the future pedestrian/cyclist path network as shown in Figure 7.
- With most of the workforce population to be transported to/from the work site via bus, the proposed development will not have any significant impact on the adjacent roads and intersections.

SOURCE: ULOTH & ASSOCIATES

See Figure 6 for more detailed concept plan.

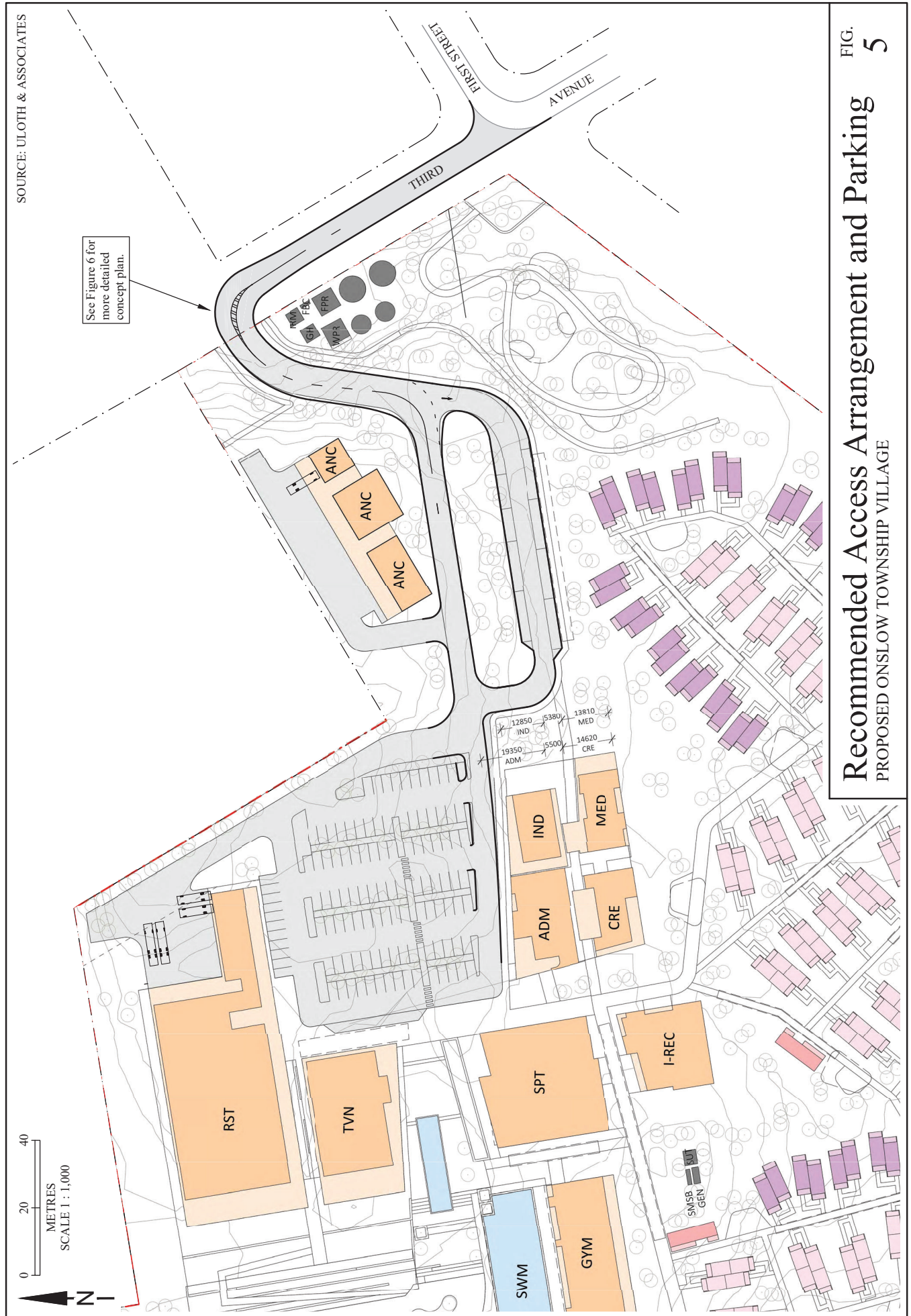
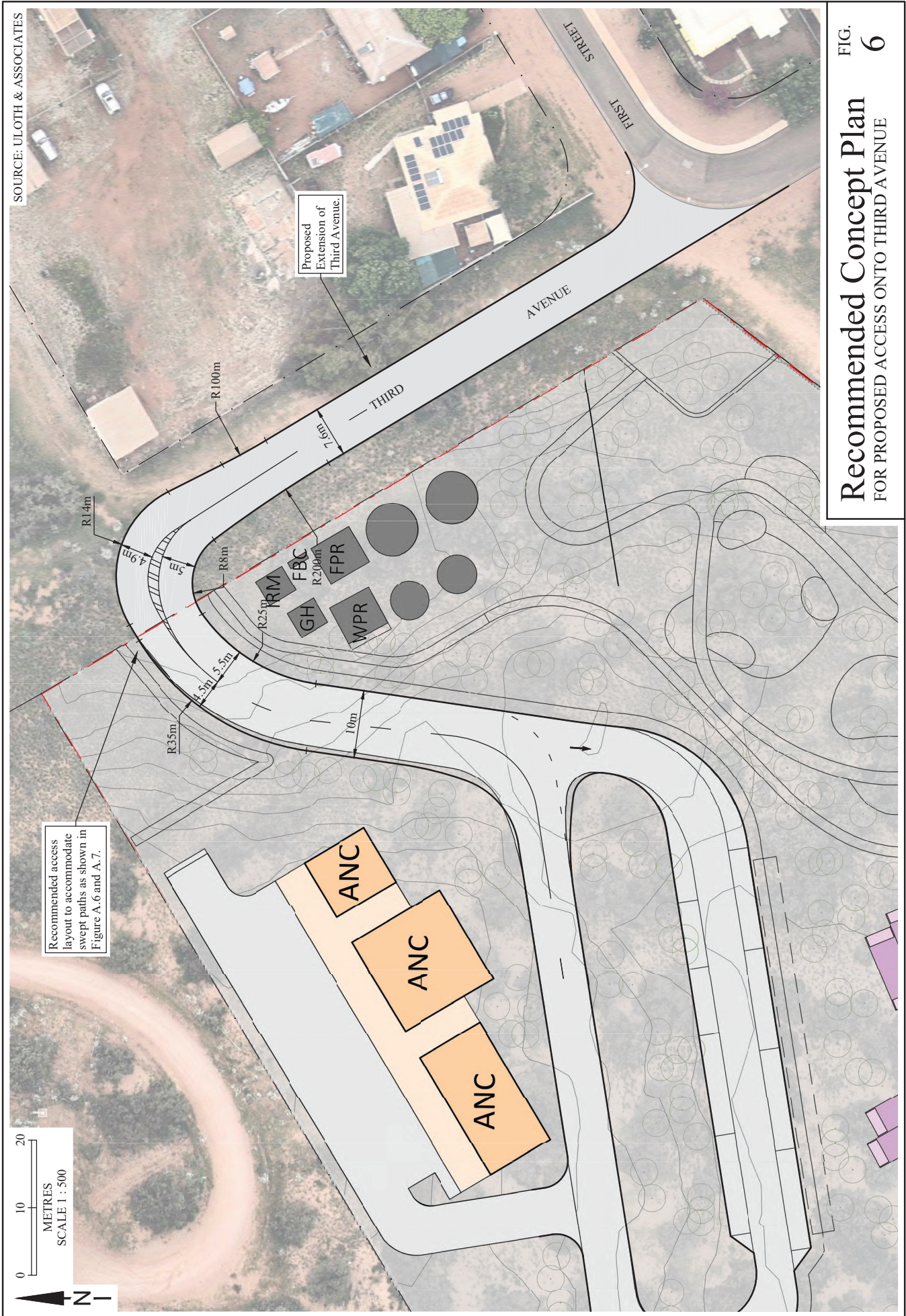


FIG. 5  
Recommended Access Arrangement and Parking  
PROPOSED ONSLOW TOWNSHIP VILLAGE



SOURCE: ULLOTH & ASSOCIATES

FIG. 6  
**Recommended Concept Plan**  
FOR PROPOSED ACCESS ONTO THIRD AVENUE







**Future Pedestrian / Cyclist Paths**  
 IN THE VICINITY OF THE PROPOSED DEVELOPMENT

FIG. 7

## **TECHNICAL APPENDIX**

The Technical Appendix documents the Existing Situation and the Townsite Expansion Structure Plan, as well as the proposed development plan and swept path diagrams.



## **A.1 EXISTING SITUATION**

Figure A.1 shows the existing situation in the vicinity of the proposed development site, while Figure A.2 shows the existing roads and intersections immediately adjacent to the site.

Figure A.3 then shows the existing footpaths in the vicinity of the proposed development.

SOURCE: NEARMAP PTY LTD

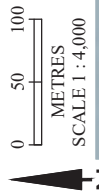


FIG. A.1  
Existing Situation  
IN THE VICINITY OF THE PROPOSED DEVELOPMENT







SOURCE: NEARMAP PTY LTD  
ULOTH & ASSOCIATES



FIG. A.3  
**Existing Footpaths**  
IN THE VICINITY OF THE PROPOSED DEVELOPMENT

## **A.2 OVERALL STRUCTURE PLAN**

Figure A.4 shows the Onslow Townsite Expansion Structure Plan, as endorsed by Western Australian Planning Commission in 2016.



**STRUCTURE PLAN REQUIREMENTS**

**Residential Precinct**

- a) The provisions of the Residential Design Codes of Western Australia (R-Codes) shall apply to residential development in this Precinct unless otherwise specified under a Local Planning Policy or Residential Design Guidelines.
- b) Development to be in accordance with the density coding identified on the Structure Plan.
- c) Sites identified as grouped subdivision sites as part of any subsequent subdivision applications may be developed to a maximum density of R40 and the Shire may require the preparation of a Local Development Plan (LDP) to be prepared prior to the development of that site.
- d) No development or subdivision shall occur within the Waste Water Treatment Plant buffer until the buffer is removed or reduced.
- e) All use, subdivision and development shall be in accordance with relevant Structure Plan.
- f) In accordance with the EPA Guidance Statement No.3, for any subdivisions within the 500m of the Onslow Salt operations, notifications are to be placed on the certificate of title of each new subdivided lot to notify prospective purchasers of the potential noise impacts.
- g) In accordance with the EPA Guidance Statement No.3, for any new dwellings within 1km of the Onslow Salt operations, the facades of the buildings fronting or perpendicular to the Onslow Salt operations are to incorporate architectural treatments to minimise noise impacts.

