



# **Appendices**

**Ordinary Council Meeting**

**Thursday 26 August 2021**



# Minutes

## Local Emergency Management Committee

First Quarter  
Wednesday 4 August 2021

## Local Emergency Management Committee – 4 August 2021

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## Notice of Meeting

Minutes of the Local Emergency Management Committee meeting held at the Bushfire Centre of Excellence at 20 Dollyup Street, Nambelup on Wednesday 4 August 2021. Supt Craig Garrett from the Bushfire Centre of Excellence provided a tour of the building prior to the meeting. The Chairperson Mr. S Kirkham then declared the meeting open the time being 10:17am.

### 1. ATTENDANCES

#### Members

S Kirkham	LEMC Chairperson   Councillor, Shire of Murray
M Walmsley	LEMC Chairperson   Shire President, Shire of Waroona
S Hull	LEMC Executive Officer   LRC   MRES, Shire of Murray & Waroona
G Stevens	CESC, Shire of Murray & Waroona
B Jordan	MALC Manager, Shire of Murray
R Wilson	CBFCO, Shire of Murray
N Palmer (Proxy)	LEMC Deputy Chairperson   Acting Sgt, WAPOL Pinjarra
G Cresswell	Emergency Services Superintendent, Alcoa
M Cross	DEMA, DFES
P Dwyer	Unit Manager, Murray SES
K Jones	Brigade Captain, Pinjarra VFRS
C Hunter	Station Manager, St John Ambulance Pinjarra
C Louis	Principal, Pinjarra Primary School
C Thompson	Community Representative, Shire of Murray

#### Ex-Officio

C Goff	RESSO, Shire of Murray & Waroona
S Walker	RESSO/AWARE Project Officer, Shire of Murray & Waroona
J Carter	District Officer – Emergency Management, DFES
A Lewis	Project Engineer, Harvey Water

#### Guest

R Marlborough	Manager Governance, Shire of Murray
D Walker	BRPC, Shire of Murray, Waroona & Harvey

### 2. ABSENT

#### Members

S Macdonald (Apology)	WCRC Manager, Shire of Waroona
I Francis (Apology)	LEMC Deputy Chairperson   OIC, WAPOL Pinjarra
J Worthington (Apology)	OIC, WAPOL Dwellingup
L Saxby (Apology)	Acting Sgt, WAPOL Dwellingup
R Blake (Apology)	OIC, WAPOL Waroona
T Sillitto (Apology)	Senior District Emergency Services Officer, DoC
S James (Apology)	Representative, Quambie Park
B Beales	CBFCO, Shire of Waroona
N Dew	Community Representative, Shire of Waroona
J Humphreys	Health and Safety Manager, Alcoa
D McLeod	CEO, Bedingfeld Park Inc Aged Care Facility
D Wilson	Representative, St John Ambulance Waroona
B Worthington	Community Representative, Shire of Waroona

#### Ex-Officio

S Beaton (Apology)	Manager EPDR, Department of Health
J Gilliland (Apology)	Manager Emergency Preparedness Agriculture and Food, DPIRD
D Cormack (Apology)	Maintenance Supervisor, Fulton Hogan
T Simpson	Local Welfare Coordinator, DoC
B Bassett	Team Leader, DoC

### **Ex-Officio**

B Finlay	District Officer Wellington – Fire Services, DFES
N Elrick	District Officer – Natural Hazards, DFES
K Laurendi	Senior Ranger Lane Poole Reserve, DBCA
P Buckley	Operations Manager, Water Corporation
J Rawlins	Field Operations Team Leader, Western Power

### **3. CONFIRMATION OF MINUTES OF MEETING**

- 3.1 Confirmation of Minutes of Local Emergency Management Committee Meeting – **refer to Appendix 1** – 5 May 2021

#### **Committee Recommendation**

##### **LEMC21/005**

**Moved: M Walmsley**

**That the minutes of the Shire of Murray & Waroona Local Emergency Management Committee Meeting held on 5 May 2021 be confirmed as a true and correct record.**

**CARRIED UNANIMOUSLY 14:0**

- 3.2 Review of Meeting Action Register – **refer to Appendix 2**

The Shire of Murray & Waroona LEMC meeting action register was reviewed and updated. Refer to **Appendix 2**.

### **4. BUSINESS ARISING**

#### **5. State EM Preparedness Procedure 7 – LEMC Requirements**

##### **5.1 Every Meeting**

- 5.1.1 Confirmation of LEMC Contact Details – **refer to Appendix 3, 4 and 5**

##### **LEMC Attendance Sheet**

The meeting attendance sheet was distributed and attendees were asked to ensure that all their contact information was up to date. The updated LEMC Contact Register is attached in **Appendix 3**.

##### **LEMC Membership Changes**

###### ***SoM/SoW - MRES - Sarah Hull***

The LEMC Chairperson – S Kirkham welcomed Sarah Hull to the meeting and introduced her as the new Manager Ranger and Emergency Services at the Shire of Murray and Shire of Waroona. S Hull stated that she is looking forward to meeting everyone and mentioned that she has come from the City of Rockingham. She advised that she previously worked in the Navy and Police as well.

###### ***Department of Health - Manager EPDR - Scott Beaton***

S Beaton from Department of Health forwarded an email as per **Appendix 4** advising that as of Friday 16 July 2021 he will no longer work with the Rockingham Peel Group. He thanked the LEMC membership for being welcoming / active over the years and apologised for the lack of attendance at LEMC meetings over the past year due to the COVID demands at hospitals.

He advised that he will be completing a handover with his replacement and they will be in contact with the Shire of Murray/Shire of Waroona LEMC once they start.

S Beaton stated that he will be continuing his on-call role with the State Health Incident Coordination Centre so he may still be in contact with the LEMC membership in the future.

**WAPOL Pinjarra - OIC - I Francis**

Acting Sgt N Palmer advised that WAPOL Pinjarra OIC - I Francis has been transferred to Rockingham and the new OIC – Snr Sgt Mark Howes will be starting on Monday 9 August 2021.

**DPIRD - Manager Emergency Preparedness Agriculture and Food - Shane Bryant**

Tim Stevens the Emergency Preparedness Coordinator Incident & Emergency Management from DPIRD sent an email as per **Appendix 5**. He advised that John Gilliland will be replacing Shane Bryant as the DPIRD representative on LEMC. J Gilliland is an apology at this meeting due to pre-existing work commitments but will attend future meetings.

C Goff on behalf of the LEMC membership thanked S Beaton, I Francis and S Bryant for all the work they have done within Emergency Management for Shire of Murray & Waroona and wished him all the best for their next chapter.

5.1.2 Review any Post-Incident Reports and/or Post-Exercise Reports

Nil.

5.1.3 Funding Nominations and Applications Progress

WALGA currently have a Local Government Animal Welfare in Emergencies Grant Program open. Applications closed on Friday 23 July 2021. R Marlborough sent in a grant application for three staff members from SoM and SoW Ranger Services to attend the training.

5.1.4 Emergency Risk Management (ERM) / Treatment Strategies Progress

As part of the State Risk Project an Emergency Risk Management Workshop for Storm and Flood is scheduled to be held at the City of Rockingham on 25 August 2021. An Emergency Risk Management Workshop for Rail Crash is also scheduled for Wednesday 29 September 2021 with the location to be confirmed.

5.1.5 Review of Local Emergency Management Arrangements

S Walker introduced herself as the AWARE Project Officer and stated that she is currently working on the combined SoM and SoW LEMA project. She advised that she has completed the final draft of the LEMA's which will be circulated via email to the LEMC membership after the meeting. The LEMC membership will be requested to review and provide feedback.

The next step will be reviewing the Local Recovery Plan and development of an Animal Welfare Sub-plan and an Evacuation Sub-plan.

5.1.6 Review Business Plan Strategies and Record Key Achievements

Currently awaiting approval of the State Strategic Business Plan by SEMC.

## 5.2 **First Calendar Quarter**

### 5.2.1 Workshop / Finalise LEMC Business Plan for the next reporting period

Currently awaiting approval of the State Strategic Business Plan by SEMC.

## 6. **GENERAL BUSINESS**

### 6.1 Consultation Request – State Hazard Plans for Collapse, Earthquake and Tsunami – **refer to Appendix 6** – R Marlborough

DFES has completed a review of State Hazard Plan Tsunami and a review and conversion of Westplans Collapse and Earthquake into State Hazard Plans for Collapse and Earthquake. The DFES State EM Policy Branch is now seeking feedback with consultation closing on Tuesday 17 August 2021.

An email was sent to the LEMC membership on Wednesday 23 June 2021 requesting feedback so a collective response can be submitted from the Shire of Murray & Waroona.

### 6.2 Local Welfare Plan Peel Region – **refer to Appendix 7** – R Marlborough

The Local Welfare Plan Peel Region was reviewed and feedback/required changes were sent to DoC as per **Appendix 7**.

### 6.3 Annual Preparedness Report Capability Survey – **refer to Appendix 8 and 9** – R Marlborough

A copy of the completed Annual Preparedness Report Capability Survey for Shire of Murray is attached in Appendix 8 and for Shire of Waroona in Appendix 9.

### 6.4 SoM/SoW - CESC - **Appendix 10** - G Stevens

A report was submitted as per **Appendix 10**.

### 6.5 DFES - DEMA - **Appendix 11** - M Cross

A report was submitted as per **Appendix 11**.

### 6.6 DFES – DO Emergency Management - **Appendix 12** - J Carter

A report was submitted as per **Appendix 12**.

### 6.7 SoM/SoW/SoH - BRPC - **Appendix 13** - D Walker

A report was submitted as per **Appendix 13**.

### 6.8 Alcoa - Emergency Services Superintendent - G Cresswell

G Cresswell advised that Alcoa have a requirement to conduct a Dam Wall Failure exercise with LG. Alcoa will be undertaking a review of flood studies and then will organise a desktop exercise with both Shires.

### 6.9 Pinjarra Primary School - Principal - C Louis

C Louis stated that he is currently reviewing bushfire plans at schools and the details need to be uploaded at the end of the month. He mentioned that Waroona SHS and Pinjarra SHS aren't apart of the bushfire zones but the other schools are involved.

6.10 SoW - Shire President - M Walmsley

M Walmsley advised that the Shire of Waroona held a meeting in regards to the management/land responsibility plan for Lake Navarino with various agencies on Monday 26 July 2021. No one has taken ownership yet but hopefully DBCA vest management. M Walmsley advised that there is no camping and Police/Rangers are helping to monitor the area.

6.11 Murray SES - Unit Manager - P Dwyer

P Dwyer advised that Murray SES has been quite busy the last few weeks with flooding in various areas particularly Pinjarra, Ravenswood and South Yunderup. He mentioned that on Saturday night a sand bag wall was constructed at the Ravenswood caravan park adjacent to the Ravenswood Hotel. Residents assisted with sand bagging. Approximately 400 sand bags were placed along the river bank. Cantwell park in Pinjarra is currently underwater which is attracting many people. Onlookers were advised of the dangers.

Murray SES have also been responding to calls in Furnissdale, Waroona and Hamel. They also assisted Mandurah with storm damage. Membership is increasing at Murray SES with around 40 members. Leaders are being trained in storm damage and rescue.

Prepping for Pinjarra VFRS to be set up at Murray SES. About to house a personnel carrier at Waroona.

6.12 Pinjarra VFRS - Brigade Captain - K Jones

K Jones stated that it is the last month for Pinjarra VFRS at the current fire station before moving to Murray SES. A lot of equipment has been moved however they still need to be mobile at the current station until the last day. Pinjarra VFRS will be located at Murray SES for approximately 4-6 months.

6.13 St John Ambulance Pinjarra - Station Manager - C Hunter

C Hunter advised that the St John Ambulance Pinjarra Depot is going well but she is currently doing an office job at RFDS.

**7. NEXT MEETING**

The next Local Emergency Management Committee meeting will be held on Wednesday 3 November 2021. The meeting time and venue is to be advised.

**8. CLOSE**

There being no further business the Chairperson declared the meeting closed the time being 11:00am.



PROPOSED SAND  
EXCAVATION

EXCAVATION and  
REHABILITATION  
MANAGEMENT PLAN

1370, Lot 226, Paterson Road,  
Nambeelup

Shire of Murray

April 2021

# EXCAVATION and REHABILITATION MANAGEMENT PLAN

1370, Lot 226, Paterson Road,  
Nambeelup

*Applicant*

**Chew Lan Sim as Trustee for King Street Trust**

*Contact*

**Nam H Teo**  
**2 Juniper Bank Way Subiaco WA 6008**  
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**Landform Research**

Lindsay Stephens BSc (Geology), MSc (Plant Ecology)  
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## Summary

King Street Trust is applying for Planning Consent and Extractive Industries Licence for sand on Lot 226, Paterson Road, Nambeelup, for a period of 10 years.

Lot 226 represents a small but significant regional sand resources in the Peel Region, because it is strategically located adjacent to the Nambeelup Industrial Area.

State Planning Policy No 2.4 Basic Raw Materials requires that identified sand resources are utilised prior to sterilisation, in line with State Planning Policy No 2.5, Agricultural and Rural Land Use Planning.

Whilst the site lies just outside the area covered by SPP 2.4 (2000) it will be incorporated under the umbrella of the draft SPP 2.4 (2018) when the policy is finalised and released.

The sand is anticipated to be mainly supplied into the Peel Region Scheme area.

Landform restoration and rehabilitation to improved parkland pasture is to progressively follow excavation.

The extraction of sand is seen as an interim use of the land prior to utilisation of the area as rural land.

The final land surface is compatible with the surrounding landform at an elevation of 0.5 metres above the highest known temporary perched water table, which is 2 metres above the regional groundwater table, in compliance with DWER Guidelines.

The proposal complies with the EPA Generic Buffer Guidelines to sensitive premises.

Hours of operation will be 6.00 am to 6.00 pm Monday to Saturday inclusive, excluding public holidays. This is similar to the operations of nearby quarries in the local area.

Perimeter fences and locked gates will be maintained to prevent illegal entry. Warning signs will be maintained as required by the Department of Mines, Industry Regulation and Safety and the Shire of Murray.

### Site Summary

ASPECT	PROPOSAL CHARACTERISTIC
<b>EXCAVATION</b>	
Total area of excavation applied for	Proposed excavation – 24.5 hectares Current excavation – Nil Under rehabilitation - Nil
Rate of excavation based on average anticipated volumes.	50 000 to 150 000 tonnes per year depending on contracts with the potential for greater volumes of sand to be removed in a particular year depending on contracts. Maximum volume is around 500 000 tonnes.
Life of project	10 years
Area cleared per year	1 - 4 hectares but dependent on contracts won. Total clearing required, 12.7 hectares
Dewatering requirements	Nil
Maximum depth of excavations	1 - 5 metres below natural land surface.
<b>PROCESSING</b>	
Resources	No processing proposed at this stage. A screening plant remains a possibility to produce specialty sands if required.
Water requirements	Nil
Water supply source	Sump on site subject to Licence otherwise water will be brought to site.
<b>INFRASTRUCTURE</b>	
Total area of plant and stock	Only mobile equipment. No structures.
Fuel storage	No fuel storage
<b>TRANSPORT</b>	
Truck movements	Variable but approximately 6 – 25 laden trucks per day but up to 100 trucks for day for short period to fill large contracts if won.
Access	Access road to Paterson Road
<b>WORKFORCE</b>	
Construction	Access road only.
Operation	2 - 4 persons
Hours of operation	Hours of operation, will be 6.00 am to 6.00 pm Monday to Friday inclusive, excluding public holidays for processing and excavation. Loading and transport from site may commence at 6.00 am Monday to Friday inclusive, excluding public holidays

## Management

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The excavation, processing and environmental management proposed has been designed to reflect best practice and utilises Commonwealth and State Guidelines.

### **Safety Management**

All quarries operate under the provisions of the *Mines Safety and Inspection Act 1994 and Regulations 1995*. These are administered by the Department of Mines Industry Regulation and Safety.

The regulation is achieved through the DMIRS Safety Regulations and Reporting Systems (SRS).

All quarries on commencement are required to register with the SRS system. As part of the registration a Project Management Plan is required to be produced and lodged online.

Officers from the Safety Division of the DMIRS regularly inspect the operations in relation to health and safety.

### **Environmental Management**

The environmental management is designed to reflect best practise, outlined in particular in;

Department of Resources, Energy and Tourism (Commonwealth), 2011, *A Guide to Leading Practice Sustainable Development in Mining*, and guidelines produced by Environmental Protection Authority, Department of Water, Environment Regulation, Department of Mines Industry Regulation and Safety, Western Australia Planning Commission and the Local Authority.

An Environmental Risk Assessment has been developed based on the EPA Environmental Factors which have been identified by the EPA as the factors to be considered when reviewing environmental impact and outcomes in Western Australia.

The EPA Factors have been used and added to in the following table, which provides for the environmental risk if not mitigated or managed and the assessed environmental risk when the proposed design and management procedures are effectively implemented.

All the EPA environmental factors, together with the other factors, are provided in the Environmental Risk Table to show that some are not relevant to this proposal. Leaving them out may lead to some uncertainty in a reviewer's mind.

The Environmental Risk Matrix was developed to the principles of AS/NZS ISO 14001:2004 (Environmental Management Systems) and AS/NZS ISO 19011:2014 (Guidelines for auditing Management Systems). The principles of AS/NZS 31000:2009 (Risk Management Guidelines) are also used when considering any risks.

The Risk Table includes references to the various parts of the document to enable easy review and provides a summary of the project and its management.

The risk assessment table also forms the basis of an auditable matrix.

Environmental Factor - Objective	Identified Issues and Commitments	Unmanaged Risk			Proposed Management	References	Managed Risk		
		Likelihood	Consequence	Risk			Likelihood	Consequence	Risk
<p><b>FLORA and VEGETATION</b></p> <p>To maintain representation, diversity, viability and ecological function at the species, population and community level.</p>	Vegetation communities and/or biodiversity may be significantly impacted by clearing, weeds and dieback.	D	2	Low	<p>The site lies in an area of Generally Degraded Vegetation meets the general description of this vegetation complex which was found by PGV Environmental to most likely match FCT 21a and 21c, neither of which are listed as a Priority vegetation community (PGV Environmental; page 6).</p> <p>An "A" Class Reserve lies to the north.</p> <p>At the end of excavation a vegetation and wildlife corridor will be re-established in line with local biodiversity planning.</p> <p>As the sand is excavated it falls naturally to the floor of the pit where it is picked up by a loader.</p> <p>As such any risk of dieback of weeds is most unlikely because the seeds and disease material will have to travel up the high face which can be up to 20 metres High.</p> <p>The vegetation proposed to be cleared is <i>Kunzea glabrescens</i> regrowth over pasture and degraded native vegetation. In all 12.7 hectares will require a Clearing Permit, with 24.5 hectares already cleared.</p>	PGV Environmental Flora and Fauna Report (attached).  Figures 1 and 7	D	2	Low
	Threatened Communities may be impacted by inadvertent impacts.	E	1	Low	<p>PGV Environmental found the vegetation to most likely match FCT 21a and 21c, neither of which are listed as a Priority vegetation community.</p> <p><i>Banksia</i> Woodland is listed as a TEC under the EPBC Act 1999, but its area is too small to trigger consideration under the EPBC Guidelines for Management.</p> <p>All <i>Banksia</i> Woodland has been excluded from the proposed sand excavation.</p>	PGV Environmental Flora and Fauna Report (attached).  Figure 7.	E	1	Low
	Priority species may be affected by clearing,	D	2	Low	<p>None recorded.</p> <p>A targeted species survey for Priority and Threatened</p>	PGV Environmental Flora and Fauna Report (attached)	E	1	Low

	disturbance, weeds, dieback and other impacts.				species is proposed to be conducted in spring to support an application for a Clearing Permit				
	Threatened Species may be impacted by inadvertent impacts.	E	1	Low	None recorded. See above.	PGV Environmental Flora and Fauna Report (attached)	E	1	Low
	Weeds may become established and impact on the local and on site biodiversity	C	3	High	A weed management program is proposed and will be used in conjunction with normal farm management.	Section 11.5 Rehabilitation Procedures Weed Management	C	1	Low
	Dieback disease may be present and impact on the local and onsite vegetation.	D	2	Low	Dieback management procedures are proposed.  See Weeds above.	Section 11.5 Rehabilitation Procedures Dieback Management	E	1	Low
	The developments may fragment communities, biodiversity and ecological linkages.	C	2	Mod	12.7 hectares of the proposed 24.5 hectare excavation area is cleared. The vegetation requiring clearing is <i>Kunzea glabrescens</i> regrowth over pasture and degraded native vegetation. That vegetation has previously been cleared and disturbed and is lesser vegetation condition. <i>Kunzea glabrescens</i> is a rapid and successful coloniser and is regrowing on the sand ridge. The topsoil will be recovered and respread at the end of excavation  Previously cleared vegetation to the north of the pit has been allowed to re-establish. This is enhancing the conservation corridors rather than reducing them.  A vegetation and wildlife corridor will be established at the end of excavation. See Figure 6. The amount of revegetation in the corridors will link the wetland in the north east to the existing <i>Banksia</i> Woodland then link through to the conservation area on the land to the north of the "A" Class Reserve on Lot 224. Compare Figures 1 and 6.	Figures 1 and 6.	D	2	Low

Environmental Factor - Objective	Identified Issues and Commitments	Unmanaged Risk			Proposed Management	References	Managed Risk		
		Likelihood	Consequence	Risk			Likelihood	Consequence	Risk
<b>TERRESTRIAL FAUNA</b>  To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.	Communities and fauna and/or biodiversity may be significantly impacted by clearing, weeds and dieback.	D	3	Mod	The site lies in an area of Generally Degraded Vegetation meets the general description of this vegetation complex which was found by PGV Environmental to most likely match FCT 21a and 21c, neither of which are listed as a Priority vegetation community (PGV Environmental; page 6).  At the end of excavation a vegetation and wildlife corridor will be re-established in line with local biodiversity planning.	PGV Environmental Flora and Fauna Report (attached)	D	2	Low
	Threatened Faunal Communities may be impacted by inadvertent impacts.	E	1	Low	No Threatened Communities occur on site.  See above.	PGV Environmental Flora and Fauna Report (attached)	E	1	Low
	Priority Fauna species may be affected by clearing, disturbance, weeds	D	2	Low	The property is rural and not a listed intensive land use. Parkland pasture and native vegetation will be returned. The key listed fauna are Black Cockatoos as considered above.  The other is the Quenda. Quenda are versatile species that readily move ahead of clearing. There is significant vegetation habitat suitable for Quenda retained. A vegetation and wildlife corridor will be established at the end of excavation. See Figures 1 and 2. and Flora and Vegetation above..	PGV Environmental Flora and Fauna Report (attached) Figures 1 and 6.	D	2	Low
	Threatened Fauna Species may be impacted by inadvertent impacts.	D	3	Mod	The property is rural and not a listed intensive land use. Parkland pasture and native vegetation will be returned. Cockatoo habitat and significant trees have been assessed by PGV Environmental and have been excluded from the proposed sand excavation.  The main Cockatoo feeding habitat locally is the <i>Banksia</i> Woodland which has been excluded.  Most of the remaining feeding habitat has reduced or low feeding quality.  Fauna will be considered in the Clearing Permit process.	PGV Environmental Flora and Fauna Report (attached)	D	1	Low



<p><b>SUBTERRANEAN FAUNA</b></p> <p>To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.</p>	<p>The development may have an impact on an isolated population of subterranean fauna.</p>	<p>E</p>	<p>1</p>	<p>Low</p>	<p>The site is deep sand with no subterranean cavities.</p>	<p>Section 10.4.</p>	<p>E</p>	<p>1</p>	<p>Low</p>
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Environmental Factor - Objective	Identified Issues and Commitments	Unmanaged Risk			Proposed Management	References	Managed Risk		
		Likelihood	Consequence	Risk			Likelihood	Consequence	Risk
<p><b>LANDFORMS</b></p> <p>To maintain the variety, integrity, ecological functions and environmental values of landforms and soils.</p>	The local landform may be altered to a form that is not compatible with the surrounding geomorphology.	D	2	Low	The site is lies on a small low sand ridge set back from Paterson Road. Most of the ridge will be retained, with only the southern portion being impacted by lowering between 1 and 4 metres. The general landform will not be altered as the vegetation ridges will almost all be retained. As compensation, a wildlife corridor will be enhanced.	8.0 Visual Management Figures 2 and 4.	E	1	Low
	The final land surface should be fit for its required end use.	D	3	Mod	The end use will continued to be pasture and productive agricultural land as previously approved, plus the re-establishment of a wildlife linkage.	Section 11.0 Closure. Figure 7.	D	1	Low
	The development and final landform will not lead to significant visual impacts.	E	1	Low	The site is lies on a small low sand ridge set back from Paterson Road. The general landform will not be altered as the vegetation ridges will almost all be retained. As compensation, a wildlife corridor will be enhanced.	Figures 2 and 4	E	1	Low
	The final landform and soils may be subject to erosion by wind, water or other processes.	C	2	Mod	The sand excavation operations are designed to minimise erosion and dust. Drainage will be internal with no release of surface water.	See Dust Management Section 6.0 and Closure, Section 11.0	D	2	Low
	Acid soils are not exposed or are managed to ensure that there are no long term adverse effects.	E	1	Low	Not present	Section 4.7	E	1	Low

Environmental Factor - Objective	Identified Issues and Commitments	Unmanaged Risk			Proposed Management	References	Managed Risk		
		Likelihood	Consequence	Risk			Likelihood	Consequence	Risk
<b>HYDRO - GEOLOGICAL PROCESSES</b>  To maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected.	The ecological functions of watercourses are to be maintained.	E	1	Low	There are no watercourses.  Drainage will continue to be to the lower elevations by seeping into the base of the excavation with no release of surface water.  Water Management Procedures are proposed.	Figures 2 and 4. Section 9.0 Water Management.	E	1	Low
	Groundwater may be impacted by changes to recharge, over-pumping, alterations to flow paths or lead to significant evaporation and water loss.	D	1	Low	The operations are based on the sand ridge only. Excavation will retain a minimum of 0.5 metre separation to the water table in compliance with DWER Policy. If the perched winter water table is intersected the floor of the pit will be backfilled to ensure 0.5 metre separation to the temporary perched winter water table.  The floor of the pit will be 0.5 metres above the regional winter water table as provided by DWER mapping.  Piezometers will be installed to verify the separations to the seasonal perched water table.  Any exposure of the water table will be backfilled to ensure compliance with the 0.5 metre proposed separation.  All water is retained on site in the base of the pit with the perimeter being slightly elevated.	Figure 4 and 5. Section 9.0 Water Management.	E	1	Low
	Wetlands may be altered by draining or flooding, potentially changing their ecological functions and biodiversity.	E	1	Low	There will be no impact on wetlands either which are excluded from excavation. The Resource Enhancement Wetland in the north eastern corner is up hydraulic gradient and is provided with a 50 metre setback which complies with DWER Guidelines. The winter wet pasture (palusplain) east of the resource also lies up hydraulic gradient (Figure 5) and in addition is provided with a 20 metre setback (Figure 2). The water regimes and recharge will not change.	Figures 6, 7 and 8.	E	1	Low
<b>WATER QUALITY</b>	Hydrocarbons, fuels and other chemicals are	C	2	High	Fuel and hydrocarbon management programs are in place. No fuel is to be stored on site.	Section 9.0 Water Management.	D	2	Low

To maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected.	stored in a manner that they pose no risk to the environment.								
	Runoff from operations may carry sediment and any deleterious materials off site.	E	1	Low	All water is retained on site in the base of the pit. Runoff from operations is to be contained and all water is either retained or treated to removed sediment and any deleterious materials.	Section 9.0 Water Management.	E	1	Low
	Water quality during and after development and operations is not adversely affected or altered.	D	2	Low	See above.  Fuel and hydrocarbon management programs are in place. No fuel is to be stored on site.	Section 9.0 Water Management.	D	2	Low

Environmental Factor - Objective	Identified Issues and Commitments	Unmanaged Risk			Proposed Management	References	Managed Risk		
		Likelihood	Consequence	Risk			Likelihood	Consequence	Risk
<b>OFFSITE EMISSIONS</b>  To maintain representation, diversity, viability and ecological function at the species, population and community level.	Dust emissions may travel offsite.	D	1	High	Based on the nature of the sand, equipment used and excavation methods, the extraction of sand has potentially the lowest impact and a generic buffer of 300 metres is appropriate and could be less if significant impacts are confined.  There are no residential properties within the application area, and the nearest residential site is located over 1000 metres away.	Figures 1, 2, 4 and 9. Section 3.0 Section 6.0	E	1	Low
	Dust emissions may impact on local and on site personnel health or quality of life.	E	1	Low	See above.  Complies with Department of Health Guidelines for dust management.	Section 6.0	E	1	Low
	Noise levels will comply with the <i>Environmental Protection (Noise) Regulations 1997</i> .	E	1	Low	Noise levels will comply with <i>Environmental Protection (Noise) Regulations 1997</i> . The site complies with the EPA Generic Buffer distances. The closest dwelling is over 1000 metres away.	Section 7.0	E	1	Low
	Noise levels and operational procedures will be used to protect on site personnel health and safety.	C	2	Mod	The operations are designed to minimise on site noise and the potential for offsite noise.	Section 7.0	D	2	Low
	Emissions gases and other materials potentially adverse to human health will not be used or will be managed.	D	2	Low	There are no gaseous or other potential harmful emissions from the operations.		D	2	Low
	Potential impacts from blasting will comply with the <i>Environmental Protection (Noise) Regulations 1997</i> and guidelines for ground vibration.			NA	There is no blasting.				NA

	Employ procedures and design the operations to minimise the risk of excessive greenhouse emissions.	E	1	Low	The excavation may provide a source of local sand for fill of the Nambeelup Industrial site and other local requirements, saving sand having to be transport much further distances and therefore helping to reduce greenhouse emissions.		E	1	Low
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Environmental Factor - Objective	Identified Issues and Commitments	Unmanaged Risk			Proposed Management	References	Managed Risk		
		Likelihood	Consequence	Risk			Likelihood	Consequence	Risk
HERITAGE  Known heritage sites will be protected.	Known aboriginal heritage sites will be protected.	E	2	Low	No archaeological or ethnographic sites are known from or recorded on Department of Planning, Land and Heritage databases.		E	2	Low
	Sites of European heritage will be protected.			NA	None known				NA
	Heritage sites uncovered during operations will be independently assessed and managed through communication with the community, Government and traditional owners.	D	2	Low	A commitment is made to this.	Section 2.5.3	D	2	Low

Environmental Factor - Objective	Identified Issues and Commitments	Unmanaged Risk			Proposed Management	References	Managed Risk		
		Likelihood	Consequence	Risk			Likelihood	Consequence	Risk
<b>SOCIAL and HEALTH</b>  To minimise the impact on the local community	Human health is protected from adverse impacts of dust, noise, other emissions and chemicals.	E	1	Low	Sand grains such as this carry no known health impacts.		E	1	Low
	Transport may impact on local, and regional roads or school bus routes.	E	1	Low	Transport will be directly to Paterson Road.		E	1	Low
	The operations have been designed to provide sufficient buffers and visual protection.	E	1	Low	The site complies with the EPA Generic Buffer distances. The closest dwelling over 1000 metres away to the north west. A shed is located 700 metres to the south.		E	1	Low

Environmental Factor - Objective	Identified Issues and Commitments	Unmanaged Risk			Proposed Management	References	Managed Risk		
		Likelihood	Consequence	Risk			Likelihood	Consequence	Risk
<b>CLOSURE AND REHABILITATION</b>  To ensure that premises are closed, decommissioned and rehabilitated in an ecologically sustainable manner, consistent with agreed outcomes and land uses, and without unacceptable liability to the State	At the end of excavation the created soils should be deep enough or of sufficient quality to be sustainable to meet the long term end use or ecological values.	B	3	High	A void is to be retained at the end of excavation and reformed to a swale in the landscape at a floor of around 0.5 above the highest known winter temporary perched water table and 0.5 metres above the regional water table, in compliance with DWER Guidelines  Rehabilitation will be directed towards the final end land use of a return to pasture and productive agricultural land on the floor and local native vegetation on the batter slopes and wildlife corridors.  Topsoil will be transferred directly from an area being cleared and spread across the surface of the areas to be rehabilitated. If direct transfer is not possible, any material stored in dumps will be respread.	Section 11.0 Closure Figures 4, 5 and 9.	D	2	Low
	All infrastructure, roads, hardstand, non natural materials are to be removed from site progressively when not required and all removed at the end of the project.	C	2	Med	This is committed to.  There is not proposed to be any infrastructure apart from the use of a serviced portable toilet during operations.	Section 11.0 Closure	D	2	Low
	No materials are to be left on site that may cause long term detrimental outcomes in terms of impacts to soils, water, heritage, vegetation health or other factors.	C	2	Med	This is committed to.	Section 11.0 Closure	D	2	Low
	All contaminated materials are to be removed from site prior to closure.	C	2	Med	All contaminated materials are to be removed from site prior to closure.	Section 11.0 Closure	D	2	Low



**RISK MATRIX**

			Effect / Consequence				
			1	2	3	4	5
Type			Insignificant	Minor	Moderate	Major	Severe
Environmental Impact			No discernible, adverse impact, individuals of species may be affected locally.	Discernible effect on the environment but no adverse impact, minor number of individuals of species may be affected locally	Minor adverse effect to the environment (including public amenity), moderate loss of individuals of species locally.	Moderate damage to ecosystem function, major loss of individuals of species locally, loss of public amenity.	Significant long-term damage/loss to ecosystem function, extinction of a species locally
Likelihood	A Almost Certain	Likely that the unwanted event could occur often (once per week) during the life of an individual item or system	Medium 11	High 16	High 20	Very High 23	Very High 25
	B Likely	Likely that the unwanted event could occur several times per year during the life of an individual item or system.	Medium 7	Medium 12	High 17	High 21	Very High 24
	C Possible	Likely that the unwanted event could occur sometime (once per year) during the life of an individual item or system.	Low 4	Medium 8	High 13	High 18	High 22
	D Unlikely	Unlikely, but possible for the unwanted event to occur once in the life of an individual item or system.	Low 2	Low 5	Medium 9	High 14	High 19
	E Rare	Highly unlikely that the unwanted event could ever occur in the life of an individual item or system.	Low 1	Low 3	Medium 6	Medium 10	High 15

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## REFERENCES – READING

### ATTACHMENTS

Email from DWER Mandurah- agreeing to the groundwater elevations.

PGV Environmental Reports – Flora, Vegetation and Cockatoos

## 1.0 INTRODUCTION

### 1.1 Background and Proposal

King Street Trust is applying for Planning Consent and Extractive Industries Licence for the extraction of sand on Lot 226, Paterson Road, Nambeelup, for a period of 10 years.

Lot 226 Paterson Road is approximately 155 ha in size. The proposed area of sand extraction is 24.5 ha of which approximately 12.9 ha contains native vegetation.

The sand is anticipated to be mainly supplied into the Peel Region Scheme area.

Landform restoration and rehabilitation to improved parkland pasture is to progressively follow excavation.

The extraction of sand is seen as an interim use of the land prior to utilisation of the area.

Rehabilitation will follow excavation, assisting in minimising the amount of open ground.

#### ***History of the Project Approvals***

As far as is known there are no historic approvals for this land.

#### ***Land Assessments***

Detailed land mapping was conducted by Lindsay Stephens of Landform Research on 7 March 2001 and 11 September 2002. The site was again inspected on 24 January 2019.

In September 2002 the assessments included vegetation surveys and detailed geotechnical assessment in support of a land capability assessment for a potential subdivision. Detailed soil mapping and determination of the water tables was made at multiple points across the subject land. Each point on the measured and interpreted mapping of the water table in September 2002 was a measured site assessment. In all around 50 soil test holes were provide using hand auger on 11 September 2002.

A Flora and Vegetation Survey was conducted by PGV Environmental on 12 February 2019 with follow up targeted Spring Survey and Cockatoo Survey completed on 31 July 2019.

### 1.2 Proponent

The application is made on behalf of the land owner.

Contact can be made through.

#### *Applicant*

Chew Lan Sim as Trustee for King Street Trust

#### *Contact*

Nam H Teo  
2 Juniper Bank Way Subiaco WA 6008  
[teostreet@globaldial.com](mailto:teostreet@globaldial.com)  
Phone 0412 455 573

### 1.3 Location and Ownership

Lot 226 lies to the north of Paterson Road, near but south of the intersection of Lake Road and Nambeelup Brook.

The lot to the north forms a buffer to the Nambeelup Industrial Area and contains an “A” Class Reserve.

Lot 226, 1370 Paterson Road, Nambeelup, Volume 2061, Folio 155, Diagram 2087.

### 1.4 Project Objectives

The proposal is to provide a source of local sand in the Peel Region to assist in minimising the cost of construction in the local and wider area.

#### ***The aims of the proposal are to;***

Provide a supply of white and yellow silica and fill sand.

- Provide a supply of sand for the construction industry to be used in the Peel Region.
- Maximise the use of basic raw materials in the local area, to enable greenhouse gases, transport, and other environmental issues associated with alternative resources, to be minimised.
- Help to keep the prices of local basic raw materials at the lowest possible levels, by maintaining small transport distances. This benefits the whole community.
- Comply with State Planning Policy No 2.5, Agricultural and Rural Land Use Planning 2016, which states that basic raw materials should be taken prior to sterilisation of the area by development.
- Comply with State Planning Policy No 2.4 Basic Raw Materials, and Rural Land Policies for the Metropolitan Area and Peel Region Scheme, all of which state that basic raw materials should be taken prior to sterilisation of the area by development. Note that the pit lies outside these Scheme areas but will supply most of the sand into the Scheme areas.
- Comply with the Peel Region Scheme Basic Raw Materials Policy.

#### ***Importance and Rationale***

Although a small sand resource, Lot 226 represents a significant regional sand resource in the Murray Shire where sand resources are limited.

The reality is that the sand is only extracted for the community. If the community did not need the sand, for sand pads, concrete products and construction materials, there would be no extraction.

Perth and Peel @ 3.5million, developed by the Western Australian Planning Commission has determined that the Metropolitan Area will grow significantly between 2012 and 2050 by around 650 000 dwellings

The construction of dwellings needs sand for roads, in particular locally for the Peel Region, much of which is low lying, the Nambeelup Industrial Area, in addition to concrete and other products that include some sand.

The Chamber of Commerce and Industry estimated in 2008 that each dwelling required 155 tonnes of sand, which includes roads. Dwellings in low lying areas requiring fill can require significantly more sand.

In addition the nearby Nambelup Industrial area will require in the order of 2 metres of fill sand across much of its area.

Not all sand has the same characteristics and the best deposits are valuable community assets. The sand on site is a particularly valuable community resource because it lies in an area where extraction can occur with minimal impact on the community, and therefore has very high community value as the Nambelup Industrial Area.

The sand extraction is a recognised resource that, within the provisions of State Planning Policy 2.5 (December 2016), should be protected for the staged extraction of sand for the local community.

A summary of the documentation of basic raw materials is listed below.

- Western Australian Planning Commission, *State Planning Policy 2.4, 2000, Basic Raw Materials*. (superseded locally by SPP 2.5 but in turn to be superseded by Draft SPP 2.4, 2018)
- Western Australian Planning Commission, *State Planning Policy No 2.5, Agricultural and Rural Land Use Planning 2016*.
- Department of Planning 2016, *Basic Raw Materials Fact Sheet*.
- Abeyasinghe P B, 2003, *Silica Sand Resources of Western Australia, Geological Survey of Western Australia, Mineral Resources Bulletin 21*.
- Department of Planning 2009, *Basic Raw Materials – Applicants Manual*, (to be updated when SPP 2.4 is updated).

## 2.0 PLANNING ASSESSMENT

### 2.1 Current Land use

The site is currently rural land used for the rural purpose of grazing.

### 2.2 Proposed Land use

Sand extraction with an end use to parkland pasture with conservation corridors.

### 2.3 End Use

After sand excavation the land will be returned to productive agricultural land and conservation.

The contoured surface will therefore be restored slopes and form that match the adjoining land and land uses.

### 2.4 Land Zonings and Policies

#### 2.4.1 State Government Policies and Planning Schemes

➤ **State Planning Policy 1.0, State Planning Framework Policy**

The State Planning Policy Framework provides for the implementation of a planning framework through the recognition and implementation of Regional Planning Policies above Local Planning Schemes and Policies.

A number of State Policies have been released under the State Planning Framework Policy.

- State Planning Policy 2.0, Environment and Natural Resources Policy
- State Planning Policy 2.4, Basic Raw Materials
- State Planning Policy No 2.5, Agricultural and Rural Land Use Planning
- State Planning Policy No 4.1, State Industrial Buffer Policy

These are considered in turn.

A number of other key State Government Policies are also relevant to the local regional planning.

➤ **State Planning Policy 2.0, Environment and Natural Resources Policy**

This policy provides for the protection of all natural resources under a number of sections;

- 5.1 General Measures
- 5.2 Water Quality including stormwater and wetlands
- 5.3 Air Quality
- 5.4 Soil and Land Quality
- 5.5 Biodiversity
- 5.6 Agricultural Land and Rangelands
- 5.7 Minerals Petroleum and Basic Raw Materials
- 5.8 Marine Resources and Aquaculture



- 5.9 Landscape
- 5.10 Greenhouse Gas Emissions and Energy Efficiency.

In addition to recognising the importance of protecting air quality, soil and land quality, water and wetlands and landscapes, the importance of Basic Raw Materials to the community is identified with reference to SPP 2.4 Basic Raw Materials, State Gravel Strategy 1998 and State Lime Strategy 2001.

Section 5.7 of SPP 2.0, deals with Minerals, Petroleum and Basic Raw Materials.

Part of Section 5.7 states;

*Basic raw materials include sand, clay, hard rock, limestone and gravel together with other construction and road building requirements. A ready supply of basic raw materials close to development areas is required in order to keep down the cost of land development and the price of housing.*

*Planning strategies, schemes and decision making should:*

*Identify and protect important basic raw materials and provide for their extraction and use in accordance with State Planning Policy No 2.4; Basic Raw Materials.*

*Support sequencing of uses where appropriate to maximise options and resultant benefits to community and the environment.*

The other factors of the natural environment are provided with the best protection possible, by this management plan, by selection of the site, operational staging and footprint and rehabilitation, bearing in mind the constraints of excavating and processing the resource.

➤ **State Planning Strategy, 2050 (2014)**

State Planning Strategy 2050 comprises a range of strategies, actions, policies and plans to guide the planning and development of regional and local areas in Western Australia and assists in achieving a coordinated response to the planning challenges and issues of the future by State and Local Governments.

The approach in the strategy considers Basic Raw Materials as listed below.

**Table 1: State Planning Strategy - Basic Raw Materials**

ELEMENT	2050 OUTCOMES	MEASUREMENT	ASPIRATIONS
Basic raw material (BRM) supply	Accessible and affordable supplies of BRM are available close to demand	The cost of supplying basic raw materials to the building and construction industry	<p>Appropriate polices are in place to manage existing and future BRM supplies over the long term.</p> <p>BRM are optimally used for their highest purpose.</p> <p>The securing of BRM sites is managed through robust strategic sequential land use planning and development control prior to final land use</p> <p>Demand for BRM is partly managed through compact settlement structures that contain high-density built form.</p>

The environmental management of the quarry has been developed to minimise short and long term impacts on the local community and environment.

The operations have been designed to continue to provide good environmental management that minimises environmental change and enables continued rural land uses.

➤ **State Planning Policy 2.4, Basic Raw Materials, 2000 – (Draft) 2018**

State Planning Policy 2.4 was released in 2000. In 2018 there was a new draft SPP 2.4 released, but this has not yet been released in final form. Many of the factors from SPP 2.5 (2016) are incorporated into the draft SPP 2.4.

State Planning Policy 2.4 recognises the site as a Priority Sand Resource. This is also recognised in the Metropolitan Rural Plan and The North West Structure Plan. Furthermore SPP 2.4 requires that resources be staged and taken prior to sterilisation by other land uses.

The need for sand is also recognised by the Chamber of Commerce and Industry in their comprehensive summary of Basic Raw Materials, (Managing the Basic Raw materials of the Perth and Outer Metropolitan Region, April 1996).

The Western Australian Planning Commission State Planning Policy 2.4, was released in July 2000. This site would fall under the provisions of IX 6.1.1. Section IX 6.3 provides some planning protection for the existing sand excavation by directing planning decisions to protect the resource.

The site is a very valuable community asset, as sand can continue to be extracted with minimal community inconvenience in the local region.

SPP 2.4 supports the principle that basic raw materials should be taken before they become sterilised by development. It provides guidelines to local government to recognise the importance of not permitting conflicting land uses to impinge on the operation and enable the resource to be taken in a staged manner.

This policy makes many statements on the intent and actions which local authorities should use to protect and manage basic raw materials.

Section 3.4 is very specific in explaining that basic raw materials need identification and protection because of increased urban expansion and conservation measures, (3.4.1), (3.4.2) and (3.4.4). Sections 3.4.5 and 3.4.6 recognise that environmental and amenity matters need to be considered.

*There are specific provisions in Section 6.2 Local Planning Scheme Provisions, such as;*

*No support for the prohibition of extractive industries in zones that permit broad rural land uses.*

*Providing an appropriate P, D or A use.*

Not precluding the extraction of basic raw materials on land which is not identified as a Priority Resource Location, Key Extraction Area or Extraction Area (6.4.2).

➤ **State Planning Policy No 2.5, Rural Planning, 2016**

SPP 2.5 Rural Planning predominantly deals with the continued rural use of suitable land and its protection for the future. The policy was updated in December 2016 and provides strong measures to identify, protect and use basic raw materials. SPP 2.5 does not cover this area but provides an indication of the factors considered in basic raw material extraction.

SPP 2.5 does reiterate the need to protect and use basic raw materials.

Basic Raw Materials are included in the definitions as;

Sand (including silica sand), clay, hard rock, limestone (including metalurgical limestone), agricultural lime, gravel, gypsum, and other construction materials. The materials may be of State, regional or local significance depending on the resource location, size, relative scarcity, value and demand for the product.

Amongst seeking to protect agricultural values, Policy Objective 4 (c) states

Outside the Perth and Peel Planning regions, secure significant basic raw material resources and provide for their extraction.

Section 5.9 deals with Basic Raw Materials and seeks to achieve the following in an environmentally acceptable manner;

*Protect the resources until the resource is extracted (5.9.a)*

*Identify significant basic raw materials on sub-regional and local planning strategies, region and local planning schemes (5.9.b, 5.9.c, 5.9.d)*

*The extraction of basic raw materials should not be generally prohibited (5.9.e)*

*Provide for sequential land use (5.9.f)*

*Limit sensitive land uses to locations demonstrated to not limit existing or potential extraction of basic raw materials (5.9.g)*

*Provide for the consideration of native vegetation or significant biodiversity values and may require retention and protection of vegetation and environmental assets (5.9.h)*

*Have regard for the potential impacts of fragmentation and connectivity of native vegetation (5.9.i)*

*Maintain adequate buffers to protect water quality in public drinking water source areas (5.9j).*

SPP 2.5 also supports preventing conflicting land uses (5.12.1), supports the generic buffers recommended by other Government documents such as the EPA Guidelines for separation distances (5.12.3), and seeks to restrict subdivision from impinging on basic raw material resources.

The Policy is also supported by Guidelines that seek to protect the Landscape and secure Transport Routes.

➤ **State Planning Policy No 4.1, State Industrial Buffer Policy**

SPP 4.1 discusses the need to consider adjoining land uses when locating buffers but does not prescribe set buffers for operations such as this. The development and processing of the resource has been designed to maintain maximum buffer distances. In situations where the buffers are less, actions such as the provision of perimeter bunding to provide visual and noise management, tree planting and operational procedures are used to mitigate and reduce impacts.

This is discussed further in Section 2.11 Surrounding Landuses and Buffers of this document.

➤ **Peel Region Scheme 2002**

The Peel Region Scheme aims to provide long term planning to the Peel Region.

The Peel Region Scheme overrides the Town Planning Scheme (Planning and Development Act 2005 Part 9 123 (1 – 3)). The Town Planning Scheme must be made consistent with the Peel Region Scheme (Planning and Development Act 2005 Part 9 123 (1 – 3)).

Lot 226 will fall under the Peel Region Scheme Strategic Minerals and Basic Raw Materials Resource Policy dated October 2002. Section 5.0 of that Policy requires the town planning schemes to be consistent with the Peel Region Scheme Strategic Minerals and Basic Raw Materials Resource Policy where it is listed as a sand pit.

Section 4.0 Objectives of the Peel Region Scheme Strategic Minerals and Basic Raw Materials Resource Policy; to identify land within the Peel Region that contains basic raw materials of State or Regional Significance and to prevent them from being sterilised by incompatible development and land uses.

Lot 226 is listed as Rural under the Peel Region Scheme.

➤ **Directions 2031 and Beyond (WAPC 2010)**

Directions 2031 and Beyond provides data on the land uses and growth of the Perth Metropolitan and Peel areas over the 20 years to 2031.

➤ **Perth and Peel @ 3.5 million**

Perth and Peel @ 3.5 million EPA provides strong support for the need for basic raw materials for the growth of Perth.

Perth and Peel @ 3.5million, developed by the Western Australian Planning Commission has determined that the Metropolitan Area will grow significantly to 2050 by around 650 000 dwellings. In the South and Peel Regions this amounts to around 200 000 new dwellings

The large amounts of sand that have been used, and will be required, for the fill of residential lots in the Peel and the Nambeelup Industrial Area is significant.

**2.4.2 Local Government Policies and Planning Schemes**

➤ **Shire of Murray Town Planning Scheme No 4**

The Shire of Murray Town Planning Scheme includes Lot 226 as “Rural” Zoned Land. Within the “Rural” Zone Extractive Industries are listed as an “SA” Use and may be approved by the Shire using their discretion.

➤ **Shire of Murray Local Planning Strategy 1994-1997**

The Shire Murray Local Rural Strategy recognises the importance of basic raw materials in Section 2.4 Mineral, Resources and Extractive Material.

➤ **Shire of Murray Extractive Industries Local Law 1982**

The proposed excavation has been designed to comply with the Local Law.

➤ **Shire of Murray Local Biodiversity Strategy 2013**

This Strategy seeks to protect specific biodiversity features on rural and other land, protect natural areas on zoned lands, maximise retention of all Local Natural Areas, protect and enhance ecological connectivity and protect and manage Local Natural Areas on reserved land.

The project has been designed to comply with the strategy as best as possible under the constraints of extraction and the need for sand resource.

➤ **Shire of Murray Biodiversity Protection Local Planning Policy 2018**

This policy seeks to identify and preserve significant trees and vegetation, mainly relating to subdivisions and other similar developments.

The proposed excavation retains the remnant vegetation and provides for the planting of additional local native vegetation.

This policy outlines the methods of planting and establishing trees, but relates to smaller rural living lots and landscape protection areas.

**2.4.3 End Use – Sequential Planning**

The extraction of sand is seen as an interim use prior to a return of the area to pasture.

No sequential land planning can be made because the future use is not known. Therefore the most appropriate end use is to restore the existing cleared and parkland pasture land with native vegetation around the perimeter and in wildlife corridors.

**2.4.4 Legislative Framework - Stakeholders**

There have been no significant changes to the scale and nature of the local land uses over the past few years. Lot 224 that adjoins to the north provides a buffer to the Nambeelup Industrial Area.

**Table 2: Legislative Framework**

Legislation	Environmental Factor regulated/affected	Discussion	Action
<i>Aboriginal Heritage Act 1972</i>	Aboriginal heritage sites	Recorded Heritage Sites A database search of DPLH has been conducted and no site recorded	A commitment is made to halt activities that may impact on a site if any is found during excavation, pending assessment by consultants.
<i>Planning and Development Act 2005</i>	Development approvals for on site constructions and any ensuing environmental impacts.	Planning Consent is required from the Shire of Murray and the WAPC.	An application for development approval is lodged.

<i>Shire of Murray Extractive Industries Local Law 2013</i>	The operations of the quarry are regulated by both the Planning Approval and Extractive Industries Licence	An Extractive Industries Licence is required.	An application for an Extractive Industry Licence is concurrently lodged with the Development Approval application.
<i>Health Act 1911</i>	Environmental and health impacts from waste water treatment and community health.	No matters of significance that would trigger this legislation have been identified.	The proposal complies with the Health Department Guideline for Dust separation. (See Dust Management) No waste materials will be disposed of on site.
<i>Department of Planning, Land and Heritage Transport Impact Guidelines 2016</i>	New developments may need to consider transport options.	This is a new operation feeding to Paterson Road, a significant local transport route that is suitable for truck traffic. Most traffic is anticipated to turn north to Lake Road and then west or east.	The transport routes are well defined routes that are widely used by truck traffic.
Western Australian Planning Commission Planning Bulletin 111/2016	New developments may need to consider fire risk and mitigation such as a bushfire policy and BAL attack document.	This is a new operation with no potential for increased fire risk as the pit will act as a fire break and prevent fire from spreading. The pit therefore acts as a fire management zone as it is devoid of vegetation.	No assessment is required because there are no significant changes to the fire risk. In fact the fire risk will reduce with the formation of the bare pit floor. There are no proposed structures.
<i>Environmental Protection Act 1986 Part IV - Assessment</i>	Referred to the EPA if the project is or may constitute a significant environmental impact.	This is a very small operation that will require a Clearing Permit under which assessment under the <i>Environmental Protection Act 1986</i> will be required for vegetation at least. If the sand is to be screened a Licence under <i>Part V of the Environmental Protection Act 1986</i> will also be required.	The proposal has been referred to the EPA by the Shire of Murray. Discussions have been held with the DWER (office of the EPA) with respect to the proposal.
<i>Environmental Protection Act 1986 Part V – DWER Licence</i>	Environmental factors that may be significantly impacted related to Prescribed Premises. Processing and Screening	If screening or even a crushing plant is to be in excess of 5 000 tonnes per year the operation will require a Department of Water Environment Regulation Licence.	At the moment, no Licence is anticipated to be required as > 5 000 tonnes of sand are not screened annually. A DWER Licence will be applied for prior to crushing and screening which triggers the “Prescribed Premises”; 5 000 tonnes of sand per annum.
<i>Environmental Protection (Noise) Regulations 1997</i>	Noise impacts.	The closest dwelling is 1200 metres to the north west. There is a shed located 700 metres to the south. The proposed excavation therefore complies with the EPA generic buffer guidelines.	Noted. See Noise Management.
<i>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</i>	Clearing and disturbance of native vegetation.	Clearing Permit under the <i>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</i> is required <i>under the Regulations</i> .	A Clearing Permit will be required under the Environmental Protection Clearing Regulations.  The proposal has been designed to avoid clearing Black Cockatoo habit and <i>Banksia</i> Woodland as determined during the site mapping by PGV Environmental.
<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>	Matters listed on the EPBC database.	The matters listed under the <i>EPBC Act 1999</i> which might apply to this site such as Black Cockatoo habitat and the potential for <i>Banksia</i> Woodland.	A Clearing Permit will be required under the Environmental Protection Clearing Regulations.  As the proposal has been designed to avoid clearing Black Cockatoo habit

			and <i>Banksia</i> Woodland as determined during the site mapping by PGV Environmental no matters listed under the <i>EPBC Act 1999</i> , will be impacted.
<i>Conservation and Land Management Act 1984</i>	Parks and Reserves and issues relating to flora and fauna.	There are no issues that trigger this legislation.	Noted.
<i>Biodiversity Conservation Act 2016</i>	The legislation seeks to protect and manage biodiversity in all its forms through regulation, conservation and restoration.	The clearing of vegetation is covered under the <i>Environmental Protection (Clearing of Native Vegetation) Regulation</i> .	A Clearing Permit will be required under the Environmental Protection Clearing Regulations.
<i>Heritage of Western Australia Act 1990</i>	Heritage	No heritage matters are identified locally or on quarry footprint. DPLH databases were searched.	Noted.
<i>Waterways Conservation Act 1976</i>	Water quality and management of surface water	There are no watercourses on site.	A Water Management Plan has been prepared and is included.
<i>Rights in Water and Irrigation Act 1914</i>	Water quality and management of surface water	There are no watercourses on site.	Noted
<i>Country Areas Water Supply (CAWS) Act 1947</i>	Water supplies	The site does not lie within a surface or groundwater control area.	Noted
State Agreement Acts	Specific acts that relate to certain large projects that may impact on some locations.	Not applicable	
<i>Contaminated Sites Act 2003</i>	Contaminated materials that may arise from excavation or be used in excavation and processing.	The only factor that is likely to fall under this category is the storage and use of maintenance items and on site maintenance.	No materials are present or to be used which would trigger this legislation apart from normal fuel and maintenance. A Water Management Plan has been prepared that includes commitments to remove any contaminated soils or other material regularly and at the end of excavation as part of the closure actions.
<i>Dangerous Goods Safety Act 2004</i>	Potential for dangerous good to impact on the environment.	Refers to fuel, which is required and blasting under the <i>Dangerous Goods Safety (Explosives) Regulations 2007</i> .	The proponent will comply with the requirements for fuel through management plans that will be implemented. Fuel and Servicing Management Plans are included in the attached Water Management Plan.
<i>Mines Safety and Inspection Act 1994</i>	Safety and management of mining operations which in turn may impact on the environment.		<b>Mine Safety</b>  The site is registered under the SRS and a Project Management Plan, Risk Assessment and Emergency plans approved. The Project Management Plan addresses all aspects of mining. The SRS System addresses ongoing Health and Safety.

## 3.0 Buffers and Social Impacts

### 3.1 Consideration of nearby sensitive premises

The quarry is designed to maximise the setbacks to the closest sensitive premises.

As part of the development of the management plans for the proposed quarry extensive analysis of the local landform, land uses and location of sensitive premises were made by Landform Research from the available sources of published information, aerial photography, historical aerial photography, site mapping, review of the nearby and surrounding land uses, local and regional planning and local and wider environmental attributes.

The main environmental issues identified in relation to buffers and setbacks to sensitive premises, in addition to those generally recognised by the various Government and Published guidance's are;

- Visual amenity
- Dust management
- Noise management
- Blasting
- Local amenity
- Cumulative impacts of quarries

### 3.2 Policies

#### ***Separation to Dwellings***

A number of Government Policies relate to buffer distances and the protection of basic raw materials. *State Planning Policy No 4.1, State Industrial Buffer Policy, (draft July 2004)* discusses the need to consider adjoining land uses when locating buffers but does not prescribe set buffers for operations such as this.

SPP 4.1 discusses the need to provide buffers both on site and offsite with respect to industry including extractive industries. It does not however specify any distance for the buffer, but notes that site specific studies should be prepared that will demonstrate that the extractive industry can operate in a manner compatible with nearby sensitive premises.

The State Industrial Policy 4.1 does not specify a set buffer distance, but notes that buffers are to be based on "scientific study" and are flexible. It further specifies the buffers by reference to other documentation such as the Environmental Protection Policies, EPA and DWER standards and DPLH Generic Industrial Buffer Guidelines; that is the EPA 1 000 metre generic buffer used in SPP 2.4 and SPP 2.5 that are used in the absence of supporting or scientific studies and information.

The buffer referred to can be both on site and offsite although in this case only on site buffers are required.

SPP 2.5 supports preventing conflicting land uses (5.12.1), supports the generic buffers recommended by other Government documents such as the EPA Guidelines for separation distances (5.12.3), and seeks to restrict subdivision from impinging on basic raw material resources.

The Policy SPP 2.5 is also supported by Guidelines that seek to protect the Landscape and secure Transport Routes.



EPA guidance "*Separation Distances between Industrial and Sensitive Land Uses*", June 2005 lists the generic buffers for sand quarries as 300 – 500 metres depending on the extent of processing.

The EPA issued *Draft Generic Buffer Guidelines 2015*, but these have been withdrawn.

A generic buffer relates to the distance at which there are unlikely to be any problems without some further investigations and does not mean that smaller buffers are not acceptable.

The issue of appropriate buffers is a matter of the distance and protection measures to prevent impact on adjoining land users. This applies mainly to noise, dust and visual impact, all of which are treated separately.

EPA Draft Environmental Assessment Guidelines 2015, "*Separation Distances between Industrial and Sensitive Land Uses*", June 2005 *DRAFT Environmental Assessment Guideline for Separation distances between industrial and sensitive land uses*", has not been implemented, with the 2005 guideline prevailing.

The draft EPA 2015 Guideline also enabled smaller separation distances based on site assessments and also listed the separation distances as 300 to 500 metres for sand, limestone and clay. Sand is at the lowest separation distances with the sand being only loaded to road trucks. The sand is readily excavated by a rubber tyred loader, whereas clay or limestone normally requires a bulldozer or excavator.

The smallest buffer applies even if screening of the sand is to be used to revive vegetation.

The walls of the pit, perimeter bunding and nature of the ridge landform will be used to reduce noise transmission. The main issues are the potential generation of dust and noise.

Excavation will be worked from inside out on the floor of the pit working below natural ground level.

Based on the nature of the sand, equipment used and excavation methods, the extraction of sand has potentially the lowest impact and a generic buffer of 300 metres is appropriate and could be less if significant impacts are confined.

The closest dwelling is 1200 metres to the north west. There is a shed located 700 metres to the south.

For comparison the majority of sand quarries across the State and within the Perth Metropolitan Area all have approvals and operate at much closer distances than 300 metres.

In sand excavation the only mobile plant is a loader and road trucks. The examples provided below show that the distances between the active pit and a dwelling on the proposed operation are consistent with operations in other locations.

**Table 3: Examples of buffers to residences**

Operator	Location	Resource and buffer
WA Limestone	Wattleup Road Hope Valley	Limestone and sand
Italia Stone Group	Wattleup, Hope Valley	Limestone
NLG Sand Supplies	Jandakot Road Jandakot	Sand 40 – 80 metres
Midland Brick	Wandena Road, Muchea	Clay 250 metres
NLG Sand Supplies	Coyle Road Oakford	40 metres
Cockburn Cement	Fancote Road, Munster	Sand and Limestone 70 metres
WA Limestone	Kerosene Lane, Medina	Limestone, 150 metres

The sand pit therefore complies with the EPA Generic Buffer Guidelines.

**“A” Class Reserve on Lot 224**

The reserve will continue to be linked as the linkage will be re-established at the end of excavation through the wetland and with local native vegetation planting.

The access road will only travel along the fire break near the Reserve in the west. In the central and eastern part there will be a 20 metre vegetated buffer retained along the northern boundary.

**Perimeter Buffers**

A perimeter buffer of 20 metres will be retained along the northern and eastern boundaries with a 40 metre setback along the western boundary, in compliance with normal policies for extractive industries.

**3.3 Community Consultation**

The Proposal will be advertised to the local property owners as part of the consideration by the Shire of Murray.

**3.4 Heritage**

A search of the Department of Planning Land and Heritage and database does not reveal aboriginal sites on Lot 266.

The site has been an operating rural property for many years, with ongoing soil disturbances through that time, and is currently used for cattle grazing.

Should any archaeological site be uncovered, work will cease in that area pending an assessment of the site by an independent consultant, traditional owners and the Department of Planning Lands and Heritage as required.

**3.5 Complaints Mechanism**

The following complaints mechanism is proposed.

1. The contact details will be displayed at the entrance to the operations.
2. A complaints book will be provided and maintained.
3. Upon receipt of a complaint it will be investigated and action taken if the complaint is determined to be legitimate.
4. When a complaint is found to be legitimate, any reasonable actions to mitigate the cause of the complaint will be taken, to prevent a recurrence of the situation in the future.
5. Details of any complaints, the date and time, means by which the complaint was made, the nature of the complaint, the complainant, investigations and any resulting actions and the reasons, will be recorded in the Complaints Book.
6. The Shire of Murray will be informed of any complaint or any other report provided to a Government Department within 3 working days.
7. The complaints book will be made available for viewing or requested details made available to the Shire or any other official upon request.

## 4.0 Physical Attributes

### 4.1 Geology and Geomorphology

The site is a relatively flat site with a low sand ridge in the north. The base land rises slowly from 8 metres AHD in the west to 10 metres AHD in the east.

The low sand ridges then extend up to 15 metres AHD generally along the northern edge of Lot 2267.

The site is a sand ridge of medium grained yellow Spearwood - Bassendean Sand. The location more fits with the Spearwood System but the resource itself is more related to Bassendean in form.

Sand from these sand ridges usually exhibit silica contents of greater than 98%. The sand can vary from white leached silica sand of high purity to yellow slightly earthy sand which contains approximately up to 2% clay and goethite coatings covering the sand grains.

The Spearwood and Bassendean Sands originated from coastal dunes that formed during the Pleistocene as calcareous and silica coastal sands. The differences being that the Bassendean System is older and further inland than the Spearwood System.

The sands of the Swan Coastal Plain have been well investigated over the years through exploration and more particularly during excavation. A summary, with analyses from various areas, is presented, (Abeysinghe 2003).

The exact volumes of each type of sand that will be available will depend on the amount of ground approved, and the permitted depth of excavation.

The site itself is underlain by alluvial soils of the North Dandalup River, Nambeelup Brook and the Serpentine – Murray Rivers. The deposited alluvial clays are overlain by the sheeted old sand dunes of the Spearwood – Bassendean Systems. The sand is deep but becomes clayey at depth as indicated by the excavation of the dam near the south western corner.

The sand ridges are deep sand. A small surface remnant of limestone marl lies in the south eastern corner, outside the proposed excavation. A good summary of the geology, soils and water features is included in Department of Water Environment Regulation 2011, *Hydrological and nutrient modelling of the Peel – Harvey Catchment Report WST 33*.

### 4.2 Regolith and Soils

The soils and excavation are deep leached sands which are well known from the many sand pits that have operated and currently operate across the Swan Coastal Plain.

The site consists of a slowly permeable clay substrate of alluvial materials that is exposed by deeper excavations. Overlying this is a thin sheet of sand across the areas of lower elevation. The sand ridges are formed where the overlying sheet of sand thickens to over 5 metres in elevation.

The sand ridges are never wet but parts of the low lying areas have temporarily water lying on them at times in winter when the vertical permeability rate of the underlying clays is exceeded by rainfall and evaporation rates are low. This is a temporary perched water table and does not reflect the regional water table.

The soil on the sand resource typically has a grey sand topsoil up to 300 mm thick over leached white silica sand of several metres. The white sand grades into cream and lighter yellow or brownish sands at depth.

### **4.3 Climate**

The climate of the area is classified as Mediterranean with warm to hot summers and cool wet winters.

Temperatures are recorded at Mandurah, where the maximum temperatures in the hottest and coldest months, December to January and July, are 28 to 30 degrees C and 18 degrees C respectively. In winter the average minima drop to 9 degrees C in July.

Average annual rainfall for the area is 888 mm. Over 80% of the rain falls during the winter months April to October inclusive. Evaporation exceeds rainfall in all but the wetter months.

Wind direction is predominantly from the east in the morning and from the south west in the afternoon during the summer months. Wind speed exceeds 10 kph for 55 % of the time at 9.00 am and 74 % of the time at 3.00 pm.

During the winter months the directions are more variable due to the presence of winter lows.

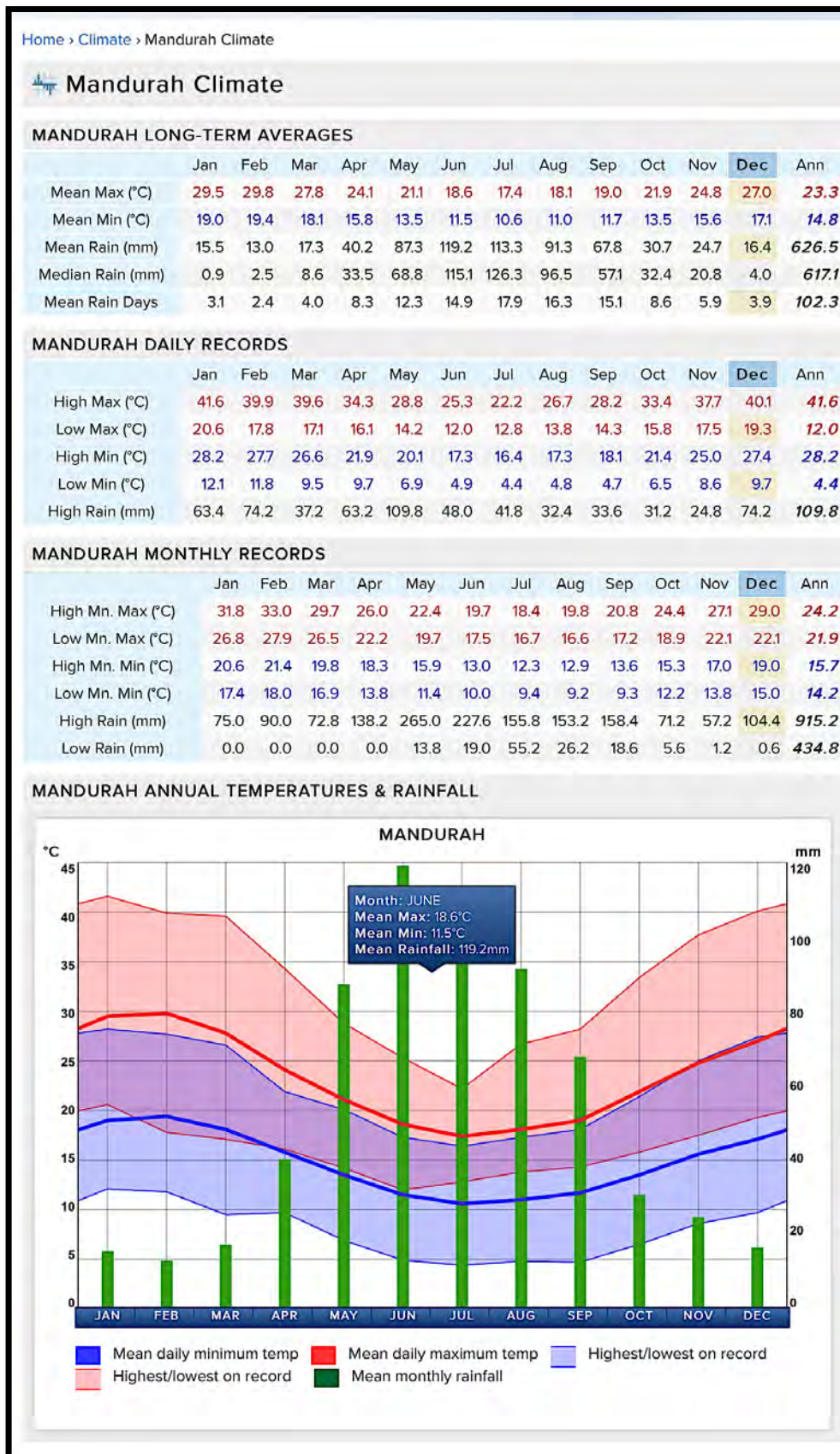


Table 4: Climate Data

## 4.4 Hydrology

### **See Section 9.0 Water Quality Management**

A good summary of the geology, soils and water features is included in Department of Water Environment Regulation 2011, *Hydrological and nutrient modelling of the Peel – Harvey Catchment Report WST 33*.

Lindsay Stephens of Landform Research extensively investigated the seasonal perched water table on Lot 226 on 11 September 2002, for a subdivision that was investigated at that time.

The field work mapped the soil types across Lot 226, mapping the underlying sandy clays and the overlying low sand ridges. Numerous hand auger holes were drilled. See Figures 5 and 11 on which every elevation is a test hole observation.

### **Surface Water**

There is no surface runoff of water due to the porosity and permeability of the sand, with precipitation draining to the water table. Drainage is to the west and north west generally to Nambeelup Brook which lies to the north of the subject land drains east west to the Serpentine River and eventually the Peel Estuary. Nambeelup Brook is shown on Figure 1.

There is a temporary perched winter water table at or near the elevation of the surface of the sand clay which pools on the pasture in the north eastern corner of Lot 226 and in the south western corner. See Figure 1 where the pooled water is shown as darker bodies in the winter aerial photograph. The areas of 0.0 metres shown in Figure 5 match the surface water winter wet.

The investigation (Figure 5) did not show the water table in metres AHD, but in depth of the water table below the land surface. The reason a measurement of below the land surface was used was to identify the areas which could support alternative waste water disposal systems for a potential subdivision.

Where temporary water was at the surface the separation is shown as 0.0 metres. Figure 5. Depths of 0.3 – 0.4 metres are the measured depth to the seasonal perched groundwater on 11 September 2002 etc. See Figure 5.

Whilst the elevation of the water table is not shown in metres AHD that elevation can be readily seen on the plan by subtracting the depth to water from the contours which is in AHD. Although some 18 years old the data is still valid and may be even more valid because rainfall in the winters around 2002 was higher than it is today. Figure 11. The contours are shown on Figure 5.

### **Groundwater**

The data in Figure 5 shows the elevation of the temporary perched winter water table at or near the elevation of the surface of the sand clay. The depths are the depth to water and represents the maximum perched winter water table.

On this site and many similar sites, there is also the main regional water permanent water table that drops below the surface in summer and rises to or near the land surface in late winter.

As the soils are deep leached sands over sandy clays of the Guildford Formation, in winter when rainfall exceeds the infiltration rate of the underlying sandy clays temporary water perches on the surface for several months in winter to early spring. This is a temporary perched water table. See Figure 4.

The shallow gradients of the land and water, and the low lateral permeability means that any westwards flow of this temporary perched water is slow.

The temporary perched water eventually drops below the surface of the sandy clays as the spring rainfall decreases, and water is lost to evaporation and evapotranspiration and the permanent water table remains. In these type of alluvial clays it is not uncommon in winter to have water laying on the surface in places and yet still be able to dig a dry hole to the permanent water table sitting within the clays. Figure 4.

DWER Data shows the maximum water table in winter on Figure 3. Those water table contours are transposed to Figure 5.

The winter maximum ground measurements of the perched water measured in September 2002 have been transferred from Figure 11 to Figure 5 as the yellow circle measurements and shown as metres AHD, having been converted from Figure 2 using the ground contours on Figure 5.

The elevation of the temporary perched water rises from wetting the surface at 8 metres AHD in the west to 12 metres AHD in the east. See Figure 5.

From those elevations the winter perched water table was drawn using the 2002 data and shows a relatively similar elevation to the DWER maximum water levels which is not surprising as the perched water will sit on the underlying clays each winter irrespective of whether it is a dry or wet winter. Figure 5.

The surface of the perched winter water table on Figure 5 is generally at the same elevation as the surface of the sandy clays, with sometimes a minor rise by mounding under the centre of the sand ridge. On the sandy clays around the sand ridge the winter seasonal perched water only forms a layer a few centimetres deep. See the section on Figure 4.

The regional permanent groundwater is not exposed on Lot 226, with the exception of the excavated soak in the south western corner. This soak is an expression of the regional water table at that location. The land surface at that location is at an elevation of around 8.0 metres AHD, with the regional winter water table rising to that elevation in winter but dropping below the land surface in summer.

All drainage from the active working areas and excavation is to the base of the excavation, and thus all surface water is retained on site.

### ***Proposed Depth of Excavation***

From the depth of the seasonal perched water table which is similar to the DWER maximum water table the base of the pit is set at 0.5 metres above the elevation of the water table, and is also shown on Figure 5 as blue text.

The pit footprint remains the same but the staging is slightly changed from 3 stages to 4 with the Stages 1 and 2 having an excavated floor elevation of 10.5 metres AHD and the eastern stages having a base elevation of 11.5 metres AHD. In reality only depths of sand of one or more metres thickness are economical to excavate so that whilst the proposed pit footprint is shown in blue, excavation to all edges is not likely and will provide further setbacks to the non excavated areas. The Staging is shown in Figure 6.



## 4.5 Vegetation

Part of the resource area is cleared. The remainder has been degraded, or cleared and allowed to regrow. Figures 7 and 8 with photos at Figure 10.

PGV Environmental completed a flora and vegetation study in February 2019 with follow up targeted vegetation surveys and Cockatoo habitat surveys on 31 July 2019

PGV found that only a small area of *Banksia* Woodland was present and this has been excluded from the proposed extraction. The *Banksia* Woodland mapping can be seen at Figure 3 in the attached PGV Environmental report. The plant communities are identified and any that may classify as *Banksia* Woodland is lists as having a “B” in the name. PGV Environmental Figure 3 is repeated at Figure 7 with the proposed sand pit overlay (Red and yellow hatching) showing that the sand pit excludes all *Banksia* Woodland.

The vegetation on the sand pit site is either cleared to pasture or dominated by *Kunzea glabrescens* which is a very common coloniser of disturbed land, which is what is occurring on this site.

See Section 10.1 for a summary and Sections 10.1 and 10.6 for a summary of the proposed management.

A Clearing Permit will be required for the sand extraction footprint of 12.7 hectares.

A Clearing Permit will not normally be issued by DWER until all other approvals are in place. Hence the application is made for Planning Consent and an Extractive Industry Licence to enable the application for a Clearing Permit to be made and issued.

Even though the Local Authority Approvals will be issued it will be the approval to clear vegetation in the areas of native vegetation, which will be the ultimate determining process for the proposed sand pit.

## 4.6 Fauna

Possibly the most significant fauna are Black Cockatoos which have been recorded in the general area.

The fauna on site will already be significantly depleted by the partial clearing. Some fauna are likely to be present. PGV Environmental completed a Level 1 Fauna Assessment with a follow up Cockatoo habit survey on 31 July 2019. See Section 10.2 for a summary and the PGV report which is attached.

The cockatoo habitat and habitat trees are identified by PGV Environmental . The plan is repeated at Figure 8 with the overlay of the proposed sand pit by blue line. This shows that all cockatoo habitat trees are excluded. A 10 metre set back is proposed and will be provided in the field with the closest res identified prior to excavation commencing.

Cockatoos and other fauna will be considered under the Clearing Permit process when an application is made for clearing.

## 4.7 Acid Sulfate

The most definitive survey procedure was produced by the Acid Sulfate Soil Management Advisory Committee NSW, 1998, in their Acid Sulfate Manual.

This Manual forms the basis for much of the assessment procedures in Australia, including those adopted by the Western Australian Planning Commission and the Department of Water, Environment Regulation. The Acid Sulfate Manual adopts the procedure of reviewing the published data followed up by field assessment, which has been completed for this site. If a geological risk is determined, then a Preliminary Acid Sulfate Assessment is conducted.

- Acid sulfate only becomes a potential risk when a number of circumstances are present.
- There is rock, soil or regolith present that is carrying sulfides.
- Sulfide carrying materials from below the water table are to be exposed to the atmosphere.
- Excavation below the water table is to be carried out exposing the sulfide carrying materials to oxygen in the atmosphere.
- Dewatering of the sulfide carrying materials is proposed, exposing them to oxygen.
- Regolith conditions are already highly acidic, below pH4, under which oxidation can occur through electron exchange without the need for the presence of oxygen.

The site is shown as yellow coloured, Moderate to Low Risk of acid sulfate conditions at depths of generally > 3 metres (yellow), in WAPC Planning Bulletin 64 (Locate 2019). The yellow covers the sand ridge with no risk and the lower elevation areas as well

The wetland area is shown as red with a listed high risk with acid sulfate occurring within 3 metres of the surface. This is the north eastern corner on lower elevation that will not be impacted by excavation.

Materials at risk under reducing conditions are normally grey in colour or have been grey with no brown or red brown iron oxides. Where exposed to the atmosphere there is a change to brown iron oxides, with yellow jarosite and other alteration minerals that are distinctive.

The site has been inspected by Lindsay Stephens of Landform Research. None of the at risk parameters occur on site.

On site the soils are white and cream to brown sands that are oxidised and do not carry any risk of acid sulfate potential.

This concurs with *Nattaporn-Prakongkep, R J Gilkes, B Singh and S Wong, 2011, Mineralogy and chemistry of sandy soils in the Perth metropolitan area of the Swan Coastal Plain, Department of Environment and Conservation* who concluded that there is no risk of acid sulfate soils in sands unless there is peat or organoferricrete present and excavation proceeds below the water table. In such situations no testing would be required because there is no risk.

The soil auger holes conducted in 2002 show no presence of organoferricrete materials or peat that indicate prolonged reducing conditions. Also those conditions only occur below the water table. With no excavation within 2 metres of the water table there is no risk of acid sulfate conditions being intersected by excavation.

No drains or excavation are proposed to be cut below the water table.

Excavation will not occur below the water table so reduced materials will not be exposed to the atmosphere during excavation.

The base of the pit is at an elevation 0.5 metres above the highest known water table.

## 5.0 PROJECT DESCRIPTION

### 5.1 Construction

This proposal is for the development of a sand pit with a return to parkland pasture.

#### **Construction Time**

The access road needs to be formed. The construction time is anticipated to be 30 days.

### 5.2 Excavation

**Table 5: Summary of Excavation**

ASPECT	PROPOSAL CHARACTERISTIC
<b>EXCAVATION</b>	
Total area of excavation applied for	Proposed excavation – 24.5 hectares Current excavation – Nil Under rehabilitation - Nil
Rate of excavation based on average anticipated volumes.	50 000 to 150 000 tonnes per year depending on contracts with the potential for greater volumes of sand to be removed in a particular year depending on contracts. Maximum volume is around 500 000 tonnes.
Life of project	10 years
Area cleared per year	1 - 4 hectares but dependent on contracts won. Total clearing required, 12.7 hectares
Dewatering requirements	Nil
Maximum depth of excavations	1 - 5 metres below natural land surface.
<b>PROCESSING</b>	
Resources	No processing proposed at this stage. A screening plant remains a possibility to produce specialty sands if required.
Water requirements	Nil
Water supply source	Sump on site subject to Licence otherwise water will be brought to site.
<b>INFRASTRUCTURE</b>	
Total area of plant and stock	Only mobile equipment. No structures.
Fuel storage	No fuel storage
<b>TRANSPORT</b>	
Truck movements	Variable but approximately 6 – 25 laden trucks per day but up to 100 trucks for day for short period to fill large contracts if won.
Access	Access road to Paterson Road
<b>WORKFORCE</b>	
Construction	Access road only.
Operation	2 - 4 persons
Hours of operation	Hours of operation, will be 6.00 am to 6.00 pm Monday to Friday inclusive, excluding public holidays for processing and excavation. Loading and transport from site may commence at 6.00 am

	Monday to Friday inclusive, excluding public holidays
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### ***Exposure of the Resource***

A Clearing Permit will be required for development of 12.7 hectares of the resource the resource and will be applied for. The remainder of the 24.5 hectare resource is pasture and does not require a clearing permit.

A loader will be used to remove any vegetation, pasture and topsoil cover by pushing it into windrows, for use on the batters to minimise soil erosion and spreading on the final land surface as part of the final rehabilitation.

Overburden – interburden, or subgrade sand, will be removed by pushing to the perimeter of the proposed pit to form perimeter bunding to the pit.

This bunding will be pushed to the perimeter of the footprint along the western edge and northern and southern edges to assist with visual protection.

### ***Extraction***

Environmental issues including dust, noise and traffic are not anticipated to be a significant risk or impact and can be managed in such a way to minimise or eliminate any potential impact on the local sensitive premises or adjoining land.

Excavation will be carried out as a sequence.

Sand will be excavated by loader, loading directly to road trucks.

Road trucks will enter from Paterson Road through Lot 226 along an access road formed on the existing fire break.

Sand is to be excavated to 0.5 metres above the highest known water table as measured in water monitoring bores and piezometres during excavation. See the attached Water Management in Section 9.0.

The depth of excavation will be 1 to 6 metres. The floor will be flat to gently sloping at 1 : 5 to 1 : 10 vertical to horizontal to enable a productive agricultural end land use with local native vegetation on buffers.

Water is unlikely to be used for dust suppression apart from the watering of internal access roads to enable road trucks to access the resource to be loaded. Water is unlikely to be required for the access road but is available to be used to dampen dust if required. See the attached Offsite Risks Management Plan for dust management.

## **5.3 Pit Design and Staging**

To maintain this type of operation normal methods of open cut excavation will be used which will require a sufficiently large footprint to enable haul roads to extend to the floor at suitable grades to ensure efficient and safe excavation conducted in a manner that minimises environmental impact.

The development of the pit will depend on the internal haul roads and access, efficiency, safety and environmental management. The footprint of disturbed ground is not proposed to be enlarged after allowing for progressive rehabilitation.

A 20 metre buffer will be provide to the east and north and a 40 metres buffer to the west at Paterson Road. Four Stages are shown in Figure 6.

### **Final Contours**

The depth of excavation will be 1 to 4 metres. The floor will be flat to gently sloping at 1 : 5 to 1 : 10 vertical to horizontal to enable a productive agricultural end land use with local native vegetation on buffers. Figure 4.

The Concept Final Contours are shown in the attached plan.

Rehabilitation will be progressive, but because of the nature of the excavation will be restricted to completed faces. The majority of the pit will not be able to be rehabilitated until the completion of excavation. Batters will be rehabilitated when formed.

Wherever possible, rehabilitation will be continued as areas are completed to ensure that the amount of ground that is open at any one time is minimised.

### **Geotechnical parameters**

The final profile of the excavated surface will be to *Mines Safety and Inspection Act 1994* as explained in documents such as *Guidelines on Safety Bund Walls Around Abandoned Open Pits (DOIR 1991)*. Figure 4.

The sand pit has steeply sloping faces during excavation in compliance with the DMIRS face angles for sand excavation. These will be battered down to 1 : 4 vertical to horizontal as a geotechnically stable landform that can be used for agricultural purposes. Figure 9.

## **5.4 Processing**

Much of the sand will be used as fill without any processing. Some sand may be screened for specialty uses but will normally be less than 5 000 tonnes per year.

A DWER Licence will be required under Part IV of the *Environmental Protection Act 1986* for screening if the annual volumes exceed 5 000 - 50 000 tonnes. (Category 70 Prescribed Premises).

## **5.5 Stockpiles**

Stockpiles may be needed for sand if the white and coloured sand is taken separately, although no stockpiles are currently planned.

If required, two small stockpiles will be created on the floor of the pit for the types of sand with a maximum elevation of 4 metres.

## **5.6 Equipment**

- No facilities are proposed for the site.
- Ablutions are to be a serviced portable system.
- A loader will excavate sand and load the trucks.
- The only other vehicles are the road trucks

- Refueling will be conducted from mobile tanker in the pit. There will be no fuel stored on site.
- Major maintenance will continue to be conducted offsite.
- It is not anticipated that a bore or water Licence will be required, because of the nature of the operations, the locality and the distances to sensitive premises.
- A mobile screen to sieve the sand may be used to improve the sand but at this stage is seen as unlikely to be required.

## 5.7 Hours of Operation

Hours of operation will be 6.00 am to 6.00 pm Monday to Saturday inclusive, excluding public holidays. This is similar to the operations of nearby sand pits in the Peel Region.

Transporting material on Saturday should not present a problem because of the high traffic volumes using local roads and low numbers of dwellings.

## 5.8 Access and Security

The access road from Paterson Road will be formed from limestone hard stand.

The site is to be secured by locked gates when it is not being actively worked. The boundary fencing will be maintained to prevent inadvertent and unauthorised entry.

Warning signs for trucks will continue to be used to alert road users to the entrance onto Paterson Road. Maintenance of signage will be undertaken through the Shire of Murray and Department of Mines Industry Regulation and Safety as required.

Signs will be erected at the gate showing contact numbers.

### ***Transport***

Truck access will be from Paterson Road to Lake Road and then east or west along Lake Road.

The number of truck movements will vary throughout the year depending on the size of contracts. To transport the required amount of sand a certain number of trucks must be used.

Road transport will use a variety of vehicles such as rigid trucks, semi-trailers or rigid (8) wheeler trucks to a 5 axle dog trailer.

In general an average of around 10 loads may be completed on each of the days when resource is transported, and for large contracts this may rise to 50 trucks laden truck movements per day, depending on the type, number of trucks available, the contracts being filled and the number of hours worked.

Such large numbers of trucks will be for limited times to fill specific contracts. On some days there is anticipated to be no activity on site between contracts.

**Table 6: Seasonal Closure and Campaign Closure**

CLOSURE OBJECTIVE		Actions for Care and Maintenance Greater than 12 months
<b>COMPLIANCE</b>		
All legally binding conditions and commitments relevant to temporary closure and rehabilitation that can be undertaken will be met.	Prior to undertaking temporary closure. <ul style="list-style-type: none"> <li>Review the latest documentation and approvals.</li> <li>Assess compliance with the conditions and commitments</li> <li>Faces and the landform are to comply with DMIRS Guidelines and be stable for the long term.</li> </ul>	
<b>SAFETY</b>		
Make the site safe	Prior to vacating; <ul style="list-style-type: none"> <li>Secure the site and any plant or structures to be left.</li> <li>Mobile plant and other equipment not required will be removed from site.</li> <li>The site will be cleaned, structures will be removed.</li> <li>Provide fencing, bunding, signage or other measures as required to provide a safe site, particularly above any faces.</li> </ul> <p><b>Security</b></p> <ul style="list-style-type: none"> <li>Complete activities to make the site safe.</li> <li>Provide bunding and warning signs above faces as required.</li> <li>Provide locked gates or log access restraints as required or maintain staff on site.</li> <li>Check and maintain perimeter fences.</li> <li>Visual audit of completed ground, to verify compliance.</li> </ul>	
<b>HYDROGEOLOGY</b>		
Ensure that there are no materials that could cause pollution or environmental harm.	<ul style="list-style-type: none"> <li>Remove fuel service materials.</li> <li>Remove any materials from which leaching may occur.</li> </ul>	
<b>BIODIVERSITY</b>		
Minimise the risk to on site or offsite biodiversity.	<ul style="list-style-type: none"> <li>Implement the Dieback Management Plan.</li> <li>Implement the Weed Management Plan.</li> <li>Inspect the site for Significant Environmental and Declared weeds. Treat accordingly</li> <li>Inspect adjoining native vegetation and rehabilitation for edge weed effects. Treat accordingly.</li> <li>Complete as much rehabilitation as possible.</li> </ul>	
<b>STAKEHOLDERS</b>		
Ensure stakeholder issues are considered.	<ul style="list-style-type: none"> <li>Prior to temporary closure, as necessary, consult with the relevant stakeholders to check whether the closure planning, where possible, considers their interests and carry them out as necessary. If care and maintenance continues modify procedures in response to changes in stakeholder position, policies or conditions.</li> </ul>	

## 5.9 Water Use

Water will not be required for dust suppression. This is discussed under Dust Management in the Offsite Impacts Management Plan.

However there is a contingency to use water from the sump to wet down the access road if required, if permitted through DWEWR Licensing. In general though dust suppression with sand excavation is not required. It is only the access road that generates dust and by locating this on pasture, capillary action from the soil will keep that moist for much of the year negating the need for wetting down. A cellulose road stabiliser can also be used to negate the need to wet down the access road.



## 5.10 Workforce

The workforce will vary, depending on the level of operation and market demands, but usually 2 – 4 persons will work on site plus truck drivers as they access the operations.

## 5.11 Safety

Excavation will be conducted to *Mines Safety and Inspection Act 1994 and Regulations 1995*. Excavation practices, and operations procedures are in compliance with the Act. Health and safety issues are overseen by the Department of Mines Industry Regulation and Safety.

Every morning prior to start there will be a daily briefing as applicable, or consideration of the potential hazards, any incidents such near misses, health and safety and any other relevant issues.

### Site Safety

The operator will have procedures in place to manage safety, health, environmental impact, site completion and rehabilitation. All workers will be required to wear full protective safety and high visibility gear when on site.

All vehicles have two way radio capability. No light vehicles will be permitted on site without registering with mobile plant on site. Full personal protection is required for all persons on site at all times.

All personnel are provided with site induction, safety and environmental awareness training.

### Emergency

The site is within mobile phone contact and all vehicles are equipped with two way radios.

- The loader will excavate from the face using an in – out movement, only approaching the face from a perpendicular movement which is the safe option. The face will be no higher than the reach of the bucket, unless the sand free falls at the angle of repose in which case the face can be higher. For higher faces, benches or an excavator will be used.
- Personal protection will be worn by all persons on site, with a minimum of hi – viz, safety boots, long clothing, hearing and eye protection and helmets when near the face or operating machinery.
- Road trucks are separated from the operating loader. Site warning signs and directions will be installed as required to maintain safety.
- Safety bunds or temporary fences will be used above any active vertical faces.
- Warning signs are maintained as required.
- Emergency preparedness plans will be developed and implemented.
- Staff and contractors are inducted and trained as necessary and have the relevant qualifications to fulfill the tasks they are assigned to.

- Where applicable Safe Operating Procedure Sheets are made available for hazards. Workers and staff on all sites are trained in the use of the procedures and all employees provided with site induction and training as necessary prior to commencing work on the site.

### **Fire Management**

The excavation area will form a natural firebreak; the access road will also assist. Water available on site can be used for fire fighting.

The safety of workers is managed through a Safety Management Plan developed through the *Mines Safety and Inspection Act 1994 and Regulations 1995*.

Normally developments in bushfire areas are required to have fire management plans in place.

Western Australian Planning Commission Planning Bulletin 111/2016 provides for an exemption of a bushfire plan requirement because there will be no structures that will burn and the open ground will form a fire break.

The Department of Mines Industry Regulation and Safety, SRS and PMP systems, with the registration of all quarries, requires bushfire planning to be covered under that system. The PMP (Project Management Plan) will be required to be produced and approved prior to excavation being commenced.

The management actions that are used to minimise fire risk are summarised below.

- Vehicles will be restricted to operational area, particularly on high fire risk days.
- Diesel rather than petrol powered vehicles are used.
- Perimeter fire breaks will be maintained for Lot 226.
- The mobile plant on site will be available to assist with emergency fire management when safe to do so.
- Fire risk is addressed and maintained through the site Safety Management Procedures (Project Management Plan)
- Water supplies will be drawn from existing farm supplies with the proposed dam to supply water.
- The farm fire fighting unit is available for fire management.
- The site is secured from unauthorised access by maintaining the existing fencing and locked gates.
- Public access will not be permitted.
- An emergency muster area is provided.
- On site communications and worker induction and training will be provided.
- The site is within mobile phone range, the surrounding area is relatively flat and any bushfire smoke will readily be noticed.

## 6.0 DUST MANAGEMENT

### 6.1 Environmental Dust

#### **Background**

Excessive dust has the potential to impact on both the workers and the adjoining land, and its potential for generation must be taken in context.

There are a number of key aspects to dust impacts;

- What is the source of particles?
- What is the potential for the particles to be disturbed?
- What is the nature of the particles and how are they likely to behave?
- What types of impacts are the particles likely to have if they move?
- What management actions can be used to mitigate or reduce dust impacts?

Most dust on site will be generated during vehicle movements.

Commonly called "dust," scientists and regulators refer to the term particulate matter (or PM) to describe the range of particles that exists in the air breathed in.

Particulate matter exists naturally in the atmosphere, eg sea-salt spray and pollens. PM can be increased due to human activities such as vehicle exhaust, industrial processes, power stations, mining, farming and wood heaters, or smoke from bushfires.

Exposure to PM can be associated with health and amenity impacts if the exposure is excessive.

The likely risk of these impacts depends on a range of factors including the size, structure and composition of the PM and the general health of the person.

Particulate matter needs to be suspended in the air to carry any distance. The particles must be smaller than sand grains, which will only carry short distances because the grains are too large to move at any more than bouncing. The particles that are able to be suspended are called Suspended Particulate Matter and the total amount of that is referred to as TSP.

Little published data is available from general mining in Western Australia even though monitoring is undertaken at some sites. There is data specifically from mining, (predominantly coal) from New South Wales (NSW Health) where particulate levels have been measured to be;

PM <2.5 microns as 2 – 5% of emissions (One micron is 1 / 1000 of 1 mm).

PM < 2.5 are invisible and called "fine particles". They are the main health issue and are caused by vehicle emissions whether they are along roads or on private land. Vehicle emissions will not occur at night or at other times when the site is not active.

PM 2.5 – PM10 microns as 15 – 45%

PM 10 (particles between 2.5 and 10 microns) are invisible and called "coarse particles". They can be breathed in, but are removed by alveoli and mucous. (NSW Health). This dust may be generated when land is cleared and topsoil disturbed or the site is subject to traffic in summer.

PM>10 microns as 50 – 70%

PM>10 is visible dust and will, based on the resource, be the vast majority of the particles.

Normally all sizes of dust are generated together, and there will be visible dust being generated when invisible dust is being formed. Therefore any visible dust present is a good sign and early indicator of a dust risk. A summary of the sources and proportions of dust is shown in; NSW EPA and NSW Ministry of Health Environmental Health Branch 2015, Review of the health impacts of emission sources, types and levels of particulate matter air pollution in the ambient air in NSW.

This is backed up by occupational monitoring through the Department of Mines Industry Regulation and Safety. Unpublished data from those quarries shows quarries are compliant or can readily be made compliant with the health and safety and community standards through normal dust management practices.

### **Sand Quarries**

Sand excavation is at the lowest risk from dust, producing very little dust material, with the exception of the vehicle dust generated from unsealed roads and the dust from fine clays within the sand that can be disturbed by vehicles movements when dry.

The main particles on site are large sand grains, which are not mobilised to the atmosphere and cannot be breathed in. The small amounts of fine clay and other particles from roads are “coarse particles” and do not provide a significant health risk even if generated.

For this operation the only sensitive premises is over 1 200 metres away and therefore there is a negligible risk to those dwellings as shown by the DWER assessment score. See Table 4 below.

Occupational dust associated with the quarrying processes falls under the *Mines Safety and Inspection Act 1994 and Regulations 1995* overseen by the Department of Mines Industry Regulation and Safety who will regularly inspect the site.

### **Tree Belt - Buffers**

Dust particles are readily stopped by tree belts and distance, with which the site complies. Tree belts slow the wind and allow the dust to settle. See *Planning Guidelines Separating Agricultural and Residential Land Uses, Department of Natural Resources Queensland 1997( Pages 65 – 111) and Department of Health WA, 2012, Guidelines for Separation of Agricultural and Residential Land Uses* which uses the same criteria (Pages 112 – 118).

The Queensland Guidelines predominantly relate to agricultural spray drift, but based on particle size also relate to dust.

The Guidelines provide for a buffer of 300 metres for open agricultural land, dropping down to 40 metres where an effective tree belt is in place. The Western Australian Department of Health also uses the same guidelines.

The Guidelines are based on field studies and demonstrate the effectiveness of tree belts and distance in providing screening against particulate travel even though the trees are *Banksia* Woodland the open paddock separation of 300 metres is easily exceeded.

A minimum of 1 200 metre buffer distances is available which complies with the Guideline and the Queensland research.

## 6.2 Assessment of Dust Risk

### **Dust Guidelines**

Dust management is an integral part of the extraction and processing of any basic raw material.

The most common form of disturbance is by mobile plant and vehicle impacts. In this local area dusty roads have the most potential to produce dust, such as the access road which is no different to any other local unsealed road.

The potential for dust emissions falls under the *Guidance for the Assessment of Environmental Factors, EPA, March 2000*. Assessments of the potential dust risk are normally made using the Land development sites and impacts on air quality, *Department of Environmental Protection and Conservation Guidelines, November 1996*.

These guidelines are still in place but are incorporated into the *DEC (DER) 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities*.

The DEC (DWER) in 2008 released a draft Guideline for the Development and Implementation of a Dust Management Plan.

Even so a dust risk assessment has been completed using the DEC (DWER) 2011 Guideline.

**Table 7: Dust Risk Assessment from DWER 2011**

PART A Number	Item	Score
1	Nuisance potential of the material	Low for excavated material and with dust control in place - 2
2	Topography and vegetation screening	Screened and sheltered - 1
3	Area of site activities	Active trafficked areas at any one time are 1 - 5 hectares in area - 3
4	Type of work being undertaken	The small scale of excavation is equivalent to partial earthworks - 6
	Summer total without dust measures	Maximum = 12

PART B Number	Item	Score
1	Distance to premises	Premises, 1 200 to the north west - 1
2	Effect of prevailing wind	Isolated premises affected by one wind direction The premises is not really affected, not in the path of prevailing winds which are easterly and south westerly - 1
	Total Part B	Maximum = 2

Activity	Calculated Score Part A x Part B	Allocated Risk of Dust
Excavation <b>with or without</b> dust suppression.	<b>Maximum Premises = 12 x 2 = 24</b>	<b>Classification 1 Negligible Risk,</b> The actions and contingencies proposed are consistent with the DWER Policy Dust management will be required for pit best practice and worker environment.

The main dust risk is the access road or any hard stand that generates dust.

By locating the road and hard stand on pasture, capillary action from the soil will keep that moist for much of the year negating the need for wetting down.

A cellulose road stabiliser can also be used to negate the need to wet down the access road if dust becomes a potential issue. That stabilises the limestone of the road and is used on many mine sites. Being cellulose based it is a natural product derived from wood that is able to be used in all situations.

### 6.3 Buffers

The sand operations comply with the EPA Generic Buffers for sand excavation. See Section 3.0.

### 6.4 Occupational Dust

There is very low risk from occupational dust to workers on site, and if dust levels on site are low they are also low offsite.

### 6.5 Actions and Management

Table 8: Dust Management

ACTIVITY	POSSIBLE RISK SEVERITY and FREQUENCY	OPERATIONAL PROCEDURES AND COMMITMENTS	RISK AFTER MANAGEMENT
<b>EARTHWORKS</b>			
Land Clearing, construction earthworks and building the bund	Low - Occasionally to open new ground	<ul style="list-style-type: none"> <li>This involves removing the topsoil for use in revegetation and topping the screening bunds, followed by removal of the overburden.</li> <li>The fine organic particles in the sand top soil are the only dust generating material. Clearing will be completed when the soils are moist.</li> <li>Clearing will be conducted to only remove the area required for immediate mining to expose the resource and construct the operational features.</li> <li>If winds are sufficiently strong, or other weather conditions are unacceptable to negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved.</li> <li>Visual monitoring of the visual dust is the best and fastest method of monitoring dust risk and dust generation and faster response can be achieved than alarms or monitors. If visual dust is significant then smaller particles may also be present.</li> </ul>	Low
Land	Low	<ul style="list-style-type: none"> <li>Land restoration is infrequent and normally conducted only once</li> </ul>	Low

restoration	- Once per year or less frequent	per year. • Scheduled activities such as ripping, overburden and topsoil spreading will be conducted at times of low dust risk	
<b>EXCAVATION - PROCESSING</b>			
Excavation	Low - Frequent	<ul style="list-style-type: none"> <li>• The digging of sand does not generate dust. The dust risk is from traffic on hardstand and roads.</li> <li>• Excavation will be conducted on the floor of the pit to provide maximum shelter for dust protection.</li> <li>• The treed buffers to the north on the adjoining property provide compliance with Government Guidelines as does the distances to the only sensitive premises to the north west.</li> </ul>	Low
Loading and stockpile creation	Low - Frequent and in campaigns	Few stockpiles will be used. Loading from the face produces little dust and is covered under excavation.	Low
<b>TRANSPORT</b>			
Road condition	Low - Frequent	<ul style="list-style-type: none"> <li>• All loads for transport outside the pit are to be covered.</li> <li>• The access road and crossover are to be maintained in good condition (free of potholes, rills and product spillages).</li> <li>• The access road and any hard stand will be located on natural soil at low elevation to enable capillary action from the soils to keep the limestone moist for most of the year. That moisture will assist in crusting and hardening the limestone through reprecipitation of the calcium carbonate.</li> <li>• The use of approved cellulose road stabilisers will also be considered to minimise water use for dust suppression.</li> </ul>	Low
Health and Amenity		<ul style="list-style-type: none"> <li>• A readily auditable trigger of no visible dust to cross the property boundary in line with DWER Licence and best practice in WA.</li> <li>• The trigger for dust management is the generation of visual dust.</li> <li>• The loader operator will determine the amount of dust being generated and they are in the best position to assess dust generation and to direct remediation.</li> <li>• On site induction training will include observation and mitigation where possible of all dust emissions.</li> <li>• Occupational dust associated with the quarrying processes falls under the <i>Mines Safety and Inspection Act 1994 and Regulations 1995</i> overseen by the Department of Mines Industry Regulation and Safety who regularly inspect the site.</li> <li>• Included in the program are personal dust monitoring assessments. If on site dust is managed, offsite dust risk is also managed.</li> <li>• Operations will temporarily cease if conditions occur where dust cannot be managed.</li> <li>• The latest weather conditions to increase the awareness of dust risk.</li> </ul>	
Complaints		<ul style="list-style-type: none"> <li>• All complaints relating to dust are to be investigated immediately on receipt of a complaint.</li> <li>• A record of all dust complaints is to be maintained together with the mitigation measures to be used to reduce the dust impacts.</li> </ul>	

Contingency		<ul style="list-style-type: none"> <li>• Sand blowing will be treated by selecting the most appropriate method of stabilisation. A summary of the potential treatments is listed.</li> <li>• If sand is found to be blowing, it will be stabilised by increasing or installing cover crop of pasture, or in the conservation corridor by planting and seeding with native plants.</li> <li>• Wind fences and wind breaks will be installed.</li> <li>• Brushing with local native vegetation recovered from clearing. <i>Kunzea glabrescens</i> is highly suitable for this purpose, because it occurs in good lengths, carries seeds on the branches, is local and growing on site, and is an excellent colonising species.</li> <li>• Rehabilitation as soon as practicable after closure of each portion of completed land.</li> <li>• Direct respreading of topsoil.</li> <li>• Direct spreading of local native vegetation fragments on wildlife corridors and batter slopes.</li> <li>• Reducing activity in that location.</li> <li>• Ceasing operations until weather conditions stabilise and improve.</li> </ul>	
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### 6.6 Dust Monitoring

Most dust generated from processing and vehicle movements has a very large visible component.

The loader operator is in the best position to assess dust and implement management to mitigate or reduce the dust risk and generation.

Human monitoring can detect potential dust risks prior, and take action prior, to significant dust being generated. They notice dust immediately such as from tyres, whereas machine monitoring has to rely on significant dust being generated, travelling to the boundaries of the premises and triggering an alarm. The operators would be negligent if they let the dust get to that level of impact prior to taking action.

The auditable condition is visible dust crossing the boundary of the premises; the lot boundary. This is the condition used on Department of Water Environment Regulation Licences and all other quarries such as sand and hard rock quarries in Western Australia and has worked well in the past.

It is also the method used by the Department of Mines Industry Regulation and Safety to rapidly assess occupational dust on site.

All operators on site are instructed to be vigilant to dust generation and management and report any excessive dust or potential dust management issues.

Visual monitoring is even more effective when complemented by an extensive reporting and complaints process and this will be used.



## 7.0 Noise Management

### 7.1 Operations

Noise Management is designed to comply with Best Practise, such as Institute of Quarrying Australia/Queensland Government, Noise Management.

### 7.2 Regulatory Framework

Noise can originate from a number of operations and may impact on onsite workers, or travel offsite and impact on external sensitive premises. Both potential noise impacts are addressed by reducing the noise generated from the quarrying and processing operations.

Offsite noise is governed by the *Environmental Protection (Noise) Regulations 1997*.

The Environmental Protection (Noise) Regulations 1997, require that sensitive premises including dwellings in non industrial and rural areas, are not subjected to general noise levels (excluding blasting), during the hours 7.00 am to 7.00 pm Monday to Saturday that exceed 45 dBA. Allowable noise to 55 dBA is permitted for up to 10% of the time and to 65 dBA for 1% of the time. Noise levels are not to exceed 65 dBA during normal working hours.

Between 9.00 am and 7.00 pm on Sundays and Public Holidays, and between 7.00 pm and 10.00 pm on all days, the base level is 40 dBA.

At night, between 10.00 pm and 7.00 am Mondays to Saturday, and before 9.00 am on Sundays and Public Holidays the permitted level drops to 35 dBA.

The 10% and 1% “time above” allowances apply at night and on Sundays and Public Holidays as well.

There are penalties for tonality of 5 dB, modulation 5 dB and 10 dB for impulsiveness, that are added to the permitted levels. That is, if the noise is tonal or modulated the permitted levels drop by 5 dB. Impulsiveness is not likely to be relevant for the quarry under normal circumstances.

The Noise Regulations provide for Construction Noise exemptions to enable construction of the site such as the building of the screening bund and opening the pits.

Influencing factors that raise the allowable noise levels are activities such as external industrial noise, some nearby land uses and busy roads. These are not relevant to this site.

Under Schedule 1 of the Noise Regulations the premises on which the extraction of basic raw materials are extracted, is classified as Industrial Land for the purposes of calculating influencing factors. This was defined as the whole cadastral boundaries in State Administrative Tribunal decision {2013} WASAT 139, *Bushbeach v City of Mandurah*. In this case the premises is quite small and approximates the area of disturbance and will have little impact on the influencing factors.

At a distance greater than 15 metres from the sensitive premises (eg dwelling), and commercial premises, a base level of 60 dBA applies at all times, with the 10% time permitted to be up to 75 dBA and the 1% permitted to be up to 80 dBA. For industrial premises the base level is 65 dBA at all times with the 10% time permitted to be up to 80 dBA and the 1% permitted to be up to 90 dBA.

### 7.3 Environmental Noise Management

The types of equipment proposed to be used are listed below. Not all plant will be on site at any one time and that provides for contingencies to reduce the operational noise on site if necessary at certain times.

Based on the experience of Landform Research and the operation of many other sand quarries the proposed sand excavation will easily be able to comply with the Noise Regulations at the closest dwellings.

**Table 9: Anticipated Plant**

Equipment	Sand Extraction
Rubber tyred loader (Komatsu WA 430 or similar)	Loading sand from the face
Semi trailer or other road trucks	Transporting product
Mobile screen	Small screen may be used to operate occasionally in the centre of the pit for screening sand for specialty uses although at this stage no screen is proposed to be used.

**Table 10: Noise Management**

General Noise Management		
OPERATIONAL PROCEDURES	COMMITMENTS	MANAGED RISK
<ul style="list-style-type: none"> <li>Comply with the <i>Environmental Protection (Noise) Regulations 1997</i>.</li> </ul>	<ul style="list-style-type: none"> <li>The operator will commit to compliance with the Regulations.</li> <li>The proposed operations comply with the EPA generic buffer distances.</li> </ul>	Noted
<ul style="list-style-type: none"> <li>Maintain adequate buffers to sensitive premises.</li> </ul>	<ul style="list-style-type: none"> <li>The operations comply with the EPA generic buffer distances of 300 to 500 metres for a sand pit.</li> <li>The closest dwelling is to the north at a distance of 1 200 metres from the closest pit face and increasing as excavation proceeds.</li> </ul>	Low
<ul style="list-style-type: none"> <li>Locate exposed features behind natural barriers and landform.</li> </ul>	<ul style="list-style-type: none"> <li>Excavation is to be conducted on the floor of the pit behind the faces and natural landform to provide maximum noise screening. Perimeter bunding is to be used where overburden is available, to provide maximum noise screening and safety protection.</li> </ul>	Low
<ul style="list-style-type: none"> <li>Maintain all plant in good condition with efficient mufflers and noise shielding.</li> </ul>	<ul style="list-style-type: none"> <li>This will be used and is committed to. All plant is to be maintained in sound condition.</li> </ul>	Low

<ul style="list-style-type: none"> <li>Maintain haul road and hardstand surfaces in good condition (free of potholes, rills and product spillages) and with suitable grades.</li> </ul>	<ul style="list-style-type: none"> <li>The access road is proposed to occupy the same footprint as the fire break along the northern edge of Lot 226.</li> <li>See dust management</li> </ul>	Low
<ul style="list-style-type: none"> <li>Implement a site code outlining requirements for operators and drivers for noise management.</li> </ul>	<ul style="list-style-type: none"> <li>A site code is to be implemented and is committed to provide site induction and training for all personnel for all parts of the operations.</li> </ul>	Low
<ul style="list-style-type: none"> <li>Shut down equipment when not in use.</li> </ul>	<ul style="list-style-type: none"> <li>Shutdown is to be used to save fuel and maintenance costs in addition to noise minimisation.</li> </ul>	Low
<ul style="list-style-type: none"> <li>Fit warning lights, rather than audible sirens or beepers, on mobile equipment wherever possible.</li> </ul>	<ul style="list-style-type: none"> <li>Lights or low frequency frog beepers are to be used rather than high pitched beepers to restrict noise intrusion.</li> </ul>	Low
<ul style="list-style-type: none"> <li>Provide a complaints recording, investigation, action and reporting procedure.</li> </ul>	<ul style="list-style-type: none"> <li>A complaints recording and investigation procedure is proposed and will be implemented and maintained.</li> </ul>	Low
<ul style="list-style-type: none"> <li>Provide all workers with efficient noise protection equipment.</li> </ul>	<ul style="list-style-type: none"> <li>All personal noise protection equipment will be provided to staff as required.</li> </ul>	Low
<ul style="list-style-type: none"> <li>Minimise and conduct at the least disruptive times.</li> </ul>	<ul style="list-style-type: none"> <li>Quarrying is to be conducted during the approved working hours.</li> </ul>	Low

## 7.4 Occupational Noise

Occupational noise associated with the quarrying processes falls under the *Mines Safety and Inspection Act 1994 and Regulations 1995*.

The management of occupational noise is normally handled by providing all necessary hearing protection, as well as conducting worker inductions and educational programs for all staff. Regular site audits of quarry and mining operations are normally conducted by the Department of Mines Industry Regulation and Safety.

As part of its commitments, the proponent – operator will implement noise management;

- by providing all necessary safety equipment such as ear protection,
- identifying sections of the plant where hearing protection is required, as well as,
- conducting induction and educational programs for its staff.

Warning signs are used to identify areas of potential noise associated with mobile plant.

The DMIRS conducts inspections of all quarries.

## 8.0 VISUAL MANAGEMENT

There are a number of management actions that can be taken in quarries to minimise visual impact and these will be used wherever possible. The general management actions are summarised below together with the visual impact issues that relate to this site. The actions will be used where applicable and as the opportunity presents to minimise visual impact.

Guidance on visual impact is contained in *Department of Planning, 2007, Visual Landscape Planning in Western Australia (DPLH 2007)*. Guidance can also be found in *Forest Commission of Victoria, undated, Landscape Types of Victoria*.

Visual Impact can occur in a number of circumstances, by the operation being set too high in the landscape, by being too close to neighbours and by insufficient visual protection.

The pit is set back 850 metres from Paterson Road behind a significant buffer of trees on the western sand ridge.

Even so there are a number of management actions that can be taken to minimise visual impact and these will be used wherever possible. The general management actions are summarised below and are used where applicable and as the opportunity presents to minimise visual impact.

- The quarry is located behind natural barriers of the western ridge and the intervening trees.
- Excavation is to occur on the floor of the pit below natural ground level.
- Excavation will be staged to work from east towards Paterson Road and in the east from the centre of the ridge to the east to minimise visibility
- The haul and access road are at low elevation along the northern boundary to minimise the visibility of truck movements.
- Overburden and interburden dumps are to be pushed into positions where they will form screening barriers.
- Progressive rehabilitation is to be completed, as completed ground becomes available.

## 9.0 WATER QUALITY MANAGEMENT

### 9.1 Water Source Protection Areas

The excavation on Lot 226 complies with DWER Guidelines for water management and separation to the groundwater of > 0.3 metres with a proposed separation of 0.5 metres.

### 9.2 Water Requirements

The pit is relatively small with short access roads and will be operated intermittently in campaigns.

The water requirements are anticipated to be minimal and sourced from farm supplies. In most cases dust suppression will not be required.

### 9.3 Water Quality Protection Guidelines

All facilities and procedures on site are designed to comply with the DWER – DMIRS Water Quality Protection Guidelines for Mining and Mineral Processing and are all complied with;

- Minesite stormwater
- WQPN 15 near sensitive water resources and 2019.
- *Department of Water Environment Regulation – South West Region Guideline – Water resource considerations for extractive industries.*

### 9.4 Surface Water

The location lies within an area of partially winter wet soils of the Pinjarra Plain within the Peel Harvey Catchment.

Surface water is confined to winter wet conditions where the low lying areas outside the proposed sand excavation have temporary perched water lying on parts for variable times following heavy or sustained winter rainfall.

This results from the sand above the underlying slowly permeable clays becoming saturated with water when the rate of rainfall exceeds the permeability of the underlying clays and evaporation rates are lower. This is a temporary perched water table and does not reflect the regional water table.

The sand ridges are never wet.

As the land surface is flat, with the lower elevations rising from 8 metres AHD in the west to 10 metres AHD in the east, there is potentially a very slow westerly flow of any winter perched surface water that winds itself around the sand ridges. Those flows are restricted by the sand ridges. There is also potentially a flow to the north west towards Nambelup Brook through the sand ridges but this is very slow.

There is however no stream surface water flow locally on Lot 226 to Nambelup Brook the north and west.

Surface water does not impact on excavation of the sand ridges.

## 9.5 Groundwater

See also Section 4.4 Hydrogeology.

There was extensive measurements of the temporary perched winter surface water on the lower elevated areas and under the sand ridges in September 2002 when the site was assessed for its capability to accept waste water systems.

The elevation of the temporary perched water rises from wetting the surface at 8 metres AHD in the west to 10 metres AHD in the east. The shallow gradients of the land and water, and the low lateral permeability, means that any westwards flow of this temporary perched water is slow. That perched temporary water table is explained in Section 4.4 Hydrogeology. It occurs for several months in winter and leads to the surface water forming on the sandy clay soils

The regional groundwater is not exposed on Lot 226 with the exception of the excavated soak in the south western corner. This soak is an expression of the regional water table at that location. The land surface at that location is at an elevation of 7.5 metres AHD, with the regional winter water table rising to that elevation in winter as a perched water table but dropping to around 6.0 metres in summer.

Department of Water Environment Regulation groundwater mapping show groundwater elevations as 5.5 metres AHD on the western boundary and 10 metres on the eastern boundary of Lot 226. See Figures 5 and 3 (DWER mapping).

Excavation will skim the sand from the ridges bringing the surface elevation of the ridges to 0.5 metres above the winter wet temporary water, but 1 – 2 metres above the regional groundwater elevation.

That will maximise the pasture potential of the excavated land.

The pit floor will maintain a 0.5 metre separation to the water table in compliance with Department of Water Environment Regulation *WQPN 15, Water Quality Protection Note "Basic Raw Materials - Extractive 2019*, and Department of Water Environment Regulation – *South West Region Guideline – Water resource considerations for extractive industries*, that provides guidelines for quarries within catchments.

The separation to the temporary winter perched water will be determined by Piezometers installed on the floor of the pit as the pit progresses forward.

The operator and application commits to minimising water impacts and will implement the measures outlined in Water Management Plan.

## 9.6 Salinity

Precipitation falling on the site is fresh.

## 9.7 Dewatering

No dewatering is proposed. All water will be retained in the pit and infiltrate into the sand.

## 9.8 Recharge

The area has no surface drainage because of the permeable and porous nature of the sand. There is no surface drainage from the excavation site. All excess water infiltrates the permeable sand.

There will be no alteration to drainage lines, and neither surface water nor ground water will be affected. On closure the surface will continue to be free draining to the water table.

Discussions of the recharge on sand and limestone areas can be found in Environmental Protection Authority in Bulletins 512, 788, 821 and 818, and whilst these do not specifically refer to the extraction of basic raw materials they do consider the impact of clearing, planting trees and rural residential developments.

The figure the EPA used for recharge from native vegetation was 10 – 15% rainfall, but in this case with degraded vegetation that figure is likely to be in the order of 20 – 25 % whereas cleared land had a recharge of 30 – 40 %.

The floor of the quarry will be cleared and so there will not be any reduction in recharge to the site, but a small increase in recharge by converting the vegetation to parkland pasture.

The site prior to excavation was pasture and will be returned to pasture even though it will be at a lower elevation. The change in recharge as a result of excavation is likely to be around 10% or equivalent to an increase in rainfall per annum of around 65 mm for the excavated areas. This will not be significant and will assist even in a small way of maintaining environmental flows in a drying climate.