**Watson Drive Precinct**

- a) For the Watson Drive Precinct development standards are defined in Part A, section 4.1.2.1 of the Structure Plan report.

**Large Live Work Lot Precinct**

- a) The development of the residential portion of the lot that faces a residential area in the Large Live-Work Lot Precinct shall be in accordance with the provisions of the Residential Design Codes of Western Australia (R-Codes) unless otherwise specified in this section.
- b) The development of the non-residential portion of the lot that faces non-residential areas in the Large Live-Work Lot Precinct shall be in accordance with the provisions of the Home Business Standards under the Shire of Ashburton Scheme in regards to employment, amenity, vehicles and car parking and servicing needs.
- c) Non-residential development in the Large Live-Work Lot Precinct shall be adequately landscaped and screened to maintain a lifestyle land use appearance as opposed to a commercial or industrial and use appearance.
- d) A Local Development Plan (LDP) shall be prepared identifying basic design requirements within this precinct, including building envelopes, types of land uses etc.

**Public Open Space and Drainage**

- a) The size and location of public open space shall be in accordance with the Structure Plan.
- b) The design of public open space shall assist in the protection and enhancement of indigenous and European heritage sites (where applicable).
- c) The design of public open space areas shall ensure appropriate provision for stormwater drainage management.
- d) The landscaping of public open space areas shall be suitable for an arid climate having regard to minimising maintenance and water use whilst providing areas of highly aesthetic and functional amenity.
- e) The design of these areas shall maximise the provision of shading to enhance amenity and promote social capital and walkability.

**Education**

- a) The development of the Education Precinct shall be in accordance with the meaning of an Education Establishment as defined under the Shire of Ashburton Local Planning Scheme.
- b) The external frontages of the Education Precinct shall be developed to a standard consistent with adjacent residential areas with regards to bulk and scale, setbacks and landscaping.
- c) The architectural style of any proposed buildings within this precinct are to be reflective of the Onslow Vernacular.

**Area Subject to Further Investigation**

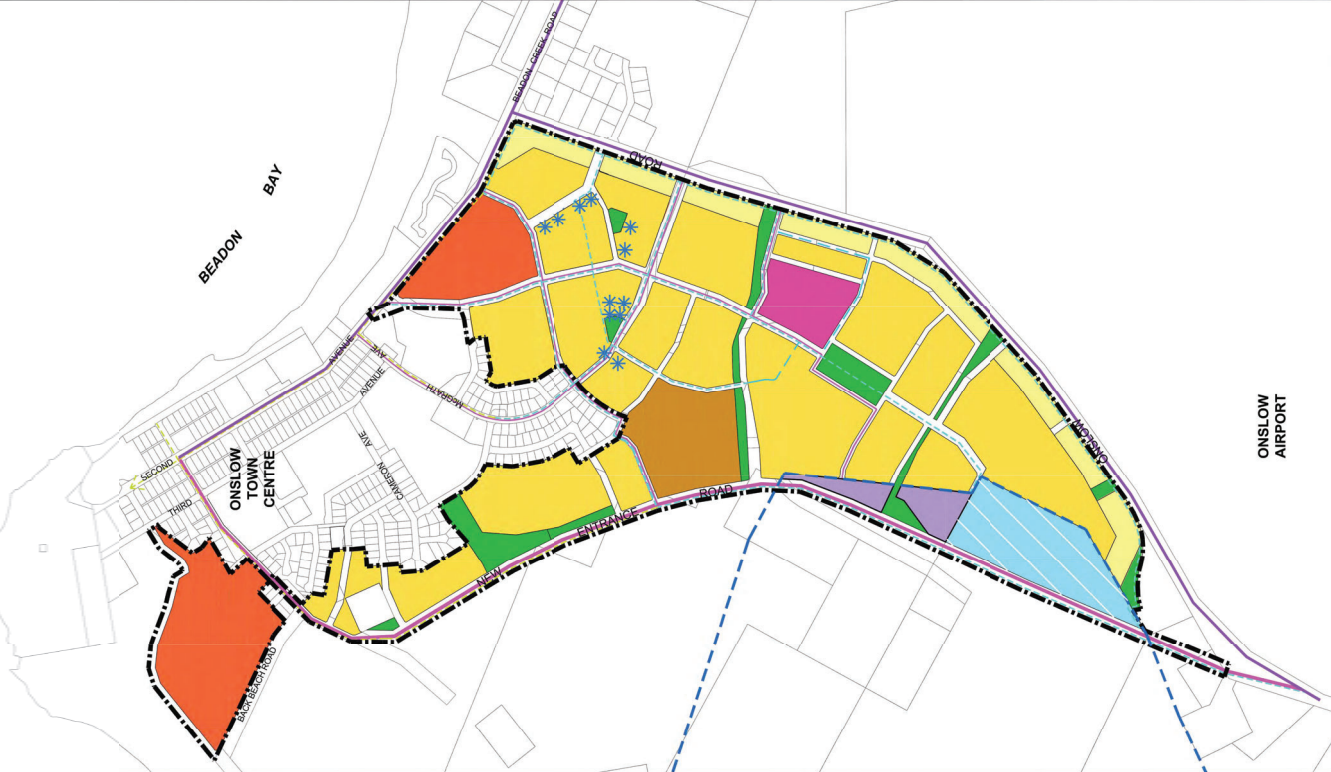
- a) The provisions of the Residential Design Codes of WA (R-Codes) and Clause 4.1.1 of this report shall apply to areas suitable for residential development in this Precinct subject to approval of the Shire of Ashburton and WAPC.
- b) For areas not suitable for development in this Precinct the provisions of the Public Open Space and Drainage Precinct shall apply including:
  - i. The design of public open space areas shall ensure the protection and enhancement of indigenous heritage sites.
  - ii. The design of public open space areas shall ensure appropriate provision for stormwater drainage management.
  - iii. The landscaping of public open space areas shall be suitable for an arid climate having regard to minimising maintenance and water use whilst providing areas of highly aesthetic and functional amenity.
- c) The area within the WWTP Buffer shall be subject to a Local Development Plan (LDP) being prepared to the satisfaction of the Shire, prior to any development.

**Land Use Permissibility**

Land use permissibility shall generally be in accordance with the Land Use Permissibility table, as shown in Part A of the Onslow Townsite Expansion Structure Plan report.

**Local Development Plans**

- a) LDP may be required by the developer, an owner of the land or the Shire by Council prior to any subdivision and/or substantial development and used as the basis for the determination of all development applications to the Shire of Ashburton.
- The LDP will enhance, elaborate and expand the details and provisions contained in this Part as well as supplement the provisions of the Scheme and the R-Codes. LDPs are required to address the following:
  - a) building envelopes;
  - b) setbacks;
  - c) interfaces with public open space and drainage areas;
  - d) distribution of land uses within a lot (Large Residential Lifestyle lots);
  - e) vehicular access and parking;
  - f) loading and unloading areas, storage yards and rubbish collection closures;
  - g) the location, orientation and design of buildings and the space between buildings; and
  - h) such other information considered relevant by the Shire of Ashburton. Variations to the provisions of the R-Codes (other than density) shall be allowed.



**CERTIFICATION OF STRUCTURE PLAN**

This Structure Plan is prepared under the provisions of the Shire of Ashburton Town Planning Scheme No. 7

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

Date: .....

Signed for and on behalf of the Western Australian Planning Commission:

.....

an Officer of the Commission duly authorised by the Commission pursuant to Section 16 of the Planning and Development Act 2015 for that purpose, in the presence of:

Witness: .....

Date: .....

Date of Expiry: .....

LEGEND	OVERALL YIELDS
	STRUCTURE PLAN AREA 199,136.3ha 100%
	RESERVE (PARKS, RECREATION & DRAINAGE) 10,135.4ha 5.0%
	EDUCATION 4,752.4ha 2.4%
	SPECIAL USE (PUBLIC PRECINCT) 9,000.0ha 4.5%
	SPECIAL USE (LARGE LIVE WORK LOTS) 14,068.0ha 7.1%
	RESIDENTIAL R30 91,932.8ha 46.1%
	AREA SUBJECT TO FURTHER INVESTIGATION 21,899.0ha 11.0%
	INVESTMENT 3,486.0ha 1.8%
	RESERVE (INFRASTRUCTURE) 10,709.8ha 5.4%
	WATER CORP UTILITIES SITE 33,194.1ha 16.7%
	COMPATIBLE LAND USES ONLY N/A N/A
	BUFFER FROM TOWN WWTP N/A N/A
	EXISTING CADASTRE N/A N/A
	TOTAL 199,136.3ha 100%

FIG. A.4

**ONSLow TOWNSITE EXPANSION STRUCTURE PLAN**

This concept has been prepared for the purposes of meeting client specifications. It does not constitute an intention agreement or contract for any part thereof, if any, and is subject to change without notice.

Although care has been taken in the preparation of this drawing by The Planning Group WA, the user of this drawing shall be responsible for its use and for any errors or omissions. The right is reserved to change this plan at any time.

Liability is expressly disclaimed by The Planning Group WA Pty Ltd for any loss or damage which may be sustained by any person acting on any oral representation gained from this.

Created: 11.11.2019  
 Drawn: 11.11.2019  
 Checked: 11.11.2019  
 Approved: 11.11.2019

**A.3 PROPOSED DEVELOPMENT PLAN**

Figure A.5 shows the overall Masterplan for the proposed Onslow Township Village, as prepared by Milieu Creative.