As water for dust suppression is not anticipated to be required there is not anticipated to be any draw on the groundwater.

The proposed operation complies with all Government Policies and Guidelines.

## 9.9 Acid Sulfate Risk

As Discussed in Section 2.6 there is no identified acid sulfate risk and as there will be no excavation below the water table there will be no potential to impact on acid sulfate conditions even if they occurred. In addition, the lower wetter elevations are excluded from excavation.

## 9.10 Unauthorised Access and Illegal Dumping

- The potential for rubbish to be dumped relates to unauthorised access to the site. Access is restricted by current farm fencing and locked gates.
- Wastes generated from on site operational activities will be recycled wherever possible and periodically disposed of at an approved landfill site.
- Any illegally dumped materials are to be removed promptly to an approved landfill or other suitable site, depending on the nature of the material.

### 9.11 Wastewater Disposal

A serviced portable toilet is proposed to be in place while the site is operating. Serviced means they are pumped out by a licensed contractor.

### 9.12 Refuelling

Fuel management will be in accordance with the relevant guidelines. The methods to be used are summarised below.

Documents specific to the fuel and maintenance are the DOW – DMIRS Water Quality Protection Guidelines for Mining and Mineral Processing

- *WQPN 60 – Tanks for mobile fuel storage in PDWSAs.*
- *WQPN 15 – Basic Raw Materials, Extractive Industries 2019.*
- *Department of Water Environment Regulation – South West Region Guideline – Water resource considerations for extractive industries.*

#### Refuelling - Fuel Management Plan

- There will be no onsite fuel storage. The loader will continue to be refuelled on site from a mobile tank or tanker. This method is used on most mine and construction sites as well as many farming properties.
- Refuelling on site will occur in the active pit area to allow for containment if any spill did occur.
- The main risk of contamination is the minor drips that occur during the removal of hoses etc. Minor spills are quickly degraded by soil microbial matter.
- The only other risk is from a tanker rupture, but tanks are designed to manage this eventuality and are normally double skinned and approved to the relevant standards.
- The operators of the mobile refuelling facilities are trained in re-fuelling duties including the management of any spills.
- In the event of a spill or adverse incident, activities will be stopped in that area until the incident is resolved.
- Spillage will be contained in plant and working areas by shutting down the plant or equipment (provided it is safe to do so). The sand will provide absorbency and will retain any spill.
- Soil contaminated by spills will be removed from the site to an approved disposal area.
- All significant adverse incidents (such as a fuel spill of >5 litres) in one dump, are to be recorded, investigated and remediated. A record is to be kept of incidents, and DWER, and Shire of Murray notified within 24 hours of an incident.



### 9.13 Servicing and Maintenance

Documents specific to the fuel and maintenance are the DWER Water Quality Protection Guidelines for Mining and Mineral Processing

- *WQPN 15 – Basic Raw Materials, Extractive Industries 2019.*

The main risk of contamination comes from tank or hose rupture on earth moving machines.

- All major servicing of vehicles will be conducted off site.
- The loader will be parked at a secure site at night and minor servicing will be conducted there if required.
- Regular inspections and maintenance of fuel, oil and hydraulic fluids in storages and lines will be carried out for wear or faults.
- In the event of a small service item being required during operations, such as lubricating and maintenance activities, these will be carried out in designated areas in the pit. Equipment for the containment and cleanup of spills is to be provided as required.
- Waste oil and other fluids derived from the routine maintenance of mobile machinery, will be transported off site and disposed off at an approved landfill site. Grease canisters, fuel filters, oil filters and top-up oils will be stored in appropriate containers in a shed or brought to the site as required.
- If any spillage occurs it will be contained in the plant and working areas by shutting down plant or equipment (provided it is safe to do so).
- Accidental spill containment and cleanup protocol will be implemented as necessary.
- Non essential or old operating plant and materials will be removed from the site. Locked gates and the existing fences will be maintained to prevent illegal dumping and contamination of water.
- There will be no waste disposal on site. Wastes generated will be recycled wherever possible and periodically disposed of at an approved landfill site. Any waste materials derived during routine maintenance activities will be stored in appropriate sealed containers within a designated storage area or taken from site and disposed of at an approved facility.
- Regular inspections (at least weekly) are to be conducted when operational to ensure no wastes, litter and the like are present in or around the excavation and processing area.

## 10.0 Biodiversity MANAGEMENT

### 10.1 Flora

The excavation area is partially cleared, or consists of generally good to degraded vegetation as described in the attached Flora and Vegetation Study.

The vegetation was assessed by PGV Environment who found the vegetation to be part of the Bassendean Central and South vegetation complex which is described as ranging from “woodland of *Eucalyptus marginata* – *Allocasuarina fraseriana* – *Banksia* species to low woodland of *Melaleuca* species and sedgeland on the moister sites. This area includes the transition of *E. marginata* to *E. todtiana* in the vicinity of Perth” (Heddle et al., 1980). The vegetation on the site meets the general description of this vegetation complex which was found by PGV Environmental to most likely match FCT 21a and 21c, neither of which are listed as a Priority vegetation community (PGV Environmental; page 6.

Eight vegetation types were recorded by PGV Environmental on the site on dry sandy soils with two small areas containing vegetation types considered fringing wetland vegetation.

The vegetation on the highest parts of the site contained a mix of *Allocasuarina fraseriana*/*Eucalyptus marginata* Low Open Woodland with *Xylomelum occidentale* and occasional *Banksia menziesii* and *B. ilicifolia* also present as small trees. The lower and mid-slopes of the survey area were dominated by dense stands of Spearwood (*Kunzea glabrescens*) with *Jacksonia furcellata* also common. *Banksia attenuata*, *B. menziesii* and *B. ilicifolia* occurred on the mid-slopes among the dense Spearwood but never in abundance. The understorey in all vegetation types was very sparse with a low diversity of native species;

PGV found most of the vegetation to be in “Good” Condition with some “Degraded” areas.

The vegetation adjoins a newly created “A” Class Reserve to the north.

No Priority or Threatened flora species were recorded by PGV Environmental. To confirm this a spring targeted survey will be conducted in support of the Application for a Clearing Permit.

The land will be returned to pasture and productive agricultural land of pasture with clumps of trees and shrubs and local native shrubs on the steep batter slopes.

A Clearing Permit will be applied for and that process will further evaluate the loss of vegetation and restoration of the site.

From PGV Environmental mapping the 6.9 hectare resource area has been selected to avoid *Banksia* Woodland and any cockatoo habitat trees.

A total 12.7 hectares of predominately *Kunzea glabrescens* dominated regrowth and disturbed vegetation contains native vegetation and will require a Clearing Permit.

The western ridge *Banksia* Woodland in better condition constitutes 10.0 hectares.

A vegetation and wildlife corridor will be established at the end of excavation. See Figure 6.

## 10.2 Fauna

Native fauna is likely to be significantly depleted on the existing pasture and reduced in other areas. The potential impacts on significant fauna are also considered during the assessment for a Clearing Permit.

The adjoining land to the north is identified as part of the buffer to the Nambeelup Industrial Area and will remain. A vegetation remnant occurs on that and is now classified as an “A” class Reserve.

The *Banksia* Woodland on the ridge in the west, which is in the best condition, is not proposed to be cleared.

PGV Environmental completed a fauna study of Lot 226 and found that the Open Woodland Habitat may provide some foraging habitat for Baudin's Black Cockatoos (*Calyptorhynchus baudinii*), Carnaby's Black Cockatoos (*Calyptorhynchus latirostris*) and Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*) as it has some tree species that are recognised foraging habitat (Valentine and Stock, 2008; Groom, 2011).

All *Banksia* Woodland and Cockatoo feeding habitat is excluded from the proposal.

Some trees with a diameter at breast height greater than 500mm were observed on the site. This tree is a potential breeding habitat tree. All habitat trees are excluded from the excavation and provided with over 10 metre setback from the edge of the drip line, to be surveyed and marked and fenced in the field prior to commencement of excavation.

The Southern Brown Bandicoot, Quenda (*Isodon fusciventer*) (Priority 4) could potentially occur on the site. Dense vegetation suitable for Bandicoots is also present on the vegetated flat portion of the Lot that is not proposed for sand extraction as well as on the lot to the north. Bandicoots are very adaptable and can move rapidly away from small areas of land as it is cleared and readily adapt to human activities.

The potential for impacts on Black Cockatoos, Bandicoots and any other fauna are required to be and will be considered during the application for a Clearing Permit. A vegetation and wildlife corridor will be established at the end of excavation. See Figure 6.

## 10.3 Wetlands

The lower lying areas on site are classified as winter wet. A number of these have been previously nominated as wetlands (Hill et al, 1996, *Wetland Mapping, Classification and Evaluation, Wetland Atlas*, Water and Rivers Commission and Department of Environment Protection).

PGV Environmental noted the presence of two wetlands mapped on the lot but outside of the survey area. Most of the lot contains part of Multiple Use Palusplain Unique Feature Identifier (UFI) 15802 and part of a Resource Enhancement Sumpland UFI 5031. (PGV 2019 page 4).

The Resource Enhancement wetland in the north eastern corner is shown on Figures 7 and 8. The wetland is vegetated with *Melaleuca preissiana* and is protected. Even though it is up hydraulic gradient a 50 metre setback is provided, in compliance with DWER setback guidelines.

The wetlands are winter wet pasture with some having wetland species. As all of Lot 226 is a grazing property all such pasture is subject to itinerant grazing which concentrates on the pasture. The wet pasture east of the sand resource is provided with a 20 metre buffer even though it is pasture.

None of the wetlands will be impacted by excavation. The more significant areas will be provided with appropriate buffers, with the wet pasture areas remaining as summer pasture.

#### 10.4 Stygofauna – Troglifauna – Short Range Endemics

Stygofauna, occur in caves and “are aquatic subterranean animals, found in a variety of groundwater systems”. Troglifauna occur in air chambers in underground caves or smaller voids.

There is no thick limestone on the resource area and therefore no potential for stygofauna. Sand readily collapses and does not provide cavities and so there is no potential for Troglifauna.

The land system is part of an extensive system of similar geomorphology and biodiversity. Therefore there is no potential for short range endemic species to be restricted to or occur on Lot 226.

#### 10.5 Weeds and Plant Diseases

Weed and plant disease management plans are included in the Closure Planning.

#### 10.6 Conservation Areas

##### ***Shire of Murray Local Biodiversity Strategy 2013***

The Shire of Murray Local Biodiversity Strategy 2013 seeks to protect specific biodiversity features on rural and other land, protect natural areas on zoned lands, maximise retention of all Local Natural Areas, protect and enhance ecological connectivity and protect and manage Local Natural Areas on reserved land.

The project has been designed to comply with the strategy as best as possible under the constraints of extraction and the need for sand resource.

The vegetation on site is classified as lying within Priority Two Vegetation Complex of Bassendean Central and South of which 3057.42 hectares or 22% remained in 2013.

**Table 11: Compliance with Shire of Murray Biodiversity Strategy**

Special Biodiversity Features	Shire of Murray Protection Target (Relevant Targets only)	Proposed Actions - Compliance
Rare and significant species of flora	All known “Threatened flora is to be protected. All natural habitat for Priority listed flora species are to be protected.	<ul style="list-style-type: none"> <li>• PGV completed a vegetation study and targeted Spring survey.</li> <li>• No Threatened or Priority flora were recorded.</li> <li>• The <i>Banksia</i> Woodland has been excluded from the proposed development.</li> <li>• The pit will be surveyed and clearly marked prior to opening to ensure the <i>Banksia</i> Woodland is protected. See Figure 7.</li> </ul>
Black Cockatoo Roosting Habitat	All breeding and roosting habitat in intensive zones of urban industrial and the like are to be protected.	<ul style="list-style-type: none"> <li>• Cockatoos have considered and habitat trees and feeding habitat has been excluded from the proposed sand pit.</li> <li>• All habitat trees are provided with a minimum of 10 metre setback from the drip line of the trees.</li> <li>• The pit will be surveyed and clearly marked prior to opening to ensure the habitat trees are protected.</li> </ul>

		<ul style="list-style-type: none"> <li>• Cockatoos will be further assessed as part of the application for a Clearing Permit.</li> <li>• All habitat trees were identified and are retained.</li> <li>• See Figure 8.</li> </ul>
Black Cockatoos foraging habitat.		<ul style="list-style-type: none"> <li>• The property is rural and not a listed intensive land use. Parkland pasture and native vegetation will be returned.</li> <li>• Cockatoos have considered and habitat trees and feeding habitat has been excluded from the proposed sand pit.</li> <li>• The pit will be surveyed and clearly marked prior to opening to ensure the <i>Banksia</i> Woodland is protected.</li> </ul>
Significant species of fauna or other specialty listed fauna.	Habitat for significant fauna are to be protected within intensive zones.	<ul style="list-style-type: none"> <li>• The property is rural and not a listed intensive land use. Parkland pasture and native vegetation will be returned.</li> <li>• The key listed fauna are Black Cockatoos as considered above.</li> <li>• The other is the Quenda. Quenda are versatile species that readily move ahead of clearing. There is significant vegetation habitat suitable for Quenda retained. Much of the pit footprint is cleared and clearing will be conducted in stages allowing most larger fauna such as Quenda to move during the clearing.</li> <li>• A vegetation and wildlife corridor will be established at the end of excavation. See Figure 6.</li> </ul>
Threatened Ecological Communities	These should be protected with suitable buffers.	<ul style="list-style-type: none"> <li>• There are no on site Threatened Ecological Communities. <i>Banksia</i> Woodland is listed as a TEC under the <i>EPBC Act 1999</i>, It is excluded from excavation. See Figure 7.</li> </ul>
Wetlands and wetland vegetation	Conservation category wetlands are to be protected.	<ul style="list-style-type: none"> <li>• The wetlands on site are mainly palusplain. There are no conservation category wetlands.</li> <li>• There is a Resource Enhancement Wetland in the north eastern corner which is provided with a 50 metre set back that complies with DWER Guidelines</li> <li>• The low elevations of palusplain will not be impacted by the proposed extraction of sand. The closest area is east of the sand ridge where a buffer of 20 metres is provided. See Figures 7, 4 and 9.</li> </ul>
Waterways	Protect Riparian vegetation associated with natural watercourses.	<ul style="list-style-type: none"> <li>• There are no watercourses on site, although Nambelup Brook runs east west across the lot to the north.</li> </ul>

### **Biodiversity Linkages**

The Nambelup Industrial Area proposes two biodiversity east west linkages.

It is not clear what status these have because the northern one crosses the runway of the airstrip and is not compatible with aircraft.

The southern linkage loops across Lot 224 adjoining to the north where *Banksia* Woodland is now classified as an “A” Class Reserve and then loops across the vegetation on Lot 226.

Much of that linkage covers the wetland vegetation on Lot 226 that will not be impacted. By planting local native vegetation along the north eastern edge of the wetland, as proposed, the linkage will be maintained. A vegetation and wildlife corridor will be established at the end of excavation. See Figures 1 and 6.

***“A” Class Reserve on Lot 224***

The reserve will continue to be linked as the linkage will be re-established at the end of excavation through the wetland and with local native vegetation planting. See Figure 1.

The access road will only travel along the fire break near the Reserve in the west. In the central and eastern part there will be a 20 metre vegetated buffer retained along the northern boundary.

## 11.0 Closure

### 11.1 Background

The site is located on Lot 226 Paterson Road, Nambeelup.

The land is zoned General Rural in the Shire of Murray Town Planning Scheme No 4.

### 11.2 End Use

The extraction areas will be returned to agriculture production as pasture and native vegetation.

At the end of excavation, any overburden will be used to backfill the site in compliance with the safety considerations of the *Mines Safety and Inspection Act 1994* and the requirements and guidelines of the Department of Mines Industry Regulation and Safety; For example *Guidelines on Safety Bund Walls Around Abandoned Open Pits 1991*.

The excavated floor will be flat to gently sloping at 1 : 10 vertical to horizontal at 0.5 metres to the water table to enable a productive agricultural end land use.

Pasture production is maximised by lowering the pasture land surface to a separation of 0.5 metres to the water table, capillary action will occur and the pasture will be able to gain soil moisture into summer. Capillary action allows for rises of soil moisture by 300 – 500 mm and, with root depth considered, land formed 0.5 metres above the temporary perched winter water table. The proximity to the groundwater will enable pasture to grow through summer, therefore providing significantly improved agricultural values. The floor of the excavation is 0.5 metres above the regional water table as determined by DWER mapping. Figures 3 and 5.

The sand resource and natural soils are leached white sand over pale coloured sand across most of the excavation footprint. With the removal of the leached upper layers of sand the remaining sand will have much higher phosphate retention which will assist with future rural land uses.

Measurements of the water table will be completed using the on site water monitoring bores and additional piezometers installed in the floor during excavation to verify the separation to the perched seasonal water table.

Any surface water exposed by excavation will be backfilled to ensure compliance with the 0.5 metre separation.

Concept final batter slopes and a contour plan are attached at Figures 4 and 5.

### 11.3 Mine Closure Considerations

The extraction of sand is an interim use prior to a return of the area to local native species, in areas of native vegetation with parkland pasture in previously cleared areas, enabling a final end use of rural living or alternative compatible use.

At this stage the most appropriate end use is to restore the surface to be visually compatible with the surrounding rural land surface.

Rehabilitation will be directed towards revegetation to parkland pasture and local native species.

Rehabilitation will contain Dieback and Weed Management in addition to monitoring and replanting failed areas.

Appropriate topsoil management is seen to be an important element in achieving successful rehabilitation and plant re-establishment on the restored surface.

Rehabilitation will progressively follow mining, with completed areas of the excavation being revegetated as soon as practicable.

Rehabilitation is to take place during the first winter months to minimise compaction effects.

The site specific issues that relate to this site are also listed to explain how this site compares to the general rehabilitation guidelines.

**Table 12: Materials Inventory**

Type	Comment	Treatment	Reference
Soil	Topsoil is natural and contains no detrimental materials.	None required. To be used in rehabilitation.	
Subsoils - Overburden	Subsoil sand is natural and contains no detrimental materials.	Non required. Generally taken as resource.	
Waste rock and non surface material and tailings	Not present. The pit bottoms in earthy yellow sand which is a natural material normally occurring on the surface.	None required.	
Saline surface water	The water quality is fresh.	No treatment necessary	
Saline ground water	The water quality is fresh.	No treatment necessary	
Acidic materials and drainage	Not present. The sand does not contain sulfides and there is no risk of acidic materials developing.	No treatment necessary.	Field geological examination by Landform Research
Sodic or dispersive materials	The water quality is fresh.		Field geological examination by Landform Research
Asbestos – asbestiform minerals	None present.		Field geological examination
Radioactive materials	Not present	The sand does not contain radioactive minerals.	Published WA Geological Survey radiometric mapping
Metallic or chemical materials	Not present	No metallic or sulfidic materials or minerals are present in the Spearwood/ Bassendean sands.	Field geological examination and experience and published information.
Tailings storage	Not required		
Ablutions waste		Serviced portable toilet system will be used.	Section 9.0 Water Quality Management
Dangerous Goods and Hazardous Materials	<b>None will remain on closure.</b>	There are normally no hazardous materials used for sand mining apart from fuel, and servicing. The only other materials are for tasks	



		such as weed management and are dealt with under those sections. The site will be checked at closure to ensure no such materials remain.	
	<b>FUEL</b> The various plant will be refueled from mobile tanker.  <b>None will remain on closure.</b>	Any soil or other materials with drips and spills will be removed offsite to an approved waste site or location.	Section 9.0 Water Quality Management
	<b>SERVICE MATERIALS</b> Only minor lubrication will be conducted on site All major servicing will be conducted offsite.  <b>None will remain on closure</b>	Any wastes will be collected and removed from site promptly to an approved recycling or waste disposal area. Only minor servicing will be conducted on site. All major servicing will be conducted offsite.	Section 9.0 Water Quality Management
General waste		Regularly removed from site to an approved disposal area. The site will be checked at closure to ensure no such materials remain.	Section 9.0 Water Quality Management

#### 11.4 Rehabilitation Objectives

Rehabilitation will be directed towards revegetation to parkland pasture and local native species.

The land surface will be returned to a form that matches the surrounding land.

Rehabilitation will progressively follow mining, with completed areas of the excavation being revegetated as soon as practicable.

Minimise impacts on wildlife linkages.

##### **Completion criteria**

- Stable post-mining landscape, and the minimisation of wind erosion.
- Provide for the protection of the local groundwater resource in terms of both quality and quantity.
- Provide a self sustaining cover of pasture on the floor of the pit.
- Achieve weed species at levels not likely to threaten the native species on batter slopes.
- Completed pasture on the floor, at slopes of 1 : 10 vertical to horizontal.
- Pasture established at 0.5 metres above the highest known perched winter water table.

- Maintenance of wildlife linkages.

#### **Parkland Pasture**

*Provide a self sustaining cover of parkland pasture on existing cleared areas, and local native groundcovers, shrubs and trees on areas of native vegetation to be cleared.*

*Achieve clumps and belts of trees and shrubs at 50 per hectare in the parkland pasture areas.*

#### **Native Vegetation – Wildlife Corridor (See Figure 6)**

*Achieve plant density of 1 native plant per 5 m<sup>2</sup> in native vegetation rehabilitation at three years.*

*Achieve a species richness of 5 native species per 100 m<sup>2</sup> in native vegetation rehabilitation at three years.*

*Provide a self sustaining cover of local native Banksia Woodland species that replicates Banksia Woodland on pre-mined areas of original native vegetation.*

*Depending on the success of rehabilitation, evolving community standards, and new research, the completion criteria may be adjusted to reflect emerging trends and also adjusted in terms of cover and species richness, depending on the results achieved and emerging technologies or techniques.*

### **11.5 Rehabilitation Procedures**

#### ➤ **Vegetation Clearing**

The site is a mixture of native vegetation and previously cleared areas and parkland pasture.

Pasture will be taken with the topsoil.

Seeds and other genetic material will be collected from native vegetation if suitable areas are available for rehabilitation. This will assist in the preservation of genetic material, such as on batter slopes and in green belts.

Where practicable vegetation will be directly transferred to a batter slope or other area being rehabilitated. Smaller indigenous shrub material will be used in the rehabilitation process when available and suitable, for example on the batter slopes of worked out areas. It will be laid on re-formed slopes to reduce wind and water erosion as well as provide a source of seeds for revegetation.

If direct transfer is not possible the vegetation will be stored in low dumps to 1 metre high or swapped with a nearby operator to try and ensure that the material is not wasted.

#### ➤ **Topsoil and Overburden Removal Replacement**

Where possible topsoil and overburden will be directly transferred from an area being cleared to an area to be rehabilitated. This will retain the organic carbon fraction, improving soil properties such as resistance to water and wind erosion and moisture retention.

Topsoil will be spread directly from an area being cleared where possible, otherwise reclaimed from a topsoil dump.

Overburden, when available, will be pushed to the perimeters to assist with visual and noise screening. From there it can be used for the rehabilitation process.

Where possible topsoil clearing and excavation will be undertaken in wetter months.

➤ **Landform Reconstruction and Contouring**

Any temporary structures, fixtures, equipment and machinery associated with sand excavation will be removed from site on completion.

The floor will be retained as gently sloping, installed with a sediment settlement sump.

The floor will be deep ripped and formed at slopes of 1 : 10 vertical to horizontal.

The land surface will be formed to the requirements of the *Mines Safety and Inspection Act 1994 and Regulations 1995* as a final land surface.

A minimum of 100 mm of topsoil where available. will be spread over the surface where available to provide a substrate for agriculture.

Experience by Landform Research on sand rehabilitation on mining leases is that good revegetation can be achieved by planting into soft overburden and deep ripped sand floor, if suitable local species are used.

**Vegetation Establishment**

➤ **Pre-Planting/Seeding Weed Control**

Pre-seeding weed control is only likely to be required where topsoils are used that contain weed species such as in the existing parkland pasture areas.

If required, this is normally only conducted after overburden and topsoil have been spread and any seeds have been allowed to germinate. Broadscale weed treatment can be detrimental to the germination and growth of native species but may be required if the weed load is to be reduced.

In May, after the first autumn rains, check for grass germination. Where grass has the potential to inhibit rehabilitation, such as areas to be returned to native vegetation, use a licensed contractor to spray with Fusillade or other suitable herbicide. In areas of parkland pasture, grass cover is desirable.

Any weeds likely to significantly impact on the rehabilitation will be sprayed with Roundup or similar herbicide or grubbed out, depending on the species involved. Weed affected topsoil and overburden will be buried. The Weed Management Plan will form the basis of weed treatment. Depending on the nature of the planting substrate, a broad spectrum spraying program may be used. In areas where grass only is a potential problem, grass specific sprays will be used. In some areas where topsoil from cleared native vegetation is available no spraying may be required.

See Weed and Dieback Management Procedures (following).

➤ **Pasture and Parkland Areas**

The preferred method of revegetation is to use the pasture seed from existing topsoil on pasture areas. However this may be deficient and additional seed is likely to be required.

Topsoil will be spread to increase the total organic carbon fraction, improving soil properties such as resistance to water and wind erosion and moisture retention.

Topsoil provides a useful source of seed for rehabilitation when the correct handling of the topsoil is used, stripped and replaced dry (autumn direct return).

However if sufficient seed is not available or does not germinate then additional seed will be added. The establishment of pasture, including the selection of the pasture species is appended to this Management Plan. The documentation is produced by the Department of Primary Industries and Regional Development.

For pasture land in this situation it is essential that the species are matched to the soil types and rainfall. The location falls into the “High Rainfall Coastal” planting regime with sandy to loamy gravel soils. Suitable perennial legumes include Birdsfoot trefoil, Lucerne, Strawberry Clover, and Sulla. Perennial pasture includes Perennial Ryegrass, Phalaris, Cocksfoot, and Summer Active Tall Fescue, Kikuyu and Rhodes Grass. Annual pasture species include Italian Ryegrass, Serradella, subterranean clover.

The actual species used will be determined by the individual season, nature of the rainfall in the preceding months and stocking/hay production proposed by the landholder which may change from time to time.

Seeding rates are 2 – 5 kg/ha depending on the species used; for example Ryegrass is seeded at 3 kg/ha whereas Rhodes Grass is seeded at 4 kg/ha.

Studies have shown that topsoil stripping and placement is best undertaken in summer for maximum germination, but this raises the potential for additional dust generation from the fine humus particles.

Any weeds likely to significantly impact on the rehabilitation are to be sprayed with Roundup or similar herbicide or grubbed out, depending on the species involved. Generally this has not been required in the past because the weed load is low. Pasture species may need to be sprayed with a grass specific spray such as Fusilade or a broad spectrum spray such as Glyphosate to reduce the competition with the revegetation.

If sufficient vegetation does not germinate from the respread top soil, the area will be seeded in early Autumn with a mixture of pasture species.

➤ ***Perimeter Native Vegetation Areas, Wildlife Corridor and Clumps***

A vegetation and wildlife corridor will be established at the end of excavation. See Figure 6.

Any recovered vegetation will be spread including leaf, root and organic matter collected from the land clearing procedures. This will increase the total organic carbon fraction, improving soil properties such as resistance to water and wind erosion and moisture retention. The difference in properties between existing topsoil and subsoils is not considered a major impediment to rehabilitation of native species in the area.

Topsoil will be re-distributed in rehabilitated areas to depths of 50 mm where available. Whilst burning is not always practicable the mixing of topsoil with ash and charcoal from burnt vegetation has shown a demonstrated improvement in the germination of local native species by triggering some species that do not normally germinate and by increasing germination rates.

Topsoil provides a useful source of seed for rehabilitation when the correct handling of the topsoil is used, stripped and replaced dry (autumn direct return). Maximum depth of 50 mm can be used to optimise revegetation of species-rich plant communities preferably spread before the end of February.

Studies have shown that topsoil stripping and placement is best undertaken in summer for maximum germination, but this raises the potential for additional dust generation from the fine humus particles.

Topsoil will be spread directly from an area being cleared where possible, otherwise reclaimed from a topsoil dump.

Rehabilitation will take place during the first winter months following the restoration earth works of each particular section of quarry. Leaving the completed earth works for one season will reduce the success of rehabilitation by at least 50%, due to compaction effects.

A combination of the three methods is always preferred by Landform Research and has proven to be the most versatile and successful. The amount and species of additional seed and tube stock depends on the quality and seed store within the topsoil, and may vary from stage to stage.

Seeds of indigenous species will be scattered during late summer at the rate of approximately 1 - 2 kg seeds per hectare if required.

Seeding conducted in summer will use scarified leguminous seeds that have been “dry smoked”. Seeding conducted in July to August will have the leguminous seeds heat treated and all seeds will be smoke treated by soaking in “smoke water” for 24 hours prior to seeding.

Seed spreading will be achieved either using mechanical seed dispersal equipment or using manual methods. Bulking with a spreading agent such as sawdust, vermiculite or sand is desirable.

Plant additional tube plants of local native species per hectare, at rates of 200 – 1 000 in June, in the areas of native vegetation, depending on the quality of the topsoil and its potential weed load.

Rehabilitation will progressively follow mining with completed areas of the excavation being revegetated as soon as practicable.

➤ **Fertiliser**

Use a 10 g tree tablet or small handful of fertiliser beside each tube plant if required. Experience shows that this is not normally necessary.

Further investigation will be needed to determine suitable rates and the timing of fertilisation. It may be possible to integrate seed dispersal and fertilisation into a single pass. The fertiliser will need to supply macro-nutrients, phosphorus, nitrogen and potassium, and other micro-nutrients.

➤ **Irrigation**

Experience by Landform Research has shown that, when completed well, there is no need for irrigation of the rehabilitation. It is cheaper to use additional seed than to install irrigation.

➤ **Erosion Control**

Soil erosion occurs when soil is exposed and disturbed by wind or water. Erosion involves soil particles being detached from areas not adequately protected by vegetation, and moved down-slope or blown by the wind.

The soils are very permeable and runoff is normally minimal unless surface materials become non-wetting. Even so experience shows that there is minimal non wetting and surface particle movement under such conditions.

Water erosion on the batter slopes can be avoided by the permeability of the materials and by leaving the surface soft, rough and undulating, with the undulations running along contour on the batter slopes. The final machinery run should be along contour and not down slope.

Wind erosion will be controlled by rehabilitating the disturbed ground as soon as practicable and leaving the soils 0.5 metres above the winter temporary perched water level.

If wind erosion and soil stability become an issue measures will be taken to stabilise the soils. These could include but not be limited to fence wind breaks, spray mulching, cover crops, interim native vegetation or spreading mulch and vegetation.

For rehabilitation areas, revegetation will take place as soon as possible following landform and soil reconstruction.

Cleared vegetation will be transferred from an area being cleared, to protect against erosion, assist with habitat creation and provide a seed source.

Control of wind erosion potential will be assisted by spreading brush and vegetation across the topsoil on the batter slopes and reconstructed soils where local native vegetation is to be established.

➤ **Monitoring**

During late summer an assessment of the success of the rehabilitation will be made to determine the rehabilitation requirements for the following winter.

Monitoring includes visual assessments and, where necessary, counts to determine the success of the rehabilitation and restoration, as follows;

- plant density
- species richness
- plant growth
- plant deaths
- regeneration
- weed infestation
- soil stability and resistance to erosion

As necessary steps will be taken to correct any deficiencies in the vegetation.

Rehabilitation of each stage will be monitored for a period of three years to ensure that the excavated site is stable and not subject to significant erosion.

Provide ongoing weed management to identify and treat significant environmental weeds or weeds likely to impact on the rehabilitation.

In areas of rehabilitation that do not meet the completion criteria measures are to be taken to increase the stem density to achieve the completion criteria. This could include but not be limited to;

- additional seeding,
- Planting additional tube plants
- Use of additional topsoil

**Suggested Plant Species to be Used**

The species identified in the Flora and Vegetation Study will be used. However not all of these will be commercially available and some will be returned through the use of local topsoil.

All species are suitable for seeding

# Indicates more suitable for low elevation and moist sites.

**Table 13: Species List**

VEGETATION STRUCTURE	HEIGHT	KEY SPECIES (to be overseeded or planted)
Tree Overstorey	> 4 m	<i>Corymbia (Eucalyptus) calophylla</i> <i>Eucalyptus marginata (sandplain)</i> <i>Eucalyptus rudis</i> # <i>Eucalyptus todtiana</i>
Tall Shrub layer	3 – 6 m	<i>Acacia saligna</i> <i>Allocasuarina fraseriana</i> <i>Banksia attenuata</i> <i>Banksia menziesii</i> <i>Banksia ilicifolia</i> <i>Banksia littoralis</i> #
Lower Shrub Layer	0.5 – 3 m	<i>Viminea juncea</i> <i>Jacksonia furcellata</i> <i>Jacksonia sternbergiana</i> <i>Jacksonia floribunda</i> <i>Viminea juncea</i> <i>Kunzea glabrescens</i> <i>Allocasuarina humilis</i> <i>Melaleuca thymoides</i> <i>Adenanthos cygnorum</i>
Ground Cover Low Shrubs	<0.5 m	<i>Acacia pulchella</i> and other small local <i>Acacia</i> <i>Hardenbergia comptoniana</i> <i>Kennedia prostrata</i> <i>Gompholobium tomentosum</i> <i>Bossiaea eriocarpa</i> <i>Melaleuca trichophylla</i> <i>Eremaea pauciflora</i> <i>Hemiandra pungens</i> <i>Stirlingia latifolia</i> <i>Nemica reticulata</i> <i>Hypocalymma angustifolium</i> <i>Hypocalymma robustum</i> <i>Petropile linearis</i> <i>Petrophile monostachya</i> <i>Anigozanthos humilis</i> <i>Anigozanthos manglesii</i> <i>Patersonia occidentalis</i> Other herbs, rushes and annuals

## 11.6 Plant Pathogen, Weed and Dieback Management

### ***Plant Pathogens***

Dieback of vegetation is often attributed to *Phytophthora cinamomi* even though there are other *Phytophthora* species and other diseases such as *Armillaria* that can cause dieback like symptoms. Microscopic soil-borne fungi of the genus *Phytophthora* kill a wide range of native plants and can cause severe damage to many vegetation types, particularly those from the families Proteaceae, Epacridaceae, Xanthorrhoeaceae and Myrtaceae.

In most cases dieback is caused by a pathogen which infests the plant and causes it to lose vigour, with leaves dying, and overtime may kill the plant. As such the management of Dieback is essentially related to plant hygiene when coming onto a site and within a site.

There are several guides to the management of Dieback.

- Department of Biodiversity Conservation and Attractions *Phytophthora* Dieback Management Manual, Forest and Ecosystem Management , October 2017.
- Department of Biodiversity Conservation and Attractions *Phytophthora* Dieback Management Plan, October 2017.
- Dieback Working Group 2005, Management of Phytophthora Dieback in Extractive Industries.
- Dieback Working Group, 2000, Managing *Phytophthora* Dieback, Guidelines for Local Government.

Jarrah Dieback (*Phytophthora cinnamomi*) is widespread throughout this part of the State, but in many cases such as this site the vegetation is not interpretable because of the levels of disturbance.

It is unclear whether dieback or other pathogens already occur on site. With the level of disturbance, previous activities and the degree of disturbance to vegetation it is likely that pathogens already exist on site.

However as part of normal best practice, plant disease management actions will be used, therefore the following general principles are applied to Dieback management.

The aim of dieback management during excavation is to minimise the risk of entry of any additional plant pathogens to the site.

In many ways the management of the site for dieback is similar to that for the management of weeds, and the two management practices are considered together.

There is very little risk of the operations spreading dieback onto vegetation on adjoining properties as there is no access to those properties and they are cleared.

On the other hand good management practices are used as part of the ongoing normal quarry operations.

Not all potential impacts apply to all parts of the proposed quarry operations.

- DBCA 2017 and Dieback Working Group 2005, Guidelines will be followed.
- Vehicles are to be prohibited from entering vegetation ahead of excavation, apart from normal travel along made firebreaks and roads for normal security and maintenance activities.
- Dieback diseases are more likely to be transported under moist soil conditions.



- All vehicles and equipment used during land clearing or land reinstatement, will be clean and free from soil or plant material when arriving at site.
- When removing topsoil and clearing, vehicles will run around the perimeter and then push inwards where possible.
- Remnant vegetation ahead of the stage to be excavated is proposed to be quarantined where possible to minimise vehicles from entering.
- No soil and vegetation is to be brought to the site apart from that to be used in rehabilitation and that which is dieback free.
- Plants to be used in rehabilitation are to be certified as from dieback free sources.
- Unwanted access to vegetated areas is discouraged through reduced tracks, signage, site marking and or fencing as appropriate.
- Excavation vehicles will be restricted to the excavation area apart from clearing land.
- Rehabilitated surfaces will be free draining and not contain wet or waterlogged conditions.
- Illegally dumped rubbish is to be removed promptly.
- When clearing land or firebreaks vehicles are to work from disturbed areas towards the pit; or, in situations where dieback interpretation is not possible, from areas of higher quality vegetation to areas of lower quality vegetation.
- Roads are to be maintained as free draining and hard surfaced.
- A split operation will be worked where practicable, where the road transport vehicles only access one side of the stockpile or processing area and excavation vehicles operate on the other side of the stockpiles and processing, reducing the risk of contamination from road transport.
- DBCA has determined that material such as sand, taken from deeper in the regolith profile where there is no organic and other plant matter, carries low risk of spreading dieback. (DEC/DWER 2004).
- The Weed Management Policy will be complied with.
- Quarry traffic is restricted to the designated access roads, pit and stockpile areas apart from clearing land and maintaining fire breaks.
- Normally transport trucks run along the bitumen roads to their destination and return. This run is considered low risk for dieback and trucks will not require cleaning during the transport phase.

### **Weed Management**

Weed management is to be used to minimise impact on site remnant vegetation and on adjoining properties. Good management practices are to be used as part of the ongoing normal quarry operations.

The management of weeds is essentially similar to that for plant diseases. The impact of weeds is really the impact within the local area and the more they are controlled the better. It is desirable that the site does not become a haven for environmental weeds and therefore a management and control program is warranted at all sites.

Weeds can be declared under the *Agriculture and Related Resources Protection Act 1976* which requires that Declared Weeds are eradicated. Other weeds are not Declared but may be classified as Environmental Weeds because they are well known for impacting on vegetation.

Generally if the actions taken for Dieback are applied they will also control weeds. Not all potential impacts will apply to this quarry and the main impacts affecting this site are also listed.

Weed management will be used to minimise impact on site and on adjoining properties. Good management practices will be used as part of the ongoing normal quarry operations.

This plan utilises the most appropriate on ground measures to minimise the risk of spread of Declared and Environmental weeds. The information provided here summarises the key points of the on ground management.

There is a significant amount of exotic vegetation on site including pasture and other species that can be classified as weeds to bushland. During the vegetation studies a number of exotic species were recorded. A number of these are weed species.

Weeds are most likely to impact on;

- Disturbed areas such as overburden dumps, topsoil stockpiles.
- Edges of access roads.
- Edges of firebreaks adjacent to surrounding vegetation.
- Locations accessible to the public on which rubbish is dumped.
- The main sources of weeds are;
- Naturally occurring in topsoil. There is a very high exotic plant seed load with most of the vegetation being pasture and exotic species.
- Weeds from edge effects from access and local roads.
- Gradual creep of weeds along access roads.
- Rubbish dumped by the public.
- Materials or waste brought to site by employees.
- Soil and seeds from vehicles arriving at site. This often applies to trucks that have carried something else such as grain, or vehicles to be used in earthworks.
- Wind blown seed from surrounding land.
- Birds and other vectors. This is more common than is often given credit for. eg Solanum species.

Weed Management will consist of, but not be limited to, the following actions.

- The Dieback Management Actions will be used to assist weed management.
- Inspections are to be conducted to monitor the presence and introduction of Environmental and Declared Weeds on an annual or more frequent basis. On identification, Declared and significant environmental weeds will either be removed, buried, or sprayed with a herbicide.
- Large plants such as Castor Oil plants and Declared Weeds are to be periodically grubbed out or spot sprayed with a herbicide.
- Rehabilitation of the final land surface will be to interim revegetation for soil stabilisation. This will not involve the elimination of exotic species, but rather provide an interim cover that stabilises the soil. Weeds that impact on that interim cover will be treated.
- Areas of grass can be sprayed with Fusilade or similar grass selective herbicide if required. This can occur over the top of rehabilitated areas without significantly setting back the broad leafed species.
- All vehicles and equipment to be used during land clearing or land reinstatement, are to be clean and free from soil or plant material when arriving at site.
- No soil and vegetation will be brought to the site apart from that to be used in rehabilitation.
- Plants to be used in rehabilitation are to be free from weeds.
- Vegetated areas ahead of excavation will be quarantined to excavation vehicles until required.
- Unwanted access to vegetated areas is to be discouraged through signage, marking, a lack of tracks, perimeter bunding and/or external fencing.
- Weed affected top soils may need to be taken offsite, used in weed affected areas, buried by 500 mm soil/overburden or taken offsite.
- Illegally dumped rubbish is the major source of weeds and will be removed promptly.
- No weed contaminated or suspect soil or plant material is to be brought onto the site.
- When clearing land or firebreaks vehicles will work in conjunction with dieback principles and push from areas of better vegetation towards areas of lower quality vegetation.
- Weeds are to be sprayed with broad spectrum spray prior to planting or seeding in weed affected soils as required.
- Weed management will work from the least affected areas to most affected.
- Ongoing monitoring of weeds should be undertaken at least annually in autumn, prior to winter rains.

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## **DWER EMAIL RELATING TO GROUNDWATER ELEVATIONS**

**Subject:** RE: Proposed sand Extraction, Lot 226 Paterson Road, Nambeelup - DWER Reference RF9823, PA 037193

**Date:** Friday, 15 January 2021 at 1:59:00 pm Australian Western Standard Time

**From:** Brett Dunn

**To:** Lindsay Stephens

**CC:** Cherryll Oldham, nam hui teo

Hi Lindsay,

Thanks for the further information.

It is encouraging the data collected in September 2002 is somewhat comparable to long term data for the area.

If the pit base elevation maintains the 0.5m clearance to the maximum groundwater level determined from long term data, the Department would have no objections to proposal being progressed, of course to subject to any other regulatory requirements under Part V of the *Environmental Protection Act 1986* being satisfied.

Please feel free to discuss further.

Kind Regards,

Brett Dunn  
Manager – Planning Advice  
Kwinana Peel Region  
Department of Water and Environmental Regulation  
T: (08) 9550 4202 | [www.dwer.wa.gov.au](http://www.dwer.wa.gov.au)

  
Peter Cullen  
Water and  
Environment Trust  
*Fellow of the Peter Cullen Trust*

**From:** Lindsay Stephens <landform@inet.net.au>

**Sent:** Tuesday, 12 January 2021 3:42 PM

**To:** Brett Dunn <brett.dunn@dwer.wa.gov.au>

**Cc:** Cherryll Oldham <CherryllO@murray.wa.gov.au>; nam hui teo <teostreet@globaldial.com>

**Subject:** Proposed sand Extraction, Lot 226 Paterson Road, Nambeelup - DWER Reference RF9823, PA 037193

Hi Brett

I was provided with your response to the extraction of sand from portion of Lot 226 paterson Road Nambeelup.

I conducted extensive measurements across the site in September 2002 for sewage disposal for a possible

subdivision that did not go ahead. As that data was dependent on the separation to the water table that measurement was used and not AHD.

I used the data as the baseline data for the proposed sand excavation and have determined that those levels are close to the winter maximum levels which being a temporary perched water table will not be too different in a wet or a dry year.

I have provided notes on the water tables with new maps.

Nothing else has changed apart from the base floor elevation. The provision of piezometers as the floor progresses still represents a good check on the water tables of the completed pit.

If the data and updated proposed levels are acceptable to the DWER then the proposal can continue to move forwards in the assessment process.

Once the DWER has accepted the final floor elevations then any issues raised during the advertising process will be addressed and supplied to the Shire of Murray.

Regards  
Lindsay Stephens



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## **PGV ENVIRONMENTAL FLORA AND FAUNA ASSESSMENTS**



LOCATION



SURROUNDING LAND USES  
LOT 226 PATERSON ROAD NAMBEELUP



Figure 1

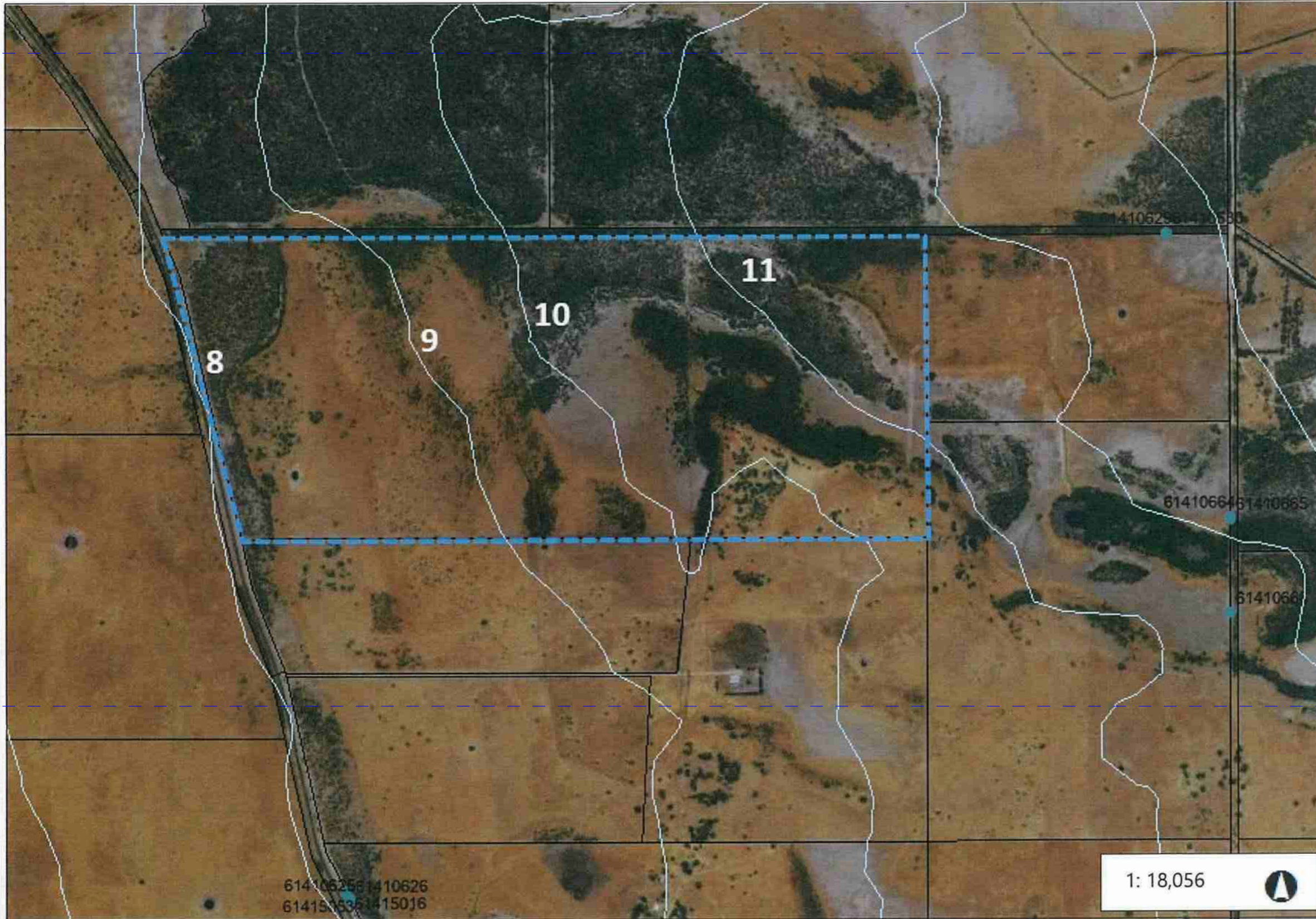
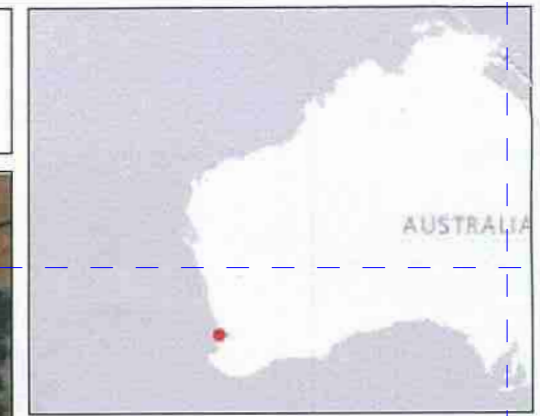


PROPOSED EXCAVATION FOOTPRINT  
LOT 226 PATERSON ROAD NAMBEELUP



Figure 2

# Lot 226 Paterson Road, Nambeelup - Maximum Groundwater Level



- Legend**
- WIN Sites - Ground with Aquifers
  - WIN Sites - Ground with Reported Aquifers
  - Cadastre
  - Murray Region Groundwater Contours MaxGL 1m

Notes

Figure 3

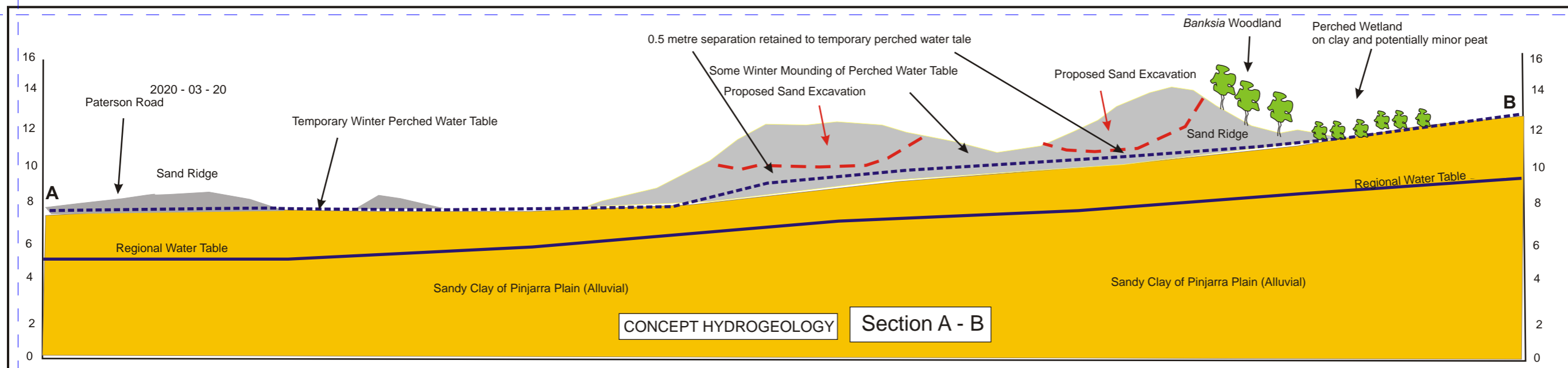
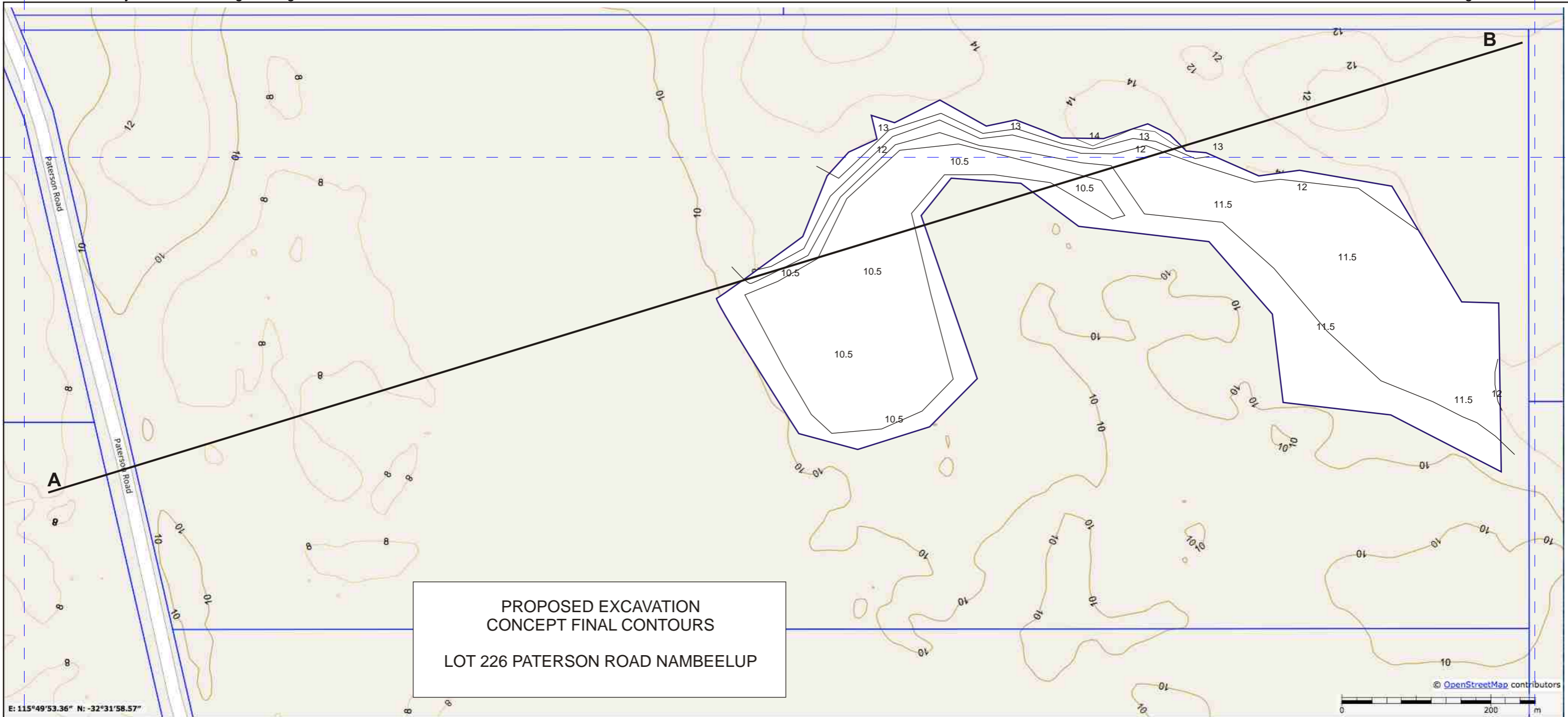
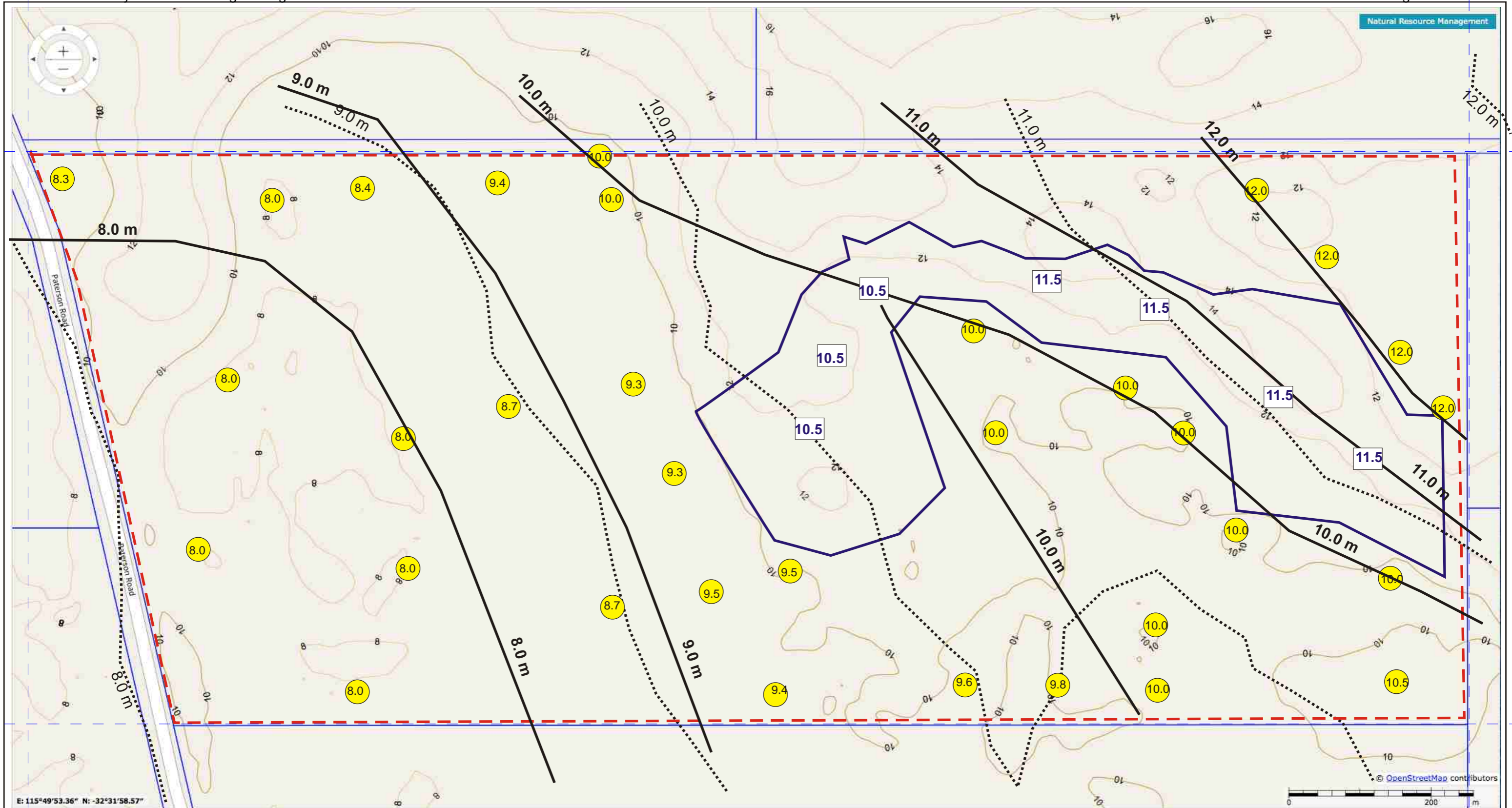


Figure 4





E: 115°49'53.36" N: -32°31'58.57"

© OpenStreetMap contributors  
0 200 m



4 JANUARY 2021

- 12.0 m DWER mapping Highest Groundwater Level (m AHD)
- 12.0 m Landform Research Water Table measurements 11 September 2002 (m AHD)
- 10.0 Landform Research Water Table measurements 11 September 2002 (m AHD)
- 11.5 Proposed minimum pit floor elevations (m AHD)
- Pit Footprint