#### **A.4 SWEPT PATH ANALYSIS**

Figures A.6 to A.10 show a number of swept path diagrams, confirming the overall access arrangements and servicing requirements for the proposed development, as follows:

- Figure A.6 shows the swept paths confirming that the recommended concept plan for access off Third Avenue can accommodate a 12.5 metre Heavy Rigid Vehicle accessing the site at the same time as passing a B99 Car.
- Figure A.7 shows swept paths for a 12.5 metre Bus accessing and circulating around the proposed pick-up/drop-off zone, while Figure A.8 shows the swept paths for a 12.5 metre Heavy Rigid Vehicle accessing the proposed service yard and loading dock adjacent to the Restaurant.
- Figure A.9 then shows the swept paths for a 10-metre Rubbish Truck accessing the proposed service yard for bin collection adjacent to the Restaurant, before proceeding to the Maintenance Area for further collections.
- Figure A.10 then shows the swept paths for an 8.8 metre Medium Rigid Vehicle accessing the proposed Maintenance Area, and the proposed Fire Access route along the internal pathways.



SOURCE: ULOTH & ASSOCIATES

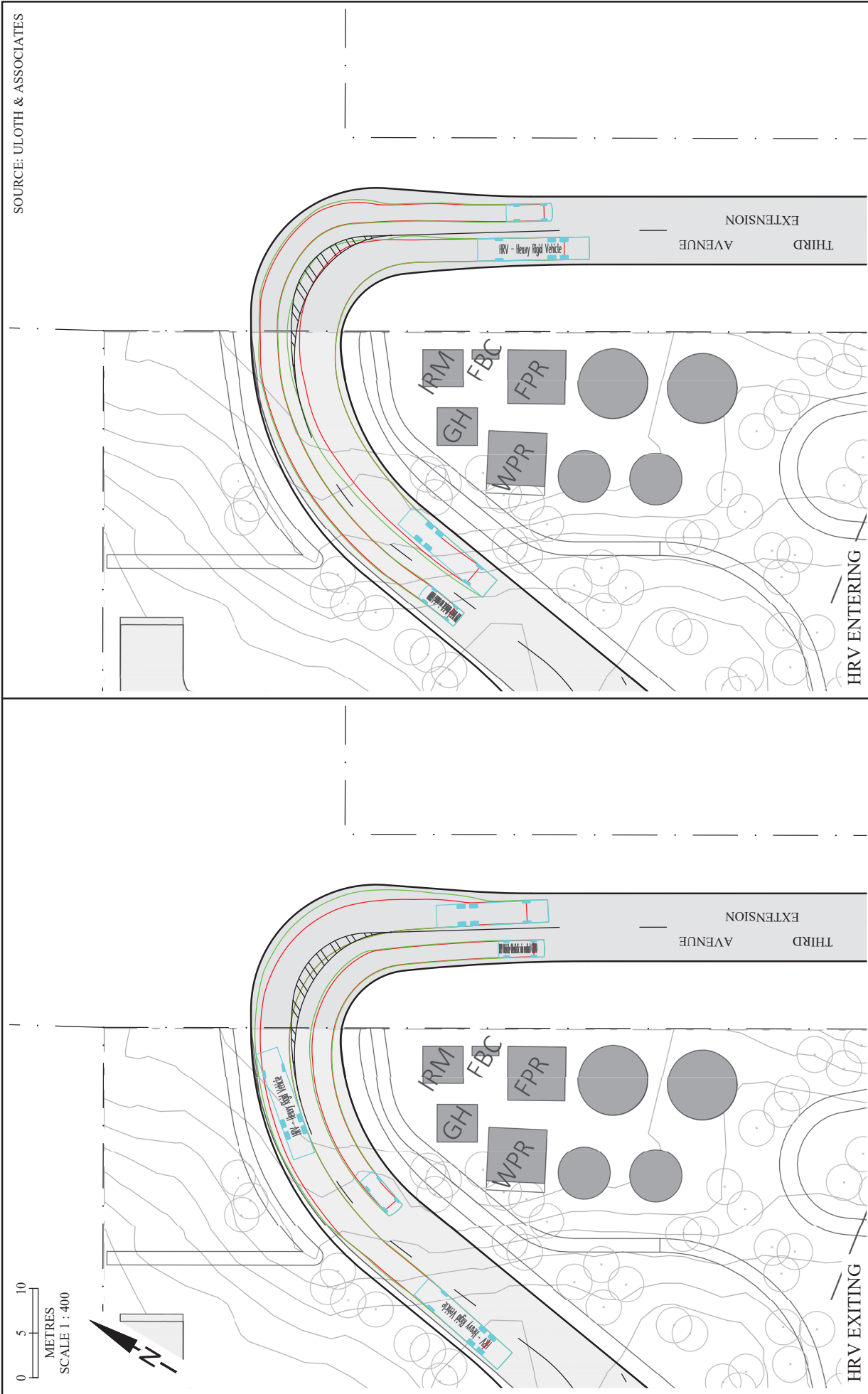
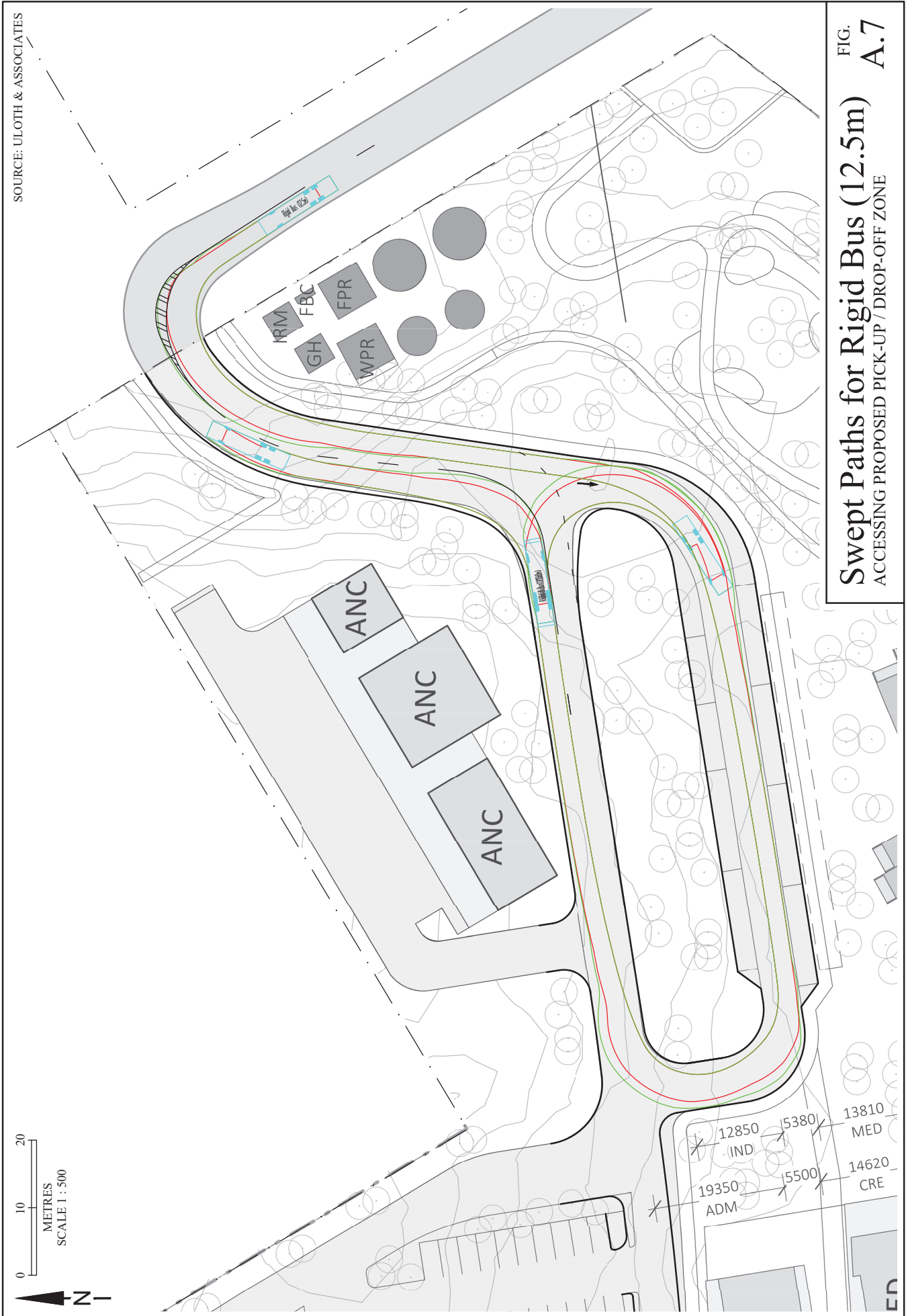


FIG. A.6  
Swept Paths for HRV (12.5m) and B99 Car (5.2m)  
ACCESSING THE SITE OFF THIRD AVENUE

SOURCE: ULOTH & ASSOCIATES

FIG. A.7  
**Swept Paths for Rigid Bus (12.5m)**  
ACCESSING PROPOSED PICK-UP / DROP-OFF ZONE





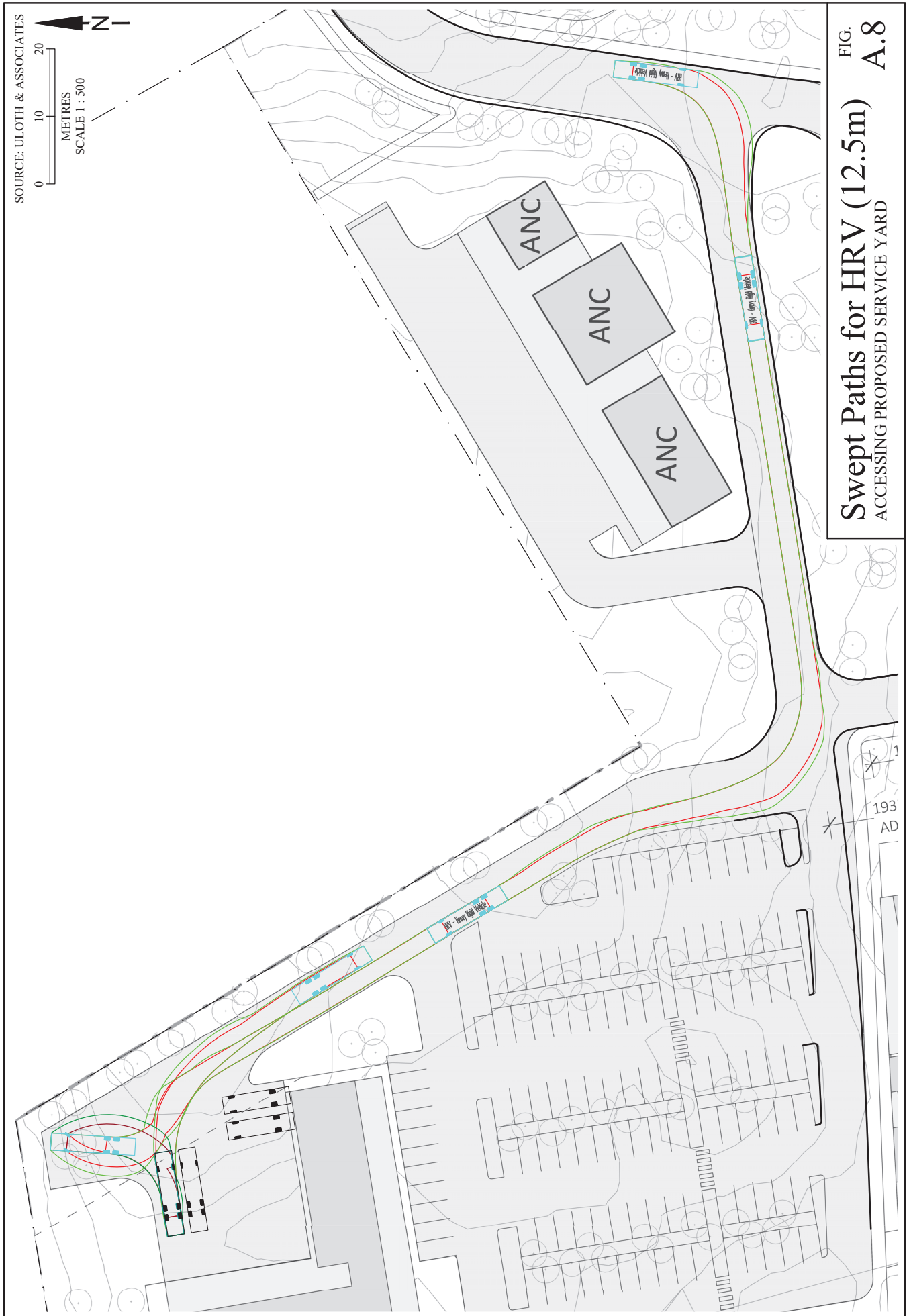


FIG. A.8  
**Swept Paths for HRV (12.5m)**  
ACCESSING PROPOSED SERVICE YARD

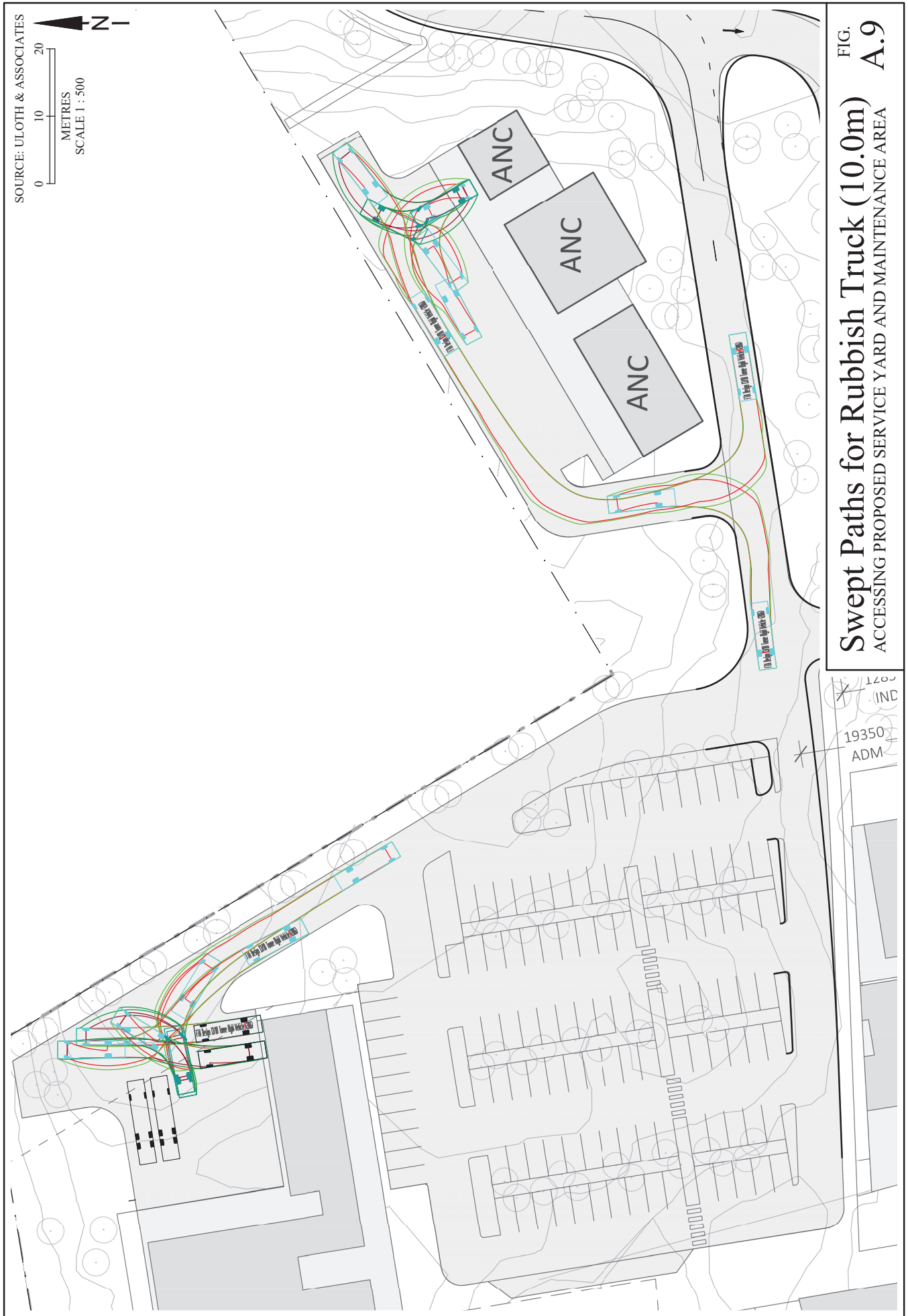


FIG. A.9  
Swept Paths for Rubbish Truck (10.0m)  
ACCESSING PROPOSED SERVICE YARD AND MAINTENANCE AREA



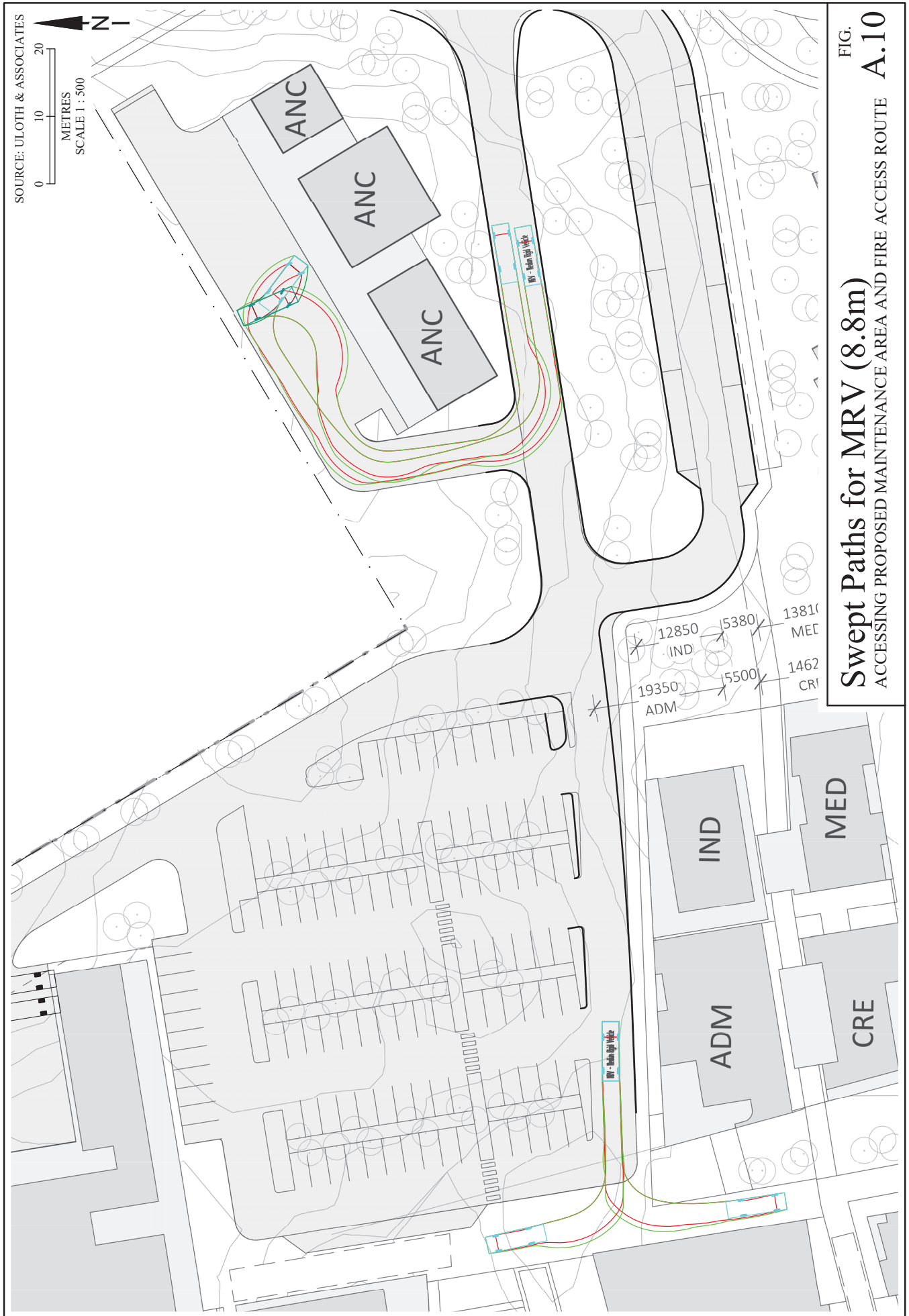


FIG. A.10  
**Swept Paths for MRV (8.8m)**  
ACCESSING PROPOSED MAINTENANCE AREA AND FIRE ACCESS ROUTE





# ATTACHMENT 10

## ACOUSTIC ASSESSMENT



# Onslow Township Village

## Revision

Revision	Date	Comment	Prepared By	Approved By
001	30/07/2021	Draft Acoustic DA	BEM	IK
002	05/08/2021	Acoustic DA	BEM	IK
003	25/08/2021	Updated Acoustic DA	BEM	IK



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## Executive Summary

Stantec has been appointed by Mineral Resources Limited (c/- Milieu Creative Design Group) to undertake acoustic assessment for the Onslow Township Village project. The project will see the development of a permanent resort style accommodation facility located in Onslow WA.