PROPOSED EXCAVATION  
EXISTING CONTOURS and WATER TABLE ELEVATIONS



LOT 226 PATERSON ROAD NAMBEELUP



Figure 5



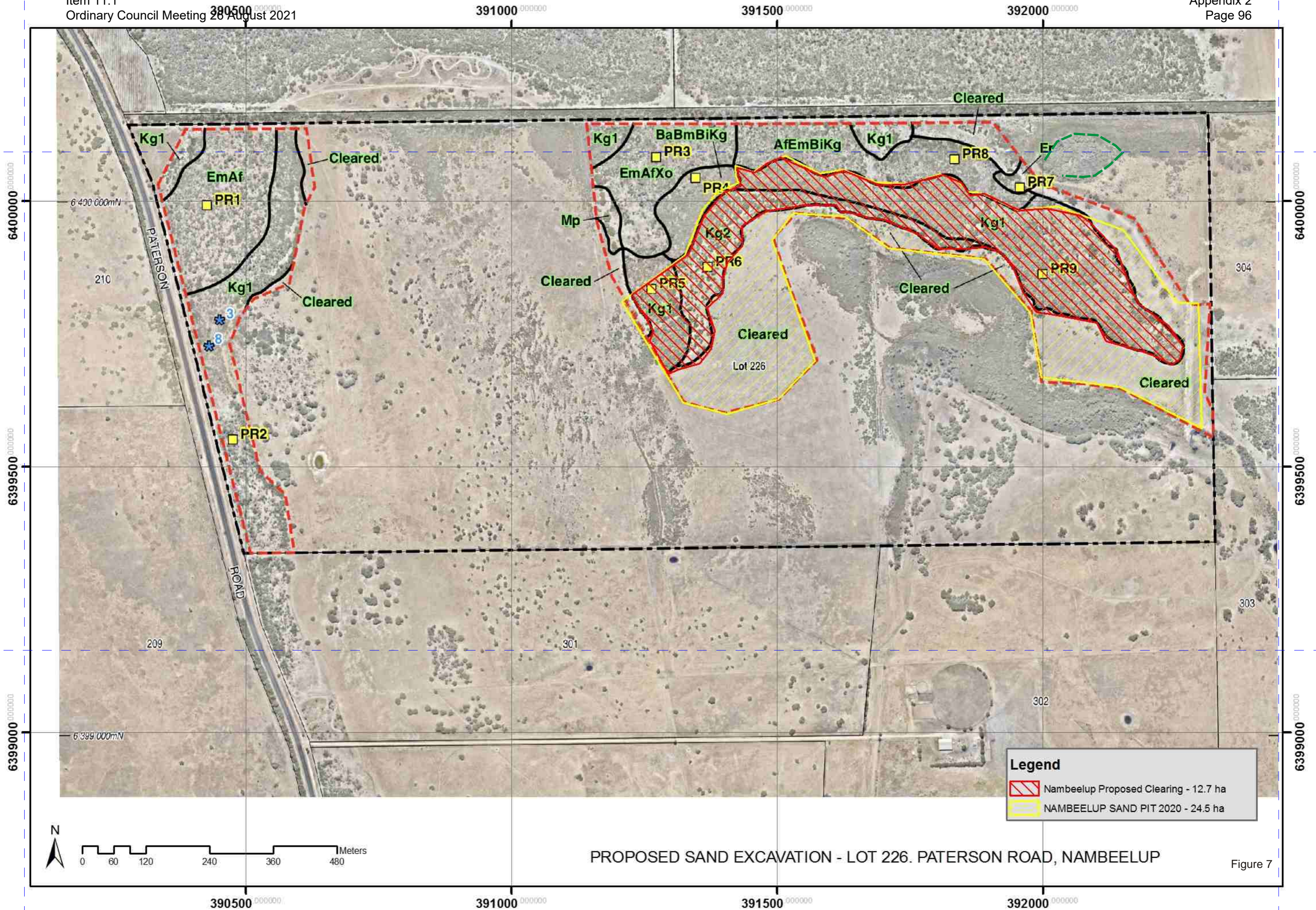
4 JANUARY 2021

-  Vegetation and wildlife corridor to be established at the end of excavation
-  Pit footprint

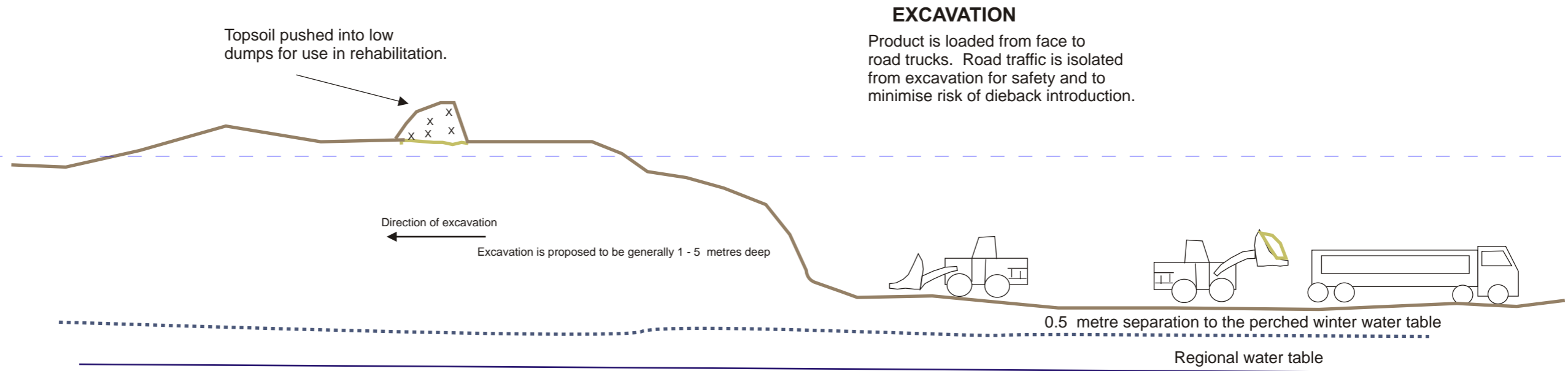
PROPOSED EXCAVATION AND STAGING  
LOT 226 PATERSON ROAD NAMBEELUP  
Design Pit Floor Elevation



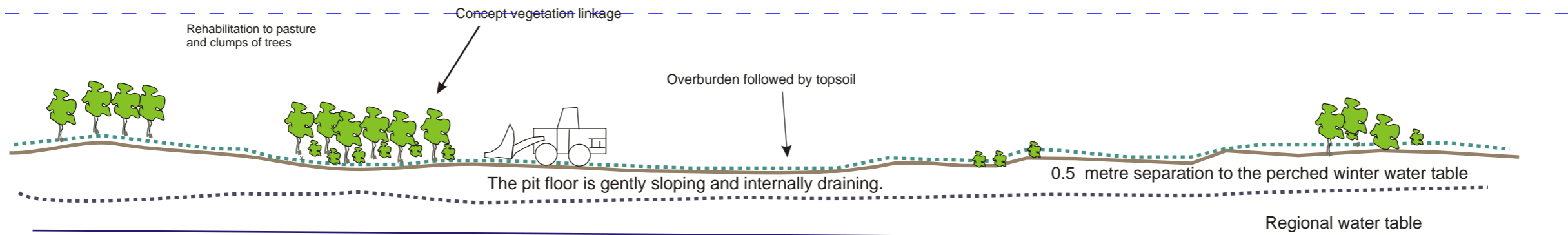
Figure 6







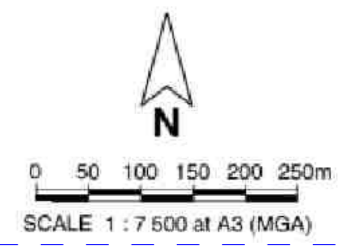
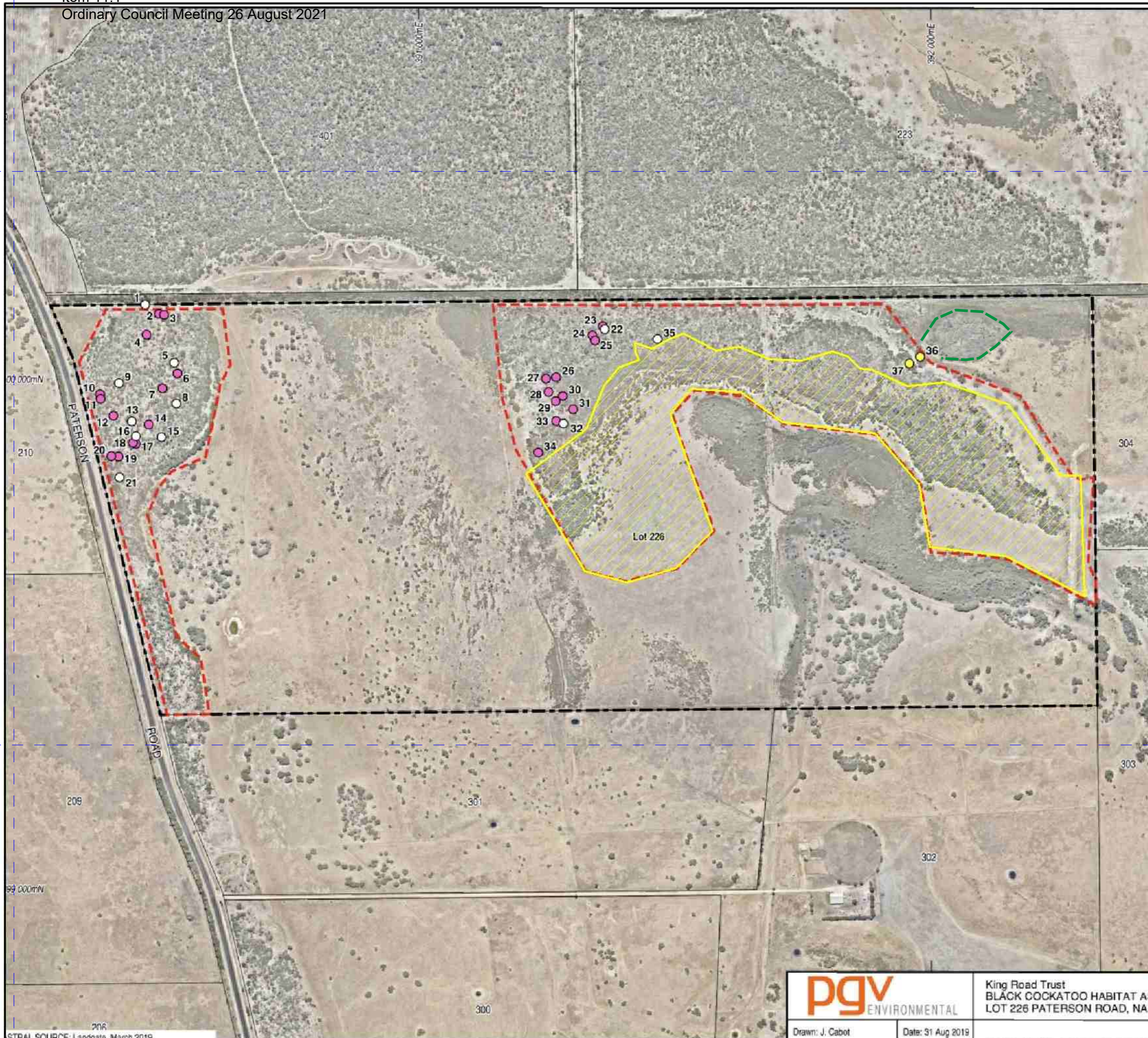
**LAND RESTORATION AND REHABILITATION**



2020 - June

CONCEPTUAL SAND EXCAVATION - Lot 226 Paterson Road Nambelup

Figure 9



- Legend**
- - - Site Boundary
  - - - Lot 226 Boundary
  - Cadastral Boundary
  - - - Easement Boundary
- Significant Trees**
- Flooded Gum (*Eucalyptus rudis*)
  - Jarrah (*Eucalyptus marginata*)
  - Standing Dead Tree
  - 15** Tree Number

OVERLAY OF PROPOSED CLEARING ON VEGETATION AND COCKATOO SURVEY

- Legend**
- NAMBEELUP SAND PIT 2020 - 24.5 ha

Figure 8



Pasture and resource with *Kunzea glabrescens* regrowth on resource in the rear.



*Kunzea glabrescens* regrowth on resource



*Banksia* - Jarrah Woodland to be retained. Jarrah Cockatoo habitat tree

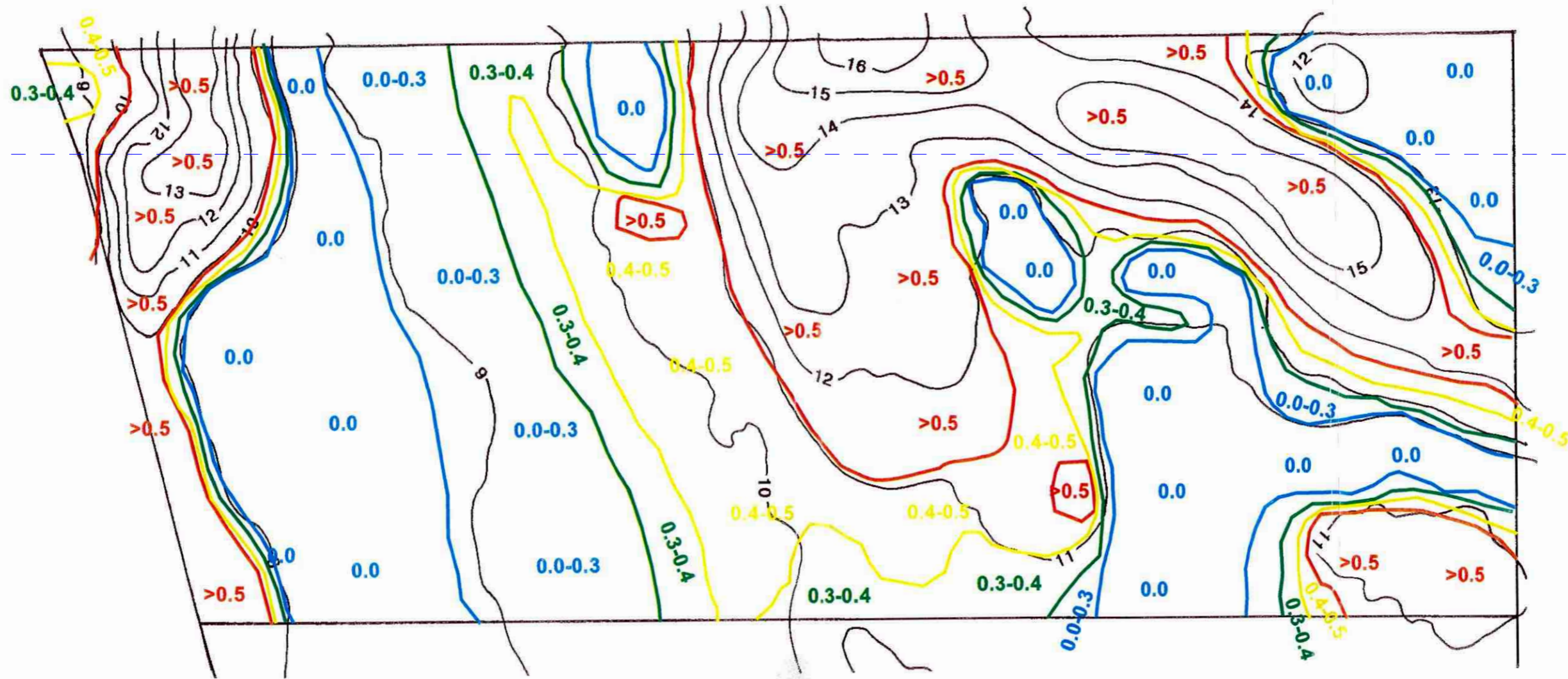


*Banksia* - Jarrah Woodland to be retained



*Kunzea glabrescens* regrowth on resource

Figure 10



MEASURED AND INTERPRETED DEPTH TO HIGHEST KNOWN WATER TABLE  
 (11 SEPTEMBER 2002)

- 0.0** Seasonally wet and waterlogged soils. Soils are generally darker organic, coloured sands over brown sands with minor ferricrete development.
- 0.0-0.3** Soils where the land surface is undulating with the highest known water table varying between 0.0 and 0.3 metres below the land surface. Grey and white sands or light brown sands.
- 0.3-0.4** Soils where the highest known water table is generally 0.3 - 0.4 metres below the land surface. Contains small undulating areas which are wetter and have the water table closer than 0.3 metres and small ridges with separations exceeding 0.4 metres. Small low rises could have a small amount of fill placed on them to achieve the 0.5 separation required for Alternative Waste Water Systems. Grey sands over white or light brown sands.
- 0.4-0.5** Soils where the highest known water table is between 0.4 and 0.5 metres from the surface. Has small low rises which exceed 0.5 metres separation and comply with the sewerage guidelines for Alternative Systems and in occasional places small depressions that are less than 0.4 metres separation. A small amount of fill can be used to raise building envelopes as necessary. Grey sands over white or light brown sands.
- >0.5** Sand ridges where the highest seasonal water table is more than 0.5 metres below the ground surface. Complies with the guidelines for Alternative Systems. Leached white sands to depth.

Scale 1 : 10 000  
 DOLA AIR PHOTO FEBRUARY 2002

**NOTE** All soils require Alternative Waste Water Systems to reduce the potential loss of nutrients. These units require the use of 150 - 300 mm of amended soils, which will raise the soil and increase the separations to the highest known water tables.

**MEASURED AND INTERPRETED WATER TABLE SEPARATIONS  
 and SOILS**

LOT 226, PATERSON ROAD. NAMBEELUP

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 Mem WA Env Cons Assoc  
**LANDFORM RESEARCH**  
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Figure 11

# LOT 226 PATERSON ROAD, NAMBEELUP

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## FLORA AND VEGETATION SURVEY AND LEVEL 1 FAUNA ASSESSMENT

Prepared for: King Street Trust  
Report Date: 18 November 2019  
Version: 2  
Report No. 2019-437

The logo for PGV Environmental is located at the bottom of the page. It features the letters 'PGV' in a large, bold, white sans-serif font. Below 'PGV', the word 'ENVIRONMENTAL' is written in a smaller, white, all-caps sans-serif font. The background of the logo area is a vibrant orange with a subtle pattern of fine, white, curved lines that create a sense of movement and depth.

**PGV**  
ENVIRONMENTAL

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- Appendix 1: DBCA Flora Database Search
- Appendix 2: Naturemap Report
- Appendix 3: Protected Matters Search Tool Report
- Appendix 4: Conservation Codes
- Appendix 5: TEC/PEC Database Search
- Appendix 6: Quadrat Data
- Appendix 7: Flora Species List
- Appendix 8: DBCA Fauna Database Search

## **1 INTRODUCTION**

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### **1.1 Background**

Lot 226 Paterson Road, Nambelup (the site) is located in the Shire of Murray, approximately 64km south of the Perth Central Business District (Figure 1). The site is bound by Paterson road to the west, unconstructed road reserve and rural land to the north and rural land to the east and south.

The site is generally flat but contains some higher areas that contain a sand resource that is proposed to be extracted for use in the future Peel Business Park (Figure 2). These higher areas contain native vegetation. Lot 226 Paterson Road is approximately 155ha in size. The proposed area of sand extraction is around 48.0ha of which approximately 34.5ha contains native vegetation.

PGV Environmental was commissioned by King Street Trust to undertake a Flora and Vegetation survey and Level 1 Fauna Survey of the site as part of an application to extract sand from the site.

### **1.2 Scope of Works**

The Flora, Vegetation and Fauna Survey report includes a description of the following:

- Physical characteristics including:
  - Landform;
  - Drainage and water bodies; and
  - Geological, hydrogeological and hydrological characteristics;
- Recent and present land use including:
  - Surrounding land uses; and
  - Assessment of current and historical activities on the subject site and surrounding areas which have the potential to result in contamination issues at the site;
- A Reconnaissance and Detailed Flora and Vegetation Survey including:
  - Desktop search and review of the Department of Biodiversity, Conservation and Attractions (DBCA) Declared Rare and Priority Flora database and Threatened Ecological Communities databases;
  - Desktop search of publicly available databases such as Naturemap and the Protected Matters Search Tool;
  - Examination of recent aerial photography and contour maps to provisionally identify vegetation types and condition;
  - A site walkover to assess the vegetation and undertake a targeted survey for Threatened and Priority species that are determined to be possibly present on the site;
  - Advice on the potential for significant species identified in the desktop searched to be present on the site; and
  - A spring survey sampling from quadrats as well as a thorough walk through the site.
- A Level 1 Fauna Survey including:
  - A search of the DBCA Databases and NatureMap for the general area for Threatened and Priority Species;

- A search of the Commonwealth Government's Protected Matters Search Tool to identify species potentially occurring within the area that are protected under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 or international migratory bird agreements (JAMBA/CAMBA); and
  - A description of the fauna habitats present on the site from the site walkover; and
  - An assessment of the significance of the site for conservation significant species in a local and regional context.
- Implications, if any, under Western Australian policies and legislation such as the *Environmental Protection Act 1986* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

## 2 EXISTING ENVIRONMENT

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### 2.1 Land Use

The site has been part of a rural property for many years and as shown in the earliest available on-line aerial photography from 1979 the lot is largely cleared apart from the higher areas subject of this report which largely remain vegetated (Plate 1).

**Plate 1: Historical Aerial Photography from 1979 (Landgate, 2019)**



The area subject of the surveys remains mostly vegetated with some areas having regenerated since the 1979 aerial (Plate 2). The whole of Lot 226 is being used for grazing livestock. Any fencing on the site does not preclude livestock from entering the areas of native vegetation.

**Plate 2: NearMap Aerial Photography from 2018**



## **2.2 Topography**

The survey area is gently undulating between a low of at around 11m Australian Height Datum (AHD) up to 16m AHD (Figure 2).

## **2.3 Geology and Soils**

The site is mapped as part of the Bassendean System and consists of very low relief, leached, grey siliceous Pleistocene sand dunes, intervening sandy and clayey swamps and gently undulating plains (Bolland, 1998). These soils are very leached, infertile and mildly acidic (DPIRD, 2019).

Two Phases of the Bassendean soils are mapped on the site by the Department of Primary Industries Regional Development (DPIRD) as follows:

Bassendean B1 Phase (212Bs\_B1) which are extremely low to very low relief dunes, undulating sandplain and discrete sand rises with deep bleached grey sands sometimes with a pale yellow B horizon or a weak iron-organic hardpan at depths generally greater than 2m. This soil type describes most of the area that to be mined for sand (DPIRD, 2019).

Bassendean B4 Phase (212Bs\_B4) which are broad poorly drained sandplain with deep grey siliceous sands or bleached sands, underlain at depths generally greater than 1.5m by clay or less frequently a strong iron-organic hardpan (DPIRD, 2019).

## **2.4 Hydrology**

Groundwater is at approximately 5 to 10m AHD and flows to the west (DWER, 2019). Groundwater is approximately 5 to 24m below ground surface (National Map, 2019) in the survey area. Aerial photographs indicate that groundwater is likely to be higher than 5m below ground surface in the lowest parts of the survey area winter and early spring. Some areas on the lot adjoining the survey area contain above-ground water in wet years.

## **2.5 Wetlands**

Two wetlands are mapped on the lot but outside of the survey area. Most of the lot contains part of Multiple Use Palusplain Unique Feature Identifier (UFI) 15802 and part of a Resource Enhancement Sumpland UFI 5031 (Plate 3) (National Map, 2019).

**Plate 3: Wetland Mapping on the site (National Map, 2019)**



The proposed area of mining does not contain any wetlands.

### 3 FLORA AND VEGETATION

#### 3.1 Methodology

##### 3.1.1 Reconnaissance Survey

A Reconnaissance and Detailed Flora and Vegetation Survey was undertaken in accordance with EPA Technical Guidance *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016a). Desktop studies including database searches were undertaken to identify potential threatened species and communities that may occur on the site. A site reconnaissance survey was conducted by Dr Paul van der Moezel from PGV Environmental on 12 February 2019 to provisionally map vegetation types and condition and to determine whether any conservation significant species could occur on the site.

##### 3.1.2 Detailed Survey

Two follow-up surveys were conducted, the first on 31 July 2019 to target the Glossy-leaved Hammer Orchid (*Drakaea elastica*) which had potential to occur on the site and is best surveyed when the leaves are most apparent. The second Detailed Spring Survey was undertaken on 25 September 2019. The detailed survey included sampling from nine 10m x 10m quadrats located within the different vegetation types as well as a thorough walk through the survey area to record all plant species, vegetation types and vegetation condition.

##### 3.1.3 Survey Conditions

The conditions that the survey was undertaken in are presented in Table 1 in order to assess the adequacy of the survey. In summary, there were no constraints to the survey.

**Table 1: Statement of Botanical Survey Conditions**

Issue	Constraints (Y/N)*	Comment
Competency/experience of the consultant conducting the survey	No	Dr Paul van der Moezel has previous survey experience on the site
Proportion of the flora identified^	No	The timing of the survey in July for <i>Drakaea elastica</i> and September for the Detailed Survey was optimal to record most of the native species.
Sources of information (historic/recent or new data)	No	Previous survey reports for the site were reviewed.
Proportion of the task achieved and further work that may need to be undertaken	No	No follow-up survey required as surveys were done in three seasons and no Threatened Flora expected to occur in other seasons.
Timing/weather/season/cycle	No	The spring survey was optimal for most flora species. 2019 was an average year for rainfall in Jun- Sep
Disturbances (Fire)	No	The fire age of the vegetation was greater than 5 years in most areas
Intensity of survey (e.g. In retrospect was the intensity adequate)	No	A total of 3 field days spent on the site.

Issue	Constraints (Y/N)*	Comment
Completeness (e.g. was relevant area fully surveyed)	No	
Resources (e.g. degree of expertise available for plant identification)	No	Experienced botanist undertook most plant identifications on site with some identification in the office or Perth Reference Herbarium
Remoteness and/or access problems	No	Accessible site accessed by a short walk from nearby 4WD tracks
Availability of contextual (e.g. bioregional) information for the study area.	No	IBRA Vegetation Mapping

\*Constraints have been rated as Significant, Moderate or No constraints

^Fungi and nonvascular flora (e.g. algae, mosses and liverworts) were not specifically surveyed for during the survey.

## 3.2 Desktop Studies

### 3.2.1 Flora Database Searches

A search of the DBCA Threatened Flora Databases: the WA Herbarium database (WAHerb and the Threatened (Declared Rare) and Priority Flora Species List (TFPL) (Appendix 1), Naturemap (Appendix 2) (DBCA, 2019) and the EPBC Act Protected Matters Search Tool (Appendix 3) (DoEE, 2019) indicates that a number of species that are listed as Endangered, Threatened or Priority are identified as potentially being located the site. The results from these database searches are shown in Table 2.

**Table 2: Conservation Significant Flora known to occur near the Site**

Scientific Name	Common Name	Conservation Status (WA)	Status under EPBC Act
<i>Caladenia huegelii</i>	King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid	Schedule 1	Endangered
<i>Drakaea elastica</i>	Glossy-leafed Hammer Orchid	Schedule 1	Endangered
<i>Eucalyptus x balanites</i>	Cadda Road Mallee	Schedule 1	Endangered
<i>Synaphea</i> sp. Fairbridge Farm (D Papenfus 696)	Selena's Synaphea	Schedule 1	Critically Endangered
<i>Synaphea</i> sp. Serpentine (G.R Brand 103)		Schedule 1	Critically Endangered
<i>Synaphea stenoloba</i>	Dwellingup Synaphea	Schedule 1	Endangered
<i>Diuris micrantha</i>	Dwarf Bee-orchid	Schedule 2	Vulnerable
<i>Diuris purdiei</i>	Purdie's Donkey-orchid	Schedule 2	Endangered
<i>Synaphea</i> sp. Pinjarra Plain (A.S George 17182)		Schedule 2	Endangered
<i>Andersonia gracilis</i>	Slender Andersonia	Schedule 3	Endangered
<i>Diuris drummondii</i>	Tall Donkey Orchid	Schedule 3	Vulnerable
<i>Drakaea micrantha</i>	Dwarf Hammer-orchid	Schedule 3	Vulnerable
<i>Tetraria australiensis</i>	Southern Tetraria	Schedule 3	Vulnerable
<i>Acacia lasiocarpa</i> var. bracteolata long peduncle variant (G.J. Keighery 5026)		Priority 1	



Scientific Name	Common Name	Conservation Status (WA)	Status under EPBC Act
<i>Acacia benthamii</i>		Priority 2	
<i>Grevillea manglesii</i> subsp. <i>ornithopoda</i>		Priority 2	
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>		Priority 2	
<i>Phyllangium palustre</i>		Priority 2	
<i>Amanita drummondii</i>	Drummond's Grisette	Priority 3	
<i>Blennospora doliiformis</i>		Priority 3	
<i>Boronia capitata</i> subsp. <i>gracilis</i>		Priority 3	
<i>Chamaescilla gibsonii</i>		Priority 3	
<i>Cyathochaeta teretifolia</i>		Priority 3	
<i>Dillwynia dillwynioides</i>		Priority 3	
<i>Eryngium</i> sp. <i>Ferox</i> (G.J. Keighery 16034)		Priority 3	
<i>Jacksonia gracillima</i>		Priority 3	
<i>Myriophyllum echinatum</i>		Priority 3	
<i>Schoenus benthamii</i>		Priority 3	
<i>Schoenus pennisetis</i>		Priority 3	
<i>Stylidium aceratum</i>		Priority 3	
<i>Caladenia speciosa</i>	Sandplain White Spider Orchid	Priority 4	
<i>Drosera occidentalis</i>	Western Sundew	Priority 4	
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>		Priority 4	
<i>Jacksonia sericea</i>	Waldjumi	Priority 4	
<i>Microtis quadrata</i>	South Coast Mignonette Orchid	Priority 4	
<i>Ornduffia submersa</i>		Priority 4	
<i>Parsonsia diaphanophleba</i>		Priority 4	
<i>Rumex drummondii</i>		Priority 4	
<i>Stylidium longitubum</i>	Jumping Jacks	Priority 4	
<i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)		Priority 4	
<i>Trithuria australis</i>		Priority 4	

Definitions of the Conservation Codes are in Appendix 4.

Based on the Reconnaissance survey Table 3 lists the species that have potential to occur on the site.

**Table 3: Likelihood of Identified Significant Flora Species Occurring on the Site**

Scientific Name	Conservation Status (WA)	Habitat*	Likelihood to occur on the site
<i>Caladenia huegelii</i>	Schedule 1	The Grand Spider-orchid prefers sand or clay loam. This species generally does not survive in disturbed areas.	Unlikely - This species may occur in the areas of better condition vegetation, however unlikely due to the very open understorey
<i>Drakaea elastica</i>	Schedule 1	The Glossy-leaved Hammer Orchid prefers low-lying situations adjoining winter-wet swamps. This species does not survive in disturbed areas.	Possible – The survey area contains low-lying habitat adjoining winter-wet swamps. However, the understorey is mostly disturbed thus reducing its likelihood.
<i>Eucalyptus x balanites</i>	Schedule 1	The Cadda Road Mallee prefers sandy soils with lateritic gravel.	Highly Unlikely – the site is not in the known species range and there is no lateritic gravel.
<i>Synaphea</i> sp. Fairbridge Farm (D Papenfus 696)	Schedule 1	Selena's <i>Synaphea</i> occurs in sandy with lateritic pebbles near winter-wet flats, in low woodland with weedy grasses.	Highly Unlikely – The site does not contain lateritic pebbles near winter-wet flats
<i>Synaphea</i> sp. Serpentine (G.R Brand 103)	Schedule 1	<i>Synaphea</i> sp. Serpentine occurs in brown sandy clay.	Highly Unlikely – the soils are sand with very little clay
<i>Synaphea stenoloba</i>	Schedule 1	Dwellingup <i>Synaphea</i> grows in sandy or sandy clay soils on winter-wet flats, granite.	Highly Unlikely – The site is not low-lying habitat and is outside the known range.
<i>Diuris micrantha</i>	Schedule 2	The Dwarf Bee-orchid is usually found on cleared firebreaks or open sandy patches that have been disturbed with in Jarrah Banksia woodland or thickets of Spearwood ( <i>Kunzea ericifolia/ glabrescens</i> ) (Williams <i>et al.</i> , 2001).	Potentially occurs on the site
<i>Diuris purdiei</i>	Schedule 2	Purdie's Donkey Orchid occurs in grey-black sand in moist winter-wet swamps.	Highly Unlikely – The site does not contain any moist winter-wet swamps

Scientific Name	Conservation Status (WA)	Habitat*	Likelihood to occur on the site
<i>Synaphea</i> sp. Pinjarra Plain (A.S George 17182)	Schedule 2	<i>Synaphea</i> sp. Pinjarra Plain occurs in grey sandy loam or clay, grey-brown clayey sand, brown clayey loam, laterite on flats, seasonally wet areas, railroad reserves often with wet depressions or drains.	Highly Unlikely – The site is not low-lying habitat
<i>Andersonia gracilis</i>	Schedule 3	Slender <i>Andersonia</i> occurs in white/grey sand, sandy clay, gravelly loam in winter-wet areas, near swamps.	Highly Unlikely – The site is not low-lying habitat
<i>Diuris drummondii</i>	Schedule 3	The Tall Donkey Orchid grows in low-lying depressions, swamps.	Highly Unlikely – The site is not low-lying habitat
<i>Drakaea micrantha</i>	Schedule 3	Dwarf Hammer-orchid occurs in grey sands over dark, grey to blackish, sandy clay-loam substrates in winter wet depressions or swamps.	Highly Unlikely – The site is not low-lying habitat
<i>Tetraria australiensis</i>	Schedule 3	Southern <i>Tetraria</i> occurs in grey sand over clay; also described as yellow and sandy or clayey lateritic soils favouring winter-wet swampy depressions, drainage lines or rises surrounding swamps.	Highly Unlikely – The site is not low-lying habitat
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)	Priority 1	This variant of <i>Acacia lasiocarpa</i> occurs in grey or black sand over clay in swampy areas, winter wet lowlands.	Highly Unlikely – The site is not low-lying habitat
<i>Acacia benthamii</i>	Priority 2	<i>Acacia benthamii</i> grows on sand, typically on limestone breakaways	Highly Unlikely – The site is not limestone
<i>Grevillea manglesii</i> subsp. <i>ornithopoda</i>	Priority 2	<i>Grevillea manglesii</i> subsp. <i>ornithopoda</i> grows amongst medium trees, or low trees, or tall (sclerophyll) shrubland, or low (sclerophyll) shrubland; in gravelly soil, or sand, or clay; occupying along creek beds.	Highly Unlikely – The site is not low-lying habitat
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	Priority 2	<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i> occurs on grey-white-yellow sand on flats on seasonally-wet sites	Highly Unlikely – The site is not low-lying habitat

Scientific Name	Conservation Status (WA)	Habitat*	Likelihood to occur on the site
<i>Phyllangium palustre</i>	Priority 2	<i>Phyllangium palustre</i> occurs in clay on winter-wet claypans, low-lying seasonal wetlands.	Highly Unlikely – The site is not low-lying habitat
<i>Amanita drummondii</i>	Priority 3	Drummond's Grisette is solitary to gregarious in leaf litter in association with <i>Agonis flexuosa</i> , <i>A. theiformis</i> , <i>Allocasuarina fraseriana</i> , <i>Corymbia calophylla</i> , <i>Eucalyptus marginata</i> , <i>E. patens</i> , <i>E. staeri</i> , <i>Jacksonia furcellata</i> , <i>Kunzea glabrescens</i> , <i>Melaleuca</i> sp., <i>Podocarpus drouynianus</i> , <i>Taxandria parviceps</i> . (Davidson <i>et al.</i> , 2015) growing in sandy soil (Amanitaceae Org, 2015).	Highly Unlikely – The vegetation on the site is not the preferred habitat of this species
<i>Blennospora doliiformis</i>	Priority 3	<i>Blennospora doliiformis</i> grows in grey or red clay soils over ironstone on seasonally-wet flats.	Highly Unlikely – The site is not low-lying habitat
<i>Boronia capitata</i> subsp. <i>gracilis</i>	Priority 3	<i>Boronia capitata</i> subsp. <i>gracilis</i> occurs in white/grey or black sand on winter-wet swamps, hillslopes.	Highly Unlikely – The site is not low-lying habitat
<i>Chamaescilla gibsonii</i>	Priority 3	<i>Chamaescilla gibsonii</i> grows in clay to sandy clay on winter-wet flats, shallow water-filled claypans.	Highly Unlikely – The site is not low-lying habitat
<i>Cyathochaeta teretifolia</i>	Priority 3	<i>Cyathochaeta teretifolia</i> occurs in grey sand, sandy clay on swamps, creek edges.	Highly Unlikely – The site is not low-lying habitat
<i>Dillwynia dillwynioides</i>	Priority 3	<i>Dillwynia dillwynioides</i> occurs in sandy soils in winter-wet depressions.	Highly Unlikely – The site is not low-lying habitat
<i>Eryngium</i> sp. <i>Ferox</i> (G.J. Keighery 16034)	Priority 3	<i>Eryngium</i> sp. <i>Ferox</i> (G.J. Keighery 16034) grows in grey to brown loamy to sandy clay, brown cracking clay on winter-wet flats, swamps, dried claypans, ridges.	Highly Unlikely – The site is not low-lying habitat
<i>Jacksonia gracillima</i>	Priority 3	<i>Jacksonia gracillima</i> occurs in grey and brown well-drained sand.	Potentially occurs on the site
<i>Myriophyllum echinatum</i>	Priority 3	<i>Myriophyllum echinatum</i> grows in clay on winter-wet flats.	Highly Unlikely – The site is not low-lying habitat
<i>Schoenus benthamii</i>	Priority 3	<i>Schoenus benthamii</i> prefers white, grey sand, sandy clay in winter-wet flats, swamps.	Highly Unlikely – The site is not low-lying habitat

Scientific Name	Conservation Status (WA)	Habitat*	Likelihood to occur on the site
<i>Schoenus pennisetis</i>	Priority 3	<i>Schoenus pennisetis</i> occurs in grey or peaty sand, sandy clay in swamps, winter-wet depressions.	Highly Unlikely – The site is not low-lying habitat
<i>Stylidium aceratum</i>	Priority 3	<i>Stylidium aceratum</i> occurs in sandy soils in swamp heathland.	Highly Unlikely – The site is not low-lying habitat
<i>Caladenia speciosa</i>	Priority 4	Sandplain White Spider Orchid occurs in white, grey or black sand.	Potentially occurs on the site
<i>Drosera occidentalis</i>	Priority 4	The Western Sundew occurs in sandy and clayey soils in swamps and wet depressions.	Highly Unlikely – The site is not low-lying habitat
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>	Priority 4	<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i> grows in loam on flats, hillsides.	Potentially occurs on the site although the soils are not loamy
<i>Jacksonia sericea</i>	Priority 4	Waldjumi grows in calcareous and sandy soils.	Potentially occurs on the site
<i>Microtis quadrata</i>	Priority 4	South Coast Mignonette Orchid occurs on clay based coastal flats (Brown et al., 2013).	Highly Unlikely – The soils are not clay
<i>Ornduffia submersa</i>	Priority 4	<i>Ornduffia submersa</i> grows in freshwater 0.05-0.6 m deep. Pools, lakes, swamps, winter-wet depressions, claypans.	No – there is no permanent water on the site
<i>Parsonsia diaphanophleba</i>	Priority 4	<i>Parsonsia diaphanophleba</i> occurs in alluvial soils along rivers.	Highly Unlikely – The site is not low-lying habitat
<i>Rumex drummondii</i>	Priority 4	<i>Rumex drummondii</i> occurs in winter-wet disturbed areas.	Highly Unlikely – The site is not low-lying habitat
<i>Stylidium longitubum</i>	Priority 4	Jumping Jacks prefer sandy clay, clay in seasonal wetlands.	Highly Unlikely – The site is not low-lying habitat
<i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)	Priority 4	<i>Tripterococcus</i> sp. <i>Brachylobus</i> occurs in grey, black or peaty sand winter-wet flats	Highly Unlikely – The site is not low-lying habitat
<i>Trithuria australis</i>	Priority 4	<i>Trithuria australis</i> occurs in granite, clay in shallow pools, seasonal swamps.	Highly Unlikely – The site is not low-lying habitat

\* sourced from Florabase, DBCA database searches and SPRAT (DoEE, 2018) unless otherwise denoted

Of the 41 species identified in the database search there is the potential for 2 Threatened (Scheduled) and 4 Priority species to occur on the site.

### 3.2.2 TEC/PEC Database Searches

A search of DBCA’s Threatened (TEC) and Priority Ecological Communities (PEC) database was conducted within a radius of 5km around the site (24-0219EC) (Appendix 5). Two conservation significant Ecological Communities were identified (Table 4).

**Table 4: TEC and PECs identified in database searches within 5km of the site**

Number	Description	Conservation Status in WA	Status under the EPBC Act
Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered
Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	Priority 3	Vulnerable

## 3.3 Vegetation

### 3.3.1 Vegetation Complex

The vegetation is part of the Bassendean Central and South vegetation complex which is described as ranging from “woodland of *Eucalyptus marginata* – *Allocasuarina fraseriana* – *Banksia* species to low woodland of *Melaleuca* species and sedgelands on the moister sites. This area includes the transition of *E. marginata* to *E. todtiana* in the vicinity of Perth” (Hedde *et al.*, 1980). The vegetation on the site meets the general description of this vegetation complex.

### 3.3.2 Vegetation Types

Vegetation types are described using the structure (eg. woodland, shrubland) and dominant species in each structure. The vegetation type level of description is used to map the vegetation at the small scale such as in this survey.



Eight vegetation types in the survey as shown on Figure 3 and described in Table 5. Quadrat data is in Appendix 6.



### 3.3.3 Floristic Community Type

Floristic Community Types (FCTs) are another way of describing vegetation and is based on the composition of the whole flora of a site rather than the dominant species. FCTs are used to identify most of the Threatened and Priority Ecological Communities on the Swan Coastal Plain.



The FCT was assessed by comparing the species composition from the quadrats with Table 22 of Gibson *et al.* (1994). The results gave a very close match with FCT 21a ‘Central *Banksia attenuata* - *Eucalyptus marginata* woodlands’ for all quadrats. The *Kunzea glabrescens* dominated vegetation and small patch of *Eucalyptus rudis* also matched closely with FCT 21a although they lack the signature species *Banksia attenuata* and *Eucalyptus marginata*.



**Table 5: Vegetation Types on the Site**

Vegetation Type	Description	Photograph
<p><b>EmAf</b> <i>Eucalyptus marginata/Allocasuarina fraseriana</i> Low Open Woodland over <i>Kunzea glabrescens</i> Tall Shrubland over <i>Conostylis aculeata/Desmocladius flexuosus</i> Low Open Shrubland</p>	<p>Occurs on the highest part of the western section of the survey area. <i>Eucalyptus marginata</i> (Jarrah) and <i>Allocasuarina fraseriana</i> (Sheoak) were 6-8m high and sparse with occasional <i>Kunzea glabrescens</i> (Spearwood) and <i>Banksia menziesii</i> to 3m. The understorey was very open and contained few native species. <i>Conostylis aculeata</i> and <i>Desmocladius flexuosus</i> were the most common shrub species with <i>Gompholobium tomentosum</i> also common. Common weed species included <i>Avena fatua</i> (Wild Oats), <i>Briza maxima</i> and <i>Ehrharta longiflora</i> (Annual Veldtgrass).</p> <p>The soils are greyish-brown sand.</p> <p>Quadrat PR1 is representative of this vegetation type.</p>	
<p><b>EmAfXo</b> <i>Eucalyptus marginata/Allocasuarina fraseriana/Xylomelum occidentale</i> Low Open Woodland over <i>Kunzea glabrescens</i> Tall Shrubland over <i>Conostylis aculeata/Desmocladius flexuosus</i> Low Open Shrubland</p>	<p>Similar to the EmAf unit but contained Woody Pear (<i>Xylomelum occidentale</i>) as a common small tree 3-4m high. <i>Kunzea glabrescens</i> was regenerating to 2m after a recent fire. <i>Banksia</i> trees were absent. The understorey was very similar to the EmAf unit with a very sparse cover of <i>Conostylis aculeata</i> and <i>Desmocladius flexuosus</i>. Other native species included <i>Macrozamia riedlei</i>, <i>Opercularia echinocephala</i> and <i>Corynotheca micrantha</i>.</p> <p>The soils are grey sand.</p> <p>Quadrat PR3 is representative of this vegetation type.</p>	

Vegetation Type	Description	Photograph
<p><b>AfEmBiKg</b> <i>Allocasuarina fraseriana/Eucalyptus marginata/Banksia ilicifolia</i> Low Open Woodland over <i>Kunzea glabrescens</i> Tall Open Scrub over <i>Conostylis aculeata</i> Low Open Shrubland</p>	<p>This vegetation type occurred on the narrow ridge of the eastern section of the survey area. <i>Allocasuarina fraseriana</i>, <i>Eucalyptus marginata</i> and <i>Banksia ilicifolia</i> are scattered trees 4-6m high over a fairly dense layer of <i>Kunzea glabrescens</i> and some <i>Jacksonia furcellata</i> 1-3m and up to 25% cover. Common shrub species include <i>Conostylis aculeata</i>, <i>Scholtzia involucrata</i>, <i>Dasyopogon bromeliifolius</i> and <i>Calytrix flavescens</i>.</p> <p>The soils are grey sand.</p> <p>Quadrat PR8 is representative of this vegetation type.</p>	
<p><b>BaBmBiKg</b> <i>Banksia attenuata/B. menziesii/B. ilicifolia/Kunzea glabrescens</i> Tall Open Scrub over <i>Conostylis aculeata/Desmocladius flexuosus</i> Low Open Shrubland</p>	<p>A small stand of this vegetation type occurs on slightly sloping ground in the eastern survey area. The vegetation is recovering from a recent fire. Pre-fire the trees (<i>Banksia attenuata</i>, <i>B. menziesii</i>, <i>B. ilicifolia</i>) would have been up to 6m high. <i>Kunzea glabrescens</i> and <i>Jacksonia furcellata</i> form a dense shrub layer up to 2m high. The understorey is very open with common native species <i>Conostylis aculeata</i>, <i>Desmocladius flexuosus</i> and common weed species <i>Briza maxima</i> and <i>Vulpia myuros</i>.</p> <p>The soils are greyish-brown sand.</p> <p>Quadrat PR4 is representative of this vegetation type.</p>	



Vegetation Type	Description	Photograph
<p><b>Kg1</b> <i>Kunzea glabrescens</i> Tall Open Scrub over <i>Conostylis aculeata</i>/<i>Corynotheca micrantha</i> Low Open Shrubland</p>	<p>This is the most common vegetation type on both the western and eastern sections of the survey area, occurring on the middle and lower parts of the low sand ridges. <i>Kunzea glabrescens</i> (Spearwood) is typically 1-2m high but can be up to 4m high in areas that have not been burnt over a longer timeframe. <i>Jacksonia furcellata</i> is often a very tall shrub in this unit. Common understorey species include <i>Conostylis aculeata</i>, <i>Corynotheca micrantha</i>, <i>Acacia pulchella</i>, <i>Xanthorrhoea preissii</i> and <i>Acacia huegelii</i>. Common weed species include <i>Briza maxima</i>, <i>Ursinia anthemoides</i>, <i>Ehrharta longiflora</i> and <i>Vulpia myuros</i>.</p> <p>The soils are grey-black sand.</p> <p>Quadrat2 PR2, 5 and 9 are representative of this vegetation type.</p>	
<p><b>Kg2</b> <i>Kunzea glabrescens</i> Tall Shrubland over pasture</p>	<p>This vegetation type has regrown on the Multiple Use wetland flats within the survey area. The Spearwood shrubs are up to 3m high and can be dense, up to 40% but no native understorey species were present.</p> <p>The soils are black sand under a white sand veneer.</p> <p>Quadrat PR6 is representative of this vegetation type.</p>	

Vegetation Type	Description	Photograph
<p><b>Er</b> <i>Eucalyptus rudis</i> Low Open Woodland over  <i>Kunzea glabrescens</i> Tall Open Scrub</p>	<p>A very small patch of <i>Eucalyptus rudis</i> (Flooded Gum) Low Open Woodland occurred in the eastern section of the survey area on the lower slopes of the ridge, in close proximity to the RE wetland in the north-east corner of the site. The <i>E. rudis</i> trees were 10-12m high and less than 30% cover over a sparse cover of <i>Kunzea glabrescens</i> and <i>Jacksonia furcellata</i> to 4m high. The understorey was predominantly weed species with very few native plants.</p> <p>The soils are grey sand.</p> <p>Quadrat PR7 is representative of this vegetation type.</p>	
<p><b>Mp</b> <i>Melaleuca preissiana</i> Low Woodland over            pasture</p>	<p>A very small patch of <i>Melaleuca preissiana</i> (Paperbark) trees occurred in the western part of the eastern survey area on lower slopes of the ridge. The <i>M. preissiana</i> trees were up to 5m high. The understorey was all pasture weed species.</p> <p>The soils are grey sand.</p>	

### 3.3.4 Vegetation Condition

The condition of the vegetation was assessed according to the system devised by Keighery and described in Bush Forever (Government of Western Australia, 2000) (Table 6).

**Table 6: Vegetation Condition Rating Scale.**

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Source: Government of Western Australia, 2000.

The condition of the vegetation ranged from Good to Completely Degraded (Figure 4). No areas of Very Good or Excellent vegetation were recorded. The absence of native vegetation in Very Good to Excellent condition is likely due to the prevalence of livestock and potentially kangaroos grazing significantly on the understorey, reducing it to a sparse cover. Fires may have also altered the understorey and tree canopy structure as evidence by many dead trees, particularly in the eastern part of the survey area.

The areas of Good condition vegetation were located in most of the western survey area and about half of the eastern survey area.

### 3.4 Flora

The site contains vegetation mostly in Good condition with a range of vegetation types that are mostly on upland sandy soils with a small area on a section of Multiple Use wetland. A total of 120 flora species were recorded during the three survey dates. The total included 95 native and 25 introduced species (Appendix 7).

The plant Families most represented on the site were the Fabaceae (Wattle and Pea Family – 18 species including 13 native and 5 introduced), Asteraceae (Daisy Family – 13 species, 8 native, 5 introduced), Myrtaceae (Myrtle Family - 9 species, all native), Poaceae (Grass Family – 9 species, one native, 8 introduced) and Proteaceae (Banksia Family – 8 species, all native).

The July targeted survey for the Glossy-leaved Hammer Orchid (*Drakaea elastica*) was undertaken along transects spaced approximately 10m apart through the site. No distinctive leaves of the orchid were observed.

One Priority 3 species, *Jacksonia gracillima*, was recorded on the site in the detailed spring survey. A total of 11 plants were recorded in two locations close to each other in open *Kunzea glabrescens* Tall Open Scrub at the western end of the site close to Paterson Road (Figure 3).

*Jacksonia gracillima* is a low shrub (Plate 4) up to 0.5m high and 1m wide that occurs on sandy soils on the Swan Coastal Plain from north of Perth to Dunsborough.

**Plate 4: *Jacksonia gracillima* on the site**



### **3.5 Conservation Significance of Flora and Vegetation**

#### **3.5.1 Vegetation**

##### *Vegetation Complex*

The vegetation on the site is part of the Bassendean - Central and South Vegetation Complex. There is approximately 10,919ha (24%) of the pre-European extent of the Bassendean Complex-Central and South remaining on the Swan Coastal Plain portion of the Perth Metropolitan Region (WALGA, 2013). The percentage protection is above the 10% minimum criteria for vegetation complexes in the Perth Metropolitan Region Constrained Area.

##### *Floristic Community Type*

Most of the Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) on the southern Swan Coastal Plain are based on the Floristic Community Type level of vegetation description (Gibson *et al.*, 1994).

The vegetation on the site was assessed as closely matching FCT 21a.

FCT21a is not a TEC or PEC at State or Commonwealth level. However, both FCT 21a and 21c are sub-units of the Banksia Woodlands of the Swan Coastal Plain ecological community which is listed as a Threatened Ecological Community under the Commonwealth EPBC Act and a Priority Ecological Community at State level.

An assessment of the potential for any vegetation types on the site meeting the requirements of the Banksia Woodland TEC is contained below in Section 3.6.

#### *Banksia Woodland TEC*

The Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (Banksia Woodland TEC) is listed as an Endangered TEC under the EPBC Act. The *Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community* (Conservation Advice) describes the Banksia Woodland TEC as follows:

*The ecological community is a woodland associated with the Swan Coastal Plain of southwest Western Australia. A key diagnostic feature is a prominent tree layer of Banksia, with scattered eucalypts and other tree species often present among or emerging above the Banksia canopy. The understorey is a species rich mix of sclerophyllous shrubs, graminoids and forbs. The ecological community is characterised by a high endemism and considerable localised variation in species composition across its range.*

Table 7 assesses the vegetation types on the site against the Banksia Woodland TEC criteria contained in the Conservation Advice.

In conclusion, none of the vegetation types was assessed as meeting the requirements of the Banksia Woodland TEC.

**Table 7: Assessment of the Banksia Woodland of the Swan Coastal Plain TEC.**

Feature	Characteristic	Vegetation Type		
		BaBmBiKg	EmAf, EmAfXo, AfEmBiKg	Kg1, Kg2, Er,Mp
Banksia Species	<p>The patch must include at least one of the following diagnostic species:</p> <ul style="list-style-type: none"> <li>• <i>Banksia attenuata</i> (Candlestick Banksia)</li> <li>• <i>Banksia menziesii</i> (Firewood Banksia)</li> <li>• <i>Banksia prionotes</i> (Acorn Banksia)</li> <li>• <i>Banksia ilicifolia</i> (Holly-Leaved Banksia).</li> </ul>	Contains <i>Banksia attenuata</i> , <i>B. menziesii</i> , <i>B. ilicifolia</i>	Contains <i>Banksia attenuata</i> , <i>B. menziesii</i> , <i>B. ilicifolia</i>	Does not contain any of the required Banksia species
Vegetation Structure	<ul style="list-style-type: none"> <li>• A distinctive upper sclerophyllous layer of low trees (occasionally large shrubs more than 2 m tall), typically dominated or codominated<sup>3</sup> by one or more of the <i>Banksia</i> species (<i>B. attenuata</i>, <i>B. menziesii</i>, <i>B. ilicifolia</i>, <i>B. prionotes</i>);</li> <li>• An emergent tree layer of medium or tall (&gt;10 m) height <i>Eucalyptus</i> or <i>Allocasuarina</i> species may sometimes be present above the <i>Banksia</i> canopy.</li> <li>• An understory that is often highly species-rich consists of: <ul style="list-style-type: none"> <li>– A layer of sclerophyllous shrubs of various heights; and,</li> <li>– A herbaceous ground layer of cord rushes, sedges and perennial and ephemeral forbs, that sometimes includes grasses. The development of a ground layer may vary depending on the density of the shrub layer and disturbance history.</li> </ul> </li> </ul>	Vegetation regenerating from recent fire but likely to regenerate to a Low Woodland structure with Banksia trees as the dominant layer.	Banksia trees are very sparse to absent from large parts of these vegetation types.	Vegetation structure does not contain an upper layer of Banksia trees.

Feature	Characteristic	Vegetation Type		
		BaBmBiKg	EmAf, EmAfXo, AfEmBiKg	Kg1, Kg2, Er,Mp
Vegetation Condition	An area of Banksia woodland needs to be at least in Good condition to be considered the TEC.	Good condition	Good condition	All areas in Good condition apart from Mp which is Degraded
Patch Size	The Banksia woodland TEC needs to meet a minimum 'patch' size depending on its condition to qualify as the TEC, as follows: <ul style="list-style-type: none"> <li>• 'Pristine' – no minimum patch size</li> <li>• 'Excellent' – 0.5ha</li> <li>• 'Very Good' – 1ha</li> <li>• 'Good' – 2ha</li> </ul>	Approximately 1.3ha	EmAf - More than 2ha EmAfXo – More than 2ha AfEmBiKg - More than 2ha	N/A
<b>Conclusion</b>		Does not meet the requirements for the TEC as the patch size is below the requirement for vegetation in Good condition.	Does not meet the requirements for the TEC as Banksia trees are not a dominant tree canopy.	Does not meet the requirements for the TEC as Banksia trees are absent.

### 3.5.2 Flora

A total of 41 conservation significant species were identified as having been recorded within 10km of the site. One Priority species, *Jacksonia gracillima*, was recorded at the western end of the site on a low sand ridge containing *Kunzea glabrescens* vegetation. The other potential species are considered to not occur on the site given none were found during the three surveys.



## 4 FAUNA

### 4.1 Methodology

The Level 1 Fauna Survey was undertaken in accordance with EPA Technical Guidance *Fauna Surveys for Environmental Impact Assessment* (EPA, 2016b). Desktop studies were undertaken to identify habitats and potential threatened species that may occur on the site. An assessment of the fauna habitats on the site was conducted by PGV Environmental on 12 February 2019.

### 4.2 Desktop Studies

Desktop studies were undertaken to identify conservation significant species potentially present on the site. A search of the DBCA Database (Appendix 8), Naturemap database (Appendix 2) and the EPBC Act Protected Matters Search Tool (Appendix 3) identified threatened species of fauna listed as potentially occurring within a 5km radius of the site (Table 8).

**Table 8: List of Fauna Species Identified from Fauna Database Searches**

Scientific Name	Common Name	Conservation Status, WA	Status under EPBC Act
<i>Calidris ferruginea</i>	Curlew Sandpiper	Schedule 1 - CR	Critically Endangered
<i>Diomedea dabbenena</i> ( <i>Diomedea exulans dabbenena</i> )	Tristan Albatross	Schedule 1 - CR	Endangered
<i>Limosa lapponica menzbieri</i>	Bar-tailed Godwit (northern Siberian)	Schedule 1 - CR	Marine/ Migratory
<i>Numenius madagascariensis</i>	Eastern Curlew	Schedule 1 - CR	Critically Endangered
<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum, Ngwayir	Schedule 1 - CR	Critically Endangered
<i>Diomedea amsterdamensis</i> ( <i>Diomedea exulans amsterdamensis</i> )	Amsterdam Albatross	Schedule 1 - CR Schedule 5 - IA	Endangered
<i>Anous tenuirostris melanops</i>	Australian Lesser Noddy	Schedule 2 - EN	Vulnerable/ Marine
<i>Botaurus poiciloptilus</i>	Australasian bittern	Schedule 2 - EN	Endangered
<i>Calidris canutus</i>	Red Knot	Schedule 2 - EN	Marine/ Migratory
<i>Calyptorhynchus baudinii</i>	Baudin's Black Cockatoo	Schedule 2 - EN	Endangered
<i>Calyptorhynchus latirostris</i>	Carnaby's Black Cockatoo	Schedule 2 - EN	Endangered
<i>Myrmecobius fasciatus</i>	Numbat, Walpurti	Schedule 2 - EN	Endangered
<i>Rostratula australis</i> ( <i>Rostratula benghalensis australis</i> )	Australian Painted Snipe	Schedule 2 - EN	Endangered Marine/ Migratory

Scientific Name	Common Name	Conservation Status, WA	Status under EPBC Act
<i>Thalassarche melanophris</i>	Black-browed Albatross	Schedule 2 - EN Schedule 5 - IA	Vulnerable/ Migratory/ Marine
<i>Calyptrorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo	Schedule 3 - VU	Vulnerable
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	Schedule 3 - VU	Vulnerable
<i>Leipoa ocellata</i>	Mallee Fowl	Schedule 3 - VU	Vulnerable
<i>Limosa lapponica baueri</i>	Bar-tailed Godwit (western Alaskan)	Schedule 3 - VU	Marine/ Migratory
<i>Neophoca cinerea</i>	Australian Sea-lion	Schedule 3 - VU	
<i>Setonix brachyurus</i>	Quokka	Schedule 3 - VU	Vulnerable
<i>Westralunio carteri</i>	Carter's Freshwater Mussel	Schedule 3 - VU	Vulnerable
<i>Diomedea epomophora</i>	Southern Royal Albatross	Schedule 3 - VU Schedule 5 - IA	Vulnerable
<i>Diomedea exulans</i>	Wandering Albatross	Schedule 3 - VU Schedule 5 - IA	Vulnerable
<i>Thalassarche cauta cauta</i> ( <i>Thalassarche cauta sensu stricto</i> )	Shy Albatross	Schedule 3 - VU Schedule 5 - IA	Marine/Migratory
<i>Thalassarche cauta steadi</i>	White-capped Albatross	Schedule 3 - VU Schedule 5 - IA	Vulnerable/ Migratory/ Marine
<i>Thalassarche impavida</i> ( <i>Thalassarche melanophris impavida</i> )	Campbell Albatross	Schedule 3 - VU Schedule 5 - IA	Vulnerable/ Migratory/ Marine
<i>Actitis hypoleucos</i> ( <i>Tringa hypoleucos</i> )	Common Sandpiper	Schedule 5 - IA	Marine/ Migratory
<i>Anous stolidus</i>	Common Noddy	Schedule 5 - IA	
<i>Apus pacificus</i>	Fork-tailed Swift	Schedule 5 - IA	Marine/Migratory
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Schedule 5 - IA	Marine/ Migratory
<i>Calidris melanotos</i>	Pectoral Sandpiper	Schedule 5 - IA	Marine/ Migratory
<i>Calidris ruficollis</i>	Red-necked Stint	Schedule 5 - IA	Marine/ Migratory
<i>Calidris subminuta</i>	Long-toed Stint	Schedule 5 - IA	Marine/ Migratory
<i>Chlidonias leucopterus</i> ( <i>Sterna leucoptera</i> )	White-winged Black tern, White-winged Tern	Schedule 5 - IA	Marine/ Migratory
<i>Diomedea sanfordi</i>	Northern Royal Albatross	Schedule 5 - IA	Endangered/ Migratory/ Marine
<i>Hydroprogne caspia</i> ( <i>Sterna caspia</i> )	Caspian Tern	Schedule 5 - IA	Marine/ Migratory
<i>Limosa lapponica</i>	Bar-tailed Godwit	Schedule 5 - IA	Marine/ Migratory
<i>Limosa limosa</i>	Black-tailed Godwit	Schedule 5 - IA	Migratory/ Marine
<i>Macronectes giganteus</i>	Southern Giant Petrel	Schedule 5 - IA	Endangered/ Migratory/ Marine
<i>Macronectes halli</i>	Northern Giant-Petrel	Schedule 5 - IA	Vulnerable/ Migratory/ Marine
<i>Motacilla cinerea</i>	Grey Wagtail	Schedule 5 - IA	Migratory/ Marine

Scientific Name	Common Name	Conservation Status, WA	Status under EPBC Act
<i>Pandion cristatus</i> ( <i>Pandion haliaetus</i> )	Osprey	Schedule 5 - IA	Marine/ Migratory
<i>Philomachus pugnax</i>	Ruff	Schedule 5 - IA	Marine/ Migratory
<i>Plegadis falcinellus</i>	Glossy Ibis	Schedule 5 - IA	Marine/Migratory
<i>Thalasseus bergii</i> ( <i>Sterna bergii</i> )	Crested Tern	Schedule 5 - IA	Marine/ Migratory
<i>Tringa glareola</i>	Wood Sandpiper	Schedule 5 - IA	Marine/ Migratory
<i>Tringa nebularia</i>	Common Greenshank	Schedule 5 - IA	Marine/ Migratory
<i>Tringa stagnatilis</i>	Marsh Sandpiper, Little Greenshank	Schedule 5 - IA	Marine/ Migratory
<i>Ardea alba</i> ( <i>Ardea modesta</i> )	Great Egret, White Egret		Marine
<i>Ardea ibis</i>	Cattle Egret		Marine
<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle		Marine
<i>Merops ornatus</i>	Rainbow Bee-eater		Marine
<i>Pachyptila turtur</i> subsp. <i>subantarctica</i>	Fairy Prion (southern)		Vulnerable
<i>Isoodon fusciventer</i>	Southern Brown Bandicoot, Quenda	Priority 4	
<i>Oxyura australis</i>	Blue-billed Duck	Priority 4	
<i>Thinornis rubricollis</i> ( <i>Charadrius rubricollis</i> )	Hooded Plover	Priority 4	Marine

Fauna are classified under five different Priority codes and rare and endangered fauna are classified under the *Wildlife Conservation (Specially Protected Fauna) Notice 2014* into five schedules of taxa. These are outlined in Appendix 4.