In support of the Development Application, an acoustic assessment has been carried out in order to satisfy the requirements stated in the relevant policies and guidelines applicable to the project. This includes:

- *Western Australian Environmental Protection (Noise) Regulation 1997 (EPNR);*
- *Australian and New Zealand Standard AS/NZS 2107:2016 - Acoustics – Recommended design sound levels and reverberation times for building interiors (AS 2107);*
- *National Construction Code 2016 Volume 1, Amendment 1, Building Code of Australia Class 2, 3 and 9c Buildings (NCC 2019);* and
- The project Functional Brief, Milieu Creative, *210712\_ONS\_Functional Brief\_Rev1*, including comments from Mineral Resources Limited / Rowe Group received 15<sup>th</sup> July 2021.

This report details the relevant acoustic criteria for providing a suitable level of acoustic amenity for occupants of the proposed development, as well as for nearby receivers, including:

- Airborne sound insulation requirements for accommodation pods;
- Internal noise levels resulting from noise intrusion from mechanical services and via the façade due to external sources (including Onslow Salt noise emissions); and
- Noise emissions from the proposed development to the nearest noise sensitive receivers.

### **External Noise Intrusion**

A noise intrusion assessment has been carried out and the minimum recommended external façade construction has been provided in the form of external glazing and wall configurations. Noise levels at the building façades were predicted, based on available data of Onslow Salt noise emissions (TPG *Onslow Townsite Expansion Structure Plan 2016, Appendix 4 – Acoustic*).

The external facades will require the following minimum glazing configuration in order to achieve the internal noise targets stipulated in AS 2107:

- Double Glazing Unit – 6mm glass / 12mm air gap / 6mm glass.

Ambient noise levels are to be measured on the project site during design development, to confirm façade performance requirements.

### **Noise Emissions**

Major sources of noise emissions have been identified as the tavern, restaurant, car parking, loading dock, waste collection and mechanical plant. These items (other than mechanical) have been predicted to comply with the EPNR based on predictive assessment at the DA stage, given the noise management measures provided.

Mechanical plant emissions will be assessed in detail as the design develops and information becomes available. Recommendations will be provided to ensure compliance to the EPNR where required.



# 1. Introduction

## 1.1 Overview

Stantec has been appointed by Mineral Resources Limited (c/- Milieu Creative Design Group) to undertake acoustic assessment for the Onslow Township Village project. The project will see the development of a permanent resort style accommodation facility located in Onslow WA.

This report presents the key acoustic considerations and criteria pertinent to the project. The criteria will form the basis of the acoustic design for the following areas:

- External noise impacts on the development; and
- Noise emissions from the site.

## 1.2 Project Location

The project site is located near Beadon Point in the township of Onslow, with residences to the south and east. The east side of Second Ave is zoned as commercial land.

Figure 1 below shows the surrounding area of the project location. Traffic and other external noise sources are expected to be minimal compared with Onslow Salt operations to the south and west of the site.



Source: NearMaps

Figure 1: Site location and surrounding area

## 2. Acoustic Criteria

The acoustic criteria presented in this Development Application report are derived from the following documentation;

- *Western Australian Environmental Protection (Noise) Regulation 1997 (EPNR);*
- *Australian and New Zealand Standard AS/NZS 2107:2016 - Acoustics – Recommended design sound levels and reverberation times for building interiors (AS2107);*
- *National Construction Code 2016 Volume 1, Amendment 1, Building Code of Australia Class 2, 3 and 9c Buildings (NCC 2019); and*
- The project Functional Brief, Milieu Creative, 210712\_ONS\_Functional Brief\_Rev1, including comments from Mineral Resources Limited / Rowe Group received 15<sup>th</sup> July 2021.

### 2.1 Environmental Protection (Noise) Regulation 1997

Environmental noise impacts resulting from the noise emissions from the project are addressed through the Environmental Protection Act 1986, with the regulatory requirements detailed in the Environmental Protection (Noise) Regulations 1997 (EPNR).

The EPNR establishes the maximum permissible noise emission levels (assigned levels) to be received at all adjacent noise-sensitive premises during specific periods of the day as a result of the cumulative noise emissions from all sources proposed for the project site. Compliance to relevant noise limits outlined in the EPNR is compulsory.

The EPNR states noise emissions from any premises are considered not to *significantly contribute to* the noise at a receiver if the noise emissions are 5 dB or below the assigned levels.

In brief, the assigned levels are determined by considering of the amount of commercial and industrial zones, as well as main transport corridors and sporting venues surrounding the noise sensitive premises. The assigned levels apply at premises receiving the noise (noise sensitive receiver) and not to areas within the project site or lot. In addition, the Environmental Protection (Noise) Regulations 1997 identify the following in Schedule 3, clause 2A.

*“If the land within either of the circles is categorised on the land use map as land in respect of which mixed uses are permitted, the use of that land that results in the highest influencing factor is to be used in the determination of the influencing factor.”*

The nearest noise sensitive receivers have been considered as the residential properties along the south and east of the site, with representative addresses selected as:

- 1 First St; and
- 5 Hedditch St, Onslow WA.

For the purpose of determining the Influencing factor for these premises, the land zoning provided on the Shire of Ashburton Town Planning Scheme No. 7 plot dated 27<sup>th</sup> March 2019 has been used to ascertain land use.

Traffic data for roads surrounding the nearest noise sensitive receivers were obtained from Main Roads Western Australia (MRWA) on the 29<sup>th</sup> July 2021. It is assumed that no significant roads are present within 450m of the nearest receivers. The available traffic data for Onslow Rd, which continues into Simpson St and Second Ave, is presented in Table 1.

**Table 1: Traffic count data (MRWA)**

Transport Corridor	EPNR Classification <sup>1)</sup>	Average Daily Traffic Volumes					
		2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Onslow Rd (North of Ansia Access Rd)	None	—	—	531	552	426	535

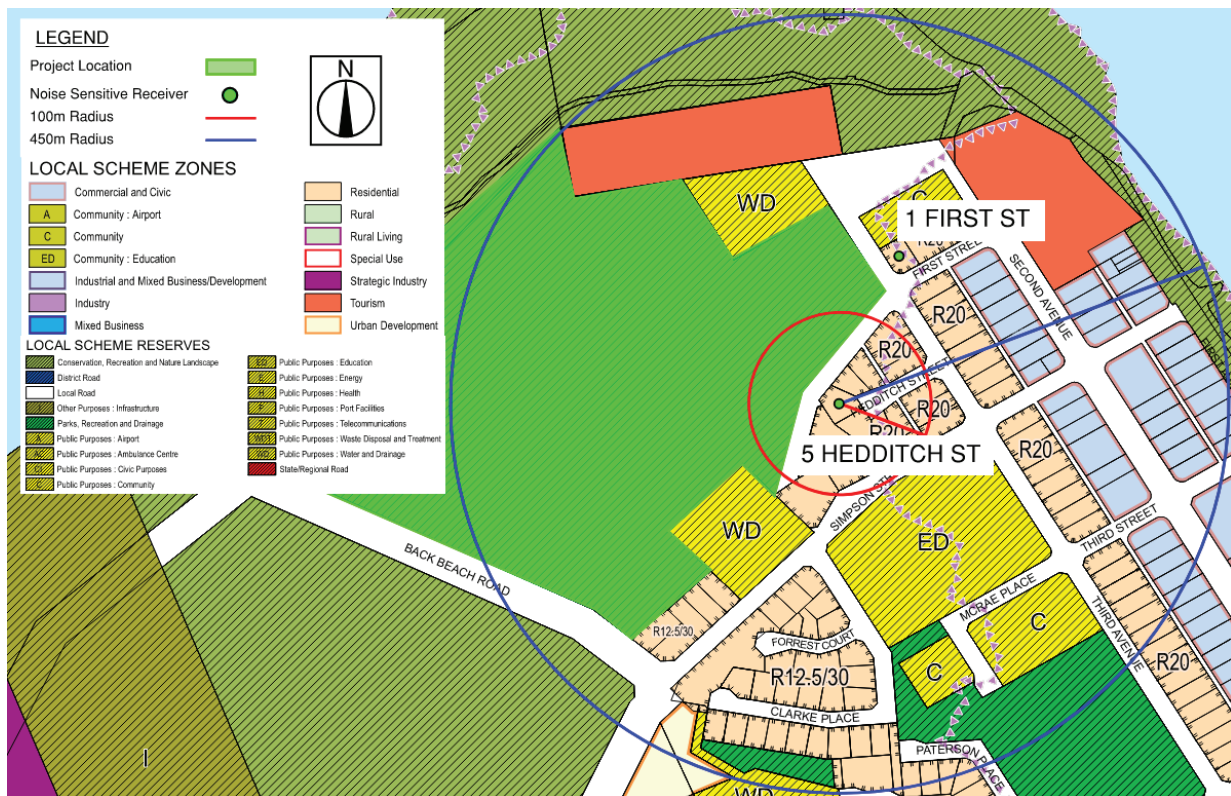
<sup>1)</sup> As defined by the EPNR. Secondary roads have between 6000-15000 vehicles per day. Major roads have greater than 15000 vehicles per day.

### 2.1.1 Influencing Factor

The influencing factor for the receivers identified results from identifying major roads, commercial and industrial areas for all nearest noise sensitive receivers is 0 – 1 dB, as summarised in Table 2.