### 4.3 Fauna Habitat

Three fauna habitats were described on the site as follows:

- Low Open Woodland Habitat (Plate 5);
- Shrubland Habitat (Plate 6); and
- Grassland Habitat (Plate 7).

The Open Woodland Habitat corresponds to most of the areas of native vegetation dominated by Eucalypts, Sheoaks and Banksias as mapped in Figure 3. The shrubland habitat is dominated by Spearwood with a mostly weedy understorey and the Grassland habitat is cleared pastureland.

**Plate 5: Open Woodland Habitat**



**Plate 6: Shrubland Habitat**



**Plate 7: Grassland Habitat**



Fauna habitat can be assessed using a number of factors including, the size of the habitat, the level of habitat connectivity, availability of specific resources (e.g. tree hollows) and overall vegetation quality. The habitat was assessed according to the following categories:

**High Quality Fauna Habitat** – These areas closely approximate the vegetation mix and quality that would have been in the area prior to any disturbance. The habitat has connectivity with other habitats and is likely to contain the most natural vertebrate fauna assemblage.

**Very Good Fauna Habitat** - These areas show minimal signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) and generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be minimally affected by disturbance.

**Good Fauna Habitat** – These areas showed signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) but generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be affected by disturbance.

**Disturbed Fauna Habitat** – These areas showed signs of significant disturbance. Many of the trees, shrubs and undergrowth are cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, contain weeds or have been damaged by vehicle or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas are likely to differ significantly from what might be expected in the area had the disturbance not occurred.

**Highly Degraded Fauna Habitat** – These areas often have a significant loss of vegetation, an abundance of weeds, and a large number of vehicle tracks or are completely cleared. Limited or no fauna habitat connectivity. Faunal assemblages in these areas are likely to be significantly different to what might have been in the area pre-disturbance. (Coffey Environments, 2009).

The Open Woodland Habitat has vegetation in Degraded to Good condition with the structure of the vegetation impacted by grazing and fire. The vegetation has some limited linkage to other areas of bushland therefore the habitat is considered to be Disturbed Fauna Habitat. The Shrubland Habitat is Good to Degraded and the Grassland Habitat does not retain any native vegetation. both fauna habitats are considered to be Highly Degraded Fauna Habitat.

#### 4.4 Conservation Significant Species

Outlined below in Table 9 is a short description of the preferred habitat for each of the species that were identified in the DBCA Database Search (Appendix 8), NatureMap Species Report (Appendix 2) and the EPBC Protected Matters Search Tool (Appendix 3) in Table 7. The preferred habitat has been compared to the habitats on the site described above and the likelihood of each species to be present was determined.

**Table 9: Preferred Habitat of Conservation Significant Fauna Species**

Scientific Name	Common Name	Habitat*	Likelihood of occurring on the site
<i>Calidris ferruginea</i>	Curlew Sandpiper	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms.	No – not coastal habitat
<i>Diomedea dabbenena</i> ( <i>Diomedea exulans dabbenena</i> )	Tristan Albatross	The Tristan Albatross is a marine, pelagic seabird and forages in open water.	No – this species is marine and pelagic
<i>Limosa lapponica menzbieri</i>	Bar-tailed Godwit (northern Siberian)	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh.	No – not coastal habitat
<i>Numenius madagascariensis</i>	Eastern Curlew	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets.	No – not coastal habitat
<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum, Ngwayir	The Western Ringtail Possum is a medium sized nocturnal marsupial. This species occurs in and near coastal Peppermint Tree ( <i>Agonis flexuosa</i> ) forest and Tuart ( <i>Eucalyptus gomphocephala</i> ) dominated forest with a Peppermint Tree understorey.	No – no suitable habitat on the site

Scientific Name	Common Name	Habitat*	Likelihood of occurring on the site
<i>Diomedea amsterdamensis</i> ( <i>Diomedea exulans amsterdamensis</i> )	Amsterdam Albatross	The Amsterdam Albatross is a marine, pelagic seabird. It nests in open patchy vegetation on Amsterdam Island.	No – this species is marine and pelagic
<i>Anous tenuirostris melanops</i>	Australian Lesser Noddy	The Australian Lesser Noddy usually occupies coral-limestone islands that are densely fringed with White Mangrove ( <i>Avicennia marina</i> ).	No – not island habitat
<i>Botaurus poiciloptilus</i>	Australasian bittern	The Australasian Bittern occurs mainly in densely vegetated freshwater wetlands and, rarely, in estuaries or tidal wetlands.	No – not wetland habitat
<i>Calidris canutus</i>	Red Knot	In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs.	No – not coastal habitat
<i>Calyptorhynchus baudinii</i>	Baudin's Black Cockatoo	Baudin's Black-Cockatoo mainly occurs in eucalypt forests, especially Jarrah ( <i>Eucalyptus marginata</i> ), Marri ( <i>Corymbia calophylla</i> ), also Karri ( <i>E. diversicolor</i> ) forest, often feeding in the understorey on proteaceous trees and shrubs, especially banksias (SEWPaC, 2012).	Potentially occurs intermittently on the site
<i>Calyptorhynchus latirostris</i>	Carnaby's Black Cockatoo	Carnaby's Cockatoo is found in the south-west of Australia from Kalbarri through to Ravensthorpe. It has a preference for feeding on the seeds of <i>Banksia</i> , <i>Hakea</i> , <i>Eucalyptus</i> , <i>Grevillea</i> , <i>Pinus</i> and <i>Allocasuarina</i> spp. It is nomadic often moving toward the coast after breeding. It breeds in tree hollows that are 2.5 - 12m above the ground and have an entrance 23-30cm with a depth of 1-2.5m. Nesting mostly occurs in smooth-barked trees (e.g. Salmon Gum, Wandoo, Red Morrell) (SEWPaC, 2012)	Potentially occurs intermittently on the site
<i>Myrmecobius fasciatus</i>	Numbat, Walpurti	Numbats occur in eucalypt forests and woodlands dominated by <i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> and <i>Eucalyptus wandoo</i> .	Highly Unlikely – the site doesn't contain the preferred habitat and the species hasn't been recorded since 1974

Scientific Name	Common Name	Habitat*	Likelihood of occurring on the site
<i>Rostratula australis</i> ( <i>Rostratula benghalensis australis</i> )	Australian Painted Snipe	The Australian Painted Snipe has been recorded at wetlands in all states of Australia but is most common in eastern Australia. It generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. It also uses inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include a cover of vegetation, including grasses.	No – not wetland habitat
<i>Thalassarche melanophris</i>	Black-browed Albatross	The Black-browed Albatross is a marine species that inhabits terraces of coastal cliffs, slopes of nearby hills, summits of rocky islets or on flat or gently-sloping ground.	No – not coastal habitat
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo	Forest Red-tailed Black Cockatoos frequent the humid to sub-humid south-west of Western Australia from Gingin in the north, to Albany in the south and west to Cape Leeuwin and Bunbury (SEWPac, 2012). It nests in tree hollows with a depth of 1-5m, that are predominately Marri ( <i>Corymbia calophylla</i> ), Jarrah ( <i>Eucalyptus marginata</i> ) and Karri ( <i>E. diversicolor</i> ) and it feeds primarily on the seeds of Marri.	Possible intermittent visitor to the site
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	The Chuditch have been known to occupy a wide range of habitats including woodlands, dry sclerophyll forests, riparian vegetation, beaches and deserts. They are opportunistic feeders, and forage on the ground at night, feeding on invertebrates, small mammals, birds and reptiles.	Highly unlikely due to site disturbance
<i>Leipoa ocellata</i>	Mallee Fowl	Mallee fowl have been found in mallee regions of southern Australia from approximately the 26th parallel of latitude southwards in mallee bushland.	No – no mallee habitat
<i>Limosa lapponica baueri</i>	Bar-tailed Godwit (western Alaskan)	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh.	No – not coastal habitat
<i>Neophoca cinerea</i>	Australian Sea-lion	Marine/Shore	No – not coastal habitat



Scientific Name	Common Name	Habitat*	Likelihood of occurring on the site
<i>Setonix brachyurus</i>	Quokka	Quokkas were originally very common on the Swan Coastal Plain, however, their distribution is now limited to Rottnest Island and a few isolated areas in the south-west of WA. On the mainland, they prefer densely vegetated areas around wetlands and streams, whereas on Rottnest Island they inhabit low scrubby coastal vegetation where water is not readily available year-round.	Highly Unlikely – thought to be locally extinct
<i>Westralunio carteri</i>	Carter's Freshwater Mussel	Carter's Freshwater Mussel is South-West Western Australia's only freshwater mussel (Murdoch University & SERCUL, 2012). Carter's Freshwater Mussel occurs in freshwater streams, rivers, reservoirs and lakes (ICUN, 2015b) and is intolerant to dehydration for more than three days and salinity (Murdoch University & SERCUL, 2012).	No – no permanent water on the site
<i>Diomedea epomophora</i>	Southern Royal Albatross	The Southern Royal Albatross is marine and pelagic and does not nest on the mainland.	No – this species is marine and pelagic
<i>Diomedea exulans</i>	Wandering Albatross	The Wandering Albatross is marine, pelagic and aerial. In the Australasian region, it occurs inshore, offshore and in pelagic waters. It flies within 15 m of the sea surface, using the updraft from wave fronts for lift. It circles over breeding islands to heights of at least 1500 m. On breeding islands, it nests on coastal or inland ridges, slopes, plateaux and plains, often on marshy ground. Nests are sited on moss terraces, in dense tussocks, and often in loose aggregations on the west (windward) side of islands. It prefers open or patchy vegetation (tussocks, ferns or shrubs), and it requires nesting areas that are near exposed ridges or hillocks so that it can take off.	No – this species is marine and pelagic

Scientific Name	Common Name	Habitat*	Likelihood of occurring on the site
<i>Thalassarche cauta cauta</i> ( <i>Thalassarche cauta sensu stricto</i> )	Shy Albatross	The Shy Albatross is a marine species occurring in subantarctic and subtropical waters, reaching the tropics in the cool Humboldt Current off South America. In the southern Indian Ocean the species has been observed over waters of 6.4-13.5°C. It has been noted in shelf-waters around breeding islands and over adjacent rises. During the non-breeding season, it occurs over continental shelves around continents. The species occurs both inshore and offshore and enters harbours and bays. The birds are scarce in pelagic waters. The species flies low to moderately high, using updraft from wave fronts for lift. It nests on level or gently sloping ledges, summits, slopes and caves of rocky islets and stacks, usually in broken terrain with little soil and vegetation.	No – this species is marine and pelagic
<i>Thalassarche cauta steadi</i>	White-capped Albatross	The White-capped Albatross is a marine species and occurs in subantarctic and subtropical waters. It reaches tropical areas associated with the cool Humboldt Current off South America. In the southern Indian Ocean it has been observed in waters of 6.4–13.5 °C. It has been noted in shelf-waters around breeding islands and over adjacent rises. During the non-breeding season, birds have been observed over continental shelves around continents. The species occurs both inshore and offshore and enters harbours and bays. The species is scarce in pelagic waters. Birds gather to scavenge at commercial fishing grounds. It nests on slopes vegetated with tussock and succulents on Auckland Island.	No – this species is marine and pelagic

Scientific Name	Common Name	Habitat*	Likelihood of occurring on the site
<i>Thalassarche impavida</i> ( <i>Thalassarche melanophris impavida</i> )	Campbell Albatross	The Campbell Albatross is a marine sea bird inhabiting sub-Antarctic and subtropical waters from pelagic to shelf-break water habitats. It tolerates sea surface-temperatures from 0–24 °C, but are mainly found in the sub-Antarctic. In December, the subspecies southern limit in the Ross Sea is at the 1.0 °C isotherm and in January at the 0.0 °C isotherm. In breeding and non-breeding seasons, they are specialised shelf feeders, concentrating around breeding islands or over adjacent submarine banks. In winter, they are commonly found in the coastal waters of continents, over up-wellings or boundaries of currents. It breeds on Campbell Island. They make their nests on tussock-covered ledges and terraces of cliffs, slopes and hills, overlooking the sea or valleys, and on the summits of rocky islets.	No – this species is marine and pelagic
<i>Actitis hypoleucos</i> ( <i>Tringa hypoleucos</i> )	Common Sandpiper	The Common Sandpiper is mostly found around muddy margins or rocky shores. Generally the species forages in shallow water and on bare soft mud at the edges of wetlands.	No – not wetland habitat
<i>Anous stolidus</i>	Common Noddy	The Common Noddy feeds on small fish, squid, pelagic molluscs, insects and even Pandanus fruit. Most items are skimmed from the surface of the ocean by dipping and breeds on islands (Birdlife Australia, 2014).	No – not coastal habitat
<i>Apus pacificus</i>	Fork-tailed Swift	The Fork-tailed Swift is almost exclusively aerial and is not known to breed in Australia. They are seen in inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. <i>Apus pacificus</i> subsp. <i>pacificus</i> is the only subspecies to migrate to Australia.	No – not coastal habitat – possibly could fly over the site but unlikely to land
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	The Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	No – not wetland habitat

Scientific Name	Common Name	Habitat*	Likelihood of occurring on the site
<i>Calidris melanotos</i>	Pectoral Sandpiper	The Pectoral Sandpiper prefers shallow fresh to saline wetlands and is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	No – not wetland habitat
<i>Calidris ruficollis</i>	Red-necked Stint	The Red-necked Stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores.	No – not coastal habitat
<i>Calidris subminuta</i>	Long-toed Stint	The Long-toed Stint prefers shallow freshwater or brackish wetlands including lakes, swamps, river floodplains, streams, lagoons and sewage ponds. The species is also fond of areas of muddy shoreline, growths of short grass, weeds, sedges, low or floating aquatic vegetation, reeds, rushes and occasionally stunted samphire.	No – not wetland habitat
<i>Chlidonias leucopterus (Sterna leucoptera)</i>	White-winged Black tern, White-winged Tern	In Australia, the species mostly inhabits fresh, brackish or saline, and coastal or subcoastal wetlands.	No – not wetland habitat
<i>Diomedea sanfordi</i>	Northern Royal Albatross	The Northern Royal Albatross is marine, pelagic and aerial and does not nest on the mainland	No – this species is marine and pelagic
<i>Hydroprogne caspia (Sterna caspia)</i>	Caspian Tern	The Caspian Tern is mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred.	No – not coastal habitat
<i>Limosa lapponica</i>	Bar-tailed Godwit	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays.	No – not coastal habitat
<i>Limosa limosa</i>	Black-tailed Godwit	The Black-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh.	No – not coastal habitat

Scientific Name	Common Name	Habitat*	Likelihood of occurring on the site
<i>Macronectes giganteus</i>	Southern Giant Petrel	The Southern Giant-Petrel is a marine bird that occurs in Antarctic to subtropical waters. In summer it mainly occurs over Antarctic waters.	No – this species is marine and pelagic
<i>Macronectes halli</i>	Northern Giant-Petrel	The Northern Giant-Petrel is marine and oceanic. It mainly occurs in sub-Antarctic waters, but regularly occurs in Antarctic waters of the southwestern Indian Ocean, the Drake Passage and west of the Antarctic Peninsula. The range of the Northern Giant-Petrel extends into subtropical waters mainly between winter and spring. It frequents both oceanic and inshore waters near breeding islands and in the non-breeding range. It is attracted to land at sewage outfalls, and scavenges at colonies of penguins and seals. It breeds on sub-Antarctic islands. Its breeding range extends into the Antarctic zone at South Georgia. It nests in coastal areas where vegetation or broken terrain offers shelter, on sea-facing slopes, headlands, in the lee of banks, under or against vegetation clumps, below cliffs or overhanging rocks, or in hollows. Tussock-grass ( <i>Poa</i> ) is widespread at many breeding sites. Its nests are built in secluded, coastal sites, sheltered by heavy vegetation.	No – this species is marine and pelagic
<i>Motacilla cinerea</i>	Grey Wagtail	The Grey Wagtail is mostly recorded in coastal areas in Western Australia (ALA, 2015) however is widespread. There is non-breeding habitat only in Australia and the species has a strong association with water, particularly rocky substrates along water courses but also lakes and marshes.	No – not coastal or wetland habitat
<i>Pandion cristatus</i> ( <i>Pandion haliaetus</i> )	Osprey	Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They feed on fish, especially mullet where available, and rarely take molluscs, crustaceans, insects, reptiles, birds and mammals.	No – not coastal or wetland habitat
<i>Philomachus pugnax</i>	Ruff	The Ruff is found on generally fresh, brackish of saline wetlands with exposed mudflats at the edges and is found in terrestrial wetlands including lakes, swamps, pools, lagoons, tidal rivers, swampy fields and floodlands.	No – not wetland habitat

Scientific Name	Common Name	Habitat*	Likelihood of occurring on the site
<i>Plegadis falcinellus</i>	Glossy Ibis	The Glossy Ibis is the smallest ibis known in Australia. This species preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation but do not breed in South-west Western Australia..	No – not wetland habitat
<i>Thalasseus bergii</i> ( <i>Sterna bergii</i> )	Crested Tern	The Crested Tern occurs in coastal areas (Birdlife Australia, 2018).	No – not coastal or wetland habitat
<i>Tringa glareola</i>	Wood Sandpiper	The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially Melaleuca and River Red Gums Eucalyptus camaldulensis and often with fallen timber.	No – not wetland habitat
<i>Tringa nebularia</i>	Common Greenshank	The Common Greenshank is a wader and does not breed in Australia. This species can be found in many types of wetlands and has the widest distribution of any shorebird in Australia. This species typically feeds on molluscs, crustaceans, insects, and occasionally fish and frogs.	No – not wetland habitat
<i>Tringa stagnatilis</i>	Marsh Sandpiper, Little Greenshank	The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks.	No – not coastal or wetland habitat
<i>Ardea alba</i> ( <i>Ardea modesta</i> )	Great Egret, White Egret	The Eastern Great Egret has been reported in a wide range of wetland habitats and usually frequents shallow waters. This species feeds on fish, insects, crustaceans, molluscs, frogs, lizards, snakes and small birds and mammals.	No – not wetland habitat

Scientific Name	Common Name	Habitat*	Likelihood of occurring on the site
<i>Ardea ibis</i>	Cattle Egret	The Cattle Egret occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands with breeding in Western Australia recorded in the far north in Wyndham in colonies in wooded swamps such as mangrove forest. This species forages away from water on low lying grasslands, improved pastures and croplands generally in areas that have livestock eating insects, frog, lizards and small mammals.	Highly Unlikely – not the preferred habitat of this species
<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle	The White-bellied Sea-Eagle is found in coastal habitats with large areas of open water, especially those close to the sea-shore. This species feeds opportunistically on a variety of fish, birds, reptiles, mammals and crustaceans, and on carrion and offal.	No – not coastal or wetland habitat
<i>Merops ornatus</i>	Rainbow Bee-eater	Populations of the Rainbow Bee-eater that breed in northern Australia are considered to be resident, and in many northern localities the Rainbow Bee-eater is present throughout the year. The Rainbow Bee-eater nests in a burrow dug in the ground. It is found across the better-watered parts of WA including islands preferring lightly wooded, sandy country near water.	Possible intermittent visitor to the site
<i>Pachyptila turtur subsp. subantarctica</i>	Fairy Prion (southern)	The southern subspecies of the Fairy Prion is a marine bird, found mostly in temperate and subantarctic seas. The species' oceanic distribution is poorly known. The Fairy Prion sometimes forages over continental shelves and the continental slope, but it can come close inshore in rough weather. It breeds on islands and rock stacks. It burrows in soil, or uses crevices and caves in cliffs or rock falls. The subspecies can also nest in scrub, herbland, tussock or pasture.	No – not coastal or wetland habitat
<i>Isoodon fusciventer</i>	Southern Brown Bandicoot, Quenda	Southern Brown Bandicoots are small grey marsupials that prefer dense scrub (up to one metre high). Their diet includes invertebrates (including earthworms, adult beetles and their larvae), underground fungi, subterranean plant material, and very occasionally, small vertebrates (DEC, 2012).	Possibly occur on the site

Scientific Name	Common Name	Habitat*	Likelihood of occurring on the site
<i>Oxyura australis</i>	Blue-billed Duck	The Blue-billed Duck is found on terrestrial wetlands in temperate regions, that are freshwater to saline, and may be natural or artificial. It nests in rushes, sedges, Lignum <i>Muehlenbeckia cunninghamii</i> and paperbark Melaleuca (Birdlife International, 2015). The species is almost completely aquatic, and is seldom seen on land. Non-breeding flocks, often with several hundred individuals, congregate on large, deep open freshwater dams and lakes in autumn. The daylight hours are spent alone in small concealed bays within vegetation or communally in large exposed rafts far from the shore (Birds in Backyards, 2015).	No – there is no open water on the site
<i>Thinornis rubricollis</i> ( <i>Charadrius rubricollis</i> )	Hooded Plover	The Hooded Plover primarily inhabits sandy, ocean beaches, with the highest densities on beaches with large amounts of beach-washed seaweed that are backed by extensive open dunes. In Western Australia the species also inhabits inland and coastal salt lakes (Birdlife International 2014)	No – not coastal or wetland habitat

\* Habitat descriptions from DoEE (2016) SPRAT Database unless otherwise denoted

A black Cockatoo Habitat assessment of the site was undertaken by PGV Environmental in 2019 (PGV Environmental, 2019). The assessment recorded around 10ha of foraging habitat for Baudin’s Black Cockatoos, Carnaby’s Black Cockatoos and Forest Red-tailed Black-Cockatoo in the Woodland vegetation types that contain Jarrah, Sheoak and Banksia trees (Valentine and Stock, 2008; Groom, 2011).

A total of 37 potential breeding habitat trees were recorded on the site in the Black Cockatoo Habitat Assessment, including 24 Jarrah, 2 Flooded Gums and 11 Standing Dead Trees. No evidence of current or past breeding was observed in any of the trees.

The level 1 fauna survey identified that the Southern Brown Bandicoot, Quenda (*Isodon fusciventer*) (Priority 4) could potentially occur on the site. Dense vegetation suitable for Bandicoots is also present on the vegetated flats portion of the site that is not proposed for sand extraction. The property to the north is vegetated and provides some connection for any fauna that could utilise the site as habitat.

The Cattle Egret (*Ardea ibis*) and Rainbow Bee-eater (*Merops ornatus*), listed Marine under the EPBC Act, may potentially utilise some sections of the site as part of a much larger home range though only likely to occur infrequently.

#### 4.5 Pest Fauna

The site shows signs of use by rabbits. Feral cats, foxes, rats and mice are also likely to be present.



#### **4.6 Biodiversity Value**

The EPA's (2002) *Terrestrial Biological Surveys as an Element of Biodiversity Protection Position Statement No. 3* indicated an ecological assessment of a site must consider its biodiversity value at the genetic, species and ecosystem levels; and its ecological functional value at the ecosystem level. The ecosystem on the site has been disturbed and the fauna assemblage would be greatly modified. There is likely to be a high percentage of introduced feral species such as foxes and rabbits and increased domestic predators such as cats.

## 5 SUMMARY AND CONCLUSIONS

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### 5.1 Flora and Vegetation

The Flora and Vegetation survey found the following:

- The 48ha survey area contains approximately 34.5ha of native vegetation;
- Eight vegetation types were recorded on the site on dry sandy soils with two small areas containing vegetation types considered fringing wetland vegetation. The vegetation on the highest parts of the site contained a mix of *Allocasuarina fraseriana*/*Eucalyptus marginata* Low Open Woodland with *Xylomelum occidentale* and occasional *Banksia menziesii* and *B. ilicifolia* also present as small trees. The lower and mid-slopes of the survey area were dominated by dense stands of Spearwood (*Kunzea glabrescens*) with *Jacksonia furcellata* also common. *Banksia attenuata*, *B. menziesii* and *B. ilicifolia* occurred on the mid-slopes among the dense Spearwood but never in abundance. The understorey in all vegetation types was very sparse with a low diversity of native species;
- The native vegetation is mostly in Good condition with some Degraded and Completely Degraded vegetation on areas that have regrown since previous clearing;
- A total of 41 Threatened (Declared Rare) or Priority Flora species were identified as having been recorded in proximity to the survey area. Of these, 2 Threatened (Declared Rare) species and 4 Priority species have the potential to occur on the dry sandy soil type vegetation;
- The Detailed survey in spring recorded 120 species on the site, including 95 native and 25 introduced flora;
- No Threatened flora species were recorded on the site;
- One Priority 3 flora species, *Jacksonia gracillima*, was recorded in low numbers at the western end of the site;
- The vegetation types were assessed as being representative of Floristic Community Type FCT21a 'Central *Banksia attenuata* - *Eucalyptus marginata* woodlands'. FCT 21a is not listed as Threatened or Priority Ecological Communities at State or Commonwealth level; and
- None of the vegetation types were assessed as being part of the Commonwealth listed Banksia Woodlands of the Swan Coastal Plain TEC due either to the absence or low density of the key Banksia species, or the size of a patch of Banksia woodland being too small for the condition of the patch.

### 5.2 Fauna

The Level 1 Fauna Survey found the following:

- There are three fauna habitats on the site:
  - Open Woodland Habitat;
  - Shrubland Habitat; and
  - Grassland Habitat.
- The Open Woodland Habitat is restricted to the areas of remnant native vegetation containing Sheoak, Jarrah and occasional Banksia and is considered to be Disturbed Fauna Habitat:

- The Shrubland and Cleared Grassland habitat are considered to be Highly Degraded Fauna Habitat due to the degree of disturbance and previous clearing having impacted on the fauna assemblage;
- The Open Woodland Habitat contains vegetation foraging habitat and potential breeding habitat suitable for the following listed species under State and Federal legislation:
  - Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) (Endangered);
  - Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) (Endangered); and
  - Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable);
- The site also contains habitat for the Southern Brown Bandicoot, Quenda (*Isoodon fusciventer*) (Priority 4);
- The Listed Marine species under the EPBC Act that may intermittently visit the site is the Cattle Egret (*Ardea ibis*) and the Rainbow Bee-eater (*Merops ornatus*); and
- Pest fauna likely to occur on the site are rabbits, feral cats, rats, mice and foxes.

### 5.3 Conclusion

The vegetation types recorded in the survey area are not considered to have significant conservation values at State or Commonwealth level. One Priority 3 plant species, *Jacksonia gracillima*, was recorded in low numbers and should be retained as far as possible in future sand mining of the site.

The fauna habitat on the site has been impacted by fire and grazing. The site contains habitat for conservation significant Black Cockatoos species including foraging and potential breeding habitat.

Clearing of the vegetation for sand extraction will require a clearing permit under State legislation. Referral under the Commonwealth EPBC Act may be required if the impact on Black Cockatoo habitat is considered likely to be significant.

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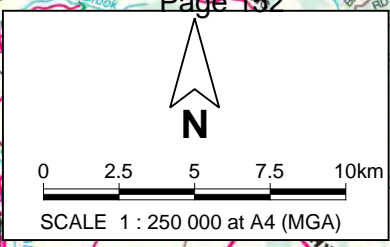
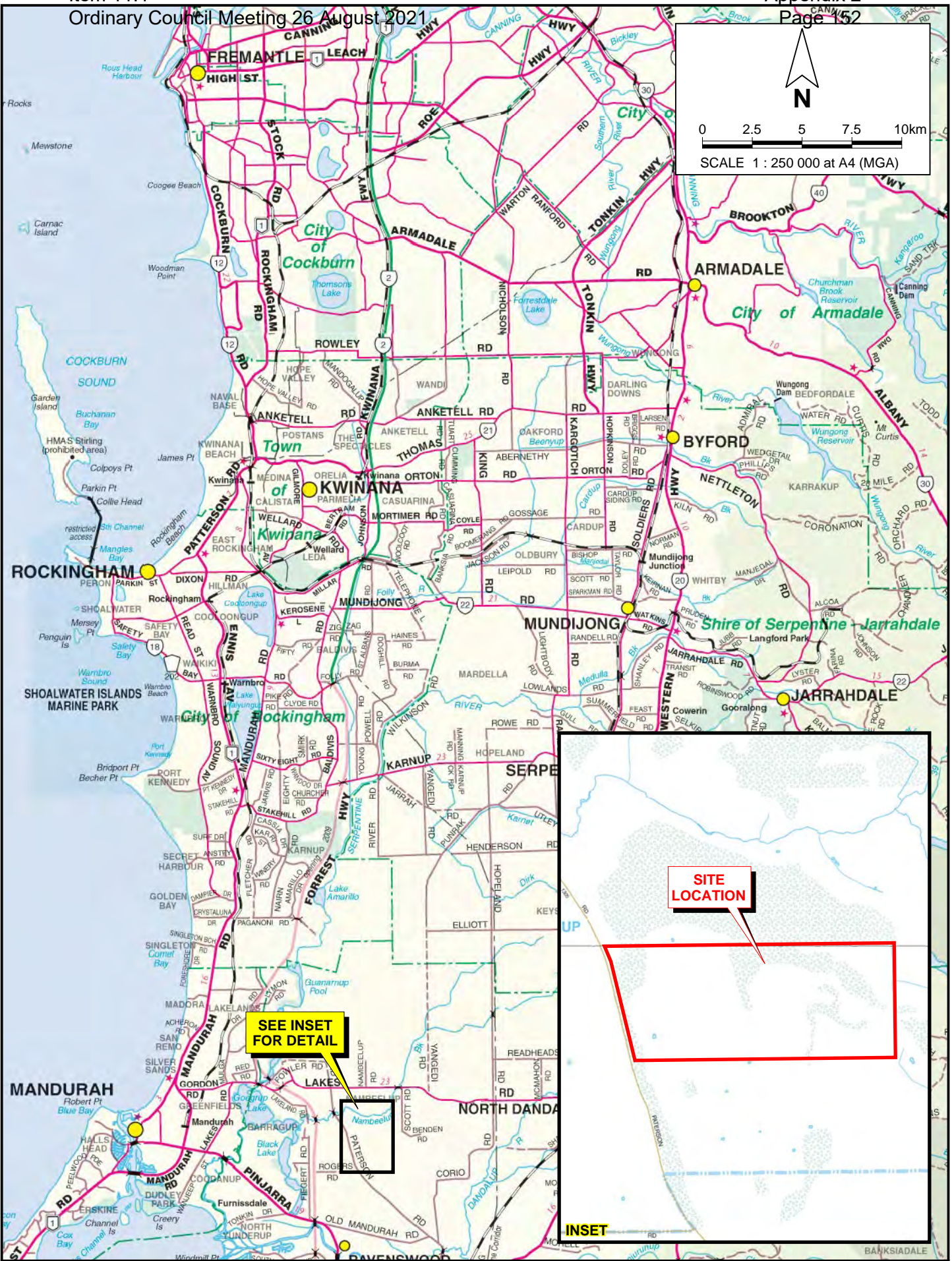
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# FIGURES



PINPOINT CARTOGRAPHICS (08) 9562 7136

Drawn: J. Cabot Job: 10348 Rpt: 2019-437	Date: 28 Mar 2019 Revision: A

King Road Trust  
 FLORA AND VEGETATION SURVEY & LEVEL 1 FAUNA ASSESSMENT  
 LOT 226 PATERSON ROAD, NAMBEELUP

**SITE LOCATION**

**Figure 1**

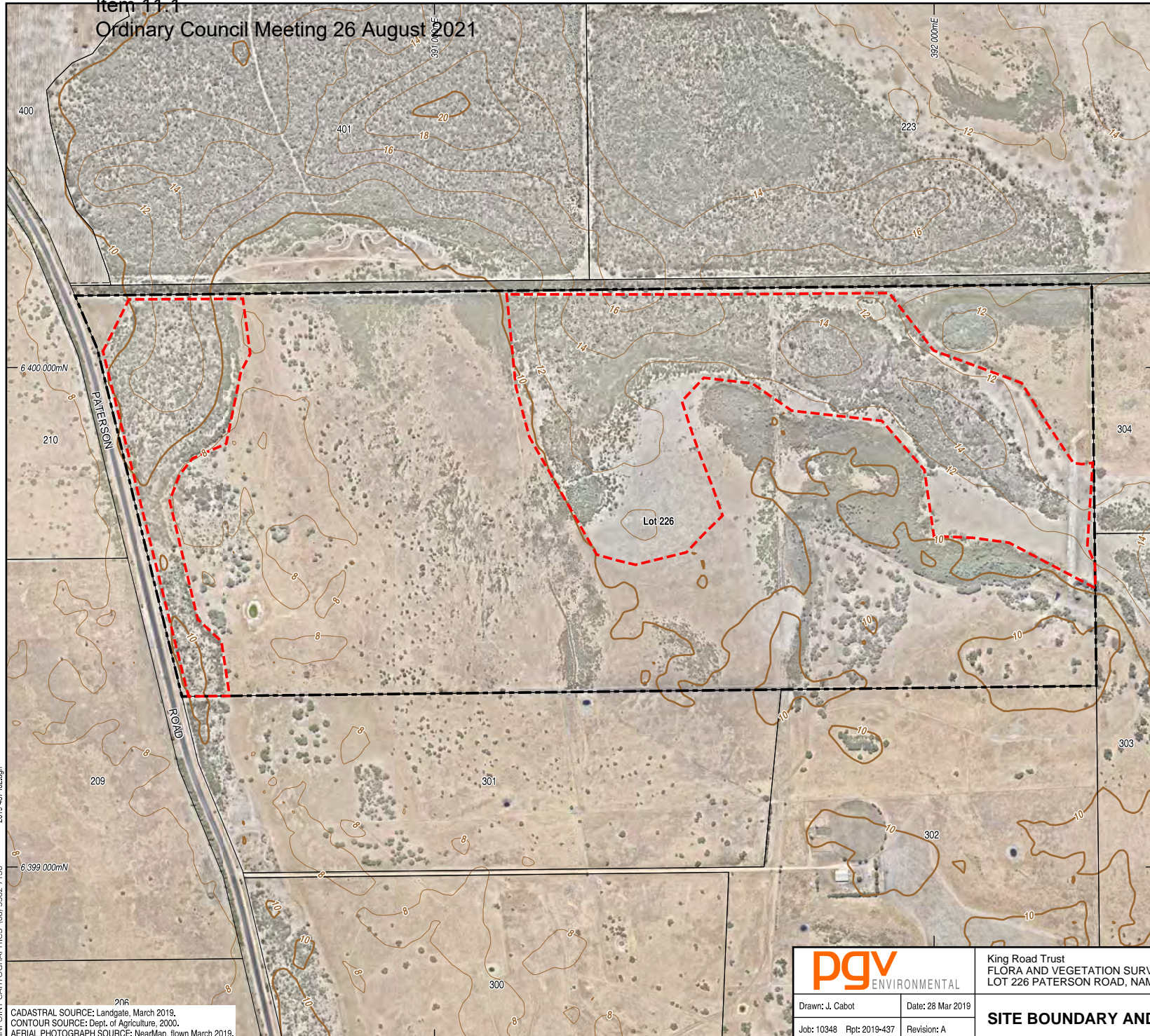




0 50 100 150 200 250m  
SCALE 1 : 7 500 at A3 (MGA)

**Legend**

- - - Site Boundary
- Lot 226 Boundary
- Cadastral Boundary
- Easement Boundary



2019-437-102.dgn  
2019-437-102.dgn  
2019-437-102.dgn

CADASTRAL SOURCE: Landgate, March 2019,  
CONTOUR SOURCE: Dept. of Agriculture, 2000.  
AERIAL PHOTOGRAPH SOURCE: NearMap, flown March 2019.

<b>pgv</b> ENVIRONMENTAL		King Road Trust FLORA AND VEGETATION SURVEY & LEVEL 1 FAUNA ASSESSMENT LOT 226 PATERSON ROAD, NAMBEELUP	
Drawn: J. Cabot	Date: 28 Mar 2019	<b>SITE BOUNDARY AND TOPOGRAPHY</b>	
Job: 10348 Rpt: 2019-437	Revision: A		

**Figure 2**



0 50 100 150 200 250m  
SCALE 1 : 7 500 at A3 (MGA)

**Legend**

- - - Site Boundary
- Lot 226 Boundary
- Cadastral Boundary
- Easement Boundary
- Quadrat Location
- Vegetation Type Boundary
- EmAf Vegetation Type
- Priority Flora**
- ✿ *Jacksonia gracillima* P3
- 3 Number of Plants

**Vegetation Types**

**EmAf**  
*Eucalyptus marginata/Allocasuarina fraseriana* Low Open Woodland over *Kunzea glabrescens* Tall Shrubland over *Conostylis aculeata* Low Open Shrubland

**EmAfXo**  
*Eucalyptus marginata / Allocasuarina fraseriana / Xylomelum occidentale* Low Open Woodland over *Kunzea glabrescens* Tall Shrubland over *Conostylis aculeata / Desmocladius flexuosus* Low Open Shrubland

**AfEmBiKg**  
*Allocasuarina fraseriana/Eucalyptus marginata/Banksia ilicifolia* Low Open Woodland over *Kunzea glabrescens* Tall Open Scrub over *Conostylis aculeata* Low Open Shrubland

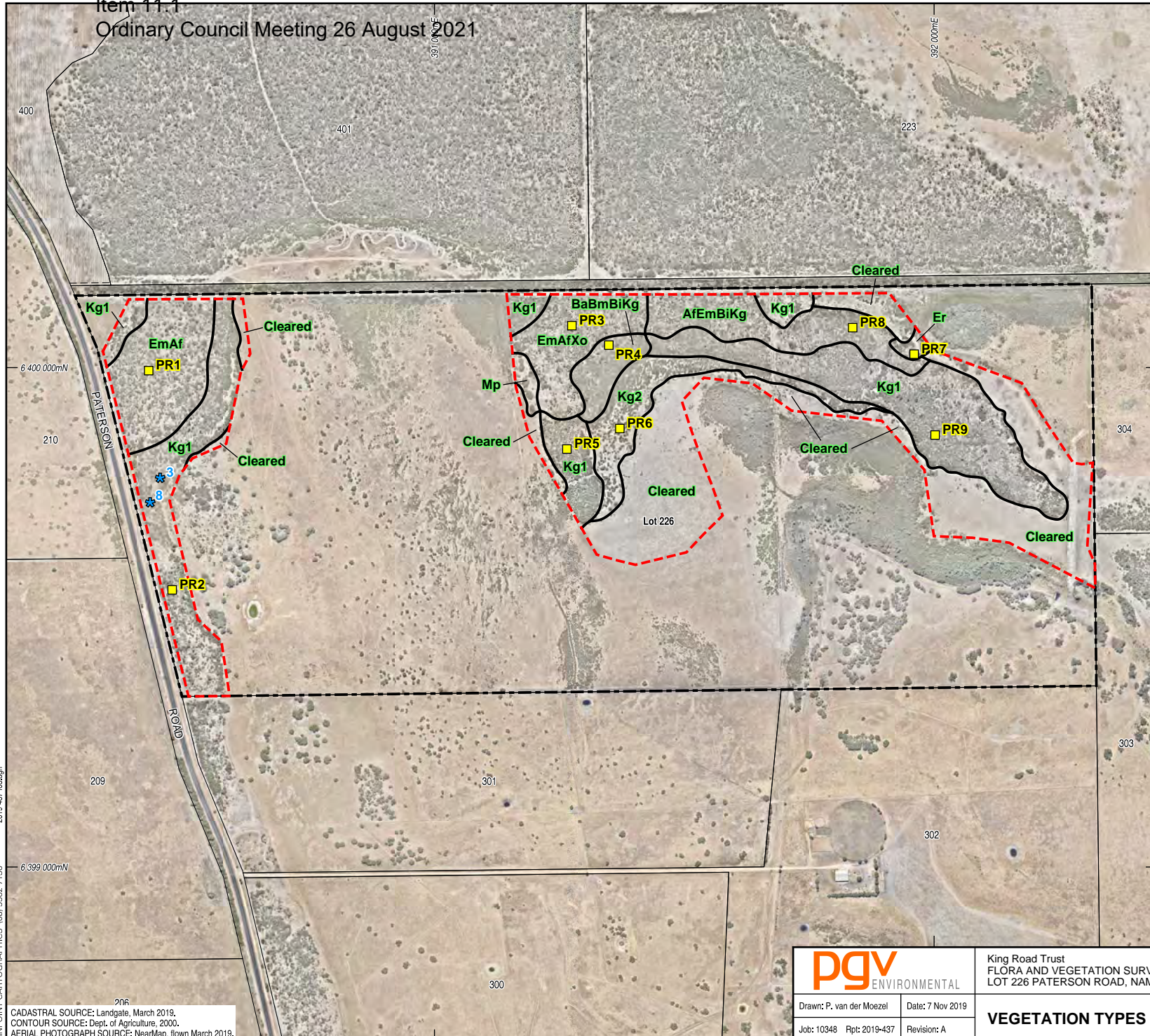
**BaBmBiKg**  
*Banksia attenuata/B. menziesii/B. ilicifolia/Kunzea glabrescens* Tall Open Scrub over *Conostylis aculeata/Desmocladius flexuosus* Low Open Shrubland

**Kg1**  
*Kunzea glabrescens* Tall Open Scrub over *Conostylis aculeata/Corynotheca micrantha* Low Open Shrubland

**Kg2**  
*Kunzea glabrescens* Tall Shrubland over pasture

**Er**  
*Eucalyptus rudis* Low Open Woodland over *Kunzea glabrescens* Tall Open Scrub

**Mp**  
*Melaleuca preissiana* Low Woodland over pasture



<b>pgv</b> ENVIRONMENTAL		King Road Trust FLORA AND VEGETATION SURVEY & LEVEL 1 FAUNA ASSESSMENT LOT 226 PATERSON ROAD, NAMBEELUP	
Drawn: P. van der Moezel	Date: 7 Nov 2019	<b>VEGETATION TYPES</b>	
Job: 10348	Rpt: 2019-437	Revision: A	<b>Figure 3</b>

CADASTRAL SOURCE: Landgate, March 2019,  
CONTOUR SOURCE: Dept. of Agriculture, 2000.  
AERIAL PHOTOGRAPH SOURCE: NearMap, flown March 2019.

2019-437-10348.gpn  
PINPOINT CARTOGRAPHICS (08) 9562 7136



0 50 100 150 200 250m  
SCALE 1 : 7 500 at A3 (MGA)

**Legend**

- - - Site Boundary
- Lot 226 Boundary
- Cadastral Boundary
- Easement Boundary
- Quadrat Location
- Vegetation Condition Boundary
- G Vegetation Condition

**Vegetation Condition**

(SOURCE: Bush Forever, Govt. of W.A., 2000)

**P - Pristine**  
Pristine or nearly so, no obvious signs of disturbance.

**Ex - Excellent**  
Vegetation structure intact, disturbance affecting individual species and weeds are non aggressive species.

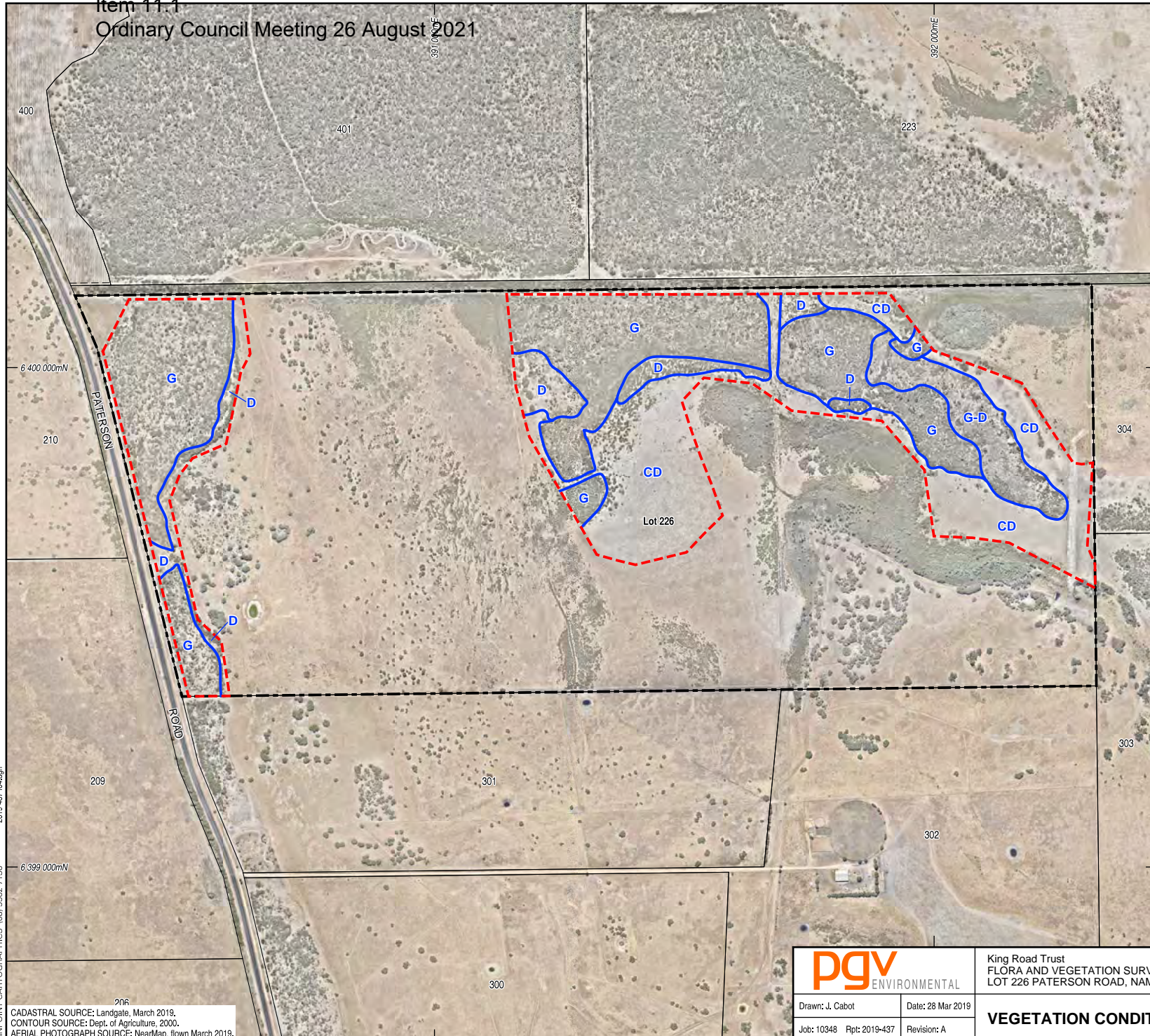
**VG - Very Good**  
Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.

**G - Good**  
Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

**D - Degraded**  
Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

**CD - Completely Degraded**  
The structure of the vegetation is no longer intact and the areas is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs.

**CI - Cleared**  
No native vegetation remaining.



2019-437-04.dgn  
PINPOINT CARTOGRAPHICS (08) 9562 7136

CADASTRAL SOURCE: Landgate, March 2019,  
CONTOUR SOURCE: Dept. of Agriculture, 2000.  
AERIAL PHOTOGRAPH SOURCE: NearMap, flown March 2019.

<b>pgv</b> ENVIRONMENTAL		King Road Trust FLORA AND VEGETATION SURVEY & LEVEL 1 FAUNA ASSESSMENT LOT 226 PATERSON ROAD, NAMBEELUP	
Drawn: J. Cabot	Date: 28 Mar 2019	<b>VEGETATION CONDITION</b>	
Job: 10348 Rpt: 2019-437	Revision: A		

**Figure 4**

# **APPENDIX 1**

## **DBCA Flora Database Search**

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
699	5206820	3237	Acacia benthamii	'2	Erect, compact shrub 1.5 cm high x 1.2 cm wide. Flowers yellow.	Plain. Brown loam.			Abundance: occasional. 80% of population flowering.	Junction Redhead and Hoplands Roads, ca 6 km NW North Dandalup	GPS	1	29/09/1998
705	7308388	3237	Acacia benthamii	'2	Perennial shrub 1 m high x spreading 2 m wide. Yellow flowers. Few flowers, new growth.	Plain. Wetland. Reserve. Grey wet.	Medium trees and low shrubland with Melaleuca rhaphephylla, Corymbia calophylla, Pericalymma ellipticum, Xanthorrhoea preissii, Hakea ceratophylla, Daviesia incrassata.	rare.		Pinjarra Nature Reserve	GPS	1	16/10/2005
709	8128073	3237	Acacia benthamii	'2		Seasonal wetland.	Open shrubland; Melaleuca rhaphephylla, Pericalymma ellipticum, Xanthorrhoea preissii, Hakea ceratophylla, Calothamnus lateralis, Hibbertia stellaris.	common in limited area.	This specimen is mounted with PERTH 07580738.	Pinjarra Nature Reserve	GPS	0	4/09/2006
710	8008388	3237	Acacia benthamii	'2	Shrub to 1.5 m.	Flat. Brown some gravel.	Corymbia calophylla, weeds, Xanthorrhoea preissii.			On W side of Hopeland Road, ca 200 m N of the intersection with Readhead Road, North Dandalup	GPS	1	7/01/2009
2605	190713	14932	Acacia lasiocarpa var. bracteolata long peduncle variant (G.J. Keighery 5026)	'1						6.5 miles W of North Dandalup	AUTO	3	17/09/1967
5546	7575238	45013	Amanita drummondii	'3						Culeenup Is., Yunderup	TOPO	3	16/05/1974
10726	3262065	20026	Blennospora doliiformis	'3	Small annual herb to 5 cm.	Small seasonal wetland between sand ridges. Soil brown sandy clay turning to clay at depth.	Melaleuca uncinata / Melaleuca viminea shrubland to 2 m height over a rich herb layer.	common.		Austin Bay Nature Reserve, along northern boundary, west of t- junction (plot austb07)	MAN	0	29/10/1993

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
10730	8893500	20026	<i>Blennospora doliiformis</i>	'3	Annual herb to 5 cm.	Small seasonal wetland between sand ridges. Soil brown sandy clay turning to clay at depth.	<i>Melaleuca uncinata</i> , <i>M. viminea</i> shrubland to 2 m high over a rich herb layer.		Vegetation condition: excellent to very good. Claypan TEC, communities 7 & 8.	Plot Austb 07. Austin Bay Nature Reserve, northern boundary	GPS	1	5/11/2013
10847	8277079	11612	<i>Boronia capitata</i> subsp. <i>gracilis</i>	'3	Perennial shrub 0.6 m high x 0.6 m wide. Pink flowers. Delicate spindly weeping shrub.	Plain. Grey sand. Collection site: road verge.	Medium trees. With <i>Eucalyptus marginata</i> , <i>Kunzea glabrescens</i> , <i>Nuytsia florabunda</i> , <i>Regelia ciliata</i> , <i>Adenanthos sygnorum</i> , <i>Hibbertia varginata</i> . Characteristic species: <i>Hypocalymma angustifolium</i> , sedges and rushes. Other alien species: few (1-3).	7 plants.	Other alien species: few (1-3).	Nambeelup Road and new Pipeline Road - 50- 100 metres from corner on the left	TOPO	3	2/09/2010
12181	870374	1596	<i>Caladenia huegelii</i>	T						Ravenswood	MAN	3	16/10/1920
12373	1829963	13862	<i>Caladenia speciosa</i>	'4	Erect tuberous herb to 60 cm high. Flowers creamy-white with pendulous segments and a small labellum for the species.	Gently undulating terrain and white sand.	<i>Eucalyptus marginata</i> , <i>banksia attenuata</i> , <i>B. ilicifolia</i> and <i>Casuarina fraseriana</i> woodland over dieback affected scrub.		Abundance: 15 plants seen.	Hopelands road on the SE corner of Hopelands farm, W of North Dandalup	MAN	0	25/09/1990
13772	7908822	19338	<i>Chamaescilla gibsonii</i>	'3		Aspect: flat. Moist brown sand. Granite derived soil over limestone. Seasonally wet. Land status: private.	(Muir's): (Myrtaceae heath), <i>Kunzea micrantha</i> subsp. <i>micrantha</i> Closed Heath over <i>Calothamnus lateralis</i> and <i>Astartea affinis</i> ms Shrubland over <i>Meeboldina roycei</i> Very Open Sedgeland. With <i>Astartea affinis</i> ms, <i>Brachyscome ? pusilla</i> , <i>Calothamnus lateralis</i> , C	1 mature plant seen.	Condition of population: healthy. Salinity and increased public access (weeds).	Austin Bay between Yunderup townsite and Austin Bay Nature Reserve, between Mandurah and Pinjarra	GPS	1	4/10/2006

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
15847	6511872	16245	Cyathochaeta teretifolia	'3	Tufted perennial herb to 1.5 m.	Seasonal Wetland; flat, black sandy peat over ?sand. Poor drainage, wet during winter/spring.	Associated species: Melaleuca preissiana, Melaleuca rhaphiophylla, Eucalyptus rudis.			System 6 Update quadrat raven 02. Subm 280 Ravenswood Speedway	GPS	1	18/12/1995
18061	4494911	3863	Dillwynia dillwynioides	'3	Shrub 1.5m.	Soil: Grey sand. Topography/dra inage: Seasonally wet flat. Geomorphology : Alluvial deposits (pinjarra plain).	Vegetation: Pericalymma floribunda, Hakea varia Dense Heath B over Schoenus rodwayanus Low Sedges.			Paganoni block E of Mandurah Rd, 11 km NNE of Mandurah (plot paga-3).	GPS	1	2/10/1992
18063	720771	3863	Dillwynia dillwynioides	'3						Yunderup	MAN	0	/12/1965
18065	720798	3863	Dillwynia dillwynioides	'3						Yunderup	MAN	0	/12/1965
18069	720801	3863	Dillwynia dillwynioides	'3	Slender shrub up to 4 ft. Flowers orange, red.	Swampy roadside.				Mandurah - North Yunderup	AUTO	3	3/10/1965
18071	6146813	3863	Dillwynia dillwynioides	'3	Erect shrub, 2 m high. Flowers yellow and orange, crowded in a short terminal raceme.	Swamp and estuarine wetland deposits during Holocene Period. Moderate litter cover, less than 5%. Black sandy loam over aeolian and marine deposits.	Salt marsh vegetation with fringing estuarine forest. Sarcocornia quinqueflora, with Casuarina obesa, Melaleuca rhaphiophylla, Eucalyptus rudis.	common in the wet area.		Goegrup Lake, N end of Caponi Road	MAN	3	/10/2001

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
18072	5890608	3863	Dillwynia dillwynioides	'3	Erect shrub 1 m high.	Swamp and estuarine wetland deposits during Holocene period. Moderate litter cover less than 5%. Black sandy loam over aeolian and marine deposits.	Salt marsh vegetation with fringing estuarine forest. Sarcacornia quinqueflora, Casuarina obesa, Melaleuca rhapaphylla, Eucalyptus rudis.	occasional	.	Goegrup Lake, N end of Caponi Road,	MAN	3	/09/2001
18075	6097340	3863	Dillwynia dillwynioides	'3	Slender erect shrub 1.5 m high. Flowers orange- yellow, wings-keel red. Largely post flowering.	Winter damp. Black sandy clay.	Melaleuca preissiana, Mel. viminea low woodland over tall shrubland.	rare.		Jeegarnyeejip Island, Murray River Delta	GPS	1	16/11/2000
18079	7745508	3863	Dillwynia dillwynioides	'3		Grey, indundated, saline sand. Edge of lake on flat, low plain near fire break. Fire break appears to have been pushed through middle of fire break.	Samphire flats under mixed Melaleuca species, Regelia ciliata, Kunzea micrantha , K. ericifolia, Acacia saligna and Eucalyptus rudis.	3 mature plants, several seedlings over an area of 5 x 5 m.	Potential threats are weeds, salinity and firebreaks.	Private Wetlands, N Yunderup, Peel-Swan Coastal region	UNK	2	11/07/2007
18080	7745494	3863	Dillwynia dillwynioides	'3		Grey, inundated, saline, clay sand. On lake edge on flat, low plain near firebreak.	Mixed Melaleuca over samphire species, Calothamnus lateralis, Hakea varia, Melaleuca incana ssp. incana, M. osullivanii, Watsonia, Melaleuca cuticularis.	1 mature plant, 3 seedlings over area of 1 x 1 m.	Potential threats include firebreaks, weeds and salinity.	Private Wetlands, N Yunderup, Peel-Swan Coastal region	UNK	2	9/07/2007



FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
18085	6084370	3863	Dillwynia dillwynioides	'3	Erect shrub 2 m high. Flowers yellow and orange, crowded in a short terminal raceme.	Swamp and estuarine wetland deposits during Holocene Period. Moderate litter cover less than 5%. Black sandy loam over aeolian and marine deposits.	Salt marsh vegetation with fringing estuarine forest. Sarcacornia quinqueflora, Casuarina obesa, Melaleuca rhapaphiophylla, Eucalyptus rudis.	common	in the wet area.	Goegrup Lake, N end of Caponi Road	MAN	3	/10/2001
18184	917575	10796	Diuris drummondii	T		Edge of swamp.	Paperbarks			Russel Road, Peel Estate	MAN	3	30/11/1956
18211	9016066	10796	Diuris drummondii	T		Swamp flats.				Pinjarra	MAN	3	/11/1932
18212	9016082	10796	Diuris drummondii	T		Swampy ground.				Pinjarra	MAN	3	/11/1932
18243	8891672	1637	Diuris purdiei	T						Pinjarra, 2 km W along Pinjarra Road from South West Highway, area bounded by Pinjarra Road, Philips Road & Sutton Street	MAN	3	18/10/1984
18246	8891656	1637	Diuris purdiei	T	Yellow within, brownish without; mid-lobe of labellum suberect not conduplicate.	In damp sand.				Pinjarra	MAN	3	16/10/1920
18247	8891591	1637	Diuris purdiei	T						Pinjarra	MAN	3	/10/1926
18248	8891621	1637	Diuris purdiei	T						Pinjarra	MAN	3	/10/1926
18249	8891613	1637	Diuris purdiei	T		Wet ground, sandy soil.				Pinjarra	MAN	3	/10/1926
18250	8891605	1637	Diuris purdiei	T						1 miles from Pinjarra on the Pinjarra - Mandurah Road	MAN	3	26/09/1937
18251	8891583	1637	Diuris purdiei	T						Pinjarra	MAN	3	27/09/1937
18398	231231	1639	Drakaea elastica	T						Ravenswood, near Pinjarra	MAN	3	16/10/1920
18401	231223	1639	Drakaea elastica	T						Ravenswood	MAN	3	16/10/1920

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
18406	1829971	1639	Drakaea elastica	T	Erect tuberous herb to 26 cm high. Leaves shiny light green.	Gently undulating terrain and white sand.	Eucalyptus marginata, Banksia attenuata, B. ilicifolia and Casuarina fraseriana woodland over dieback affected scrub and thickets of Kunzea ericifolia.		Abundance: One colony of six plants seen in bud.	Hopelands road near the SE corner of Hopelands farm, ca 600 metres N of the S boundry	MAN	0	25/09/1990
18411	7439857	1639	Drakaea elastica	T		Low plain. Moist grey sand.	Thicket with associated vegetation: Kunzea sp.	10 mature plants in area ca 200 m x 200 m.	Healthy population. Plants are scattered through bushland on proposed road alignment. Bushland appears in excellent condition. Roadworks are potential threat.	Lot 907 Fowler road, Stake Hill	GPS	1	12/09/2006
20489	7908768	41803	Eryngium sp. Ferox (G.J. Keighery 16034)	'3		Aspect: flat. Moist brown clay. Granite derived soil over limestone. Seasonally wet. Land status: private.	(Muir's): Closed Tall Scrub over Open Sedgeland over Herbland and Grassland. With Astartea affinis, Kunzea micrantha subsp. micrantha, Melaleuca osullivanii, Meeboldina roycei, Austrodanthonia occidentalis, Lachnagrostis filiformis, Sowerbea laxiflora, T	mature ca 50 seen.	Condition of population: healthy. Salinity and increased public access (weeds).	Austin Bay between Yunderup townsite and Austin Bay Nature Reserve, between Mandurah and Pinjarra	GPS	1	6/10/2006
23348	1505548	13512	Eucalyptus rudis subsp. cratyantha	'4	Bark thin, grey, shortly fibrous, with shallow longitudinal fissures, thicker and sometimes tessellated with age.		With E. calophylla and Melaleuca preissiana.			Murray River flats between Pinjarra and Mandurah	MAN	0	13/08/1979

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
23355	6101232	13512	Eucalyptus rudis subsp. cratyantha	'4	Erect, spreading tree 7-8 m high x 3-4 m wide. Rough bark, light grey. Leaves petiolate.	Swamp and estuarine wetland deposits during holocene period. Moderate litter cover less than 5%. Black sandy loam over aeolian and marine deposits.	Salt marsh vegetation with fringing estuarine forest. Salt marsh Sarcocornia quinqueflora with Casuarina obesa, Melaleuca rhaohiophylla, Eucalyptus rudis.			Geogrup Lake - N end of Caponi Road	MAN	3	24/01/2002
23358	7908733	13512	Eucalyptus rudis subsp. cratyantha	'4		Riverbank. Aspect: flat. Moist brown loam/clay. Land status: private.	(Muir's): Low Open Forest over Tall Shrubland over Very Open Sedgeland and Very Open Herbland. With Eucalyptus rudis subsp. rudis, Melaleuca rhaohiophylla, Astartea affinis, Juncus kraussii subsp. australiensis and Lobelia alata.	mature 1 seen.	Condition of population: healthy. Salinity and increased public access (weeds).	Austin Bay between Yunderup townsite and Austin Bay Nature Reserve, between Mandurah and Pinjarra	GPS	1	10/11/2006
26836	7857438	19630	Grevillea bipinnatifida subsp. pagna	'1	Multistemmed low spreading shrub 30/40 cm high x 50 cm wide. Flowers red; in flower. Leaves narrow, green.	Winter wet flats. Grey sandy clay.	Eucalyptus calophylla low woodland over dense sedgeland.	scattered.		Pinjarra Nature Reserve; W of Pinjarra, No. 41184	GPS	3	5/10/2006
28089	6097375	13452	Grevillea manglesii subsp. ornithopoda	'2	Slender erect shrub 2 m high x 1 m wide. Flowers white, in flower.	Dune. White sand, clay.	Melaleuca viminea - Kunzea ericifolia shrubland.	rare.		Little Yunderup Island, Yunderup Delta	GPS	1	15/11/2000
32653	1131214	20462	Jacksonia gracillima	'3					Checked in W.E. Blackall's collecting book. Not recorded. - M.A. Lewington 17/7/2009.	Peel Estate, in Mandurah- Pinjarra area	MAN	3	/08/1939
32807	1131753	4027	Jacksonia sericea	'4		Deep grey sand.	Banksia woodland, beneath B. attenuata and B. ilicifolia stand.			Location 14, Pinjarra- Mandurah road	MAN	3	21/02/1966

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32808	1131745	4027	Jacksonia sericea	'4		Deep grey sand.	Banksia woodland, beneath B. attenuata and B. ilicifolia.			Location 14, Pinjarra- Mandurah road	MAN	3	21/02/1966
32822	7577907	4027	Jacksonia sericea	'4		Slope. Dry red- brown sand with limestone rock.	Low shrubland. Associated species: Allocasuarina humilis, Santalum acuminatum, Acacia rostellifera, Grevillea vestita, Rhagodia baccata, Hakea trifurcata, H. prostrata, Conostylis aculeata.	20+ mature plants.	Condition of population: moderate.	Possible city reserve, Meadow Springs, Mandurah	GPS	1	22/01/2007
32837	8341036	4027	Jacksonia sericea	'4	Perennial, prostrate 0.5 m high x 2 m wide. Flowers yellow-orange.	Plain, grey sand,	Low shrubland, bare areas. Banksia attenuata, Acacia pulchella, Acacia cyclops, Grevillea crithmifolia, Scaevola crassifolia.	over 50 plants.	Percentage of population flowering 90%.	Railway Reserve, Mandurah Station	GPS	1	24/11/2011
32931	3138321	19272	Johnsonia pubescens subsp. cygnorum	'2			Banksia woodland.			Nambeelup Road	AUTO	4	16/11/1992
32933	6632335	19272	Johnsonia pubescens subsp. cygnorum	'2	Herb, 15 cm.	Grey sand with thin litter layer.	Banksia attenuata, B. menziesii, B. ilicifolia low woodland over scattered Adenanthos cygnorum ssp. cygnorum over Allocasuarina humilis, Melaleuca thymoides open shrubland over Leucopogon conostephioides, Calytrix flavescens, Scholtzia involuta, Stirl			From Site A. SW corner of Lot 1 Elliott Road, Shire of Serpentine - Jarrahdale (Keysbrook)	MAN	2	26/10/1999
37703	792802	33742	Microtis quadrata	'4		Sandy clay loam. Flat terrain, swamp.	Growing in Melaleuca, Nuytsia, Eucalyptus calophylla very open low woodland over heath.	1000+ plants in full flower.		2.3 km W of Pinjarra on Mandurah Road, W side of Pinjarra caravan park	MAN	3	10/10/1984
38084	8893276	6193	Myriophyllum echinatum	'3	Annual herb to 3 cm.	Small seasonal wetland between sand ridges. Soil brown sandy clay turning to clay at depth.	Melaleuca uncinata, M. viminea shrubland to 2 m high over a rich herb layer.		Vegetation condition: excellent to very good. Claypan TEC, communities 7 & 8.	Plot Austb 07. Austin Bay Nature Reserve, N boundary	GPS	1	5/11/2013

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38619	7908792	36200	Ornduffia submersa	'4		Aspect: flat. Moist brown clay. Granite derived soil over limestone. Seasonally wet. Land status: private.	(Muir's): Scattered E. rudis amongst Tall Open Scrub over Closed Sedgeland. With Eucalyptus rudis subsp. rudis, Melaleuca lateritia, M. rhapsiophylla, Schoenus natans, Meeboldina roycei, Villaris albiflora, V. capitata, Triglochin calyprata, T. lineari	1 mature plant seen.	Condition of population : healthy. Salinity and increased public access (weeds).	Austin Bay between Yunderup townsite and Austin Bay Nature Reserve, between Mandurah and Pinjarra	GPS	1	5/10/2006
38826	7329601	6573	Parsonsia diaphanophle ba	'4	Vine 10 m high. Flowers pale pink; largely post flowering.	Riverine floodplain. Semi- saline clay.	Casuarina obesa low forest.	uncommo n.		Serpentine Nature Reserve; Serpentine River, 1.5 km N of Lakes Road, off Fowler	GPS	1	5/01/2006
38827	6513042	6573	Parsonsia diaphanophle ba	'4	Creeper.	River spit, brown loam.	Eucalyptus rudis Forest over mixed Thicket.	scattered, plants inconspicu ous as they festoon higher branches of Eucalyptu s rudis trees.		Spit in the Murray River, S of the Ravenswood Drag Strip. Old Mandurah Road, Ravenswood	GPS	1	31/08/1995
39769	4551591	17366	Phyllangium palustre	'2	Small annual herb, 0.5 cm high.	Low-lying seasonal wetland.	Species rich herbland.		Abundance: abundant.	Clay flats along N boundary of Austin Bay Nature Reserve, ca 2 km S of Yunderup (between plots AustB 6 & 7)	GPS	1	29/10/1993
42104	7908784	2435	Rumex drummondii	'4		Aspect: flat. Winter wet, oxbow lake edges. Granite derived soil over limestone. Land status: private.	(Muir's): Woodland/Low closed Forest/Shrubland/Sedgeland. With Eucalyptus rudis subsp. rudis, Melaleuca rhapsiophylla, Astartea affinis ms, Baumea vaginalis, Juncus draussii subsp. australiensis, Lepidosperma longitudinale, Lobelia alata, Isolepis cernua		Condition of population: healthy. Salinity and increased public access (weeds).	Austin Bay between Yunderup townsite and Austin Bay Nature Reserve, between Mandurah and Pinjarra	GPS	1	4/10/2006

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
42372	6388442	974	Schoenus benthamii	'3	Tufted rush 15 cm high. Spikelets terminal. 2 involucral bracts present.	Seasonal wetland. Damp, grey clayey sand.	Open shrubland. Melaleuca rhapheophylla, Pericalymma ellipticum, Xanthorrhoea preissii, Hakea ceratophylla, Daviesia incrassata.	few.		Pinjarra Industrial Area	MAN	3	24/10/2002
42539	7702531	1008	Schoenus pennisetis	'3		Low plain on private land. Grey sandy clay.	Low heath C of Pericalymma ellipticum, Anigozanthos viridis, Astartea scoparia, Cyathochaeta avenacea, Pattersonia occidentalis, Synaphea stenuloba, Schoenus rigens.	ca 50 mature plants.	Potential threat; industrial development	Lot 504 Field road, Pinjarra	GPS	1	30/08/2007
44080	6388477	18564	Stylidium aceratum	'3	Annual herb 10 cm high. Leaves basally rosetted. Petal paired vertically. Petals white with red spot.	Seasonal wetland. Damp, grey clayey sand.	Open shrubland. Melaleuca rhapheophylla, Pericalymma ellipticum, Xanthorrhoea preissii, Hakea ceratophylla, Daviesia incrassata.	common.		Pinjarra Industrial Area	MAN	3	31/10/2002
44087	8543089	18564	Stylidium aceratum	'3	Annual herb 4-8 cm high; corolla lobes paired vertically, white or pale pink with pink-red markings, white basally (especially on lower lobes); throat appendages subulate; column lacking an appendage.	Winter-wet swamp; brown clay loam.	Low heath with Viminaria juncea; Stylidium spp.	locally frequent.		Reserve at corner of Moores Road and Phillips Road, Pinjarra	GPS	1	6/11/2007
44737	4495403	7756	Stylidium longitubum	'4	Delicate annual herb.	Soil: Peaty sand. Topography/dra inage: Seasonally wet poorly drained flat adjacent to river channel. Geomorphology : Alluvial deposits (pinjarra plain).	Vegetation: Eucalyptus rudis Low Forest A over Hakea varia, Melaleuca raphiophylla Thicket over Leptocarpus aff. roycei Tall Sedges.			Paganoni block E of Mandurah Rd, 11 km NNE of Mandurah near Serpentine River (adj. to plot paga-2).	GPS	1	4/11/1992

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
44751	6388469	7756	Stylidium longitubum	'4	Perennial herb 10 cm high. Leaves occasional ons tem. Flowers in panicle - pink.	Seasonal wetland. Damp, grey clayey sand.	Open shrubland. Melaleuca rhaphephylla, Pericalymma ellipticum, Xanthorrhoea preissii, Hakea ceratophylla, Daviesia incrassata.	common.		Pinjarra Industrial Area	MAN	3	24/10/2002
44752	6388450	7756	Stylidium longitubum	'4	Annual herb 10 cm high. Flowers bright pink.	Seasonal wetland. Damp, grey clayey sand.	Open shrubland. Melaleuca rhaphephylla, Pericalymma ellipticum, Xanthorrhoea preissii, Hakea ceratophylla, Daviesia incrassata.	very common.		Pinjarra Industrial Area	MAN	3	21/11/2002
46330	8569053	18590	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	Sprawling shrub 80 x 50 cm.	Flat. Grey sandy loam.	Sparse Corymbia calophylla woodland. With Jacksonia sp. ?, Melaleuca sp. ?, Calothamnus sp. ?, Veldt grass.			Private Property Lot 19. Ca 1.5 km N along the South Western Highway, E side from the Fairbridge Farm entrance. N of Pinjarra. Plant is ca 3 m from fenceline dividing Lot 19 and 20	GPS	1	30/08/2013
46333	5297249	18590	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	Compact shrub 50 cm high x 40 cm wide. Flowers yellow. Growth phase: active. Immature fruits present on new growth. Seeds shed.	Plain. Grey clayey sand.		occasional	80+% of population flowering.	5 km NE of Pinjarra,	GPS	1	8/10/1998
46334	5892473	18590	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	Compact perennial shrub 45 cm high x 45 cm wide. Active growth phase. Flowers yellow. Fruits present.	Grey clayey sand. Edge of seasonal swamp.	Scrubland. Growing with Synaphea sp. Pinjarra.	locally frequent.	80+% of population flowering.	ca 8 km NE of Pinjarra on E side of rail line,	MAN	3	/10/2001
46344	7463634	18590	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	Dense, clumped subshrub. Leaves highly divided with fine ultimate lobes. Inflorescences erect, rachis straight. Perianth ascending, finely pubescent.	Rail reserve. Gently sloping land between seasonally wet area and upper slope, and low land near railway line. Grey-brown sandy loam on lower slopes.	Wet and dry heath, showing a preference for more exposed, sparsely vegetated areas. With Xanthorrhoea preissii, Anigozanthos manglesii, Adenanthos meisneri, Mesomelaena tetragona and Conostylis sp., plus weed invasion by Eragrostis curvula and Briza maxi	66 living plants, 1 dead plant.		ca 2 km S along rail access track from deviation of Shanns Road, SW of North Dandalup, E side of railway line	GPS	1	11/09/2003

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46349	7469209	18590	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	Dense, clumped subshrub. Leaves highly divided with fine ultimate lobes. Inflorescences erect, rachis straight. Perianth ascending, finely pubescent.	Moist, grey - brown, sandy loam on a winter wet low plain.	Narrow strip of Pericalymma ellipticum and Melaleuca sp. dense shrubland with Xanthorrhoea preisii, Adenanthos meisneri, Acacia applanata, Dryandra nivea, Conostylis sp., Watsonia bulbillifera and weedy grasses.			1.8 km S along rail access track from Shanns road deviation, rail reserve between rail service track and private property, W side of rail line	GPS	1	7/09/2003
46351	7212984	18590	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	Dwarf shrub, sprawling over rocks, 65 x 80 cm. Leaves with a regular pattern of division. Rachis and peduncle green. Flowers opening narrowly. Stigma with broad lateral lobes (not emarginate or with horns).	Edge of drainage channel between lateritic and granitic rocks. Moist grey- brown sand.	Degraded, very open Corymbia calophylla woodland with sparse, very low Hibbertia, Acacia, Conostylis, Kennedia and weed species, including Watsonia meriana var. bulbillifera and Arctotheca calendula.		rare, scattered plants along drainage fence line.	South Western Highway, c. 1.2 km N of South Dandalup River	GPS	1	17/10/1998
46352	4958128	18590	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	Dense, clumped shrub 30 cm high x 40 cm wide. Upright racemes of bright yellow flowers.	Plain. Dry but close to winter wet area. Sandy with lateritic pebbles.	Low Woodland A with weedy grasses, Marri and Jarrah.	infrequent , localised.		Between 300-950 m N of South Dandalup River bridge, N of Pinjarra	GPS	1	13/10/1997
46371	5206359	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Compact shrub 40 cm high x 50 cm wide. Flowers yellow. Active growth phase.	Swamp. Grey clayey sand.	With Eragrostis.		Abundance: occasional. 80+% of population flowering.	E side of rail line, 3.1 km S of South Street along Shanns Road, 3.1 km S of Dandalup	GPS	1	22/09/1998
46373	5892503	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Compact, perennial shrub 45 cm high x 40 cm wide. Flowers yellow. Range of age fruits present.	Grey clayey sand. Edge of seasonal swamp.	Scrubland.	locally frequent.	80+% of population flowering. Northern limit of population.	ca 10 km NE of Pinjarra on W side of rail line,	MAN	3	/10/2001



FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
46375	7463553	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Typical. Small leaves with rounded apices on short, pilose petioles. Small, crowded flowers in long, undulating spikes.	Moist, dark grey sandy loam.	Wet heath composed of Pericalymma ellipticum, Xanthorrhoea preissii, Kingia australis, Adenanthos meisneri and species of Conostylis, Drosera and Hibbertia, frequently with high levels of Watsonia meriana var. bulbillifera, Eragrostis curvula and Homeria	locally common.		Between 1.4-2.9 km S of Shanns Road deviation; E side of rail line and E side of unmade shire road	GPS	1	17/09/2003
46376	7463545	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Typical looking specimen. Smaller leaves and flowers than others at this site.	Wet depression to the west of drainage channel near to access track. Grey clayey sand.	Low shrubland comprised of Pericalymma ellipticum, Regelia ciliata and Taxandria sp. with Xanthorrhoea preissii, Stirlingia latifolia and Restionaceae species, Watsonia meriana var. bulbillifera, Eragrostis curvula, Sonchus oleraceus and Avena barbata.	rare.		Rail reserve, 3.6-3.65 km S of Shanns Road deviation; W side of rail- line; W side of rail access track, NE Pinjarra	GPS	1	7/09/2003
46377	8031436	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T		Near fence and adjacent to the track on W side of Rail.	Amongst native shrubs.			Along railway reserve S of Shanns Road, turn east	GPS	3	/08/2008
46378	8031975	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T				1 near rail road.		Along railway reserve S of Shanns Road, turn east	GPS	3	/08/2008
46379	8031932	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T		E side of railway line.				Along railway reserve S of Shanns Road, turn east	GPS	3	/08/2008
46380	8031444	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T				3 plants in enclosure.		Along railway reserve S of Shanns Road, turn east	GPS	3	/08/2008

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46381	7836465	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Typical. Small leaves with rounded apices on short, pilose petioles. Small, crowded flowers in long undulating spikes.	Edge of inundated area in small marri woodland remnant. Moist dark grey sandy loam.	Corymbia calophylla open woodland with an understorey of Xanthorrhoea preissii and Restionaceae species, Synaphea sp. Pinjarra Plain. Weed invasion by Watsonia bulbillifera and Eragrostis curvula.	locally common.		Between 1.4-2.9 km S of Shanns Road deviation, E side of rail line and E side of unmade shire road, SW North Dandalup	UNK	2	17/09/2003
46382	7836473	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Typical. Small leaves with rounded apices on short, pilose petioles. Small, crowd flowers in long undulating spikes.	Moist dark grey sandy loam.	Wet heath composed of Pericalymma ellipticum, Xanthorrhoea preissii, Kingia australis, Adenanthos meisneri and species of Conostylis, Drosera and Hibbertia, frequently with high levels of Watsonia bulbillifera, Eragrostis curvula and Homeria flaccida inv	locally common.		Between 1.4-2.9 km S of Shanns Road deviation, E side of rail line and E side of unmade shire road, SW North Dandalup	UNK	2	17/09/2003
46383	7836600	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Typical. Small leaves with rounded apices on short, pilose petioles. Small crowd flowers in long undulating spikes.	Moist, dark grey sandy loam.	Wet heath composed of Pericalymma ellipticum, Xanthorrhoea preissii, Kingia australis, Adenanthos meisneri and species of Conostylis, Drosera and Hibbertia, frequently with high levels of Watsonia bulbillifera, Eragrostis curvula and Homeria flaccida inv	locally common.		Between 1.4-2.9 km S of Shanns Road deviation, E side of rail line and E side of unmade shire road	UNK	2	17/09/2003
46384	7836589	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Typical. Small leaves with rounded apices on short, pilose petioles. Small crowd flowers in long undulating spikes.	Moist dark grey sandy loam.	Wet heath composed of Pericalymma ellipticum, Xanthorrhoea preissii, Kingia australis, Adenanthos meisneri and species of Conostylis, Drosera and Hibbertia frequently with high levels of Watsonia bulbillifera, Eragrostis curvula and Homeria flaccida inva	locally common.		About 2.8 km S along rail access track from Shanns Road deviation, E side of track, SW of North Dandalup	UNK	2	17/09/2004

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
46385	7836597	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Typical. Small leaves with rounded apices on short, pilose petioles. Small, crowded flowers in long undulating spikes.	Moist, dark grey sandy loam.	Wet heath composed of Pericalymma ellipticum, Xanthorrhoea preissii, Kingia australis, Adenanthos meisneri and species of Conostylis, Drosera and Hibbertia, frequently with high levels of Watsonia bulbillifera, Eragrostis curvula and Homeria flaccida inv	locally	common.	About 2.8 km S along rail access track from Shanns Road deviation, E side of railway line, E side of track, SW North Dandalup	UNK	2	17/09/2003
46386	7836503	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Small pale green leaves with long lobes and rounded apices on short, pilose petioles. Small, crowded flowers in long undulating spikes.	Moist dark grey sandy loam.	Wet heath composed of Pericalymma ellipticum, Xanthorrhoea preissii, Kingia australis, Adenanthos meisneri and species of Conostylis, Drosera and Hibbertia, frequently with high levels of Watsonia bulbillifera, Eragrostis curvula and Homeria flaccida inv	locally	common.	About 2.8 km S along rail access track from Shanns Road deviation, E side of railway line, E side of track, SW North Dandalup	UNK	2	17/09/2003
46387	7836511	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Typical looking specimen. Smaller leaves and flowers than others at this site.	Wet depression to the west of drainage channel near to access track. Grey clayey sand.	Low shrubland comprised of Pericalymma ellipticum, Regelia ciliata and Taxandria sp. with Xanthorrhoea preissii, Stirlingia latifolia and Restionaceae species plus Watsonia bulbillifera, Eragrostis curvula, Sonchus oleraceus and Avena barbata.	rare.		Rail reserve 3.6-3.65 km S of Shanns Road deviation, W side of rail-line, W side of rail access track, NE Pinjarra	UNK	2	7/09/2003
46390	7836481	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Typical. Small leaves with rounded apices on short, pilose petioles. Small, crowd flowers in long undulating spikes.	Moist dark grey sandy loam.	Wet heath composed of Pericalymma ellipticum, Xanthorrhoea preissii, Kingia australis, Adenanthos meisneri and species of Conostylis, Drosera and Hibbertia, frequently with high levels of Watsonia bulbillifera, Eragrostis curvula and Homeria flaccida inv	locally	common.	Between 1.4-2.9 km S of Shanns Road deviation, E side of rail line and E side of unmade shire road, SW North Dandalup	UNK	2	17/09/2003

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
46391	7212992	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Dwarf shrub, 50 x 70 cm. Leaves short with broad, rounded lobes. Leaves pale green with fine, shallow reticulation. Rachis green, peduncle red and green.	Seasonally wet lowland by side of railway. White-grey clayey sand over granite.	Pericalymma ellipticum dominated low shrubland with Hakea, Xanthorrhoea, Lambertia, Dasypogon between areas of Corymbia calophylla/Allocasuarina woodland.	locally frequent in swampy area.		3.2 km SW along Shanns Road from crossing at North Dandalup, 100 m along rail service track; E side of railway line	GPS	1	19/10/1998
46392	5892481	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	45 cm high x 45 cm wide. Active growth phase. Flowers yellow. Range of age fruits present.	Grey sand. Edge of seasonal swamp.	Scrubland.	locally frequent.	80+% of population flowering. Southern limit of population.	ca 8 km NE of Pinjarra on E side of rail line,	MAN	0	/10/2001
46393	7836627	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Typical. Small leaves with rounded apices on short, pilose petioles. Small crowded flowers in long undulating spikes.	Moist, dark grey sandy loam.	Wet heath composed of Pericalymma ellipticum, Xanthorrhoea preissii, Kingia australis, Adenanthos meisneri and species of Conostylis, Drosera and Hibbertia, frequently with high levels of Watsonia bulbillifera, Eragrostis curvula and Homeria flaccida inv	locally common.		Between 1.4-2.9 km S of Shanns Road deviation, E side of rail line and E side of unmade shire road	UNK	2	17/09/2003
46394	7836538	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	Typical looking specimen. Smaller leaves and flowers than others at this site.	Wet depression to the W of drainage channel near to access track. Grey clayey sand.	Low shrubland comprised of Pericalymma ellipticum, Regelia ciliata and Taxandria sp. with Xanthorrhoea preissii, Stirlingia latifolia and Restionaceae species plus Watsonia bulbillifera, Eragrostis curvula, Sonchus olearaceus and Avena barbata.	rare.		Rail reserve, 3.6-3.65 km S of Shanns Road deviation, W side of rail- line, W side of rail access track, NE Pinjarra	UNK	2	7/09/2003

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
46416	7463863	30751	Synaphea sp. Pinjarra Plain (A.S. George 17182)	T	Clumped sub-shrub 60-70 cm tall. Leaves dark green with linear-oblong ultimate lobes, mid-vein raised, venation prominent. Petioles glabrous; sheathing base yellow-green. Very long inflorescences; peduncle and rachis thick; peduncle green and red,	Dark grey, moist, sandy loam.	Corymbia calophylla woodland remnant with low shrubland understorey comprising Pericalymma ellipticum, Xanthorrhoea preissii, Synaphea sp. Pinjarra (R. Davis 6578), Restionaceae with Eragrostis curvula and Watsonia meriana var. bulbifera.	uncommo n.		1.4 km S along rail access track from Shanns Road, E side of railway line, E side of track; SW of North Dandalup	GPS	1	17/09/2003
46510	7702523	16749	Synaphea stenoloba	T		Flat on private land. Moist grey sandy loam.	Open woodland B of Corymbia calophylla over thicket of Jacksonia sternbergiana, over low sedges. Associated vegetation: Hypolaena exsulca, Astartea scoparia, Cyathochaeta avenacea, Dasypogon bromeliifolius, Mesomelaena tetragona, Stackhousia monogyna, Ph	less than 100 plants.	Healthy population scattered over entire block.	Lot 504 Field road, Pinjarra	GPS	1	30/08/2007
46520	5297257	16749	Synaphea stenoloba	T	Erect compact shrub, 60 cm high x 40 cm wide. Flowers yellow. Growth phase: active.	Brown sandy clay. Swamp.	Pericalymma.	occasional	.	12.5 km S of Dandalup, entrance to Alcoa Pinjarra,	GPS	1	22/09/1998
46525	5788390	16749	Synaphea stenoloba	T	Undershrub, fine lobed leaf, spreading. Possibly a resprouter. Fruit held on long old flowering spike.	Flat. Dark brown sandy loam.	Woodland over grass. Associated species: Eucalyptus calophylla, Banksia grandis, Verticordia plumosa, Jacksonia sp., Hibbertia sp., Dryandra sp., grasses.			Entrance to Fairbridge Farm, 600 m E of South West Highway, on road reserve near farm,	GPS	1	15/12/1999

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
46527	6533973	16749	Synaphea stenoloba	T	Low shrub to 0.3 m by 0.3 m, flowers yellow.	Edge of seasonal wetland, flat, brown sandy loam over light brown loamy clay, poor drainage, wet during winter/spring.	Associated species: Xanthorrea preissii.	occasional by roadside.		SW corner Phillips and Moores Roads, W Pinjarra S of Pinjarra Road, Shire of Murray (adjacent to System 6 Update quadrat pind01)	GPS	1	31/08/1995
46534	7463057	16749	Synaphea stenoloba	T	Inflorescences exceeding leaves; leaves with concave ultimate lobes; flowers glabrous; stigma with slender apical lobes.	Reserve in good condition. Heath between woodland margin and edge of small lake. Moist grey- black clay (heath) to grey sand (woodland).	Heath with Pericalymma ellipticum, Dryandra nivea, Synaphea petiolaris, Thysanotus, Drosera spp., Hakea, Boronia, Daviesia, Patersonia, Microtis, Restionaceae, Asteraceae.	115 mature and 45 immature plants across reserve.	Very low weed invasion.	CALM Nature Reserve at intersection of Moores Road and Phillips Road, behind caravan park; W of Pinjarra township	GPS	1	12/10/2003
46536	7463111	16749	Synaphea stenoloba	T	Large plant 1 m x 0.9 m. Many mature stems from base. Numerous stems arising from nodes; internodes long. Flowers glabrous, crowded in inflorescence; peduncle thick, infused with red. No pilose hairs on petiole. Very narrow leaf lobes; lobing irregular,	Very narrow remnant between rail access track and paddock fence. Depressed, swampy area to W of drainage ditch. Inundated, grey- brown, clay- loam.	Growing with tall Taxandria sp. shrubs through dense, low shrubland of ?Melaleuca, Stirlingia latifolia, Acacia alata, Adenanthos meisneri, Pericalymma ellipticum, Dryandra nivea, Hypocalymma angustifolium.	1 mature plant.		3.4 km S along rail access track from Shann's Road, W side of railway line, SW of North Dandalup	GPS	1	7/09/2003

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
46544	7463162	16749	Synaphea stenoloba	T	Inflorescences exceeding leaves; leaves with concave ultimate lobes; flowers glabrous; stigma with slender apical lobes.	Grey brown clay loam in lower areas, upland marri woodland on white-grey sand. Large areas severley degraded by motocross riding. Numerous sites of waste dumping. Small lakes throughout area.	Low heath areas with Pericalymma ellipticum, Synaphea petiolaris, Hakea varia, Hibbertia stellaris, Conostylis, Drosera spp., Restionaceae, Asteraceae, etc.	120	mature plants.	Shire land adjacent to Pinjarra Industrial Estate, intersection of Moores Road and Phillips Road, W of Pinjarra township	GPS	1	12/10/2003
46545	7841329	16749	Synaphea stenoloba	T	Perennial shrub to 0.4 m high spreading to 0.6 m wide with yellow flowers. Scale covering the whole plant.	Coastal plain seasonal wetland with Bassendean sand over clay.	Low shrubland including Melaleuca incana, Jacksonia sternbergiana, Calothamnus lateralis, Hypolaena exsulca, Stylidium roseoalatum.	occasional	.	Reserve 34033, Phillip-Moore Road, Pinjarra	GPS	1	29/11/2007
46552	8147957	16749	Synaphea stenoloba	T	Inflorescences exceeding leaves; leaves with concave ultimate lobes; flowers glabrous; stigma with slender apical lobes.	Dark grey inundated clay. Reserve in very good condition.	Heath near roadside bounded by more inundated heathland. With Pericalymma ellipticum, Dryandra nivea, Synaphea petiolaris, Thysanotus, Drosera spp., Hakea, Boronia, Daviesia, Pagtersonia, Microtis, Restionaceae, Asteraceae. Area bounded by low wet heath	115	mature and 45 immature plants across reserve.	CALM Nature Reserve at intersection of Moores Road and Phillips Road, behind caravan park; W of Pinjarra township	GPS	1	12/10/2003
46554	8114021	16749	Synaphea stenoloba	T	Dwarf shrub 50 cm tall. Inflorescence exceeding leaves. Leaves with elongate, linear ultimate lobes. Rachis and peduncle green. Flowers opening widely.	Low lying winter wet flat. Brown-black loam.	Sparse Melaleuca, Nuytsia floribunda, Kingia australis woodland with shrubland of Leptospermum, Xanthorrhoea preissii, Stirlingia latifolia, Sphaerolobium medium, Conostylis, Cyperaceae.	occasional	, area not thoroughly searched.	Swampy area on E side of Alcoa refinery access road, off South Western Highway, N of Pinjarra	GPS	1	27/10/1997

FID	Sheet	NameID	Taxon	Cons_Cod e	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_ Me	Precision	Date
46555	8147949	16749	Synaphea stenoloba	T	Inflorescences exceeding leaves; leaves with concave ultimate lobes; flowers glabrous; stigma with slender apical lobes.	Dark grey inundated clay. Reserve in very good condition.	Heath near roadside bounded by more inundated heathland. With Pericalymma ellipticum, Dryandra nivea, Synaphea petiolaris, Thysanotus, Drosera spp., Hakea, Boronia, Daviesia, Pagtersonia, Microtis, Restionaceae, Asteraceae. Area bounded by low wet heath	115 mature and 45 immature plants across reserve.		CALM Nature Reserve at intersection of Moores Road and Phillips Road, behind caravan park; W of Pinjarra township	GPS	1	12/10/2003
46556	8147922	16749	Synaphea stenoloba	T	Clumped, sprawling plant. Inflorescences greatly exceeding leaves; somewhat undulating along length. Leaves with irregular lobing, ultimate lobes broader than seen in plants from the Alcoa access road.	Highly degraded roadside area; small dips and mounds. Moist, grey-brown clay- loam.	Corymbia calophylla woodland remnant over Acacia pulchella, Adenanthos cygnorum, Synaphea sp. Fairbridge Farm (D. Papenfus DP 696), Stirlingia latifolia, Patersonia, Xanthorrhoea preissii, Grevillea, Kennedia prostrata, Mesomelaena tetragona and Eragrost	1 plant.		800 m N of Fairbridge Road on South Western Highway, W side of road; N of Pinjarra	GPS	1	20/09/2003
49094	8125619	44444	Tripterococcu s sp. Brachylobus (A.S. George 14234)	'4	Annual herb 0.6 m high with green flowers.	Reserve. Plain, wetland with wet gray clay.	Low/tall shrubland with Xanthorrhoea preissii, Hypocalymma angustifolia, Dasypogon bromoliifolius, Melaleuca thymoides, Hibbertia stelbris.	200 plants.	Population structure: 90% flowering. Burnt January 2007. Many alien species.	Pinjarra Nature Reserve, reserve number 41184	GPS	1	19/11/2009
49122	7514220	33019	Trithuria australis	'4	Small caespitose aquatic herb. Plants in flower dioecious.	In flooded track along N boundary, grey clay.		occasional .		Along N boundary of Austin Bay Nature Reserve (A4990), c. 1 km S of Yunderup	TOPO	0	8/10/2004
49130	7514166	33019	Trithuria australis	'4	Small aquatic herb.	Growing on track in water to 10cm deep on clayey sand.		occasional .		Austin Bay Nature Reserve, on track junction along N boundary of the reserve	GPS	0	4/11/2005



FID	PopId	NameId	Taxon	ConsStatus	WARank	PopNumber	SubPopCode	Location	District	Vesting	Purpose1	Purpose2	CountDate	Method	MaturreCo	JuvenileC	SeedlingC	LiveTotal	PlantType	AreaOccupi	inFlow	Population
296	86277	3237	Acacia benthamii	'2		3		Junction of Redhead and Hopelands Roads, ca. 6km NW North Dandalup. Land tenure unknown - WAHERB record only.	SWAN COASTAL	UNKN OWN	UNKN OWN		29/09/1998 0:00		0		0					N
301	86282	3237	Acacia benthamii	'2		8		Lot 203 Stock Rd. Stakehill	SWAN COASTAL	PRI			31/03/2005 0:00	ESTMT	0		20					N
302	86283	3237	Acacia benthamii	'2		9		Pinjarra Nature Reserve, adjacent to Moore & Phillips Rd within reserve. Population extends over approx 400x300m stip adjacent to Philips Rd.	SWAN COASTAL	CC	NRE		20/11/2006 0:00	ESTMT	0		250					N
893	92885	14932	Acacia lasiocarpa var. bracteolata long peduncle variant (G.J. Keighery 5026)	'1		3		Ca 500m SW of the junction of Scott Rd and Lakes Rd.	PERTH HILLS	UNKN OWN			17/09/1967 0:00		0		0					N
3753	94968	20026	Blennospora doliiformis	'3		10		Austin Bay Nature Reserve (No. 4990), along N boundary, W of t-junction (Plot austb07). Small seasonal wetland between sand ridges.	SWAN COASTAL	CC	CFF		29/10/1993 0:00		0		0					N
4784	91482	13862	Caladenia speciosa	4		12		SE corner of Hopelands Farm, Hopelands Rd. Private Property. SW corner of Lot 52 Mandurah Rd,	SWAN COASTAL	PRI			25/09/1990 0:00	ACT_IND	15		15					N
6230	93204	16245	Cyathochaeta teretifolia	'3		2		Ravenswood. Drag Strip. 1 km S of Mandurah Rd, at 2.7 km E of the junction with Pinjarra Rd. Murray.	SWAN COASTAL	PRI			18/12/1995 0:00		0		0					N
7016	86754	3863	Dillwynia dillwynioides	'3		2		Austin Bay Nature Reserve, near the northern boundary.	SWAN COASTAL	CC	CFF	NRE	15/06/1995 0:00		0		0					N
7020	86766	3863	Dillwynia dillwynioides	'3		6		Wetland in Paganoni block, 11 km ENE of Mandurah. W side of Stock Route Rd, at ca 2.5 km S of Paganoli Rd.	SWAN COASTAL	SPC			15/06/1994 0:00		0		0					N

FID	PopId	NameId	Taxon	ConsStatus	WARank	PopNumber	SubPopCode	Location	District	Vesting	Purpose1	Purpose2	CountDate	Method	MaturreCo	JuvenileC	SeedlingC	LiveTotal	PlantTypeC	AreaOccupi	inFlo	Populatio
7024	86745	3863	Dillwynia dillwynioides	'3		10		Walk track adj. to Serpentine River (W side), N side of Pinjarra Rd. Between St.Ives Retirement Village and Serpentine River (i.e. end of 2nd boardwalk).Lot 123.	SWAN COASTAL	PRI			30/10/2006 0:00	ESTMT	850		850				Y	
7025	86746	3863	Dillwynia dillwynioides	'3		11		Coodanup-Serpentine Rd (West), Track N from riverside. Lot 440.	SWAN COASTAL	PRI			30/10/2006 0:00	UNKNOWN	300		300				Y	
7027	86748	3863	Dillwynia dillwynioides	'3		13		Water Corp, Un-Named Reserve (ID: 38749), N of Austin Bay.	SWAN COASTAL	WAT	OTH		14/11/2006 0:00	UNKNOWN	16		16				Y	
7028	98817	3863	Dillwynia dillwynioides	'3		14	A	Private Property, Lot 548. Austin Bay, between Yunderup townsite and Austin Bay Nature Reserve (Between Mandurah and Pinjarra).	SWAN COASTAL	PRI			12/10/2006 0:00	ESTMT	600		600				Y	
7029	98818	3863	Dillwynia dillwynioides	'3		14	B	Crown Reserve 50025 (Conservation, Recreation). Austin Bay, between Yunderup townsite and Austin Bay Nature Reserve (Between Mandurah and Pinjarra).	SWAN COASTAL	RDL	REC		12/10/2006 0:00		0		0				Y	
7030	86749	3863	Dillwynia dillwynioides	'3		15		Serpentine River Reserve, Bridal trail off Caponi Rd (Possibly un-named reserve, ID:46501).	SWAN COASTAL	UNKN	UNKN		19/02/2007 0:00	ESTMT	100		100				N	
7034	86753	3863	Dillwynia dillwynioides	'3		19		Goegrup Lake, N end of Caponi Rd. Lot 442.	SWAN COASTAL	PRI			1/10/2001 0:00		0		0				N	
7042	86760	3863	Dillwynia dillwynioides	'3		26		Un-Named National Park (ID: 20215). Jeegarnyeejip Island, Murray River Delta.	SWAN COASTAL	LGA			16/11/2000 0:00		0		0				N	
7069	89507	10796	Diuris drummondii	T	VU	6		Private Property, Lots 172, 173, 174, 175 and 176 (previously R 12081). On SE corner of junction of Wilson Rd & Pinjarra-Mandurah Rd.	SWAN COASTAL	PRI			3/12/1999 0:00	ACT_IND	15		15				Y	

FID	PopId	NameId	Taxon	ConsStatus	WARank	PopNumber	SubPopCode	Location	District	Vesting	Purpose1	Purpose2	CountDate	Method	Maturation	JuvenileC	SeedlingC	LiveTotal	PlantTypeC	AreaOccupi	inFlower	Population
7117	107482	10796	Diuris drummondii	T	VU	42		'Murrayfield Air Park' Reserve 50750, approximately 900 metres East of Nambeelup Rd, and 170m in the reserve; north east of Mandurah	SWAN COASTAL	CC	CFF		16/12/2009 0:00	ACT_IND	236		0		PLANTS		Y	HEALTHY
7131	90604	12938	Diuris micrantha	T	VU	3		Cooleenup Island, Yunderup. On Reserve 23016 (Camping and Recreation Ground).	SWAN COASTAL	LGA	REC	CAM	24/10/1992 0:00	ESTMT	20		20				Y	
7151	85054	1637	Diuris purdiei	T	EN	7		Pinjarra NR (R 41184), Lot 348. Pinjarra Rd, between Sutton Rd & Phillips Rd. [E side of reserve]. Shire of Murray.	PERTH HILLS	CC	CFF		18/09/2008 0:00		30		30				Y	
7325	97404	1639	Drakaea elastica	T	CR	36	A	Private Property, 601 Lakes Road, East Greenfields (Stake Hill).	SWAN COASTAL	PRI			9/09/2009 0:00	ACT_IND	64		64					N
7326	97405	1639	Drakaea elastica	T	CR	36	B	Main Roads vested, Lot 907 Fowler Road, Stake Hill. N off Lakes Road. Near junction with Lakelands Road. East of Private property Lot 601. Access road has been rehab'd and the eastern portion fenced. Plants mostly in SE cnr of lot.	SWAN COASTAL	MRD	GVT		17/08/2010 0:00	ESTMT	62		62					N
7327	97407	1639	Drakaea elastica	T	CR	37	A	Main Roads vested, Lot 212 Lymon Rd, Stake Hill. Between Stock Rd and Paganoni Reserve. Along edge of firebeak on W side of road reserve for future Kwinana Fwy extension. Population has been cleared for freeway extension.	SWAN COASTAL	MRD			1/09/2010 0:00	ACT_IND	0		0					N

FID	PopId	NameId	Taxon	ConsStatus	WARank	PopNumber	SubPopCode	Location	District	Vesting	Purpose1	Purpose2	CountDate	Method	Maturation	JuvenileC	SeedlingC	LiveTotal	PlantTypeC	AreaOccupi	inFlo	Populatio
7329	97409	1639	Drakaea elastica	T	CR	37	C	Private Property, Lot 519 Stock Rd, Stake Hill. North-eastern boundary of the property. [Adjacent to the west side of the Kwinana Freeway extension].	SWAN COASTAL	PRI			6/09/2010 0:00	ACT_IND	4	30	0		PLANTS	1200	N	MODERATE
7331	97411	1639	Drakaea elastica	T	CR	38	A	Lot 50. Western side of Serpentine River, in WAPC land bounded by Stock, Lakes and Fowler Roads. Edge of Perth to Bunbury Hwy. Shire of Murray. Adjacent to Serpentine River NR, W side of bike path near SW cnr of reserve.	SWAN COASTAL	SPC			3/08/2010 0:00	ESTMT	104		104				N	
7332	97412	1639	Drakaea elastica	T	CR	38	B	Unnamed Nature Reserve (44986), Lot 4157. Near southern boundary of Reserve 44986 on the west side of Serpentine River. Occurs on N & S sides of central sandy track through reserve and scattered throughout vegetation in small clumps. Shire of Murray.	SWAN COASTAL	CC	CFF		23/07/2010 0:00	ACT_IND	420		420				N	
7333	97413	1639	Drakaea elastica	T	CR	38	D	Lot 50. Western side of Serpentine River, in WAPC land bounded by Stock and Lakes Roads and Forrest Hwy. South-Western side of Kwinana Freeway (freeway bisects Lot 50). Shire of Murray.	SWAN COASTAL	SPC			3/08/2010 0:00	ESTMT	92		92				N	
7347	109313	1639	Drakaea elastica	T	CR	49		Freehold (WAPC Owned) Vacant Residential Lot 193. North end of Fiegert Road, East of Mandurah. Approx 400-500m North of Pinjarra Road. WAPC Reserve, 70m South West of Population.	SWAN COASTAL	SPC	UCL		22/07/2014 0:00	ACT_IND	0	3	6	0	PLANTS	15	N	HEALTHY

FID	PopId	NameId	Taxon	ConsStatus	WARank	PopNumber	SubPopCode	Location	District	Vesting	Purpose1	Purpose2	CountDate	Method	MaturreCon	JuvenileC	SeedlingC	LiveTotal	PlantTypeC	AreaOccupi	inFlo	Populatio
7348	109909	1639	Drakaea elastica	T	CR	50		Jubata Reserve (CR 49425), Lot 1995, Dudley Park 6210. City Of Mandurah.	SWAN COASTAL	LGA	PAR		8/10/2015 0:00	ACT_IND	14	2	0		PLANTS	3500	Y	HEALTHY
7350	113829	1639	Drakaea elastica	T	CR	52		Private Property. Lot 223 Lakes Rd, Nambeelup. NW corner of the porperty. Population extends 100m NW of GPS coords.	SWAN COASTAL	PRI			13/10/2017 0:00	ACT_IND	24	50	0		PLANTS	1026	Y	HEALTHY
7441	90840	3115	Drosera occidentalis	4		6		E corner of Lot 21, S side of Mandurah-Pinjarra Rd, Ravenswood.	PERTH HILLS	MRD	OTH		5/10/1989 0:00		0		0				N	
7453	101635	3115	Drosera occidentalis	4		18	A	Reserve No 34033, Moores Rd, Pinjarra. 150 m W of Phillips Rd, at 64 m N of SEC pole No.11	SWAN COASTAL	LGA	REC		9/08/1990 0:00	ESTMT	1700		1700				N	
7454	101636	3115	Drosera occidentalis	4		18	B	Reserve No, 34033, Moores Rd, Pinjarra. 350 m W of Phillips Rd, at 60 and 90 m N of the powerlines.	PERTH HILLS	LGA	REC		9/08/1990 0:00	ACT_IND	336		336				N	
10626	90994	13452	Grevillea manglesii subsp. ornithopoda	'2		3		'Yunderp Island' site is possibly developed,3.6km south of Furnisdale.	SWAN COASTAL	UNKN OWN	UNKN OWN		15/11/2000 0:00		0		0				N	
11955	94660	19272	Johnsonia pubescens subsp. cygnorum	'2		2		Nambeelup Rd., ENE of Mandurah	SWAN COASTAL	LGA	VER		16/11/1992 0:00		0		0				N	
13507	96563	33742	Microtis quadrata	4		1		Nature Reserve 41184. Mandurah-Pinjarra Rd, 2.3 km NW of Pinjarra, on the W side of Pinjarra Caravan Park.	PERTH HILLS	CC	CFF		10/10/1984 0:00		0		0				N	
13669	88365	6193	Myriophyllum echinatum	'3		1		Austin Bay Nature Reserve. Ca 0.65 km W and 0.15 km S from the NE corner of the reserve.	PERTH HILLS	CC	CFF	NRE	15/06/1994 0:00		0		0				N	
14045	88789	6573	Parsonsia diaphanophleba	4		2		E bank of the Murray River, adjoining the SW corner of Lot 41 Old Mandurah Rd.	SWAN COASTAL	LGA	REC		31/08/1995 0:00		0		6				N	

FID	PopId	NameId	Taxon	ConsStatus	WARank	PopNumber	SubPopCode	Location	District	Vesting	Purpose1	Purpose2	CountDate	Method	Maturation	JuvenileC	SeedlingC	LiveTotal	PlantTypeC	AreaOccupi	inFlower	Population
14046	88790	6573	Parsonia diaphanophleba	4		3		Fringing the W bank of Serpentine River. E of Ibis Retreat. Benara Farm, Lot 2 of Pt Lot 42, Cockburn Sound Location 16.	PERTH HILLS	UNKN OWN			15/06/1983 0:00		0		0				N	
15616	89309	7756	Stylidium longitubum	4		5		Un-named Reserve (ID:34033), Pinjarra Industrial Area.	PERTH HILLS	LGA	REC		21/11/2002 0:00		0		0				N	
15623	89293	7756	Stylidium longitubum	4		11		Un-named Reserve (ID: 44986), Paganoni block E of Mandurah Rd, 11km NNE of Mandurah near Serpentine River (adj. to plot paga-2).	SWAN COASTAL	CC	CFF		4/11/1992 0:00		0		0				N	
15625	89295	7756	Stylidium longitubum	4		13		Austin Bay Nature Reserve (ID: 4990), swale WSW of Grey Rd (plot austb-3).	SWAN COASTAL	CC	CFF		29/10/1993 0:00		0		0				N	
15962	103961	18590	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	CR	1	A	South Western Hwy, west side. 800m north along the South Western Hwy, west side, from the 'Fairbridge Farm' entrance. North of Pinjarra.	SWAN COASTAL	MRD	VER		21/09/2010 0:00	ACT_IND	7		0	PLANTS	95	Y	POOR	
15963	103962	18590	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	CR	1	B	South Western Hwy. 1.2-1.5km north along the South Western Hwy, east side, from the 'Fairbridge Farm' entrance. North of Pinjarra.	PERTH HILLS	MRD	VER		18/10/2010 0:00	ACT_IND	3		0	PLANTS	490	Y	HEALTHY	
15964	103963	18590	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	CR	1	C	Private Property Lot 20. 1.2-1.5km north along the South Western Hwy, east [south] side, from the 'Fairbridge Farm' entrance; plants then extend into Fairbridge Farm property. North of Pinjarra.	PERTH HILLS	PRI			18/10/2010 0:00	ACT_IND	2	2	0	PLANTS		Y	HEALTHY	
15965	107942	18590	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	CR	1	D	Private Property Lot 19 ~1.5km north along the South Western Hwy, east side, from the 'Fairbridge Farm' entrance. North of Pinjarra. Plant is ~3m from fenceline dividing Lot 19 and 20 and ~5m from PP/Gas pipeline gate	PERTH HILLS	PRI	PAS		30/08/2013 0:00	ACT_IND	1		0	PLANTS	1	Y	HEALTHY	

FID	Popld	Nameid	Taxon	ConsStatus	WARank	PopNumberr	SubPopCode	Location	District	Vesting	Purpose1	Purpose2	CountDate	Method	MaturreCo	JuvenileC	SeedlingC	LiveTotal	PlantTypeC	AreaOccupi	inFlo	Populatio
15966	94504	18590	Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	CR	2		Rail reserve, both sides of railway line between 1.8-2.45km south along rail service track from Shanns Road. Plants located on west side ca. 1.8km. Remaining plants on east side at ca. 2.0-2.15km and 2.35-2.45km in association with swampy areas.	SWAN COASTAL	RAI	RRE		23/09/2010 0:00	ACT_IND	159	14	0		PLANTS	1176	Y	HEALTHY
15983	94551	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	CR	1		3.1km south along Shanns Road (including access track) from rail crossing at South Street, both sides of access track and on the easter side of the railway line. SW of North Dandalup.	SWAN COASTAL	RAI	RRE		11/09/2003 0:00	ACT_IND	140	171	311				Y	
15984	94552	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	CR	2		Rail Reserve 1.4km to 2.9km south from the westward deviation of Shanns Road. Located on the east and west sides of the railway line, and the east and west sides of a track. N extent: 32* 32' 51` S & 115* 56' 00` E.	SWAN COASTAL	RAI	RRE		11/08/2008 0:00		0		0				Y	
15986	94554	19055	Synaphea sp. Pinjarra (R. Davis 6578)	T	CR	4		Rail reserve between 3.6 to 4.1km south of the westward deviation of Shanns Road, along the east and west sides of the railway line and west side of a track.	SWAN COASTAL	RAI	RRE		7/09/2003 0:00	ACT_IND	151	108	259				Y	
15991	107447	30751	Synaphea sp. Pinjarra Plain (A.S. George 17182)	T	EN	2		Unknown Road reserve, pop located 4.44 Km S of South St/Railway Ave intersection on an unmade road reserve on the E of the railway, North Dandalup. All plants are E of the track.	SWAN COASTAL	LGA	VER		14/09/2012 0:00	ACT_IND	2	0	0	0	PLANTS	10	Y	HEALTHY
16046	103386	16749	Synaphea stenoloba	T	CR	4	C	South West Highway, W verge. Located 800m N of Fairbridge Road. NE of Pinjarra.	SWAN COASTAL	MRD	VER		29/08/2013 0:00	ACT_IND	5		0		PLANTS	20	Y	MODERATE

FID	PopId	NameId	Taxon	ConsStatus	WARank	PopNumber	SubPopCode	Location	District	Vesting	Purpose1	Purpose2	CountDate	Method	MaturreCo	JuvenileC	SeedlingC	LiveTotal	PlantTypeC	AreaOccupi	inFlo	Populatio
16049	103389	16749	Synaphea stenoloba	T	CR	6	A	Private Property, Lot 600 (previously part of Lot 504), 31 Fields Street, Pinjarra. Throughout property, going onto drainage R 31656 to the south.	SWAN COASTAL	PRI			7/10/2010 0:00	ACT_IND	143		0			1590	Y	POOR
16050	103390	16749	Synaphea stenoloba	T	CR	6	B	Recreation Reserve (34033), Lot 323. Adjacent to the Pinjarra Industrial Estate, at the intersection of Phillips Road and Moores Road, Pinjarra. [W of intersection, N of Moores Rd].	SWAN COASTAL	LGA	REC		7/10/2010 0:00	ACT_IND	38		0	PLANTS	####	Y	POOR	
16051	103391	16749	Synaphea stenoloba	T	CR	6	C	Recreation Reserve (34033), Intersection of Moores and Phillips Road [E of intersection, N side of Moores Rd]. Behind Pinjarra Caravan Park on Pinjarra Rd. Plants are in 4 patches within the reserve.	SWAN COASTAL	LGA	REC		7/10/2010 0:00	ACT_IND	150		0	PLANTS	2658	Y	POOR	
16052	106321	16749	Synaphea stenoloba	T	CR	6	D	Private Property, Lot 601 (previously part of Lot 504 - Pop 6A), 29 Fields Street, Pinjarra. Throughout property, going onto drainage R 31656 to the south.	SWAN COASTAL	PRI			7/10/2010 0:00	ACT_IND	0		0			N	POOR	
16059	93404	16749	Synaphea stenoloba	T	CR	12		Railway Reserve, W side. 3.4 km S along rail access track from Shanns Rd.	SWAN COASTAL	RAI	RRE		23/09/2010 0:00	ACT_IND	0		0	PLANTS		N		
16130	84539	1033	Tetraria australiensis	T	VU	12	A	Railway Reserve. West side of rail line. 3.8 km S along access track from Westward deviation of Shanns Rd, North Dandalup. [Adjacent to PTA owned PP Lot 50].	SWAN COASTAL	RAI	RRE		12/11/2009 0:00	ESTMT	120		120			N	HEALTHY	
16131	106342	1033	Tetraria australiensis	T	VU	12	B	Lot 50 on Plan 3765 west side of rail reserve. 3.8 km S along access track from Westward deviation of Shanns Rd, North Dandalup. [PTA owned]	SWAN COASTAL	PRI			12/11/2009 0:00		0		0			N		



FID	PopId	NameId	Taxon	ConsStatus	WARank	PopNumber	SubPopCode	Location	District	Vesting	Purpose1	Purpose2	CountDate	Method	Maturation	JuvenileC	SeedlingC	LiveTotal	PlantTypeC	AreaOccupi	inFlower	Population
16138	108105	1033	<i>Tetraria australiensis</i>	T	VU	17		Unnamed Shire road reserve, 4.3-5.1km S of Lakes Road, north Dandalup, on the unmade road reserve E of the Railway. Plants occur on the east of the track within the unmade road reserve.	SWAN COASTAL	LGA	VER		14/09/2012 0:00	ACT_IND	16		0		PLANTS	36		HEALTHY
16139	108106	1033	<i>Tetraria australiensis</i>	T	VU	18		Unnamed road reserve SW of North Dandalup along the rail reserve which parallels the northern end of Shanns Rd. The plants are located 3.2 km south of Lakes Rd along the rail access track on the eastern side of the railway line.	SWAN COASTAL	LGA	VER		28/09/2010 0:00	PART_CNT	2		0		CLUMPS		N	
16573	93726	44444	<i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)	4		14		Recreation Reserve 34033, Pinjarra Industrial Site. N side of Moores Rd, ca 1.5 km E from the junction with Curtis Rd.	PERTH HILLS	LGA	REC		17/11/1995 0:00		0		0				Y	
16581	96435	33019	<i>Trithuria australis</i>	4		4		Austin Bay NR (4990). On track along N boundary of NR. Ca. 1km S of Yunderup. Murray.	SWAN COASTAL	CC	CFF		4/11/2005 0:00		0		0				N	

# **APPENDIX 2**

## **Naturemap Report**

# NatureMap Species Report

Created By Guest user on 08/03/2019

Current Names Only Yes  
 Core Datasets Only Yes  
 Method 'By Circle'  
 Centre 115° 50' 27" E, 32° 32' 08" S  
 Buffer 5km  
 Group By Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	146	1519
Priority 1	1	2
Priority 2	1	2
Priority 3	1	1
Priority 4	2	10
Protected under international agreement	16	99
Rare or likely to become extinct	7	53
<b>TOTAL</b>	<b>174</b>	<b>1686</b>

Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
<b>Rare or likely to become extinct</b>				
1.	24784 <i>Calidris ferruginea</i> (Curlew Sandpiper)		T	
2.	24731 <i>Calyptorhynchus banksii subsp. naso</i> (Forest Red-tailed Black Cockatoo)		T	
3.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)		T	
4.	24092 <i>Dasyurus geoffroyi</i> (Chuditch, Western Quoll)		T	
5.	10796 <i>Diuris drummondii</i> (Tall Donkey Orchid)		T	
6.	1639 <i>Drakaea elastica</i> (Glossy-leaved Hammer Orchid)		T	
7.	24798 <i>Numenius madagascariensis</i> (Eastern Curlew)		T	
<b>Protected under international agreement</b>				
8.	41323 <i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
9.	24779 <i>Calidris acuminata</i> (Sharp-tailed Sandpiper)		IA	
10.	24786 <i>Calidris melanotos</i> (Pectoral Sandpiper)		IA	
11.	24788 <i>Calidris ruficollis</i> (Red-necked Stint)		IA	
12.	24789 <i>Calidris subminuta</i> (Long-toed Stint)		IA	
13.	41332 <i>Chlidonias leucopterus</i> (White-winged Black Tern, white-winged tern)		IA	
14.	48587 <i>Hydroprogne caspia</i> (Caspian Tern)		IA	
15.	30932 <i>Limosa lapponica</i> (Bar-tailed Godwit)		IA	
16.	25741 <i>Limosa limosa</i> (Black-tailed Godwit)		IA	
17.	48591 <i>Pandion cristatus</i> (Osprey, Eastern Osprey)		IA	
18.	24802 <i>Philomachus pugnax</i> (Ruff, reeve)		IA	
19.	24843 <i>Plegadis falcinellus</i> (Glossy Ibis)		IA	
20.	48597 <i>Thalasseus bergii</i> (Crested Tern)		IA	
21.	24806 <i>Tringa glareola</i> (Wood Sandpiper)		IA	
22.	24808 <i>Tringa nebularia</i> (Common Greenshank, greenshank)		IA	
23.	24809 <i>Tringa stagnatilis</i> (Marsh Sandpiper, little greenshank)		IA	
<b>Priority 1</b>				
24.	14932 <i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)		P1	
<b>Priority 2</b>				
25.	19272 <i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>		P2	
<b>Priority 3</b>				
26.	11612 <i>Boronia capitata</i> subsp. <i>gracilis</i>		P3	
<b>Priority 4</b>				
27.	48588 <i>Isoodon fusciventer</i> (Quenda, southwestern brown bandicoot)		P4	
28.	24328 <i>Oxyura australis</i> (Blue-billed Duck)		P4	
<b>Non-conservation taxon</b>				
29.	16975 <i>Acacia decurrens</i>	Y		
30.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
31.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
32.	24262 <i>Acanthiza inornata</i> (Western Thornbill)			
33.	24560 <i>Acanthorhynchus superciliosus</i> (Western Spinebill)			
34.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
35.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
36.	25755 <i>Acrocephalus australis</i> (Australian Reed Warbler)			
37.	48320 <i>Amanita eucalypti</i>			
38.	24310 <i>Anas castanea</i> (Chestnut Teal)			
39.	24312 <i>Anas gracilis</i> (Grey Teal)			
40.	24315 <i>Anas rhynchotis</i> (Australasian Shoveler)			
41.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
42.	47414 <i>Anhinga novaehollandiae</i> (Australasian Darter)			
43.	11434 <i>Anigozanthos humilis</i> subsp. <i>humilis</i>			
44.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
45.	24562 <i>Anthochaera lunulata</i> (Western Little Wattlebird)			
46.	25558 <i>Ardea ibis</i> (Cattle Egret)			
47.	41324 <i>Ardea modesta</i> (great egret, white egret)			
48.	24340 <i>Ardea novaehollandiae</i> (White-faced Heron)			
49.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
50.	1264 <i>Arnocrinum preissii</i>			
51.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
52.	24353 <i>Artamus cyanopterus</i> (Dusky Woodswallow)			
53.	6334 <i>Astroloma pallidum</i> (Kick Bush)			
54.	2471 <i>Atriplex prostrata</i> (Hastate Orache)	Y		
55.	24318 <i>Aythya australis</i> (Hardhead)			
56.	<i>Barnardius zonarius</i>			
57.	24319 <i>Biziura lobata</i> (Musk Duck)			
58.	6341 <i>Brachyloma preissii</i> (Globe Heath)			
59.	25598 <i>Cacomantis flabelliformis</i> (Fan-tailed Cuckoo)			
60.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
61.	19309 <i>Calectasia narragara</i>			
62.	25717 <i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
63.	5460 <i>Calyptrix fraseri</i> (Pink Summer Calyptrix)			
64.	<i>Carassius auratus</i>			
65.	25625 <i>Carduelis carduelis</i> (Goldfinch, European Goldfinch)	Y		
66.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
67.	43380 <i>Chelodina colliei</i> (South-western Snake-necked Turtle)			
68.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
69.	<i>Cherax quinquecarinatus</i>			
70.	24980 <i>Christinus marmoratus</i> (Marbled Gecko)			
71.	<i>Chroicocephalus novaehollandiae</i>			
72.	24288 <i>Circus approximans</i> (Swamp Harrier)			
73.	24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt)			
74.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
75.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
76.	25592 <i>Corvus coronoides</i> (Australian Raven)			
77.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
78.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
79.	25027 <i>Ctenotus australis</i>			
80.	24322 <i>Cygnus atratus</i> (Black Swan)			
81.	30901 <i>Dacelo novaeguineae</i> (Laughing Kookaburra)	Y		
82.	25607 <i>Dicaeum hirundinaceum</i> (Mistletoebird)			
83.	3095 <i>Drosera erythrorhiza</i> (Red Ink Sundew)			
84.	2504 <i>Dysphania plantaginella</i>			
85.	<i>Egretta garzetta</i>			
86.	<i>Egretta novaehollandiae</i>			
87.	<i>Elanus axillaris</i>			
88.	47937 <i>Elseymornis melanops</i> (Black-fronted Dotterel)			
89.	<i>Eolophus roseicapillus</i>			
90.	24567 <i>Epthianura albifrons</i> (White-fronted Chat)			
91.	24379 <i>Erythronys cinctus</i> (Red-kneed Dotterel)			
92.	3872 <i>Euchlopsis linearis</i> (Swamp Pea)			
93.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
94.	25623 <i>Falco longipennis</i> (Australian Hobby)			
95.	25727 <i>Fulica atra</i> (Eurasian Coot)			
96.	24761 <i>Fulica atra</i> subsp. <i>australis</i> (Eurasian Coot)			
97.	34028 <i>Galaxias occidentalis</i> (Western Minnow)			
98.	25729 <i>Gallinula tenebrosa</i> (Dusky Moorhen)			
99.	24763 <i>Gallinula tenebrosa</i> subsp. <i>tenebrosa</i> (Dusky Moorhen)			
100.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
101.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
102.	24293 <i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)			
103.	24295 <i>Haliastur spheonurus</i> (Whistling Kite)			
104.	25410 <i>Heleioporus eyrei</i> (Moaning Frog)			
105.	5134 <i>Hibbertia huegelii</i>			
106.	5172 <i>Hibbertia stellaris</i> (Orange Stars)			
107.	5176 <i>Hibbertia vaginata</i>			
108.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
109.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
110.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
111.	3966 <i>Hovea pungens</i> (Devil's Pins, Puyenak)			
112.	4012 <i>Jacksonia furcellata</i> (Grey Stinkwood)			
113.	24511 <i>Larus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Silver Gull)			
114.	7574 <i>Lechenaultia floribunda</i> (Free-flowering Leschenaultia)			
115.	5850 <i>Leptospermum laevigatum</i> (Coast Teatree)	Y		
116.	1085 <i>Lepyrodia glauca</i>			
117.	6374 <i>Leucopogon conostephioides</i>			
118.	6451 <i>Leucopogon tenuis</i>			
119.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
120.	25388 <i>Litoria moorei</i> (Motorbike Frog)			
121.	1244 <i>Lomandra sonderi</i>			
122.	24326 <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)			
123.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
124.	25758 <i>Megalurus gramineus</i> (Little Grassbird)			
125.	25184 <i>Menetia greyii</i>			
126.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)			
127.	<i>Microcarbo melanoleucos</i>			
128.	25191 <i>Morethia lineocellata</i>			
129.	<i>Nannoperca vittata</i>			
130.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
131.	25564 <i>Nycticorax caledonicus</i> (Rufous Night Heron)			
132.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
133.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
134.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
135.	24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)			
136.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
137.	25697 <i>Phalacrocorax carbo</i> (Great Cormorant)			
138.	25698 <i>Phalacrocorax melanoleucos</i> (Little Pied Cormorant)			
139.	24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
140.	25699 <i>Phalacrocorax varius</i> (Pied Cormorant)			
141.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
142.	48071 <i>Phylidonyris niger</i> (White-cheeked Honeyeater)			
143.	24596 <i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
144.	<i>Phytophthora cinnamomi</i>			
145.	24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
146.	25720 <i>Platycercus icterotis</i> (Western Rosella)			
147.	25704 <i>Podiceps cristatus</i> (Great Crested Grebe)			
148.	24681 <i>Poliocephalus poliocephalus</i> (Hoary-headed Grebe)			
149.	2419 <i>Polygonum aviculare</i> (Wireweed)	Y		
150.	25722 <i>Polytelis anthopeplus</i> (Regent Parrot)			
151.	24767 <i>Porphyrio porphyrio</i> subsp. <i>bellus</i> (Purple Swamphen)			
152.	24771 <i>Porzana tabuensis</i> (Spotless Crane)			
153.	1676 <i>Prasophyllum hians</i> (Yawning Leek Orchid)			
154.	<i>Pterostylis</i> sp.			
155.	4177 <i>Pultenaea ochreatea</i>			
156.	<i>Purpurecephalus spurius</i>			
157.	24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)			
158.	48096 <i>Rhipidura albiscapa</i> (Grey Fantail)			
159.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
160.	38836 <i>Russula erumpens</i>			
161.	25534 <i>Sericornis frontalis</i> (White-browed Scrubwren)			
162.	30948 <i>Smicornis brevirostris</i> (Weebill)			
163.	25597 <i>Strepera versicolor</i> (Grey Currawong)			
164.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
165.	48293 <i>Styphelia ciliosa</i>			
166.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
167.	24682 <i>Tachybaptus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
168.	24207 <i>Tachyglossus aculeatus</i> (Short-beaked Echidna)			
169.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
170.	1036 <i>Tetraria octandra</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
171.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
172.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
173.	1361 <i>Tricoryne elatior</i> (Yellow Autumn Lily)			
174.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye, Silveryeye)			

**Conservation Codes**

- T - Rare or likely to become extinct
- X - Presumed extinct
- IA - Protected under international agreement
- S - Other specially protected fauna
- 1 - Priority 1
- 2 - Priority 2
- 3 - Priority 3
- 4 - Priority 4
- 5 - Priority 5

<sup>1</sup> For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

# **APPENDIX 3**

## **Protected Matters Search Tool Report**

# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 08/03/19 16:43:58

[Summary](#)

[Details](#)

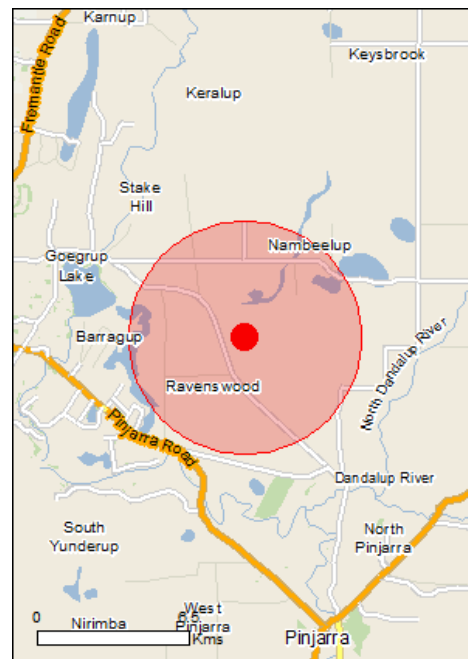
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

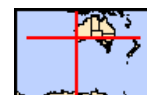
[Acknowledgements](#)



This map may contain data which are  
©Commonwealth of Australia  
(Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 5.0Km





## Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	1
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	1
<a href="#">Listed Threatened Species:</a>	43
<a href="#">Listed Migratory Species:</a>	29

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

<a href="#">Commonwealth Land:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	36
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

<a href="#">State and Territory Reserves:</a>	3
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	38
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	None

**Matters of National Environmental Significance**

Wetlands of International Importance (Ramsar)		[ Resource Information ]
Name		Proximity
<a href="#">Peel-yalgorup system</a>		Within 10km of Ramsar

**Listed Threatened Ecological Communities** [ Resource Information ]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
<a href="#">Banksia Woodlands of the Swan Coastal Plain ecological community</a>	Endangered	Community likely to occur within area

**Listed Threatened Species** [ Resource Information ]

Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Anous tenuirostris melanops</a> Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
<a href="#">Botaurus poiciloptilus</a> Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calyptorhynchus banksii naso</a> Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Calyptorhynchus baudinii</a> Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Species or species habitat likely to occur within area
<a href="#">Calyptorhynchus latirostris</a> Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
<a href="#">Diomedea amsterdamensis</a> Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
<a href="#">Diomedea dabbenena</a> Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
<a href="#">Diomedea epomophora</a> Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
<b>Item 11.1</b> <a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Diomedea sanfordi</a> Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Limosa lapponica baueri</a> Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Limosa lapponica menzbieri</a> Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Pachyptila turtur subantarctica</a> Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Rostratula australis</a> Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
<a href="#">Thalassarche cauta cauta</a> Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Thalassarche cauta steadi</a> White-capped Albatross [82344]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<b>Mammals</b>		
<a href="#">Dasyurus geoffroii</a> Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Neophoca cinerea</a> Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Pseudocheirus occidentalis</a> Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Setonix brachyurus</a> Quokka [229]	Vulnerable	Species or species habitat may occur within area

Carter's Freshwater Mussel, Freshwater Mussel [86266] Vulnerable Species or species habitat likely to occur within area

#### Plants

##### [Andersonia gracilis](#)

Slender Andersonia [14470] Endangered Species or species habitat may occur within area

##### [Caladenia huegelii](#)

King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309] Endangered Species or species habitat may occur within area

##### [Diuris micrantha](#)

Dwarf Bee-orchid [55082] Vulnerable Species or species habitat known to occur within area

##### [Diuris purdiei](#)

Purdie's Donkey-orchid [12950] Endangered Species or species habitat likely to occur within area

##### [Drakaea elastica](#)

Glossy-leafed Hammer Orchid, Glossy-leafed Hammer Orchid, Warty Hammer Orchid [16753] Endangered Species or species habitat known to occur within area

##### [Drakaea micrantha](#)

Dwarf Hammer-orchid [56755] Vulnerable Species or species habitat likely to occur within area

##### [Eucalyptus x balanites](#)

Cadda Road Mallee, Cadda Mallee [87816] Endangered Species or species habitat may occur within area

##### [Synaphea sp. Fairbridge Farm \(D. Papenfus 696\)](#)

Selena's Synaphea [82881] Critically Endangered Species or species habitat likely to occur within area

##### [Synaphea sp. Serpentine \(G.R. Brand 103\)](#)

[86879] Critically Endangered Species or species habitat may occur within area

##### [Synaphea stenoloba](#)

Dwellingup Synaphea [66311] Endangered Species or species habitat likely to occur within area

#### Reptiles

##### [Caretta caretta](#)

Loggerhead Turtle [1763] Endangered Species or species habitat known to occur within area

##### [Chelonia mydas](#)

Green Turtle [1765] Vulnerable Species or species habitat known to occur within area

##### [Dermochelys coriacea](#)

Leatherback Turtle, Leathery Turtle, Luth [1768] Endangered Species or species habitat known to occur within area

##### [Natator depressus](#)

Flatback Turtle [59257] Vulnerable Species or species habitat known to occur within area

#### Listed Migratory Species

[ Resource Information ]

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name Threatened Type of Presence

#### Migratory Marine Birds

##### [Anous stolidus](#)

Common Noddy [825] Species or species habitat may occur within area

Name	Threatened	Type of Presence
<p>Item 11.1  <a href="#">Apus pacificus</a>            Fork-tailed Swift [678]</p>		
<p>Ordinary Council Meeting 26 August 2021</p>		
<p>Appendix 2            Page 197</p>		
<a href="#">Diomedea amsterdamensis</a> Amsterdam Albatross [64405]	Endangered	Species or species habitat likely to occur within area
<a href="#">Diomedea dabbenena</a> Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
<a href="#">Diomedea epomophora</a> Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Diomedea sanfordi</a> Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche cauta</a> Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat likely to occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
<p>Migratory Marine Species</p>		
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
<a href="#">Manta alfredi</a> Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
<a href="#">Manta birostris</a> Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Grey Wagtail [642] Species or species habitat may occur within area

Migratory Wetlands Species

[Actitis hypoleucos](#)  
Common Sandpiper [59309] Species or species habitat known to occur within area

[Calidris acuminata](#)  
Sharp-tailed Sandpiper [874] Species or species habitat known to occur within area

[Calidris canutus](#)  
Red Knot, Knot [855] Endangered Species or species habitat known to occur within area

[Calidris ferruginea](#)  
Curlew Sandpiper [856] Critically Endangered Species or species habitat known to occur within area

[Calidris melanotos](#)  
Pectoral Sandpiper [858] Species or species habitat known to occur within area

[Limosa lapponica](#)  
Bar-tailed Godwit [844] Species or species habitat known to occur within area

[Numenius madagascariensis](#)  
Eastern Curlew, Far Eastern Curlew [847] Critically Endangered Species or species habitat known to occur within area

[Pandion haliaetus](#)  
Osprey [952] Breeding known to occur within area

[Tringa nebularia](#)  
Common Greenshank, Greenshank [832] Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [ Resource Information ]

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name Threatened Type of Presence

Birds

[Actitis hypoleucos](#)  
Common Sandpiper [59309] Species or species habitat known to occur within area

[Anous stolidus](#)  
Common Noddy [825] Species or species habitat may occur within area

[Anous tenuirostris melanops](#)  
Australian Lesser Noddy [26000] Vulnerable Species or species habitat may occur within area

[Apus pacificus](#)  
Fork-tailed Swift [678] Species or species habitat likely to occur within area

[Ardea alba](#)  
Great Egret, White Egret [59541] Breeding known to occur within area

Name	Threatened	Type of Presence
Item 11.1 <a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat known to occur within area
<a href="#">Diomedea amsterdamensis</a> Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
<a href="#">Diomedea dabbenena</a> Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
<a href="#">Diomedea epomophora</a> Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Diomedea exulans</a> Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Diomedea sanfordi</a> Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
<a href="#">Macronectes halli</a> Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Pachyptila turtur</a> Fairy Prion [1066]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Item 11.1 <a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
<a href="#">Thalassarche cauta</a> Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat likely to occur within area
<a href="#">Thalassarche impavida</a> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche melanophris</a> Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thalassarche steadi</a> White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
<a href="#">Thinornis rubricollis</a> Hooded Plover [59510]		Species or species habitat may occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
<b>Mammals</b>		
<a href="#">Neophoca cinerea</a> Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat likely to occur within area
<b>Reptiles</b>		
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area



**State and Territory Reserves** [ Resource Information ]

Name	State
Unnamed WA35283	WA
Unnamed WA50750	WA
Unnamed WA51946	WA

**Invasive Species** [ Resource Information ]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
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**Birds**

Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
<b>Mammals</b>		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area

Name	Status	Type of Presence	Appendix 2 Page 202
Item 11.1 Feral deer Feral deer species in Australia [85735] <b>Ordinary Council Meeting 26 August 2021</b>		Species or species habitat likely to occur within area	
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area	
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area	
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area	
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area	
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area	
Sus scrofa Pig [6]		Species or species habitat likely to occur within area	
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area	
<b>Plants</b>			
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area	
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area	
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area	
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area	
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area	
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area	
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area	
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area	
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area	
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within	

Name	Status	Type of Presence area	Appendix 2 Page 203
<b>Item 11.1 Ordinary Council Meeting 26 August 2021</b>			
Pinus radiata			
Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area	
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area	
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area	
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area	
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area	
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area	
<b>Reptiles</b>			
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area	

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

## Coordinates

-32.5356 115.84265

Ordinary Council Meeting 26 August 2021

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [Office of Environment and Heritage, New South Wales](#)
- [Department of Environment and Primary Industries, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment, Water and Natural Resources, South Australia](#)
- [Department of Land and Resource Management, Northern Territory](#)
- [Department of Environmental and Heritage Protection, Queensland](#)
- [Department of Parks and Wildlife, Western Australia](#)
- [Environment and Planning Directorate, ACT](#)
- [Birdlife Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Museum Victoria](#)
- [Australian Museum](#)
- [South Australian Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- [Australian Tropical Herbarium, Cairns](#)
- [eBird Australia](#)
- [Australian Government – Australian Antarctic Data Centre](#)
- [Museum and Art Gallery of the Northern Territory](#)
- [Australian Government National Environmental Science Program](#)
- [Australian Institute of Marine Science](#)
- [Reef Life Survey Australia](#)
- [American Museum of Natural History](#)
- [Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

# **APPENDIX 4**

## **Conservation Codes**

## Conservation Codes for Western Australian Flora and Fauna

Specially protected fauna or flora are species\* which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such.

Categories of specially protected fauna and flora are:

### **T Threatened species – Schedules 1-4**

Published as Specially Protected under the *Wildlife Conservation Act 1950*, and listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).

- **Threatened fauna** is that subset of ‘Specially Protected Fauna’ declared to be ‘likely to become extinct’ pursuant to section 14(4) of the Wildlife Conservation Act.
- **Threatened flora** is flora that has been declared to be ‘likely to become extinct or is rare, or otherwise in need of special protection’, pursuant to section 23F(2) of the Wildlife Conservation Act.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

### **CR Critically endangered species – Schedule 1**

Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

### **EN Endangered species – Schedule 2**

Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

### **VU Vulnerable species - Schedule 3**

Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

**EX Presumed extinct species - Schedule 4**

Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.

**IA Migratory birds protected under an international agreement - Schedule 5**

Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.

**CD Conservation dependent fauna - Schedule 6**

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.

**OS Other specially protected fauna - Schedule 7**

Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.

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**P Priority species**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.



**1 Priority 1: Poorly-known species**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

**2 Priority 2: Poorly-known species**

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

**3 Priority 3: Poorly-known species**

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

**4 Priority 4: Rare, Near Threatened and other species in need of monitoring**

(a) Rare: Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened: Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

\*Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

A list of the current rankings can be downloaded from the Parks and Wildlife Threatened Species and Communities webpage at <http://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities>

## **Commonwealth of Australia Conservation Codes**

Threatened fauna and flora may be listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in any one of the following six categories:

### **Extinct**

A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.

### **Extinct in the wild**

A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time:

- a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
- b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

### **Critically endangered**

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

### **Endangered**

A taxon is Endangered when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing a very high risk of extinction in the wild.

### **Vulnerable**

A taxon is Vulnerable when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing a high risk of extinction in the wild.

### **Conservation dependent**

A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:

- a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or
- b) the following subparagraphs are satisfied:
  - i. the species is a species of fish;

- ii. the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;
- iii. the plan of management is in force under a law of the Commonwealth or of a State or Territory;
- iv. cessation of the plan of management would adversely affect the conservation status of the species.

The EPBC Act does not provide for listing in a data deficient category. Where sufficient data (evidence) is unavailable to allow assessment by the Threatened Species Scientific Committee against the criteria for listing, the species are found to be ineligible. A recommendation is made to the Minister to not include the species in any category under the EPBC Act. For reasons of transparency and to inform future research, the Threatened Species Scientific Committee publishes the names of those species found to be data deficient. As data deficient is not a listing category under the EPBC Act, this has no statutory implications and the species is not considered to be listed under the EPBC Act.

# **APPENDIX 5**

## **TEC/PEC Database Search**





















OCC_UNIQUE	COM_ID	COM_NAME	STATE_CATG	COMM_CATG	S_ID_COUNT	FIRST_S_ID	LAST_S_ID	BUFFER	BDY_ID	ORIG_FID
121462	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15744		200	118461	30660
121467	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15749		200	118466	30665
121474	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15756		200	118473	30672
121475	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15757		200	118474	30673
121476	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15758		200	118475	30674
121480	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15762		200	118479	30678
121481	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15763		200	118480	30679
121484	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15766		200	118483	30682
121521	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15803		200	118820	30719
121525	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15807		200	118824	30723
121527	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15809		200	118526	30725
121528	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15810		200	118527	30726
121662	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15944		200	118661	30860
121663	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15945		200	118662	30861
121664	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15946		200	118663	30862
121665	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15947		200	118664	30863
121703	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15985		200	118702	30901
121736	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld16018		200	118735	30934
121737	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld16019		200	118736	30935
121794	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld16076		200	118793	30992
121796	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld16078		200	118795	30994
121797	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld16079		200	118796	30995
121798	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld16080		200	118797	30996
121799	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld16081		200	118798	30997
121800	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld16082		200	118799	30998
121801	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld16083		200	118800	30999
121802	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld16084		200	118801	31000
121803	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld16085		200	118802	31001
121804	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld16086		200	118803	31002
108912	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld03194		200	105911	18115
108939	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld03221		200	105938	18142
109350	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld03632		200	106349	18553
121434	Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	1	BanksiaWld15716		200	118433	30632
5706	Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	Priority 3	Vulnerable	1	Goegruplake01		500	3392	2901
5735	Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	Priority 3	Vulnerable	1	Blacklake01		500	3420	2929
5736	Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	Priority 3	Vulnerable	1	Blacklake02		500	3421	2930

# **APPENDIX 6**

## **Quadrat Data**

**QUADRAT PR1**

**50 390428 E 6399994 N**

**Vegetation:** *Eucalyptus marginata*/*Allocasuarina fraseriana*/*Banksia menziesii*/*B. ilicifolia* Low Woodland over *Hibbertia hypericoides*/*Desmocladius flexuosus* Low Open Shrubland  
**Condition:** Good  
**Soil Type:** Grey-brown sand  
**Landform:** Top of low rise



**QUADRAT (10 x 10m)**

<b>SPECIES</b>	<b>HEIGHT (m)</b>	<b>COVER (%)</b>
<i>Eucalyptus marginata</i>	6	10
<i>Banksia menziesii</i>	6	10
<i>Allocasuarina fraseriana</i>	6	5
<i>Banksia ilicifolia</i>	6	5
<i>Leucopogon propinquus</i>	0.6	2
<i>Hibbertia hypericoides</i>	0.5	5
<i>Opercularia hispidula</i>	0.4	4
<i>Sowerbaea laxiflora</i>	0.4	<1
<i>Burchardia congesta</i>	0.4	<1
<i>Lepidosperma leptostachyum</i>	0.4	<1
<i>Lepidosperma squamatum</i>	0.4	1
* <i>Briza maxima</i>	0.3	5
<i>Conostylis aculeata</i>	0.3	<1
<i>Hovea trisperma</i>	0.3	<1
<i>Corynotheca micrantha</i>	0.3	<1
<i>Orthrosanthus laxus</i>	0.3	<1
<i>Gompholobium tomentosum</i>	0.3	<1
<i>Desmocladius flexuosus</i>	0.2	20
* <i>Ursinia anthemoides</i>	0.2	1



<b>SPECIES</b>	<b>HEIGHT (m)</b>	<b>COVER (%)</b>
<i>Caladenia flava</i>	0.2	<1
* <i>Lolium perenne</i>	0.2	<1
* <i>Lotus subbiflorus</i>	0.1	1
* <i>Ornithopus compressus</i>	0.1	<1
<i>Dianella revoluta</i> var. <i>divaricata</i>	0.1	<1
* <i>Hypochaeris glabra</i>	Flat	<1
<i>Drosera erythrorhiza</i>	Flat	<1
<i>Hardenbergia comptoniana</i>	Climber	<1

\* introduced species

**QUADRAT PR2**

**50 390475 E 6399555 N**

**Vegetation:** *Kunzea glabrescens* Tall Shrubland over *Conostylis aculeata* Low Open Shrubland  
**Condition:** Good  
**Soil Type:** Grey sand  
**Landform:** Top of small rise



**QUADRAT (10 x 10m)**

<b>SPECIES</b>	<b>HEIGHT (m)</b>	<b>COVER (%)</b>
<i>Kunzea glabrescens</i>	4	25
<i>Acacia pulchella</i>	0.5	2
<i>Conostylis aculeata</i>	0.4	2
<i>Acacia huegelii</i>	0.4	1
<i>Burchardia congesta</i>	0.4	<1
<i>Gompholobium tomentosum</i>	0.4	<1
* <i>Ehrharta longiflora</i>	0.3	1
<i>Corynotheca micrantha</i>	0.3	<1
<i>Lomandra hermaphrodita</i>	0.3	<1
<i>Desmocladus flexuosus</i>	0.2	5
* <i>Ursinia anthemoides</i>	0.2	1
* <i>Briza maxima</i>	0.2	1
<i>Dasypogon bromeliifolius</i>	0.2	<1
<i>Caladenia flava</i>	0.2	<1
* <i>Vulpia myuros</i>	0.1	20
<i>Microtis media</i>	0.1	<1
<i>Trachymene pilosa</i>	0.1	<1

<b>SPECIES</b>	<b>HEIGHT (m)</b>	<b>COVER (%)</b>
<i>*Ornithopus compressus</i>	0.1	<1
<i>Quinetia urvillei</i>	<0.1	<1
<i>*Hypochaeris glabra</i>	Flat	2
<i>Drosera erythrorhiza</i>	Flat	<1
<i>Thysanotus patersonii</i>	Climber	<1
<i>Drosera menziesii</i>	Climber	<1

\* introduced species

**QUADRAT PR3**

**50 391275 E 6400084 N**

**Vegetation:** *Eucalyptus marginata*/*Allocasuarina fraseriana*/*Xylomelum occidentale* Low Open Woodland over *Kunzea glabrescens* Tall Shrubland over *Hibbertia hypericoides* Low Open Shrubland  
**Condition:** Very Good, recovering from fire  
**Soil Type:** Grey sand  
**Landform:** Top of low rise



**Quadrat (10 x 10m)**

<b>SPECIES</b>	<b>HEIGHT (m)</b>	<b>COVER (%)</b>
<i>Eucalyptus marginata</i>	5	5
<i>Allocasuarina fraseriana</i>	4	2
<i>Xylomelum occidentale</i>	3	4
<i>Kunzea glabrescens</i>	2	1
<i>Leucopogon propinquus</i>	0.5	2
<i>Hibbertia hypericoides</i>	0.4	5
<i>Bossiaea eriocarpa</i>	0.4	2
<i>Conostylis aculeata</i>	0.4	1
<i>Lepidosperma pubisquameum</i>	0.4	1
<i>Opercularia hispidula</i>	0.4	<1
<i>Acacia stenoptera</i>	0.4	<1
<i>Corynotheca micrantha</i>	0.3	4
* <i>Ursinia anthemoides</i>	0.3	2
<i>Burchardia congesta</i>	0.3	<1
<i>Sowerbaea laxiflora</i>	0.3	<1
<i>Desmodcladus flexuosus</i>	0.2	10
* <i>Briza maxima</i>	0.2	10
<i>Brachyloma preissii</i>	0.2	<1

<i>Drosera stolonifera</i>	0.2	<1
<i>Lomandra hermaphrodita</i>	0.2	<1
<i>Gompholobium tomentosum</i>	0.2	<1
<i>Hemiandra pungens</i>	0.1	2
<i>Caladenia flava</i>	0.1	<1
<i>Kennedia prostrata</i>	0.1	<1
<i>Poranthera microphylla</i>	<0.1	<1
* <i>Hypochaeris glabra</i>	Flat	5
<i>Drosera erythrorhiza</i>	Flat	1

\* introduced species

**QUADRAT PR4**

**50 391349 E 6400045 N**

**Vegetation:** *Banksia attenuata*/*B. ilicifolia*/*B. menziesii* Low Woodland over  
*Kunzea glabrescens* Open Heath over *Conostylis*  
*aculeata*/*Desmocladius flexuosus* Open Low Heath

**Condition:** Very Good

**Soil Type:** Grey-brown sand

**Landform:** Upper slope



**QUADRAT (10 x 10m)**

<b>SPECIES</b>	<b>HEIGHT (m)</b>	<b>COVER (%)</b>
<i>Banksia attenuata</i>	5	10
<i>Banksia ilicifolia</i>	4.5	5
<i>Jacksonia furcellata</i>	2	10
<i>Kunzea glabrescens</i>	1.6	30
<i>Melaleuca thymoides</i>	1.3	2
<i>Conostylis aculeata</i>	0.4	1
<i>Bossiaea eriocarpa</i>	0.4	<1
<i>Burchardia congesta</i>	0.4	<1
<i>Corynotheca micrantha</i>	0.3	<1
<i>Hibbertia hypericoides</i>	0.3	<1
<i>Hibbertia huegelii</i>	0.3	<1
* <i>Ursinia anthemoides</i>	0.3	<1
<i>Acacia huegelii</i>	0.3	<1
<i>Desmocladius flexuosus</i>	0.2	40
* <i>Romulea rosea</i>	0.2	<1
<i>Conostylis juncea</i>	0.2	<1
<i>Leucopogon polymorphus</i>	0.2	<1
* <i>Briza maxima</i>	0.2	<1

<b>SPECIES</b>	<b>HEIGHT (m)</b>	<b>COVER (%)</b>
<i>Gompholobium tomentosum</i>	0.2	<1
<i>Brachyloma preissii</i>	0.1	<1
<i>Caladenia flava</i>	0.1	<1
<i>Lomandra hermaphrodita</i>	0.1	<1
<i>Lagenophora huegelii</i>	0.1	<1
<i>Kennedia prostrata</i>	0.1	<1
* <i>Trifolium campestre</i>	0.1	<1
<i>Conostylis setigera</i>	0.1	<1
* <i>Ornithopus compressus</i>	0.1	<1
<i>Dodonaea</i> sp	0.1	<1
* <i>Lotus subbiflorus</i>	<0.1	<1
<i>Chamaescilla corymbosa</i>	<0.1	<1
<i>Trachymene pilosa</i>	<0.1	<1
* <i>Hypochaeris glabra</i>	Flat	1
<i>Drosera erythrorhiza</i>	Flat	1
<i>Pyrorchis nigricans</i>	Flat	<1

\* introduced species

**QUADRAT PR5**

**50 391265 E 6399837 N**

**Vegetation:** *Kunzea glabrescens* Tall Open Scrub  
**Condition:** Degraded  
**Soil Type:** Dark grey sand  
**Landform:** Flat



**QUADRAT (10 x 10m)**

<b>SPECIES</b>	<b>HEIGHT (m)</b>	<b>COVER (%)</b>
<i>Kunzea glabrescens</i>	1.5-2	60
<i>Conostylis aculeata</i>	0.4	<1
* <i>Ursinia anthemoides</i>	0.2	<1
* <i>Vulpia myuros</i>	0.1	1
* <i>Ehrharta longiflora</i>	0.1	<1
<i>Crassula colorata</i>	<0.1	<1
* <i>Arctotheca calendula</i>	Flat	<1
* <i>Hypochaeris glabra</i>	Flat	<1

\* introduced species



**QUADRAT PR6**

**50 391371 E 6399878 N**

**Vegetation:** *Kunzea glabrescens* Tall Shrubland  
**Condition:** Degraded  
**Soil Type:** Black sand  
**Landform:** Flat



**QUADRAT (10 x 10m)**

<b>SPECIES</b>	<b>HEIGHT (m)</b>	<b>COVER (%)</b>
<i>Kunzea glabrescens</i>	3.5	20
<i>Pultenaea reticulata</i>	2.5	5
* <i>Romulea rosea</i>	0.2	<1
* <i>Ornithopus compressus</i>	0.1	1
* <i>Disa bracteata</i>	0.1	<1
* <i>Ursinia anthemoides</i>	0.1	<1
* <i>Hypochaeris glabra</i>	Flat	<1

\* introduced species

**QUADRAT PR7**

**50 391960 E 6400027 N**

**Vegetation:** *Eucalyptus rudis* Low Woodland over *Kunzea glabrescens* Low Shrubland over weeds  
**Condition:** Degraded  
**Soil Type:** Grey sand  
**Landform:** Lower slope



**QUADRAT (10 x 10m)**

<b>SPECIES</b>	<b>HEIGHT (m)</b>	<b>COVER (%)</b>
<i>Eucalyptus rudis</i>	10	25
<i>Kunzea glabrescens</i>	0.7	10
* <i>Solanum nigrum</i>	0.4	<1
* <i>Lolium perenne</i>	0.3	40
<i>Opercularia hispidula</i>	0.3	1
<i>Jacksonia furcellata</i>	0.3	<1
* <i>Bromus diandrus</i>	0.2	10
<i>Desmodium flexuosus</i>	0.2	1
<i>Tetragonia decumbens</i>	0.2	<1
* <i>Sonchus oleraceus</i>	0.2	<1
<i>Caladenia flava</i>	0.2	<1
* <i>Ursinia anthemoides</i>	0.2	<1
* <i>Trifolium campestre</i>	0.1	1
* <i>Romulea rosea</i>	0.1	<1
* <i>Lotus subbiflorus</i>	0.1	<1
<i>Cotula australis</i>	0.1	<1
<i>Homalosciadium homalocarpum</i>	<0.1	<1
* <i>Hypochaeris glabra</i>	Flat	1
* <i>Taraxacum officinale</i>	Flat	<1
* <i>Arctotheca calendula</i>	Flat	<1

\* introduced species

**QUADRAT PR8**

**50 391837 E 6400080 N**

**Vegetation:** *Allocasuarina fraseriana*/*Banksia ilicifolia* Low Open Woodland over  
*Kunzea glabrescens* Tall Open Scrub over *Desmocladius flexuosus*  
 Low Shrubland

**Condition:** Good

**Soil Type:** Grey sand

**Landform:** Upper slope of small rise



**QUADRAT (10 x 10m)**

<b>SPECIES</b>	<b>HEIGHT (m)</b>	<b>COVER (%)</b>
<i>Allocasuarina fraseriana</i>	8	5
<i>Banksia ilicifolia</i>	7	5
<i>Kunzea glabrescens</i>	2-4	40
<i>Jacksonia furcellata</i>	2.5	4
<i>Leucopogon propinquus</i>	0.5	1
<i>Lyginia imberbis</i>	0.4	1
<i>Dasypogon bromeliifolius</i>	0.4	1
<i>Conostylis aculeata</i>	0.4	<1
<i>Patersonia occidentalis</i>	0.4	<1
* <i>Ursinia anthemoides</i>	0.3	1
<i>Scholtzia involucrata</i>	0.3	<1
<i>Podotheca gnaphalioides</i>	0.3	<1
<i>Brachyloma preissii</i>	0.3	<1
<i>Desmocladius flexuosus</i>	0.2	20
* <i>Briza maxima</i>	0.2	1
<i>Caladenia flava</i>	0.2	<1
<i>Lomandra hermaphrodita</i>	0.2	<1
<i>Conostylis juncea</i>	0.2	<1

<b>SPECIES</b>	<b>HEIGHT (m)</b>	<b>COVER (%)</b>
<i>Bossiaea eriocarpa</i>	0.1	<1
* <i>Ornithopus compressus</i>	0.1	<1
* <i>Trifolium campestre</i>	0.1	<1
* <i>Hypochaeris glabra</i>	Flat	1
<i>Drosera erythrorhiza</i>	Flat	<1
<i>Drosera menziesii</i>	Climber	<1

\* introduced species

**QUADRAT PR9**

**50 392002 E 6399865 N**

**Vegetation:** *Kunzea glabrescens/Jacksonia furcellata* Tall Open Scrub over weeds  
**Condition:** Good  
**Soil Type:** Black sand  
**Landform:** Flat



**QUADRAT (10 x 10m)**

SPECIES	HEIGHT (m)	COVER (%)
<i>Kunzea glabrescens</i>	3	50
<i>Jacksonia furcellata</i>	2.1	4
<i>Calytrix fraseri</i>	0.5	<1
* <i>Ursinia anthemoides</i>	0.3	1
<i>Brachyloma preissii</i>	0.3	<1
* <i>Briza maxima</i>	0.3	<1
<i>Podotheca gnaphalioides</i>	0.2	<1
<i>Caladenia flava</i>	0.2	<1
<i>Trachymene pilosa</i>	0.1	1
* <i>Arctotheca calendula</i>	0.1	<1
* <i>Ornithopus compressus</i>	0.1	<1
* <i>Aira caryophyllea</i>	0.1	<1
<i>Rhodanthe citrina</i>	0.1	<1
<i>Quinetia urvillei</i>	<0.1	<1
* <i>Lotus subbiflorus</i>	<0.1	<1
<i>Crassula colorata</i>	<0.1	<1
* <i>Hypochaeris glabra</i>	Flat	2
<i>Drosera erythrorhiza</i>	Flat	<1
<i>Drosera menziesii</i>	Climber	<1

\* introduced species

# **APPENDIX 7**

## **Flora Species List**

**Lot 226 Paterson Road, Nambeelup Species List – (February, July and September 2019)**

**GYMNOSPERMS**

CYCADACEAE  
*Macrozamia riedlei*

**MONOCOTYLEDONS**

ANARTHRIACEAE  
*Lyginia barbata*

ASPARAGACEAE  
*Laxmannia squarrosa*  
*Lomandra hermaphrodita*  
*Sowerbaea laxiflora*  
*Thysanotus patersonii*

COLCHICACEAE  
*Burchardia congesta*

CYPERACEAE  
*Ficinia marginata*  
*Lepidosperma leptostachyum*  
*Lepidosperma squamata*

DASYPOGONACEAE  
*Dasypogon bromeliifolius*

HAEMODORACEAE  
*Conostylis aculeata*  
*Conostylis juncea*  
*Conostylis setigera*  
*Phlebocarya ciliata*

HEMEROCALLIDACEAE  
*Arnocrinum preissii*  
*Corynotheca micrantha*  
*Dianella revoluta* var. *divaricata*  
*Johnsonia lupulina*

IRIDACEAE  
*\*Gladiolus caryophyllaceus*  
*\*Moraea flaccida*  
*Orthrosanthus laxus*  
*Patersonia occidentalis*

ORCHIDACEAE  
*Caladenia flava*  
*\*Disa bracteata*  
*Elythranthera brunonis*  
*Pterostylis ?pyramidalis*  
*Pterostylis vittata*  
*Pyrorchis nigricans*

POACEAE  
*\*Aira caryophyllea*  
*Amphipogon turbinatus*  
*\*Avena fatua*  
*\*Briza maxima*  
*\*Bromus diandrus*  
*\*Ehrharta longiflora*  
*\*Lolium perenne*  
*\*Vulpia bromoides*  
*\*Vulpia myuros*

RESTIONACEAE  
*Desmocladus flexuosus*

XANTHORRHOEACEAE  
*Chamaescilla corymbosa*  
*Xanthorrhoea brunonis*  
*Xanthorrhoea preissii*

**DICOTYLEDONS**

APIACEAE  
*Homaloscadium homalocarpum*

ARALIACEAE  
*Trachymene pilosa*

ASTERACEAE  
*\*Arctotheca calendula*  
*\*Cotula australis*  
*\*Hypochaeris glabra*  
*Lagenophora huegelii*  
*Podolepis gracilis*  
*Podotheca angustifolia*

*Podotheca chrysantha*  
*Podotheca gnaphalioides*  
*Quinetia urvillei*  
*Rhodanthe citrina*  
*Senecio pinnatifolius*  
*\*Taraxacum officinale*  
*\*Ursinia anthemoides*

CARYOPHYLLACEAE

*\*Minuartia mediterranea*  
*\*Petrorhagia dubia*

CASUARINACEAE

*Allocasuarina fraseriana*

DILLENACEAE

*Hibbertia huegelii*  
*Hibbertia hypericoides*  
*Hibbertia subvaginata*

DROSERACEAE

*Drosera erythrorhiza*  
*Drosera glanduligera*  
*Drosera menziesii*  
*Drosera stolonifera*

ERICACEAE

*Brachyloma preissii*  
*Conostephium pendulum*  
*Leucopogon conostephioides*  
*Leucopogon polymorphus*  
*Leucopogon propinquus*

FABACEAE

*Acacia huegelii*  
*Acacia pulchella*  
*Acacia saligna*  
*Acacia stenoptera*  
*Bossiaea eriocarpa*  
*Gastrolobium capitatum*  
*Gompholobium tomentosum*  
*Hardenbergia comptoniana*  
*Hovea trisperma*  
*Jacksonia furcellata*  
*Jacksonia gracillima* **P3**

*Kennedia prostrata*  
*\*Lotus subbiflorus*  
*\*Ornithopus compressus*  
*\*Ornithopus sativus*  
*Pultenaea reticulata*  
*\*Trifolium campestre*  
*\*Trifolium glomeratum*

GOODENIACEAE

*Dampiera linearis*

LAMIACEAE

*Hemiandra pungens*

LAURACEAE

*Cassytha racemosa*

LORANTHACEAE

*Nuytsia floribunda*

MACARTHURACEAE

*Macarthuria australis*

MYRTACEAE

*Calytrix flavescens*  
*Calytrix fraseri*  
*Eremaea ebracteata*  
*Eucalyptus marginata*  
*Eucalyptus rudis*  
*Kunzea glabrescens*  
*Melaleuca preissiana*  
*Melaleuca thymoides*  
*Scholtzia involucrata*

OROBANCHACEAE

*\*Orobanche minor*

PHYLLANTHACEAE

*Poranthera microphylla*

PROTEACEAE

*Adenanthos cygnorum*  
*Banksia attenuata*  
*Banksia grandis*  
*Banksia ilicifolia*



*Banksia menziesii*  
*Petrophile linearis*  
*Stirlingia latifolia*  
*Xylomelum occidentale*

RUBIACEAE  
*Opercularia hispidula*

RUTACEAE  
*Boronia crenulata*

SAPINDACEAE  
*Dodonaea sp*

SOLANACEAE  
*\*Solanum nigrum*

STYLIDIACEAE  
*Stylidium brunonianum*

VIOLACEAE  
*Hybanthus calycinus*

# **APPENDIX 8**

## **DBCA Fauna Database Search**

Item 11.1  
Ordinary Council Meeting 26 August 2021

NAME_SCI	NAME_COM	CLASS	CONS_CODE	Date	DAY	MONTH	YEAR	SOURCE_ID	SOURCE	CERTAINTY	METHOD	TYPE	COUNT	LOCALITY	SITE	ACCURACY_M
Calidris acuminata	sharp-tailed sandpiper	BIRD	IA	28/02/2003	28	2	2003	291053 163	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	STAKE HILL	Geogrup Lane	500
Calidris acuminata	sharp-tailed sandpiper	BIRD	IA	25/09/2009	25	9	2009	770723 163	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	NAMBEELUP	Nambellup Ponds	500
Calidris acuminata	sharp-tailed sandpiper	BIRD	IA	22/10/2010	22	10	2010	5106898 163	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	NAMBEELUP	Settlement Ponds, Custom Compos	100
Calidris acuminata	sharp-tailed sandpiper	BIRD	IA	12/02/2012	12	2	2012	5099211 163	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	NAMBEELUP	Nambellup compost ponds	100
Calidris ferruginea	curlew sandpiper	BIRD	CR & IA	22/10/2010	22	10	2010	5106898 161	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	NAMBEELUP	Settlement Ponds, Custom Compos	100
Calidris ruficollis	red-necked stint	BIRD	IA	28/02/2003	28	2	2003	291053 162	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	STAKE HILL	Geogrup Lane	500
Calidris ruficollis	red-necked stint	BIRD	IA	22/10/2010	22	10	2010	5106898 162	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	NAMBEELUP	Settlement Ponds, Custom Compos	100
Calidris ruficollis	red-necked stint	BIRD	IA	12/02/2012	12	2	2012	5099211 162	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	NAMBEELUP	Nambellup compost ponds	100
Calidris subminuta	long-toed stint	BIRD	IA	22/10/2010	22	10	2010	5106898 965	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	NAMBEELUP	Settlement Ponds, Custom Compos	100
Calidris subminuta	long-toed stint	BIRD	IA	12/02/2012	12	2	2012	5099211 965	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	NAMBEELUP	Nambellup compost ponds	100
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	28/01/2006	28	1	2006	22464	TFAUNA	Certain	Targeted survey	Day sighting	0	Stake Hill		1000
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	6/02/2006	6	2	2006	22307	TFAUNA	Certain	Targeted survey	Day sighting	0	Nambeelup		1000
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	6/02/2006	6	2	2006	22308	TFAUNA	Certain	Targeted survey	Day sighting	0	Ravenswood		1000
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	6/02/2006	6	2	2006	22465	TFAUNA	Certain	Targeted survey	Day sighting	14	Barragup		1000

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NAME_SCI	NAME_COM	CLASS	CONS_CODE	Date	DAY	MONTH	YEAR	SOURCE_ID	SOURCE	CERTAINTY	METHOD	TYPE	COUNT	LOCALITY	SITE	ACCURACY_M
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	6/02/2006	6	2	2006	22466	TFAUNA	Certain	Targeted survey	Secondary sign	0	Ravenswood		1000
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	6/02/2006	6	2	2006	22467	TFAUNA	Certain	Targeted survey	Secondary sign	0	Ravenswood		1000
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	6/02/2006	6	2	2006	22468	TFAUNA	Certain	Targeted survey	Secondary sign	0	Ravenswood		1000
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	6/02/2006	6	2	2006	22469	TFAUNA	Certain	Targeted survey	Secondary sign	0	Ravenswood		1000
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	6/02/2006	6	2	2006	22486	TFAUNA	Certain	Targeted survey	Secondary sign	0	Ravenswood		1000
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	6/02/2006	6	2	2006	22487	TFAUNA	Certain	Targeted survey	Secondary sign	1	Ravenswood		1000
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	6/02/2006	6	2	2006	22488	TFAUNA	Certain	Targeted survey	Secondary sign	0	Ravenswood		1000
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	6/02/2006	6	2	2006	22489	TFAUNA	Certain	Targeted survey	Secondary sign	0	Ravenswood		1000
Calyptorhynchus banksii naso	forest red-tailed black cockatoo	BIRD	VU	6/02/2006	6	2	2006	22490	TFAUNA	Certain	Targeted survey	Secondary sign	0	Ravenswood		1000
Calyptorhynchus latirostris	Carnaby's cockatoo	BIRD	EN	28/02/2003	28	2	2003	291053 794	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	STAKE HILL	Geogrup Lane	500
Dasyurus geoffroi	chuditch, western quoll	MAMMAL	VU	1/01/1992	1	1	1992	979	TFAUNA	Certain	Opportunistic sighting	Day sighting	1	CORIO SWAMP SYSTEM		1000
Dasyurus geoffroi	chuditch, western quoll	MAMMAL	VU	1/06/2016	1	6	2016	82182	TFAUNA	Moderately certain	Opportunistic sighting	Dead	1	Nambeelup		1000
Isoodon fusciventer	quenda, southwestern brown bandicoot	MAMMAL	P4	25/05/2012	25	5	2012	68428	TFAUNA	Certain	Community survey	Day sighting	4	NAMBEELUP		1000
Myrmecobius fasciatus	numbat, walpurti	MAMMAL	EN	1/01/1974	1	1	1974	96496	TFAUNA	Certain	Survey	Caught or trapped	1	Mandurah		10000
Numenius madagascariensis	eastern curlew	BIRD	CR	15/02/1997	15	2	1997	3178	TFAUNA	Certain	Survey	Day sighting	5	Mandurah		10000
Numenius madagascariensis	eastern curlew	BIRD	CR	15/02/1997	15	2	1997	3178	TFAUNA	Certain	Survey	Day sighting	5	Mandurah		10000

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Ordinary Council Meeting 26 August 2021

NAME_SCI	NAME_COM	CLASS	CONS_CODE	Date	DAY	MONTH	YEAR	SOURCE_ID	SOURCE	CERTAINTY	METHOD	TYPE	COUNT	LOCALITY	SITE	ACCURACY_M
Numenius madagascariensis	eastern curlew	BIRD	CR	15/02/1997	15	2	1997	3178	TFAUNA	Certain	Survey	Day sighting	5	Mandurah		10000
Numenius madagascariensis	eastern curlew	BIRD	CR	15/02/1997	15	2	1997	3178	TFAUNA	Certain	Survey	Day sighting	5	Mandurah		10000
Oxyura australis	blue-billed duck	BIRD	P4	13/11/1999	13	11	1999	62039 216	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	BARRAGUP	Goegrup Lake	500
Tringa glareola	wood sandpiper	BIRD	IA	25/09/2009	25	9	2009	770723 154	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	NAMBEELUP	Nambellup Ponds	500
Tringa glareola	wood sandpiper	BIRD	IA	22/10/2010	22	10	2010	5106898 154	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	NAMBEELUP	Settlement Ponds, Custom Compos	100
Tringa glareola	wood sandpiper	BIRD	IA	12/02/2012	12	2	2012	5099211 154	BIRDATLAS2	Moderately Certain	Observational	Sighting	1	NAMBEELUP	Nambellup compost ponds	100

# LOT 226 PATERSON ROAD, NAMBEELUP

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## BLACK COCKATOO HABITAT ASSESSMENT

Prepared for: King Street Trust  
Report Date: 18 November 2019  
Version: 1  
Report No. 2019-459

The logo for PGV Environmental is located at the bottom of the page. It features the letters 'PGV' in a large, bold, white sans-serif font. Below 'PGV', the word 'ENVIRONMENTAL' is written in a smaller, white, all-caps sans-serif font. The background of the bottom half of the page is a vibrant orange with a subtle, curved white line that sweeps across the width of the page, creating a sense of movement and depth.

**PGV**  
ENVIRONMENTAL

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Figure 4: Significant Trees

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## 1 INTRODUCTION

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### 1.1 Background

Lot 226 Paterson Road, Nambelup (the site) is located in the Shire of Murray, approximately 64km south of the Perth Central Business District (Figure 1). The site is bound by Paterson road to the west, unconstructed road reserve and rural land to the north and rural land to the east and south.

The site is generally flat but contains some higher areas that contain native vegetation. Lot 226 Paterson Road is approximately 155ha in size, of which approximately 34.5ha contains native vegetation (Figure 2).

An Environmental Features Survey undertaken by PGV Environmental (PGV, 2019) identified habitat on the site that was suitable for three species of Black Cockatoo listed under both Western Australian and Federal legislation being:

- Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) (Endangered);
- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) (Endangered); and
- Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable).

PGV Environmental was commissioned by King Street Trust to undertake a Black Cockatoo Habitat Assessment of the site.

### 1.2 Scope of Works

The Black Cockatoo Habitat Assessment was undertaken to:

- Describe the Black Cockatoo habitat on the site;
- Determine the impact of potential development on Black Cockatoos if the site was to be cleared; and
- Assess the clearing in the context of the significance of the impact on Black Cockatoos.

## **2 BLACK COCKATOOS**

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### **2.1 Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*)**

Carnaby's Black Cockatoo is found in the south-west of Australia from Kalbarri through to Ravensthorpe. It has a preference for feeding on the seeds of *Banksia*, *Hakea*, *Eucalyptus*, *Grevillea*, *Pinus* and *Allocasuarina* spp. It is nomadic, often moving toward the coast after breeding. It breeds in tree hollows that are 2.5 – 12m above the ground and have an entrance of 23-30cm with a depth of 1-2.5m. Nesting mostly occurs in smooth-barked trees (e.g. Salmon Gum, Wandoo, Red Morrell). Eggs are laid from July to October, with incubation lasting 29 days (DoE, 2014).

The site is inside the boundary of the modelled distribution and breeding range for Carnaby's Black Cockatoos (SEWPaC, 2012), but is not within a confirmed breeding area (National Map, 2019).

### **2.2 Baudin's Black Cockatoo (*Calyptorhynchus baudinii*)**

Baudin's Black Cockatoo is most common in the far south-west of Western Australia. It is known to breed from the southern forests north to Collie and east to near Kojonup. Baudin's Black Cockatoo is typically found in vagrant flocks and utilises the taller, more open Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) woodlands where it feeds mainly on Marri seeds and various Proteaceous species (Johnstone and Kirkby, 2011).

The site is inside the modelled distribution for Baudin's Black Cockatoos (SEWPaC, 2012). Baudin's Black Cockatoo predominantly lives in the south-west, Darling Range and Scarp.

### **2.3 Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)**

Forest Red-tailed Black Cockatoos are endemic to the humid to sub-humid south-west of Western Australia (SEWPaC, 2012). The range of Forest Red-tailed Black Cockatoos is bound by Gingin in the north to Mt Helena, Christmas Tree Well, West Dale, North Bannister, Mt Saddleback, Kojonup, Rocky Gully, upper King River and Green Range (east of Albany) (SEWPaC, 2012; DoE, 2014). It nests in tree hollows with a depth of 1-5m, that are predominately Marri, Jarrah and Karri (*E. diversicolor*) and it feeds primarily on the seeds of Marri and Jarrah (Johnstone and Kirkby, 2011).

The site is inside the modelled distribution for Forest Red-tailed Black Cockatoos (SEWPaC, 2012).

### 3 BLACK COCKATOO HABITAT

#### 3.1 Habitat Survey

PGV Environmental undertook a Black Cockatoo habitat assessment on 31 July 2019 in accordance with the *EPBC Act referral guidelines for three threatened Black Cockatoo species: Carnaby’s cockatoo (endangered) Calyptorhynchus latirostris Baudin’s cockatoo (vulnerable) Calyptorhynchus baudinii Forest red-tailed Black Cockatoo (vulnerable) Calyptorhynchus banksii naso* (SEWPaC, 2012) (Black Cockatoo Referral Guidelines) and the methodology that is outlined in the SPRAT Database for each of the Black Cockatoo species for Black Cockatoo Habitat Assessments.

The site was traversed on foot and information on Black Cockatoo foraging, roosting and breeding habitat was assessed. The extent, type and quality of the vegetation present, including the presence and extent of plants known to be used by Black Cockatoos was investigated.

#### 3.2 Foraging Habitat

Foraging habitat species that have been recorded on the site are shown in Table 1 (Valentine and Stock, 2008; Groom, 2011).

**Table1: Foraging Species for Black Cockatoos on Lot 226 Paterson Road**

Scientific Name	Common Name
<i>Allocasuarina fraseriana</i>	Sheoak
<i>Banksia attenuata</i>	Candlestick Banksia
<i>Banksia grandis</i>	Bull Banksia
<i>Banksia menziesii</i>	Firewood Banksia
<i>Eucalyptus marginata</i>	Jarra

Foraging habitat is concentrated in the uplands on the site, with the remaining areas dominated by Spearwood (*Kunzea glabrescens*), Paperbark (*Melaleuca preissiana*) and Flooded Gum (*Eucalyptus rudis*) (Figure 3).

The total area that contains foraging habitat is approximately 9ha. The Black Cockatoo Referral Guidelines refer to the quality of the foraging habitat as an important characteristic in determining the significance of the impact. However, there is no guidance as to how the quality is determined in the Black Cockatoo Referral Guidelines other than specifying that ‘quality’ foraging habitat refers to the use of the habitat by Black Cockatoos rather than the overall quality of the vegetation which would normally be described using understorey as well as tree canopy.

Banksia and Jarrah trees are considered to be a High Resource for Black Cockatoos and therefore the foraging habitat on the site is considered to be ‘quality’ foraging.

There was no evidence recorded of foraging on the site during the site survey.

### **3.3 Roosting Habitat**

The site is not mapped as a confirmed roost site by the Department of Biodiversity, Conservation and Attractions (DBCA) (National Map, 2019). There was no evidence of roosting recorded during the assessment of the site.

### **3.4 Breeding Habitat**

Black Cockatoos are known to breed in hollows of large eucalypts. The site is not known as a breeding site for Black Cockatoos (DoP, 2011; Peck *et al.*, 2018; National Map, 2019). No evidence of breeding by Black Cockatoos was observed on the site by PGV Environmental during the assessment.

The Black Cockatoo Referral Guidelines define trees of certain species with a Diameter at Breast Height (DBH) of 500mm or greater as breeding habitat regardless of the presence or not of hollows. The theory behind this definition is the concept that while the trees may not currently contain hollows, they are mature enough that in the next 50 years or so a hollow might form and be of use to Black Cockatoos for the purposes of breeding.

The Black Cockatoo habitat assessment measured all trees on the site with a DBH greater than 500mm. In addition, the trees were photographed and assessed for the presence of hollows or spouts.

A total of 37 potential breeding habitat trees were recorded on the site. The total included 24 Jarrah (*Eucalyptus marginata*), 11 Standing Dead Trees and two Flooded Gums (*Eucalyptus rudis*) (Appendix 1). The trees ranged in DBH from 510mm up to 1900mm (Appendix 1). There were 11 trees that had a DBH greater than 1000mm. The details of the significant trees on the site are contained in Appendix 1 and Appendix 2 and the locations are shown on Figure 4.