**Table 2: Influencing factor (IF)**

Noise Sensitive Premises	Commercial Zones	Industrial Zones	Transport Corridors	Influencing Factor
1 First St	4 % within a 100 m radius 7 % within a 450 m radius	0 % within a 450 m radius	None within 450 m radius	1 dB
5 Hedditch St	0 % within a 100 m radius 7 % within a 450 m radius	0 % within a 450 m radius	None within 450 m radius	0 dB



Source: Shire of Ashburton Town Planning Scheme No. 7, Mar 2019

**Figure 2: Zoning map of areas surrounding the project site**

### 2.1.2 Assigned Noise Levels for Nearest Sensitive Receivers

Table 3 summarises the most stringent assigned levels at the nearest noise sensitive premises. It is required that all noise emissions from the development are below the assigned level for all defined periods of the day and at the lot boundary of the receiver or 15m from any associated building. It is noted that the EPNR assigned levels only apply at the premises receiving the noise only and not to noise within the site.



**Table 3: Assigned levels for 5 Hedditch St**

Type of premises receiving noise	Time of day	Assigned Level (dB)		
		L <sub>A10</sub>	L <sub>A1</sub>	L <sub>Amax</sub>
Noise sensitive premises: Highly sensitive area	0700 to 1900 hours Monday to Saturday	45	55	65
	0900 to 1900 hours Sunday & public holidays	40	50	65
	1900 to 2200 hours all days	40	50	55
	2200 hours on any day to 0700 hours Monday to Saturday, and 0900 hours Sunday & public holidays	35	45	55
Noise sensitive premises: any area other than highly sensitive areas	All Hours	60	75	80
Commercial premises	All Hours	60	75	80
Industrial and utility premises	All Hours	65	80	90

### 2.1.3 Noise Character Adjustments

Regulation 7 states that the noise character must be “free” of annoying characteristics, namely —

- Tonality, e.g. whining, droning;
- Modulation, e.g. like a siren; and
- Impulsiveness, e.g. banging, thumping.

Regulation 9 (1) establishes the methodology for determining noise characteristics. If these characteristics cannot be reasonably and practicably removed, a series of adjustments to the measured levels are required, indicated in Table 4.

**Table 4: Noise character adjustment**

Adjustment where noise emission is not music these adjustments are cumulative to a maximum of 15 dB			Adjustment where noise emission is music	
Where tonality is present	Where modulation is present	Where impulsiveness is present	Where impulsiveness is not present	Where impulsiveness is present
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 dB

### 2.1.4 Noise Emissions mechanical services

At this stage no information has been on mechanical equipment. Typically, projects of this type involve noise emissions from mechanical services such as air conditioning units and condensers and exhaust fans.

It is important that noise emissions from the site do not present any form of tonality, modulation or impulsiveness (as defined by the EPNR).

Given that data from mechanical plant manufacturers is generally limited to broadband data or in 1/1 octave band value, it is not possible to objectively determine tonality, as it is described in the EPNR. 1/3 octave band data is required yet is typically unavailable.

Therefore, a +5 dB correction shall be conservatively assigned when assessing noise emissions from mechanical equipment. In summary, night-time noise emissions from mechanical equipment shall comply with  $L_{A10}$  30 dB at the nearest noise sensitive receiver (5 Hedditch St).

## 2.2 Internal Noise Levels and Reverberation Times

The criteria recommended in Table 5 are based on the limits presented in Australian Standard 'Acoustics – Recommended design sound levels and reverberation times for building interiors' (AS 2107:2016). The levels stated in AS 2107:2016 apply to the combined internal noise levels from building services and external sources. The internal noise level criteria in AS2107 recommend continuous equivalent ( $L_{Aeq}$ ) levels for background noise. This document is a common reference for establishing satisfactory goals for quasi-static mechanical and external noise ingress. AS2107 also provides recommended reverberation times for optimising the acoustic amenity in occupied spaces.

**Table 5: Design internal noise levels and recommended reverberation time (AS2107)**

Type of occupancy/activity	Recommended design sound level, $L_{Aeq}$ dB(A)	Reverberation Time (Seconds)
Sleeping areas (Accommodation Pods)	30 – 35	—
Creche	40 – 45	0.4 – 0.6
Common areas (e.g. games rooms)	45 – 50	< 1.0
General office areas	40 – 45	0.4 – 0.6
Open Plan Office	40 – 45	0.4 <sup>(1)</sup>
Meeting Room (8 pax)	30 – 40	0.2 – 0.4 (Video Conferencing)
Training Rooms	30 – 40	0.2 – 0.4 (Video Conferencing)
Prayer Room, Meditation	40 – 45	< 0.6
Corridors and lobby spaces	40 – 50	< 1.0
Kitchens and service areas	45 – 55	—
Activity rooms/ Games room	45 – 50	—
Gym	< 50	< 1.0
Cafe	45 – 50	See Note 1
Restaurant	45 – 50	See Note 1
Tavern	< 50	0.6 – 1.0
Crib Room	40 – 45	0.4 – 0.6
Consult Rooms	40 – 45	0.4 – 0.6
Physio Rooms	40 – 45	0.4 – 0.6
Waiting rooms / reception areas	40 – 50	0.4 – 0.6

Note 1: Reverberation time should be minimised as far as practicable for noise control.

## 2.3 Sound Transmissions and Insulation — National Construction Code 2019

The acoustic requirements for inter-tenancy walls, floors etc. in residential buildings are outlined in NCC 2019. The general acoustic requirements for buildings of these classes are summarised in Table 6.

The Accommodation Pods have been considered Class 3 buildings. Building Certifier to confirm.

**Table 6: Sound insulation requirements in accordance with NCC 2019**

Construction	Condition	Deemed-to-Satisfy Requirements	Verification Requirements
<b>Walls</b>	<b><u>Airborne Sound Insulation</u></b>		
	Between sole-occupancy units	Minimum $R_w + C_{tr}$ 50	Minimum $D_{nT,w} + C_{tr}$ 45
	Between a sole-occupancy unit and a plant room, lift shaft, stairway corridor, public corridor or the like	Minimum $R_w$ 50	Minimum $D_{nT,w}$ 45
	<b><u>Impact Sound Insulation</u></b>		
	Between a laundry, kitchen, bathroom or sanitary compartment in a sole-occupancy unit, and a habitable room in an adjoining unit	Discontinuous construction <sup>1)</sup>	As deemed to satisfy
	Between a sole-occupancy unit and a plant room or lift shaft	Discontinuous construction <sup>1)</sup>	As deemed to satisfy
<b>Floors</b>	<b><u>Airborne Sound Insulation</u></b>		
	Between sole-occupancy units and between sole occupancy unit and lift shaft, stairway or public corridor	Minimum $R_w + C_{tr}$ 50	Minimum $D_{nT,w} + C_{tr}$ 45
	<b><u>Impact Sound Insulation</u></b>		
	Between sole-occupancy units and between sole occupancy unit and lift shaft, stairway or public corridor	Maximum $L_{n,w}$ 62	Maximum $L_{nT,w}$ 62
<b>Services</b>	<b><u>Airborne Sound Insulation</u></b>		
	Between a habitable room (other than a kitchen) in a sole-occupancy unit and a duct, soil, waste or water supply pipe duct (if the duct or pipe is located in a wall or floor cavity and serves or passes through more than one sole-occupancy unit)	Minimum $R_w + C_{tr}$ 40	N/A
	Between a kitchen or non-habitable room in a sole-occupancy unit and a duct, soil, waste or water supply pipe duct (if the duct or pipe is located in a wall or floor cavity and serves or passes through more than one sole-occupancy unit)	Minimum $R_w + C_{tr}$ 25	N/A
	If a storm water pipe passes through a sole-occupancy unit (habitable room other than kitchen)	Minimum $R_w + C_{tr}$ 40	N/A
	If a storm water pipe passes through a sole-occupancy unit (kitchen or non-habitable room)	Minimum $R_w + C_{tr}$ 25	N/A

1) For the purposes of this Part, "discontinuous construction" means a wall having a minimum 20 mm cavity between two separate leaves.



## 2.4 Green Building Council of Australia Green Star Rating

The Sustainability Consultant is to advise if a Green Building Council of Australia (GBCA) star rating (or equivalency) is to be targeted. If so, they should confirm the version of the GBCA submission guidelines to be used and whether any Acoustic Credits are being targeted.

Achievability of Acoustic Credits will be reviewed as the design progresses further.

## 2.5 Further Acoustic Considerations

Based on Stantec Acoustics discussions with the architect, the following will be factored into acoustic design of the project;

- Acoustic separation performance of party walls and bounding walls of sole occupancy units (accommodation pods) is typically addressed through NCC 2019, which provides the bare minimum requirements. Additional treatments above what is typically recommended in NCC 2019 (e.g. to achieve Green Star Acoustic Credits) could incur additional cost to the project;
- Gym floors should incorporate a floor raised by 150mm in order to accommodate a typical vibration isolating sprung floor system;
- Noise emissions from the services and plant will need consideration. At these stages of the project equipment details are typically unavailable. However, detailed reviews of mechanical plant shall be conducted during design development stages of the project.

## 3. Acoustic Environment

### 3.1 Historical Information

Understanding the existing acoustic environment of the project site is critical and based on the information available, it is apparent that the Onslow Salt operations (24hrs) drive the ambient noise levels across the township at all times of day.

At the Development Application stage, the design environmental noise levels have been predicted based on available information.

The TPG *Onslow Townsite Expansion Structure Plan 2016, Appendix 4 – Acoustic* is the report *11061853-01 Onslow Salt Draft* by Lloyd George Acoustics (LGA) dated 12<sup>th</sup> November 2011. The report includes a summary of the noise data collected by Onslow Salt over the period 2001 – 2011, stating the mean  $L_{A10}$  daytime and night-time noise levels measured at the Onslow Salt Clarke Place noise monitor during times where Onslow Salt was operational.

The reported noise levels were, to the nearest decibel:

- Daytime (0700 – 1900hr) mean  $L_{A10}$  – 54 dB(A); and
- Night-time (2200 – 0700hr) mean  $L_{A10}$  – 47 dB(A).

### 3.2 Design Noise Intrusion Levels

Design environmental noise levels have been selected, allowing for the predicted growth of Onslow Salt operations since 2011 and accounting for a 20-year design horizon on the project.

While no spectral content of the recorded data was made available, the frequency content has been predicted based on the weighted average of noise data provided in Table 3.2 of the LGA report.

The design environmental noise levels are provided in Table 7. The design considers daytime noise levels intruding into bedrooms, as night-shift personnel may be sleeping during the day and require adequate acoustic amenity for this.

**Table 7: Design Environmental Noise Levels at the Project Site**

Noise Source	$L_{eq}$ dB(A)	1/1 Octave Band Sound Pressure Levels (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Onslow Salt Operations (Daytime Predicted)	<b>60</b>	57	58	56	56	55	53	51	50

Ambient noise levels are to be measured on the project site during design development, to confirm façade performance requirements.

## 4. Noise Intrusion

Noise intrusion assessments for the proposed sensitive spaces associated with the project were conducted based on the predicted environmental noise levels. External wall and glazing have been provided according to the noise intrusion assessment results with the view of providing satisfactory internal noise levels that achieve the internal noise level criteria detailed in this report.

As the design develops, the DA stage assessment will need to be calibrated using on-site noise measurements.

Roof configuration recommendations have also been provided, based on a design rain noise rate of 15mm/hr.

Calculations were undertaken following the methodology described in British Standard BS EN 12354:2000 and by utilizing the highest predicted noise levels at each façade to determine suitable glazing to address the noise sensitive of each space. Appropriate corrections were applied to the linear spectral noise levels to compensate for potential losses due to flanking paths and façade correction.

### 4.1 External Envelope

#### 4.1.1 External Walls

Based on the latest architectural layouts (received 20<sup>th</sup> August 2021), it is evident that the building envelope will consist of primarily glazed elements. The noise intrusion has been calculated for all façade elements relative to their surface area.

Where solid elements are used as the external wall, the walls are recommended to achieve  $R_w + C_{tr}$  45 as a minimum. Typically, this can be achieved with the following configuration:

- 110mm Concrete Panel; or
- Min. 250mm thick rammed earth wall (CSIRO 1987, *Bulletin No. 5 Earth-Wall Construction*).

Alternative construction material may be used to achieve the required performance. This will, however, require review and approval of the Acoustic Engineer.

Where lightweight construction is proposed, this will result in reduced acoustic performance, specifically in the lower frequencies. The following configuration ( $R_w + C_{tr}$  36) is recommended as a minimum for lightweight external walls:

- Colorbond 0.55mm or sheet steel equivalent;
- 150mm steel stud;
- 90mm glass wool insulation (density 14 kg/m<sup>3</sup>) within the stud cavity; and
- 2 layers of 13mm standard plasterboard to the internal face.

Alternatively, where 9mm fibre cement sheet is used as the external face, 1 layer of 13mm standard plasterboard may be used for the internal face.

#### 4.1.2 External Glazing

Glazing configurations to achieve the required internal noise levels have been provided, taking into consideration the predicted external noise levels. This configuration is to achieve acceptable internal noise levels considering the existing acoustic environment. Assessment of glazing configuration to mitigate noise intrusion from other sources (e.g. mechanical services) will be undertaken as the design progresses.

To ensure compliance to the recommended internal noise levels specified in Table 5, the treatments as detailed in Table 8 shall be applied. It is assumed that double glazed systems are required to achieve the project thermal performance criteria.



**Table 8: External Glazing Recommendations**

Glazing Configuration	R <sub>w</sub> + C <sub>tr</sub>	Spectrum Sound Transmission Loss (dB)						
		63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2kHz	4k Hz
6mm glass + 12mm air gap + 6mm glass	<b>30 (35, -5)</b>	23	25	21	35	41	37	39

*Note: Glazing performance provided for glass only. Overall performance of the glazing system including the frames and seals shall not degrade by more than 3 dB as per the performance requirement stated.*

### 4.1.3 Roof Construction

Whilst it is not a mandatory requirement of the NCC, rain noise intrusion shall be considered with a view of ensuring an adequate level of amenity for occupants. Additionally, roof construction should be adequately designed to control external noise intrusion from noise sources identified in this report. 150mm thick concrete is generally adequate for this.

It is strongly recommended to use a concrete base for any roof mounted plant to prevent mechanical services noise intrusion.

Where a lightweight roof is used (e.g. Accommodation Pods), the following construction is generally adequate to fulfil the rain noise requirements.

One layer of Colorbond sheet metal or similar (0.55 mm); and

- 75 mm thick high-density Anticon insulation hard-fixed to the underside of roof and over steel purlins;
- Minimum ceiling cavity to be 300mm;
- Suspended ceiling system; and
- Min. 50 mm thick glass wool insulation (min. 14kg/m<sup>3</sup>) over one layer of 13 mm standard plasterboard.

## 5. Noise Emissions

### 5.1 Overview of Assessment

Noise emissions from all possible noise emitting sources proposed redevelopment are required to comply with the *Environmental Protection (Noise) Regulations 1997* (EPNR).

The following noise sources have been identified based on proposed architectural layouts;

- Tavern and Restaurant (patrons and music emissions, particularly in alfresco areas);
- Car parking (vehicle movements, audible reversing beacons and closing of doors)
- Loading dock and service vehicle deliveries;
- Waste and recycling collection and disposal;
- Children playing at the creche; and
- Mechanical plant serving the site.

To determine compliance to the assigned level criteria detailed by the EPNR (refer to Section 2.1 of this report), acoustic assessments of the above sources were undertaken, based on details provided by the design team and current architectural package (received 20<sup>th</sup> August 2021).

Noise emissions assessments have been undertaken using current noise modelling software (SoundPLAN v8.2). Design advice and recommendations have been detailed to ensure predicted compliance to the EPNR. Noise contours are presented in Appendix B.

Mechanical plant details have not been provided at this stage and will be included in the acoustic assessment once available. Appropriate treatments to ensure compliance with the EPNR (e.g. solid barriers, acoustic cowlings/louvres, low noise fans) will be recommended if required.

### 5.2 Noise Model Inputs

#### 5.2.1 Topography

The topographical data for the project site and surrounding areas was sourced from Geoscience Australia 2011, *1 Second SRTM Derived Digital Elevation Model (DEM)*.

#### 5.2.2 Ground Absorption

A ground condition of 0 refers to flat non-porous surfaces that are highly reflective to noise and a ground condition of 1 refers to highly absorptive.

A ground factor of 0.6 was assumed in the model to account for attenuation due to ground absorption with relatively sparse vegetation cover. A ground factor of 0 (fully reflective) was used over water.

#### 5.2.3 Meteorological Conditions

The CONCAWE algorithm has been selected for meteorological conditions, as presented Table 9, and have been factored into the model in consideration of the worst case environmental conditions for propagation of noise.

**Table 9: Meteorological Conditions Incorporated into the Noise Model**

Parameter	Day (0700 – 1900)	Evening / Night (1900 – 0700)
Temperature	20	15
Humidity	50	50

Parameter	Day (0700 – 1900)	Evening / Night (1900 – 0700)
Wind Speed (m/s)	4	3
Wind Direction	All	All
Pasquill Stability Class	E	F

## 5.3 Tavern and Restaurant Noise Emissions

The Tavern and Restaurant are located nearest to Beadon point, approximately 100m away from the nearest accommodation pod and 250m away from external noise sensitive receivers. The restaurant and tavern are designed to accommodate many patrons, both having large alfresco areas.

### 5.3.1 Operating Hours

The anticipated operating hours of the tavern and restaurant have been advised to be:

- Tavern – 6-9 AM and 5-9 PM;
- Restaurant – 4-8 AM and 4-8 PM.

These operating periods cater for shift workers and cover all assessment periods of the EPNR.

### 5.3.2 Sound Power Levels

The technical research paper '*Prediction of Noise from Small to Medium Sized Crowds*' (Hayne et al., November 2011), was used to estimate patron noise levels.  $L_{10}$  patron Sound Power Levels are approximated by the formula  $15 \cdot \text{Log}(N) + 67$ , where N is the number of patrons.

Patron noise levels used in the noise emissions assessment have considered the following:

- Sound level associated with speech from a 50% mixture of male and female patrons;
- Corrections for elevated patron noise in the tavern, due to the consumption of alcohol (+3 dB); and
- Even distribution of patrons around the outdoor areas.

It is assumed that music will be set at an ambient or “conversational” level for the majority of the time. However, occasional live music acts are expected to perform at the venue. As such, low frequency attenuation becomes increasingly pertinent when proposing treatments for music as a source of noise compared with crowd noise at a numerically equivalent sound power level.  $L_{10}$  spectral noise data for music was sourced from measured levels on similar Stantec projects. The design does not allow for the use of sub-woofers with high low-frequency output.

An acoustic assessment was conducted for patrons and music within the tavern and restaurant alfresco areas. Noise from the alfresco areas is assumed to dominate emissions, as the architectural drawings show the indoor seating areas as being fully enclosed, with emissions thereby attenuated by the building facades (performance specified in Section 4.1). Noise management measures have been proposed to achieve compliance to external noise levels as per the EPNR.

Patron and music noise inputs to the noise model are presented in Table 10.

**Table 10: Patron and Music Sound Power Levels – Tavern and Restaurant Alfresco Areas**

Time of Day	Number of Patrons in Alfresco Areas	Patron SWL, dB(A)	Music SWL <sup>(1)</sup> , dB(A)
0700 to 1900 hours Monday to Saturday;	Tavern: 80 Patrons	99	85



Time of Day	Number of Patrons in Alfresco Areas	Patron SWL, dB(A)	Music SWL <sup>(1)</sup> , dB(A)
0900 to 1900 hours Sunday and Public Holidays; and 1900 to 2200 hours all days.	Restaurant: 80 Patrons	96	85
2200 hours on any day to 0700 hours Monday to Saturday; and	Tavern: 60 Patrons	97	85
0900 hours Sunday & public holidays	Restaurant: 80 Patrons	96	85

Note 1: Music levels were set for each scenario such that they would not become audible over patron noise and attract adjustments to the received level per the EPNR criteria. Refer to Section 5.3.4 for noise management measures required.

### 5.3.3 Results

Patron and music noise prediction results are presented in Table 11. Compliance to the EPNR is predicted at all times of day for residences around the project site, provided the management measures in Section 5.3.4 are adhered to. Noise contours are presented in Appendix B.

Noise levels at the Accommodation Pods are predicted to be up to 56 dB(A) externally, below the design level of 60 dB(A).

**Table 11: Tavern and Restaurant Noise Emissions at External Receivers**

Time of Day	Most Stringent EPNR L <sub>A10</sub>	1 First St	2 Second Ave	9 Third Ave	1 Hedditch St	3 Back Beach Rd	29 Simpson St	Complies ? (Y/N)
0700-1900 hr Mon-Sat; 0900-1900 hr Sun & Pub Hol; and 1900-2200 hr all days.	<b>40 dB(A)</b>	34	23	36	26	36	34	<b>YES</b>
2200 hr on any day to 0700 hours Mon to Sat; and to 0900 hr Sun & Pub Hol	<b>35 dB(A)</b>	32	21	34	25	35	33	<b>YES</b>

Note: Music levels were set for each scenario such that they would not become audible over patron noise and attract adjustments to the received level per the EPNR criteria.

### 5.3.4 Noise Management

**The tavern and restaurant amplifier systems should have known output sound levels via the controls to assist in ensuring music from the venue is inaudible at the receivers.** When music becomes audible at the receiver, adjustments of 10 – 15 dB are required per the EPNR, introducing a non-compliance. Music levels should be set based on field measurements to the south and east so as not to be audible at nearby receivers and attract adjustments for music as per the EPNR. It is not recommended for external parties to bring their own speaker systems to the venue nor that music is played in the outdoor areas above what may be considered an “ambient” level (e.g. patrons remain able to converse

without raising their voices). Noise emissions from the venue should be addressed in the venue operations noise management plan.

The following is recommended for any amplifier / PA system used in the tavern and restaurant:

- Music must not become audible at nearby receivers. Note that where the noise received at a premises is music, adjustments to the received level are required when assessing compliance to the EPNR. Should music become audible and dominant, adjustments of +10 to 15 dB are required. This would likely result in non-compliance to the EPNR;
- It is critical that any music from the venue be level calibrated to a level where it is inaudible at the receiving premises and no higher than the Sound Power Levels advised in Table 10. The system should have known output sound levels indicated on the controls to assist in ensuring the amplified sound is kept within acceptable limits at nearby receivers. The limits should be set based on field measurements at nearby sensitive premises;
- The system should incorporate a frequency equalizer that is set to control low frequency sound (bass);
- The noise from the system (within the building and/or in alfresco areas) is to be calibrated by field measurements, limited so as not to exceed the set levels and made tamper proof; and
- Allowable music noise levels for indoor speakers within the building will be dependent on design of the external facades, which will be developed during further stages of design. Further management measures such as closing all external doors and windows may be required to achieve the desired noise levels.

Given the movement of patrons between indoor and outdoor areas, noise emissions from the venue should be managed, ensuring that they do not become a dominant source of noise at the site boundaries at any time.

In addition, the following administrative controls are recommended:

- The venue amplifier / PA system should be locked away, accessible by management only; and
- Venue staff are to monitor dispersal of patrons after closing and manage any noise issues arising.

## 5.4 Car Park Noise Emissions

Noise emissions from vehicle movements associated with car parks are formed by a combination of successive noise events. The complexity of these noise events can be difficult to accurately simulate as individual noise sources (i.e. vehicle parking bay turnover rates, location of noise event due such as motion (acceleration, deceleration), idling points, ignition, door slams etc.).

At the time of writing this report, information car park peak turnover and expected traffic movements has not been made available. Worst-case assumptions have been made for the purpose of predicting noise emissions at the DA stage.

The following assumptions were made regarding vehicle movements;

- Car parking areas on the project site were identified from the architectural drawings. Road surface of the car parks was assumed to be "asphaltic driving lanes" (i.e. sealed car parks);
- The night-time period of the EPNR was considered for assessment, with the majority of dayshift workers predicted to leave the camp prior to 7 AM on any day, with night-shift workers also returning to camp prior to this time after a shift;
- Worst-case vehicle movements per hour were estimated to be 200. Carpark movement noise emissions are considered to be dominant over the noise of passenger vehicles on the access road and will be assessable against the EPNR  $L_{A10}$  criterion;
- Up to four audible reversing beacons may be sounding concurrently at any one time, however this will occur less than 10% of the time and will be assessable against the EPNR  $L_{A1}$  criterion; and

- Car door slamming represents the worst-case maximum noise level at the external receivers and is assessable against the EPNR  $L_{Amax}$  criterion.

### 5.4.1 Sound Power Levels

For a thorough assessment of car park noise emissions, reference has been made to the technical research paper “*Prediction of parking area noise in Australian conditions*” from the Australian Acoustical Society Conference (Nicol and Johnson, 2011) and parking lot study “*Parking Area Noise – Recommendations for the Calculation of Sound Emissions of Parking Areas, Motorcar Centers and Bus Stations as well as of Multi-Storey Car Parks and Underground Car Parks*” (Bavarian Landesamt für Umwelt, 2007, 6<sup>th</sup> edn), referred to as BayLfU 2007.

The BayLfU formula for car park noise was used (SWL 63 dBA per movement), being adjusted for Australian conditions (+1 dB correction, Nicol and Johnson 2011) and for the  $L_{A10}$  statistical SWL parameter (+2 dB correction, Nicol and Johnson 2011). Correction for non-sealed surfaces or car park areas were not applied. The noise source was modelled as an area source in SoundPLAN at a height of 1.5m above ground level.

In addition, maximum levels resulting from car/truck doors slamming were modelled and assessed against the EPNR  $L_{Amax}$  criterion. The Sound Power Level was based on the average maximum noise level of car/truck door shutting according to BayLfU 2007, Table 19.

Noise source Sound Power Levels and their relevant assessment criteria are presented in Table 12.

**Table 12: Car Parking Activities Sound Power Levels and Assessment Criteria**

EPNR Criteria Applicable	Noise Sources	Sound Power Level, dB(A)
$L_{A10}$	Car parking maneuvers – Peak (200 movements)	89 <sup>1</sup>
$L_{A1}$	Reversing Beacons, 4 off	101 <sup>2</sup> (95 per unit)
$L_{Amax}$	Car/truck Door Closing, Maximum Level	100 <sup>3</sup>

Note 1: Based on BayLfU 2007, adjustments per Nicol and Johnson 2011.

Note 2: Based on WA Noise Regulation Branch, Department of Environment and Conservation 2012: Which is Safer - Tonal or Broadband Reversing Alarms? Adjusted to Sound Power Level.

Note 3: Based on BayLfU 2007 Table 19, adjusted to Sound Power Level.

### 5.4.2 Results

Results of the assessments are shown in Table 13 below, with each scenario assessed against a different statistical parameter. As these are the worst-case results, compliance is inferred for all nearby sensitive receivers. Noise contours are presented in Appendix B.

**Table 13: Car Parking Assessment Results**

Assessment Scenario	Assigned Level – Night, dB(A)	Highest Received Noise Level, at Receiver	Complies? (Y/N)
$L_{A10}$	35	34 dB(A) – 10 Third Ave	YES
$L_{A1}$	45	45 dB(A) – 10 Third Ave	YES
$L_{Amax}$	55	47 dB(A) – 5B First St	YES

### 5.4.3 Management Measures

The following management measures are recommended:

- Vehicles using the site carpark should be fitted with broadband type reversing alarms (referred to as “quackers” or croakers”) as opposed to “beepers”. This is especially critical where reverse parking is mandated by the Client.



**Tonality at the receiver locations would attract a +5 dB adjustment per the EPNR and may result in non-compliance;**

- Personnel may be notified in the site induction to arrive and leave the carpark in an orderly fashion, to minimise noise (e.g. no slamming of doors) so as not to disrupt their colleagues or the community.

## 5.5 Loading Dock and Waste Collection

Loading of goods is assumed to be from the Restaurant/Tavern loading dock area, which is located approx. 125m from the nearest accommodation pod and 250m from the nearest external receiver. The primary bin stores for waste collection are at the tavern/restaurant bin store and the maintenance shed bin store near the site entry point. Given the ambient noise levels due to continuous Onslow Salt operations, waste collection and loading dock operations are not expected to cause a significant loss of amenity.

### 5.5.1 Loading Dock

At the time of writing this report, information regarding delivery schedules and anticipated truck sizes has not been made available. Worst-case assumptions have been made for the purpose of predicting emissions at DA stage.

Noise emissions from loading docks are required to be compliant to the assigned levels outlined in the EPNR. Assessment of each noise source against the EPNR criteria ( $L_{A10}$ ,  $L_{A1}$ , or  $L_{Amax}$ ) is proportional to the period of the day, and the combined frequency and duration of each noise event.

Noise emissions which are likely to be present for  $\geq 10\%$  of the “representative assessment period” (24 minutes in 4 hours) are to be assessed against the  $L_{A10}$  criteria. Typically, a single truck is considered present for less than 10 % of a representative measurement period, and therefore, assessment is conducted against the  $L_{A1}$  criteria. However, the cumulative number of trucks in a “representative assessment period” may result in assessment against the  $L_{A10}$  criteria. Therefore,  $L_{A10}$  criteria has been used as a worst-case scenario.

To objectively assess truck movements and additional loading dock operations, Sound Power Levels of typical activities obtained from previous Stantec measurements have been used as model inputs. The noise sources modelled are provided in Table 14. The sources considered represent worst-case concurrent loading dock activities.

**Table 14: Sound Power Levels – Loading Dock Activities**

Noise Sources <sup>1</sup>	Sound Power Level, dB(A)
19m Semi-articulated truck driving and reversing	102
19m Truck unloading activities (i.e. forklifts, pallet trucks etc.)	95

*NOTE 1: The combined spectrum has been corrected based measurement conditions (i.e. distance, proximity to reflective surfaces etc.)*

Prediction results are presented in Table 15. Compliance to the EPNR, based on the assumption that the loading dock will be used between 0700 – 1900 hours Monday to Saturday only. Noise contours are presented in Appendix B.

Noise levels at the Accommodation Pods are predicted to be up to 49 dB(A) externally, below the design level of 60 dB(A).

**Table 15: Loading Dock Noise Emissions at External Receivers**

Time of Day	Most Stringent EPNR $L_{A10}$	1 First St	2 Second Ave	9 Third Ave	1 Hedditch St	3 Back Beach Rd	29 Simpson St	Complies? (Y/N)
0700-1900 hr Mon-Sat	45 dB(A)	42	35	42	38	37	35	YES