There were 12 trees recorded as containing a potential hollow or spout, however these were recorded from the ground and their suitability as Black Cockatoo breeding habitat was not able to be determined. Other hollows may not be visible from the ground. The potential hollows and/or spouts were recorded in eight of the Standing Dead trees with and four recorded in the live Jarrah trees

The tree on the site have all been impacted by fire with several being hollowed out at the base and 14 out of the 24 Jarrahs on the site in Poor or Very poor condition.

There was also some termite activity recorded in one of the Standing Dead trees (Appendix 1).

### **3.5 Regional Context**

To assist in determining the significance of any impact on Black Cockatoo habitat on the site an assessment of Black Cockatoo habitat within the vicinity of the site was undertaken. There are very few areas in the vicinity of the site that contain native vegetation within 10km (Figure 5) which contain habitat for Black Cockatoos. Therefore the site is unlikely to be able to sustain a breeding pair. There is one small area to the north that is in better condition and is likely to provide better foraging habitat for migrating birds.

## 4 BLACK COCKATOO REFERRAL GUIDELINES

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The EPBC Act referral guidelines for three threatened Black Cockatoo species: Carnaby's cockatoo (endangered) *Calyptorhynchus latirostris* Baudin's cockatoo (vulnerable) *Calyptorhynchus baudinii* Forest red-tailed Black Cockatoo (vulnerable) *Calyptorhynchus banksii naso* (SEWPaC, 2012) (Black Cockatoo Referral Guidelines) contain several steps to determine whether or not a referral is required. These steps are:

1. The definition of habitat (breeding, roosting and foraging – Table 1 in the Black Cockatoo Referral Guidelines);
2. A description of the type of action that may have a high or low risk of being a significant impact and therefore require referral (Table 3 in the Black Cockatoo Referral Guidelines);
3. Formulation of a mitigation strategy to reduce the scale of impact; and
4. A flowchart to assist in decision making on whether or not an action should be referred.

### **Step 1 Black Cockatoo Habitat**

There is approximately 9ha of native vegetation containing foraging habitat for Carnaby's Black Cockatoos, Baudin's and Forest Red-tailed Black Cockatoos. There are 37 trees that are considered to be potential breeding trees under the definition provided by the DoEE. There is no recorded roosting on the site.

### **Step 2 Level of Impact**

#### *Foraging*

The site contains approximately 9ha of vegetation that is suitable foraging habitat. In accordance with the Referral Guidelines clearing greater than 1ha of quality foraging habitat may constitute a significant impact.

#### *Roosting*

The Black Cockatoo Referral Guidelines consider the clearing of a known roosting site as a high risk of being a significant impact. There are no records of roosting on the site.

#### *Breeding*

According to Table 3 in the Black Cockatoo Referral Guidelines the clearing of any known nesting tree has a high risk of being a significant impact. A known nesting tree is defined in the Black Cockatoo Referral Guidelines as any existing tree in which breeding has been recorded or suspected. There are no known nesting trees that occur on the site and therefore there is no risk of a significant impact on known breeding habitat of Black Cockatoos.

The Black Cockatoo Referral Guidelines also consider that the clearing or degradation of any part of a vegetation community known to contain breeding habitat is likely to have a high risk of a significant impact. In Table 1 of the Black Cockatoo Referral Guidelines breeding habitat is defined as woodlands, forests or isolated trees that contain or consist of live or dead trees of certain species with either a

DBH of or greater than 500mm or the presence of suitable nest hollows. The site contains 37 Jarrah, Flooded Gums and Standing Dead Trees with a DBH of or greater than 500mm.

The Black Cockatoo Referral Guidelines state that breeding habitat predominantly applies to those areas within the breeding range of the Black Cockatoo species as shown in the maps attached to the Black Cockatoo Referral Guidelines. The site is within the breeding range of Carnaby's Black Cockatoos. The breeding range of Forest Red-tailed Black Cockatoos is not specified within the map attached to the Black Cockatoo Referral Guidelines, however the site is within the mapped distribution range. Clearing any of the potential breeding habitat trees may be considered a significant impact according to the Black Cockatoo Referral Guidelines.

### ***Step 3 Mitigation***

Mitigation in this case could be the avoidance of area of significant trees and foraging habitat to take the impact under the threshold of the referral guidelines.

### ***Step 4 Referral Advice***

The Decision-Making flowchart in Figure 1 of the Black Cockatoo Referral Guidelines was applied if more than 1ha of foraging and/or any significant trees are impacted:

1. Could the impacts of your action occur within the modelled distribution of the black cockatoos? – YES
2. Could the impacts of your action affect any black cockatoo habitat or individuals? - YES
3. Have you surveyed for black cockatoo habitat using the recommended methods? – YES
4. Could your action have an impact on black cockatoos or their habitat? – YES
5. Is your impact mitigation best practice so that it may reduce the significance of your impacts on black cockatoos? Prioritise impact avoidance over impact minimisation – YES

The result of the assessment using the Black Cockatoo Referral Guidelines is that clearing of a significant tree and/or 1ha of the foraging habitat could have a high risk of a significant impact and therefore referral is recommended.

## 5 SUMMARY AND CONCLUSION

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Lot 226 Paterson Road, Nambeelup contain habitat for three species of listed black cockatoos including:

- Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) (Endangered);
- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) (Endangered); and
- Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable).

The habitat on the site is approximately 9ha of foraging habitat consisting primarily of Sheoak, Banksias and Jarrah trees.

There was no evidence of recent roosting at the site was observed during the assessment, and no previous records of roosting on the site.

The site contained a total of 37 trees that had a diameter at breast height of 500mm or greater that are considered potential future breeding habitat, including 24 Jarrah (*Eucalyptus marginata*), 11 Standing Dead Trees and two Flooded Gums (*Eucalyptus rudis*).

Assessment of clearing using the Black Cockatoo Referral Guidelines indicates that clearing more than 1ha of quality foraging habitat and/or a potential breeding habitat trees has a high likelihood of leading to a significant impact and Referral under the EPBC Act is recommended.

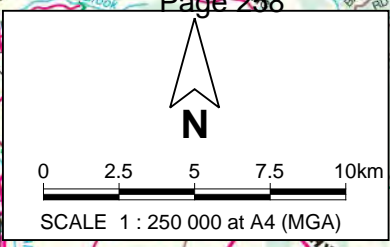
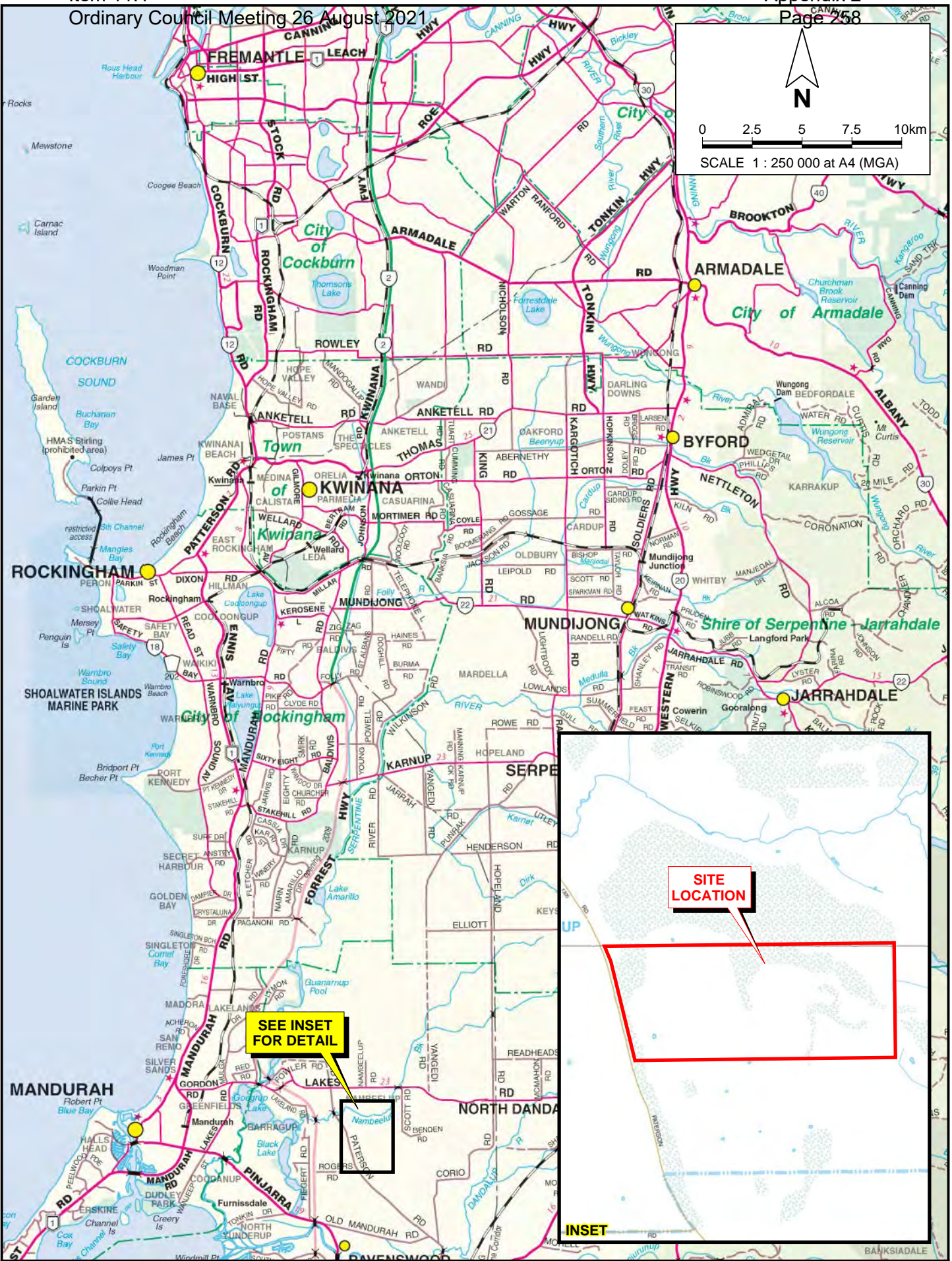
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# FIGURES



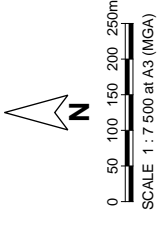
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Drawn: J. Cabot	Date: 31 Aug 2019
Job: 10348 Rpt: 2019-459	Revision: A

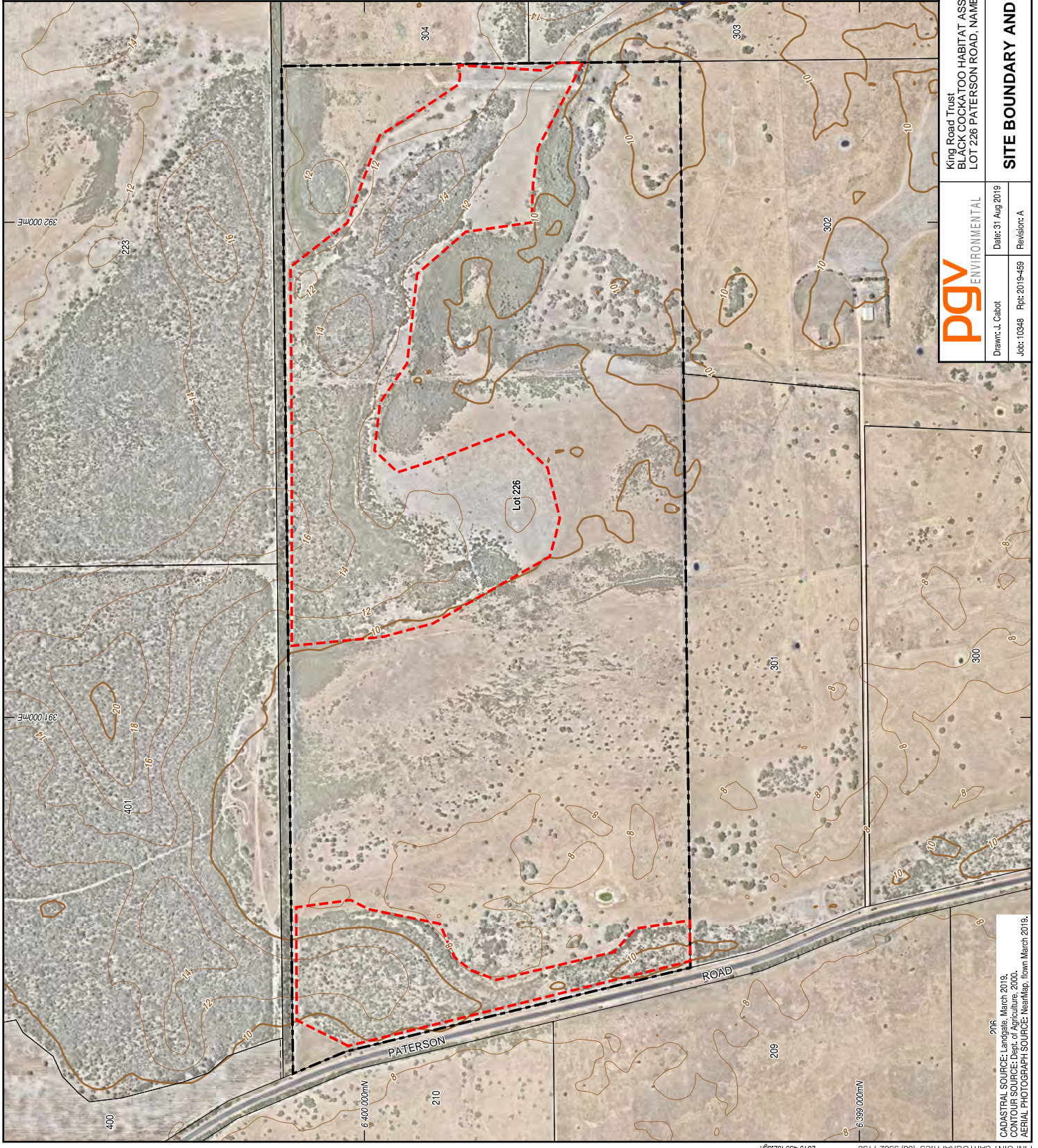
King Road Trust  
BLACK COCKATOO HABITAT ASSESSMENT  
LOT 226 PATERSON ROAD, NAMBEELUP

**SITE LOCATION**

**Figure 1**



- Legend**
- Site Boundary
  - Lot 226 Boundary
  - Cadastral Boundary
  - Easement Boundary
  - Topographic Contour



King Road Trust  
BLACK COCKATOO HABITAT ASSESSMENT  
LOT 226 PATERSON ROAD, NAMBEELUP

**PGV ENVIRONMENTAL**

Drawn: J. Cabot  
Date: 31 Aug 2019  
Job: 10348  
Rpt: 2019-459  
Revision: A

**SITE BOUNDARY AND TOPOGRAPHY**

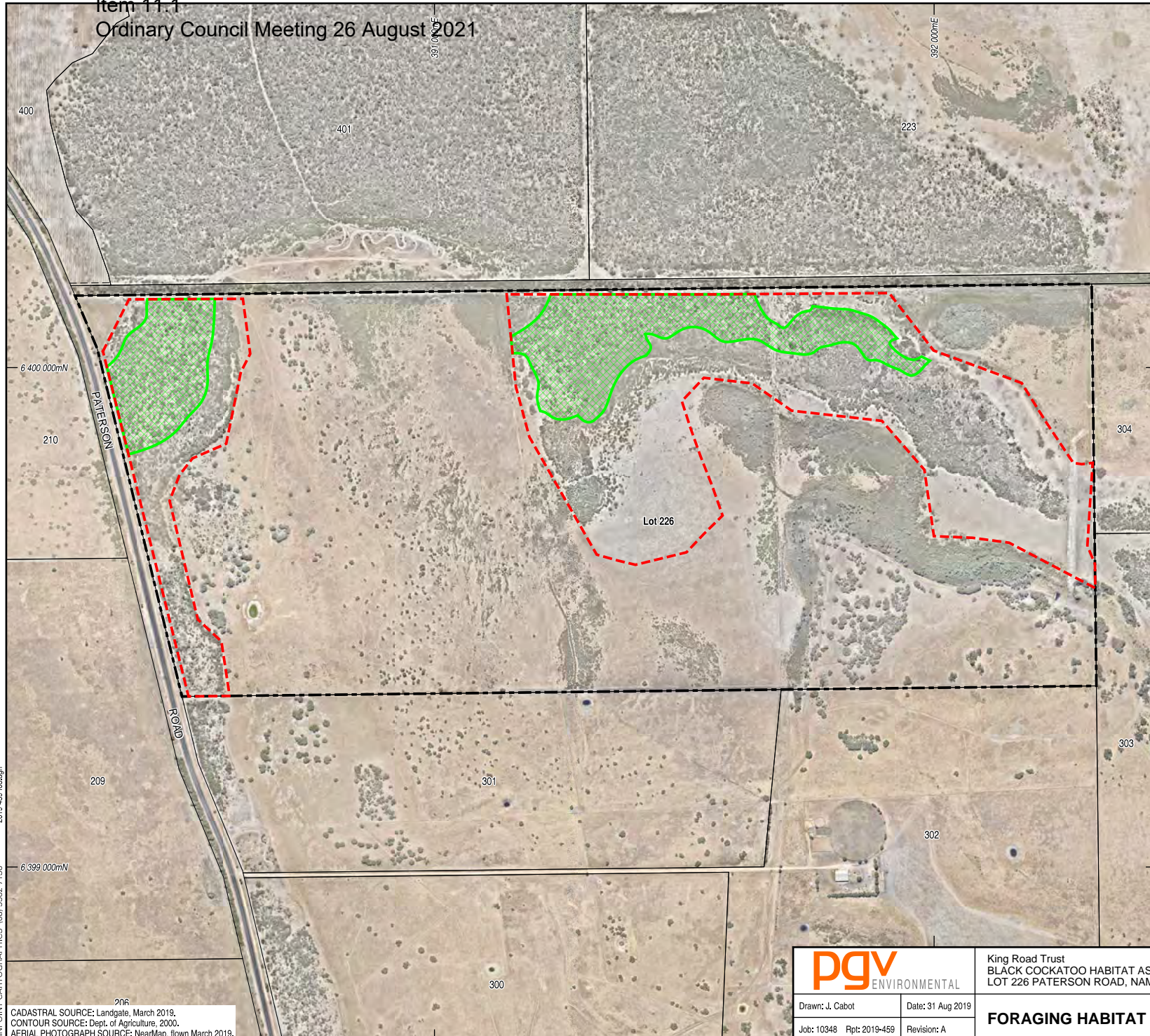
219F  
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CONTOUR SOURCE: Dept. of Agriculture, 2000,  
AERIAL PHOTOGRAPH SOURCE: NearMap, flown March 2015.



0 50 100 150 200 250m  
 SCALE 1 : 7 500 at A3 (MGA)

**Legend**

- - - Site Boundary
- Lot 226 Boundary
- Cadastral Boundary
- Easement Boundary
- Foraging Habitat



2019-458-103.dgn

CADASTRAL SOURCE: Landgate, March 2019,  
 CONTOUR SOURCE: Dept. of Agriculture, 2000.  
 AERIAL PHOTOGRAPH SOURCE: NearMap, flown March 2019.

<b>pgv</b> ENVIRONMENTAL		King Road Trust BLACK COCKATOO HABITAT ASSESSMENT LOT 226 PATERSON ROAD, NAMBEELUP	
Drawn: J. Cabot	Date: 31 Aug 2019	<b>FORAGING HABITAT</b>	
Job: 10348 Rpt: 2019-459	Revision: A		

**Figure 3**



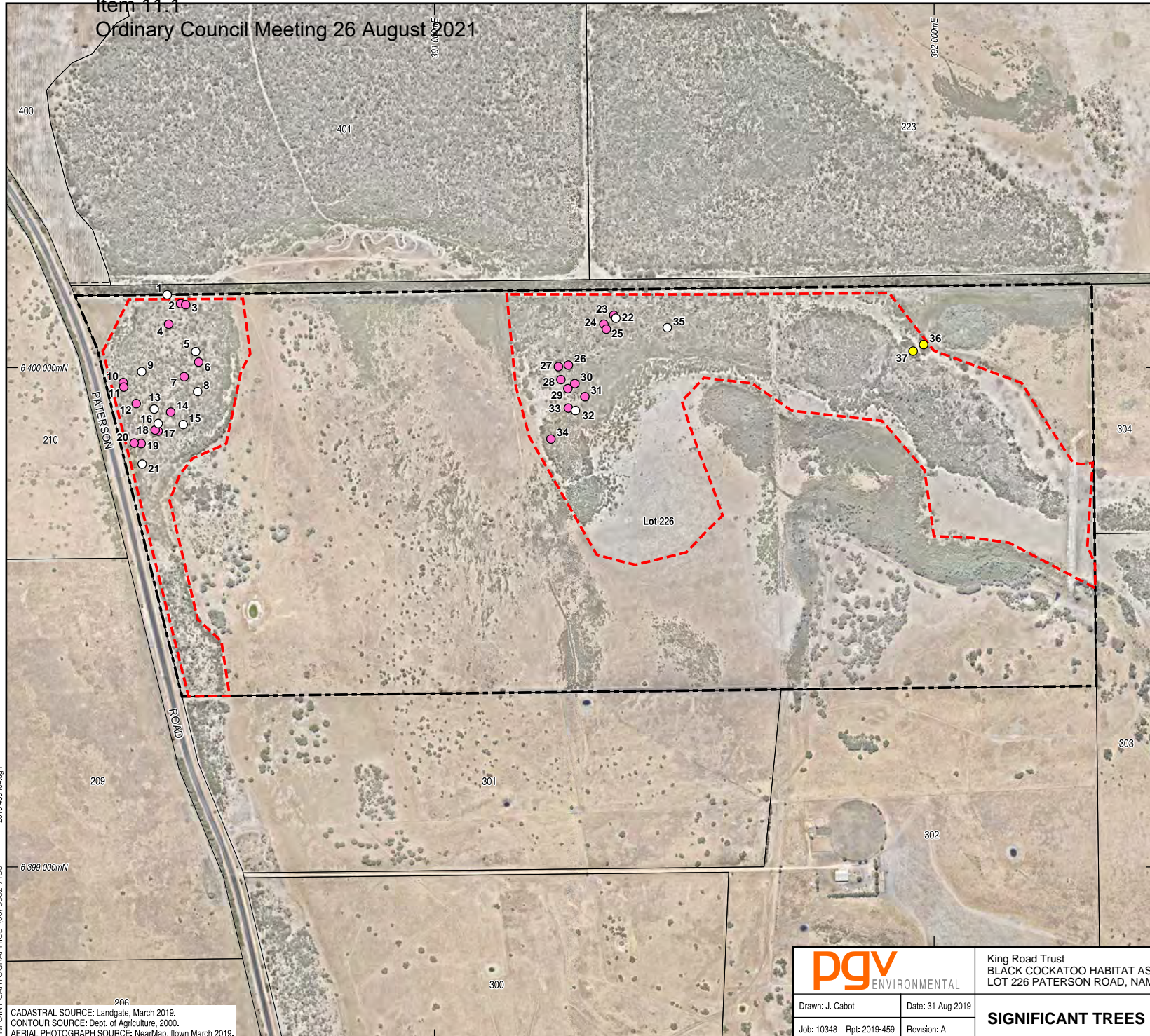
0 50 100 150 200 250m  
SCALE 1 : 7 500 at A3 (MGA)

**Legend**

- - - Site Boundary
- Lot 226 Boundary
- Cadastral Boundary
- Easement Boundary

**Significant Trees**

- Flooded Gum (*Eucalyptus rudis*)
- Jarrah (*Eucalyptus marginata*)
- Standing Dead Tree
- 15** Tree Number



2019-459-04.dgn  
PINPOINT CARTOGRAPHICS (08) 9562 7136

CADASTRAL SOURCE: Landgate, March 2019,  
CONTOUR SOURCE: Dept. of Agriculture, 2000.  
AERIAL PHOTOGRAPH SOURCE: NearMap, flown March 2019.

<b>pgv</b> ENVIRONMENTAL		King Road Trust BLACK COCKATOO HABITAT ASSESSMENT LOT 226 PATERSON ROAD, NAMBEELUP	
Drawn: J. Cabot	Date: 31 Aug 2019	<b>SIGNIFICANT TREES</b>	
Job: 10348 Rpt: 2019-459	Revision: A		

**Figure 4**

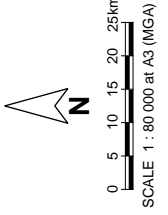
King Road Trust  
BLACK COCKATOO HABITAT ASSESSMENT  
LOT 226 PATERSON ROAD, NAMBEELUP

CONTEXT PLAN

	Drawn: J. Cabot	Date: 31 Aug 2019
	Job: 10348	Revision: A



**Legend**  
— Site Boundary  
 Lot 226 Boundary



CADASTRAL SOURCE: Landgate, March 2019,  
 CONTOUR SOURCE: Dept. of Agriculture, 2000.  
 AERIAL PHOTOGRAPH SOURCE: NearMap, flown March 2015.

# **APPENDIX 1**

## **Significant Tree Survey Results**

**Lot 226 Paterson Road, Nambeelup Potential Black Cockatoo Breeding Tree Data**

Tree Number	Species	Easting MGA zn50	Northing MGA zn50	Height (m)	Diameter (mm)			Notes (hollows, bees etc.)
					DBH1	DBH2	DBH3	
1	Standing Dead Tree	390465	6400146	9	760			Small potential hollow
2	Jarrah ( <i>Eucalyptus marginata</i> )	390492	6400128	9	620			Very poor condition, no hollows
3	Jarrah ( <i>Eucalyptus marginata</i> )	390502	6400126	10	1890			Fair condition, hollow at base, potential spout
4	Jarrah ( <i>Eucalyptus marginata</i> )	390468	6400087	12	1160			Good condition, no hollows
5	Standing Dead Tree	390522	6400032	7	1540			Hole at base, potential hollow/spout
6	Jarrah ( <i>Eucalyptus marginata</i> )	390528	6400011	11	640			Poor condition, no hollows
7	Jarrah ( <i>Eucalyptus marginata</i> )	390499	6399982	9	510			Very poor condition, no hollows
8	Standing Dead Tree	390526	6399952	9	730			Potential hollow/spout
9	Standing Dead Tree	390414	6399992	11	1600			Potential hollow/spout
10	Jarrah ( <i>Eucalyptus marginata</i> )	390377	6399970	10	950			Poor condition, no hollows
11	Jarrah ( <i>Eucalyptus marginata</i> )	390378	6399961	8	650			Poor condition, no hollows
12	Jarrah ( <i>Eucalyptus marginata</i> )	390403	6399928	6	1400			Poor condition, potential spout and hollow
13	Standing Dead Tree	390439	6399917	8	680			Potential hollow/spout
14	Jarrah ( <i>Eucalyptus marginata</i> )	390472	6399911	10	960			Good condition, no hollows
15	Standing Dead Tree	390497	6399886	9	1250			Potential hollow/spout
16	Standing Dead Tree	390447	6399888	9	1900			Potential hollow/spout
17	Jarrah ( <i>Eucalyptus marginata</i> )	390447	6399873	11	570			Poor condition, no hollows
18	Jarrah ( <i>Eucalyptus marginata</i> )	390441	6399875	12	520			Good condition, no hollows
19	Jarrah ( <i>Eucalyptus marginata</i> )	390413	6399848	9	680			Fair condition, no hollows
20	Jarrah ( <i>Eucalyptus marginata</i> )	390399	6399849	11	670			Poor condition, no hollows
21	Standing Dead Tree	390415	6399807	7	890			Potential hollow/spout
22	Standing Dead Tree	391363	6400099	9	820			No hollow/spout
23	Jarrah ( <i>Eucalyptus marginata</i> )	391359	6400105	8	1060			Mostly dead, very poor condition, no hollows
24	Jarrah ( <i>Eucalyptus marginata</i> )	391339	6400087	9	590	560		Mostly dead, very poor condition, no hollows
25	Jarrah ( <i>Eucalyptus marginata</i> )	391344	6400077	11	650			Fair condition, no hollows
26	Jarrah ( <i>Eucalyptus marginata</i> )	391268	6400005	8	720			Fair condition, no hollows
27	Jarrah ( <i>Eucalyptus marginata</i> )	391248	6400002	10	600			Fair condition, no hollows
28	Jarrah ( <i>Eucalyptus marginata</i> )	391253	6399976	8	520			Poor condition, sprouting, no hollows
29	Jarrah ( <i>Eucalyptus marginata</i> )	391267	6399958	9	760			Poor condition, sprouting, no hollows
30	Jarrah ( <i>Eucalyptus marginata</i> )	391281	6399968	11	990			Sprouted at base, poor condition, no hollows
31	Jarrah ( <i>Eucalyptus marginata</i> )	391301	6399942	12	1090			Hollow at base, potential hollow/spout
32	Standing Dead Tree	391282	6399914	9	1170			Termite, potential hollow/spout
33	Jarrah ( <i>Eucalyptus marginata</i> )	391268	6399919	11	860			Fair condition, hollow at base, no hollows
34	Jarrah ( <i>Eucalyptus marginata</i> )	391233	6399857	8	820			Very poor condition, Potential hollow/spout
35	Standing Dead Tree	391466	6400080	8	540			No hollow/spout
36	Flooded Gum ( <i>Eucalyptus rudis</i> )	391979	6400046	11	1210	1170		Good condition, no hollows
37	Flooded Gum ( <i>Eucalyptus rudis</i> )	391958	6400033	11	610	480	220	Good condition, no hollows



# **APPENDIX 2**

## **Significant Tree Photos**

### Lot 226 Paterson Road, Nambeelup

Tree 1



Tree 2



Tree 3



Tree 4



Tree 5



Tree 6



Tree 7



Tree 8



Tree 9



**Lot 226 Paterson Road, Nambeelup**

Tree 10



Tree 11



Tree 12



Tree 13



Tree 14



Tree 15



Tree 16



Tree 17



Tree 18



**Lot 226 Paterson Road, Nambeelup**

Tree 19



Tree 20



Tree 21



Tree 22



Tree 23



Tree 24



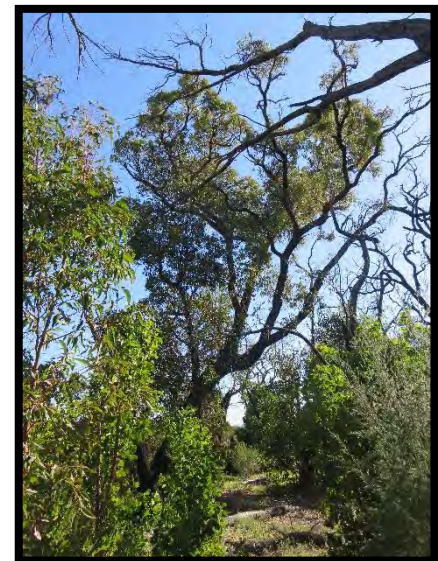
Tree 25



Tree 26



Tree 27



**Lot 226 Paterson Road, Nambeelup**

Tree 28



Tree 29



Tree 30



Tree 31



Tree 32



Tree 33



Tree 34



Tree 35



Tree 36



**Lot 226 Paterson Road, Nambeelup**

Tree 37





**Development Application  
 Extractive Industry  
 Lot 226 Paterson Road, Nambeelup  
 Summary of Submissions**

No.	Submitter	Summary of Submission	Comment	Council Recommendation
<b>State Agencies</b>				
1.	Department Water Environmental Regulation D20/46495	<p>The Department has reviewed the documents provided, including the proposed Sand Excavation and Rehabilitation Management Plan (SERMP) (Landform, Research 2020).</p> <p>At this point the Department <b>does not support the proposal due to insufficient information within the supporting documents to ensure protection of water resources.</b> Advice is also provided with regard to regulations under Part V of the Environmental Protection Act 1986 (EP Act), that should be accurately represented within the planning approval reports. Further advice is provided below.</p> <p><b><u>Groundwater Levels</u></b>                      For the protection of groundwater resources the SERMP proposes “The base of the sand pit is set at around 10.5 metres AHD which is 0.5 metres above the temporary seasonal perched water table and in turn around 2 metres above the regional water table”.</p>	<p><b>DWER - Water</b></p> <p>A separate document that included slightly amended final floor elevations, was provided to the Department of Water.</p> <p>The document is attached</p> <p>The DWER responded and provided their acceptance of the documentation on the groundwater elevations</p> <p>The figures have been renumbered and included as the Figures at the end of the updated Management Plan.</p>	<p>Amended documents have been provided– April 2021                      Referred to DWER who advised proposal is satisfactory.</p> <p>Figures still vary from text, however all information in present.</p> <p>Conditioned application to be a separation of 500mm from the maximum ground water levels with the site to be monitored.</p>



		<p>The separation distance between excavation and the maximum groundwater level (MGL) <b>of 0.5m is supported</b>, however assumptions with regard to local groundwater levels are not.</p> <p>The regional groundwater contours utilised within the report are from the Perth Groundwater Atlas (DoE, 2004). This document is intended to inform water-bore drillers, irrigators, and private householders to establish groundwater bores in the superficial aquifer, and presents contours based on estimated based on recorded groundwater levels measured in May of 2003 i.e. minimum levels. <a href="#">This document is not appropriate to inform site specific decisions for an MGL.</a></p> <p>The attached figure presents MGL's derived from the Murray Drainage and Water Management Plan (DoW, 2011), which utilises historical local groundwater data. This would be an appropriate first reference for allowable excavation depths whilst maintaining a 0.5m separation. <a href="#">At this point the proposed excavation to 10.5 m AHD will not achieve this.</a></p> <p>The SERMP also proposes to determine the separation to the temporary winter perched water will be determined by Piezometers installed on the floor of the pit as the pit progresses forward (Section 9.5). This is not appropriate in the absence of confirmation of the winter peak and subsequent correlation</p>		<p>Water monitoring required.</p> <p>DWER advised they satisfied with the above document.</p>
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		<p>to long term data. Please note the attached figure also provides the location of a number of Department long term monitoring bores which are not included within the hydrogeological characterisation of the site. Reference is also made to a <a href="#">Water Management Plan, within the report, however no plan was provided with referred documents.</a></p> <p><b><u>Industry Regulation</u></b>                  The Department regulates emissions and discharges from the construction and operation of prescribed premises through a works approval and licensing process, under Part V of the EP Act. The categories of Prescribed premises are outlined in Schedule 1 of the Environmental Protection Regulations 1987.                  The EP Act requires a works approval to be obtained before constructing a prescribed premises and makes it an offence to cause an emission or discharge unless a licence or registration is held for the premises.</p> <p>Insufficient information was provided to enable DWER to determine whether the proposal will be categorised as Prescribed Premises as per Schedule 1 of the Environmental Protection Regulations 1987 (EP Regulations). Based on the information provided the proposed sand mining operation, specifically the proposed</p>	<p>All the text is incorporated into the Management Plan at Section 4.4 Hydrology.</p> <p><b>DWER – Industry Regulation</b>                  As noted in the Management Plan, extraction of sand does not require an <i>Environmental Protection Act 1986 Part V Licence as a Prescribed Premises.</i></p>	<p>Forwarded to DWER who advised satisfied with updated documents</p> <p>Noted</p> <p>As above</p>
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		<p>screening process may cause the premises to become Prescribed Premises as per for the purposes of Part V Division 3 of the EP Act, if it has the capability to meet or exceed the specified production or design capacity* of the relevant categories under Schedule 1 of the EP Regulations. e.g.</p> <p>12. - Screening, etc. of material: premises (other than premises within category 5 or 8) on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated 50000 tonnes or more per year</p> <p>70. Screening, etc. of material: premises on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated.</p> <p>More than 5 000 but less than 50,000 tonnes per year                  The EP Act makes it an offence to undertake any work which causes a premises to become, or become capable of being, a Prescribed Premises unless the work is undertaken in accordance with a works approval. It is also an offence under the EP Act to cause an emission or alter the nature or volume of waste, noise or odour from the Prescribed Premises, unless done so in accordance with a works approval or licence</p>	<p>A licence would be required if the sand was screened at rates of more than 5000 tonne per year. <b>Currently screening of sand is not proposed</b></p> <p>A commitment is made to apply for a DWER Licence if screening is undertaken in excess of 5000 tonnes per year.</p>	<p>Conditioned Further approval required for screening over 5000tonne.</p>
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	<p>or a registration (for operation) is held for the premises.</p> <p>The Applicant is therefore advised to refer to the information and Industry Regulation Guide to Licensing available at <a href="http://www.der.wa.gov.au/our-work/licences-and-works-approvals">http://www.der.wa.gov.au/our-work/licences-and-works-approvals</a> and / or if they have queries relating to works approvals and licences to contact DWER at <a href="mailto:info@dwer.wa.gov.au">info@dwer.wa.gov.au</a> or 6364 7000.</p> <p>*'Production capacity' and 'design capacity'</p> <ul style="list-style-type: none"><li>• The production capacity is the rate at which a product is produced as relevant to the description of the prescribed premises category; and</li><li>• design capacity is the maximum capacity/capability for which the facility or equipment is designed to receive, handle, process, contain or emit, as relevant to the description of the prescribed premises category.</li></ul> <p>In view of the uncertainty regarding regulation under Part V of the EP Act advice has been provided on environmental risks and mitigation strategies, based on the available information. In the event that the applicant determines that a works approval or licence application is required under Part V of the EP Act, the advice provided in this communication does not prejudice and must</p>		
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	<p>not be considered to infer the outcome of the EP Act licence and works approval process.</p> <p><b><u>Native Vegetation</u></b>        Under section 51C of the EP Act, clearing of native vegetation is an offence unless undertaken under the authority of a clearing permit, or the clearing is subject to an exemption. Exemptions for clearing that are a requirement of written law, or authorised under certain statutory processes, are contained in Schedule 6 of the EP Act. Exemptions for low impact routine land management practices outside of environmentally sensitive areas (ESAs) are contained in the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (the Clearing Regulations).</p> <p>Based on the information provided, no exemption applies to the proposed clearing and a clearing permit is required. The Department has not received a clearing permit application relating to this proposal. Application forms are available from <a href="https://www.der.wa.gov.au/our-work/clearing-permits/46-clearing-permit-application-forms">https://www.der.wa.gov.au/our-work/clearing-permits/46-clearing-permit-application-forms</a>. Additional information on how to apply for a clearing permit is available here:  <a href="https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Fact_sheets/Fact_Sheet_-_how_to_apply.pdf">https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Fact_sheets/Fact_Sheet_-_how_to_apply.pdf</a></p>	<p><b>DWER – Native Vegetation</b>        A Clearing Permit will be required for the Red Hatched Area on Figure 7.</p> <p>A Clearing Permit cannot be granted by DWER until Development Approval is provided. Therefore a Clearing Permit will be applied for after Development Approval is provided.</p>	<p>Advice note that a clearing permit is required prior to clearing</p>
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<p>2.</p>	<p>Department Biodiversity Conservation and Attractions          D20/47953</p>	<p><b>Native vegetation</b>          The clearing of native vegetation associated with the proposal will require a Clearing Permit from the Department of Water and Environmental Regulation (DWER), under the requirements of the Environmental Protection Act 1986.</p> <p><b>Threatened flora and fauna</b>          The vegetation that will be cleared to implement the proposed sand excavation provides suitable habitat for the threatened flora, glossy-leafed hammer orchid (<i>Drakaea elastica</i>), listed under the Biodiversity Conservation Act 2016 (BC Act). The report 'Lot 226 Paterson Road, Nambeelup - Flora and Vegetation Survey and Level 1 Fauna Assessment' (PGV Environmental 2019), provides details of the targeted survey conducted for this species. The survey was undertaken at the appropriate time of year to detect <i>D. elastica</i> and this species was not located within the proposed excavation area.</p> <p>The PGV Environmental report identified 9 hectares of foraging habitat and 37 potential breeding trees for black cockatoos listed as threatened fauna under the BC Act. It is noted that all of the black cockatoo habitat trees and the feeding habitat have been excluded from the area proposed for excavation.</p>	<p><b>DWER – Native Vegetation - Fauna</b></p> <p>A Clearing Permit will be required for the Red Hatched Area on Figure 7.</p> <p>A Clearing Permit cannot be granted by DWER until Development Approval is provided. Therefore a Clearing Permit will be applied for after Development Approval is provided.</p> <p>The proposal has been provided to the EPA who made some suggestions which led to the modification of the proposal to eliminate all <i>Banksia</i> Woodland and restrict the clearing to regrowth <i>Kunzea glabrescens</i> Thicket, which has been previously cleared and is heavily grazed. DBCA notes that the vegetation survey was completed at the correct time of the year and <i>Drakaea elastica</i> was not detected.</p> <p>All Black Cockatoo feeding habitat including <i>Banksia</i> Woodland has been excluded from the amended proposal.</p>	<p>Advice note added that a clearing permit is required prior to clearing</p>
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	<p><b>Ecological linkages</b>                  The vegetation that will be cleared for the excavation and the adjoining vegetation and wetlands on Lot 226 have been identified as a Local Natural Area and also as an ecological linkage in the Shire of Murray's Local Biodiversity Strategy (2013). The WA Local Government Association and the former Department of Environment and Conservation's 'South West Regional Ecological Linkages' (2009) report also identifies a regional ecological linkage through the area.</p> <p>The 'Excavation and Rehabilitation Management Plan - Lot 226, Paterson Road, <b>Nambeelup</b>' (Landform Research 2020) (the Plan) states that "a vegetation and wildlife corridor will be established at the end of excavation" to connect the wetlands and the existing banksia woodland to the conservation reserve on Lot 401 (a Swan Bioplan area) located to the north of Lot 226. The Plan also outlines that areas of native vegetation cleared for the pit are intended to be returned to native vegetation at the completion of operations.</p> <p>A general overview of the proposed revegetation strategy is provided with a potential species list and completion targets.</p>	<p><b>Ecological Linkages</b>                  Ecological Linkages are provided for the end of excavation as shown in Figure 12. It is noted that the approved conservation areas on the land to the north makes it difficult for the vegetation linkages to be effective and that the adjoining land to the east does not have local native vegetation to link further.</p> <p>The linkages do however provide retained linkages to the wetland in the north western corner and link to the conservation area on the adjoining land to the north. See Figure 6.</p> <p>As the linkages are provided in the Management Plan their maintenance and revegetation will form part of the commitments to biodiversity management on site.</p>	<p><b>Ecological Linkage</b>                  Figure 12 does not exist, however Figure 6 provides a Vegetation and wildlife corridor which is to be established at the end of excavation. The updated Excavation and rehabilitation management plan outlines the process and implementation for the establishment of the ecological linkage.</p>
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	<p>Should the proposal be approved, it is considered that further detailed planning will need to be undertaken to ensure that the existing ecological corridor's values and functions are reinstated and improved.</p> <p><b>Wetlands</b>                  The portion of Lot 226 proposed for excavation adjoins areas of sumpland and palusplain mapped as Resource Enhancement or Multiple Use management category within the DBCA's Geomorphic Wetlands of the Swan Coastal Plain dataset. The proposal provides a 50 metre buffer to Resource Enhancement wetland (UFI 5031) to the east of the proposed excavation area.</p> <p>An area currently mapped as a Multiple Use wetland (UFI 5132), adjoins the south west of proposed stage 2 and 3 of the excavation area. This wetland is likely to support values commensurate with a Resource Enhancement or Conservation category wetland. The proposed excavation does not appear to provide a buffer to this wetland. To ensure that impacts to the wetland are avoided, the Environmental Protection Authority's 'Guidance Statement 33: Environmental Guidance for Planning and Development' (2008) recommends that wetlands that are to be protected require a minimum 50 metre buffer distance between the proposal and the edge of the wetland vegetation.</p>	<p><b>Wetlands</b>                  The wetlands have been excluded from development.</p> <p>The wetland to the north east has been provided with a 50 metre buffer as the edge of the sand pit will be formed inside the disturbance footprint.</p> <p>The wetland will be better linked to remnant vegetation on site at the end of mining.</p> <p>The 50 metre buffer complies with the Guidelines for wetland management, which is taken as the edge of the wetland vegetation.</p>	<p><b>Wetlands</b>                  Conditioned</p>
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		<p>To confirm the management category of the wetland, the proponent can undertake a detailed assessment of the wetland's values and boundaries in accordance with 'A methodology for the evaluation of wetlands on the Swan Coastal Plain' (DBCA 2017)</p>		
<p>3.</p>	<p>Dept Mines Industry Regulations D20/43621</p>	<p>Although EIL's fall outside the Mining Act 1978, information on mineral resources, including basic raw materials, is of importance to the Geological Survey and Resource Strategy Division, within DMIRS. The information is used in our MINEDEX database, which is a source of information for our State-wide resource mapping system - GeoView. The locations and status of basic raw material extraction sites are also valuable inputs to our resource assessment and land use planning role.</p> <p>Our aim is for the database to be a comprehensive and up-to-date source of information on all mining-related activities throughout the State. It is a database that is used to inform other government agencies, as well as the general public, of the location of mines and mineral resources. You are encouraged to use it whenever researching information on mineral or petroleum resources, and including basic raw materials.</p>	<p><b>MINEDEX</b></p> <p>The sand excavation will be noted in MINEDEX.</p> <p>The Pit will be provided with a specific number and the operator will be required to register the site under DMIRS SRS safety management system through the <i>Mines Safety and Inspection Act 1994</i>.</p>	<p>Noted</p>





		<p>Thank you for the opportunity to note this proposal. DMIRS has determined this proposal raises no significant issues with respect to mineral and petroleum resources, geothermal energy, and basic raw materials. It would be appreciated if DMIRS continues to be notified of all applications for EIL's in the Shire of Murray and that all future correspondence is addressed to the Executive Director of the Geological Survey and Resource Strategy Division and submitted electronically to <a href="mailto:records@dmirs.wa.gov.au">records@dmirs.wa.gov.au</a></p>		
4	<p>Department Primary Industries Regional Development D20/42449</p>	<p>The Department Primary Industries and Regional Development does not object to the proposed extraction of sand at the abovementioned Lot. DPIRD assessed the Weed Management Plan and that it fulfils the guidelines.</p>	<b>Noted</b>	<b>Noted</b>
5	<p>Late Submission Peel Harvey Catchment Council D20/48957</p>	<p>The Peel-Harvey Catchment Council (PHCC) is the NRM regional body responsible for the Peel-Harvey Natural Resource Management (NRM) Region. The following comments are provided within the context of our mission statement: "as environmental stewards we will encourage and enable effective catchment management to create a healthier natural environment in the Peel-Harvey by building community education and capacity, influencing and leading critical thought and environmental pride, and exemplifying and implementing best practice." Our NRM Region covers over</p>		



		<p>1.1 million hectares of the Serpentine, Murray, Hotham-Williams and Harvey River catchments.</p> <p>1. PHCC's position is that the need for fill, and proposed sand extraction operations such as that proposed here, should be reduced by selecting a more compact urban footprint thereby achieving multiple social, environmental and economic benefits, including significantly reducing impacts on Banksia Woodlands and consequently the endangered Carnaby's Black Cockatoo, for which these woodlands provide vital habitat.</p> <p>2. The PHCC acknowledges that sand is classified as a basic raw material and the use of sand <b>is embedded within WA's building and construction industry practices that relies largely on blanket clearing, levelling and fill. Innovation through contemporary planning approaches that are more sympathetic to natural topography, are supported by the PHCC.</b> The PHCC believes that demand-side management, through measures that actively promote alternative housing and construction methods (to reduce the need for basic raw materials such as sand) and which seek to promote a cultural shift away from unsustainable legacy practices, <b>is needed.</b></p>	<p><b>Need for Sand</b>        The need for fill sand is recognised by the PHCC.</p> <p><b>Biodiversity Values</b>        The sand resource is selected to be taken from previously cleared and cleared areas, with all significant native vegetation retained that includes retention of all <i>Banksia</i> Woodland and Black Cockatoo feeding and nesting habitats.</p>	<p>1. Agree the Banksia Woodlands and Carnaby's Black Cockatoos should be protected. Banksia Woodlands have been removed from the excavation area.</p> <p>2. Noted: In an ideal world, developers would be looking for less expensive development options and would provide innovative solutions to lessen the need for fill, however at this time whilst the WAPC supports basic raw materials extraction under SPP2.4 the developers are not forced to innovate and look for other solutions.</p>
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	<p>3. The PHCC is concerned about the impact of the proposed development on the <b>value of the landscape</b>. We note that State Planning Policy No. 2 stipulates that decision-making should consider the need for <b>a landscape or visual impact assessment for land-use or development that may have a significant impact on sensitive landscapes</b>. The PHCC requests that the Shire of Murray give consideration to this context when determining this application.</p> <p>Based on the information viewed by the PHCC, we are <b>not supportive</b> of the proposal based on the following:</p> <p>4. The potential impact on the nearby wetlands and groundwater particularly the seasonally perched water table is not clear and may adversely impact on the Ramsar listed Peel-Yalgorup wetlands.</p>	<p><b>3. Landscape Value</b>                  The ridge which is low and only a few metres above the surrounding plain is retained with excavation only skimming sand from the ridge.</p> <p><b>4. Wetlands</b>                  The groundwater contours were mapping in past years when groundwater elevations were higher. Those values correlate with DWER groundwater contours.</p> <p>The wetlands are up gradient from the proposed pit and the palusplain down gradient will not be impacted.</p>	<p><b>3. Landscape Value</b>                  Clause 5.47 of SPP2.0 Environment Natural Resources <i>recommends decision makers consider the capacity of sensitive landscapes to absorb new activities and encourage the restoration of those through appropriate planning</i>. This site contains protected Banksia Woodland, cockatoo habitat and foraging vegetation as well as protected wetlands. This excavation site does not impact these area and will, with rehabilitation, enhance and improve the ecological linkages in this area. <b>Conditions of approval will ensure this outcome.</b></p> <p><b>4 Wetlands</b>                  DWER have supported 0.5m separation to maximum groundwater. and the management plans and final contour plans acknowledge the excavation may not encroach within 500mm of the maximum groundwater levels. The conditions of approval require water monitoring and annual reporting to the Shire.</p>
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		<p>5. The proposed removal of vegetation from the sand hills will have an adverse impact on the <b>visual landscape of the area</b></p> <p>6. The proposal is within the East-West vegetation and wildlife corridor which has been identified</p>	<p><b>Groundwater</b> The final land surface is compliant with the measured on site contours and DWER Groundwater Atlas Contours and DWER WQPN Policy 15 for the Extraction of Basic Raw Materials. DWER have accepted the final contour plan as being compliant with their requirements.</p>	<p>5. Visual Landscape The excavation site is located generally at the rear of the lot approximately 900m from Paterson Road, where there is sufficient vegetation to screen the site from the road. It is unlikely that this extractive industry will have an adverse impact on the visual amenity of the area, particularly when the site is to be progressively rehabilitated. The excavation and rehabilitation commences from the west – road side.</p> <p>6. The site is within the East-West vegetation and wildlife corridor, which is generally protected from this excavation. This vegetation and wildlife corridor is to be rehabilitated and re-established under the excavation and rehabilitation and management plan and conditions of approval.</p>
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		<p>7. No rehabilitation plan has been submitted.</p> <p>From the information viewed by the PHCC, it is recommended that the following occur prior to the application being determined:</p> <p>8. That a spring fauna and flora survey be conducted, as this will be required to inform the vegetation clearing permit and should also inform the Shire planning approval.</p> <p>9. The depth below surface of the seasonal perched water table <b>is not clearly presented in the information provided as part of the submission. It is also based on information collected for a different purpose in 2002 and so is not contemporary.</b> Given the potential impacts on the Peel-Harvey estuary, this should be determined prior to the application being determined as it may impact on the proposed operation, and relevant conditions that would be imposed.</p> <p>10. The vegetation to be retained including habitat trees should be identified on site and clearly tagged.</p>	<p><b>8. Flora and Vegetation</b>                  A Spring survey has been conducted and is attached. The survey has been reviewed by the EPA/DWER in their considerations.</p> <p>9. The pit footprint is in the form of a shape file which can accurately be marked out on the ground prior to opening the pit.</p>	<p>7. The rehabilitation and management plan provides sufficient information on the management, operation and rehabilitation of the site including the ecological linkages.</p> <p><b>8. Flora and Vegetation</b>                  DBCA noted the spring survey and appropriateness of the survey timing in their comments.</p> <p>9. Amended ground water details have been provided to proponent by DWER. A condition of approval for 2 water monitoring bores be installed to the satisfaction of the Shire with annual reports to be provided of maximum ground water levels in late winter.</p> <p>10. No clearing of native vegetation can occur without a clearing permit being issued by DWER. Whilst it is desirable that any habitat tree</p>
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		<p>In the event that the application is to be approved it is suggested that the following conditions should be imposed:</p> <p>a. Any Clearing Permit which is issued is to be complied with.</p> <p>b. All vegetation to Lot 226 which it to be retained is to be fenced prior to the operation commencing and is to remain fenced during the length of the operation.</p> <p>c. Prior to the commencement of the operation, a concept rehabilitation plan is to be submitted outlining the basis of the vegetation and wildlife corridor. At the completion of each stage of the operation a detailed rehabilitation plan is to be submitted and implemented to the satisfaction of the Shire of Murray.</p> <p>d. Prior to the commencement of the operation a Fauna Management Plan is to be submitted to the Shire of Murray and thereafter complied with.</p>	<p>a. Any Clearing Permit will be issued by the DWER and will be supervised by the DWER under the Environmental Protection Act 1986 Regulations.</p> <p>b. Fencing of vegetation is not required unless stock are retained on site. The land is rural land.</p> <p>c. A Rehabilitation Plan is included in the Management Plan at Section 11.0 Closure and on the attached Figures.</p> <p>d. Fauna will be considered by DWER under the Clearing Permit. DWER will suggest and condition any requirements for fauna management.</p>	<p>within the excavation area be retained, this is difficult to achieve and there is no point marking trees for retention within the excavation area.</p> <p>a. A condition has been included that a clearing permit is required prior to any development, however the proponent is required to comply with the requirements of a clearing permit anyway.</p> <p>b. Condition included that the vegetation and rehabilitation areas to be fence to prevent stock from entering the areas.</p> <p>c. Condition included that rehabilitation must be progressive. However requiring a rehabilitation plan to be submitted outlining the rehabilitated areas is a good idea and has been included as an advice note.</p> <p>d. Condition to be included requiring a fauna relocation plan prior to clearing of vegetation.</p>
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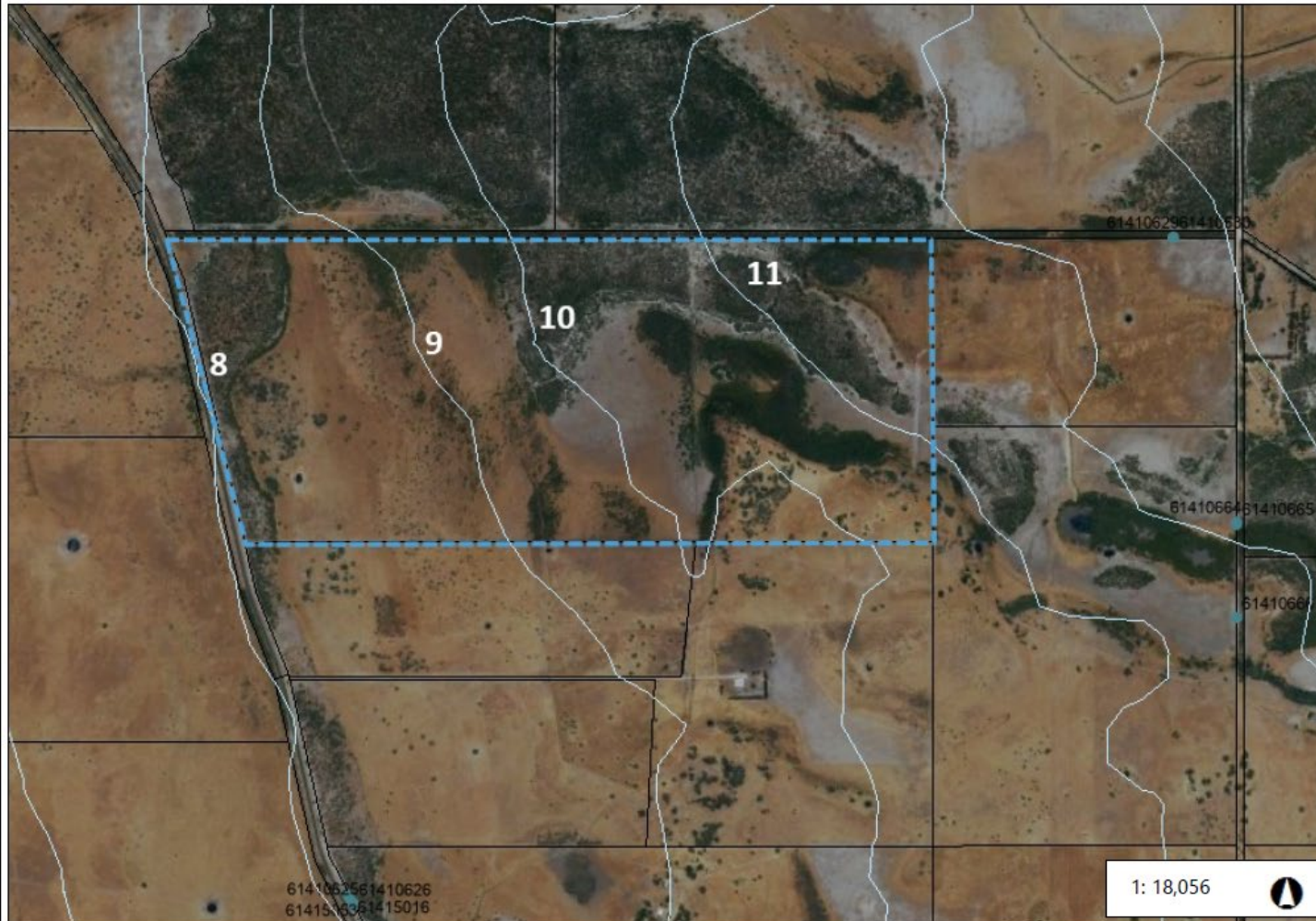


		<p>e. Any fuel spills on the Lot 226 are to be reported to the Shire of Murray and to the relevant agencies within 7 days of the spill occurring outlining the circumstances of the spill, the volume of the spill, actions already taken including containment, recovery and remediation and future actions to address the impacts and to prevent future spills.</p> <p>f. An annual compliance report is to be submitted to the Shire of Murray outlining compliance with the Clearing Permit and Shire of Murray conditions.</p>	<p>e. Fuel management procedures are in place in Sections 9.12 and 9.13 of the Management Plan.</p> <p><b>f. Compliance Reporting</b>                  The Shire of Murray are able to require annual compliance reporting if they deem it necessary.</p>	<p>e. The excavation and management report advises the fuel reloading will be via tankers, however agree that any spills should be reported to DWER and the Shire.</p> <p>f. Renewal of excavation licences are required annually which provide Shire officers with the opportunity to undertake an inspection of each excavation site including clearing permit conditions. Compliance matters are generally identified at this time.</p>
<b>Land Owners</b>				
1	Land Owner D20/43138	<p>On behalf of the owners of the adjoining lot on Scott road, I wish to register support for the application prepared by Dr Lindsay Stevens.</p> <p>You will recall that we had a similar proposal for lot 303. This was shelved at your suggestion largely relating to the 3.5m study which no longer appears relevant.</p> <p>The demand for sand is increasing and will do so as the Nambeelup business park progresses.</p> <p>If there is any way we can assist we will be pleased to do so.</p>	Noted	Noted



Government of Western Australia  
Department of Water and Environmental Regulation

### Lot 226 Paterson Road, Nambeelup - Maximum Groundwater Level



**Legend**

- WIN Sites - Ground with Aquifers
- WIN Sites - Ground with Reporter Aquifers
- Cadastre
- Murray Region Groundwater Contours MaxGL 1m

**Notes**

Author:  
Recipient:

0.9 0 0.46 0.9 Kilometers

WGS\_1984\_Web\_Mercator\_Auxiliary\_Sphere  
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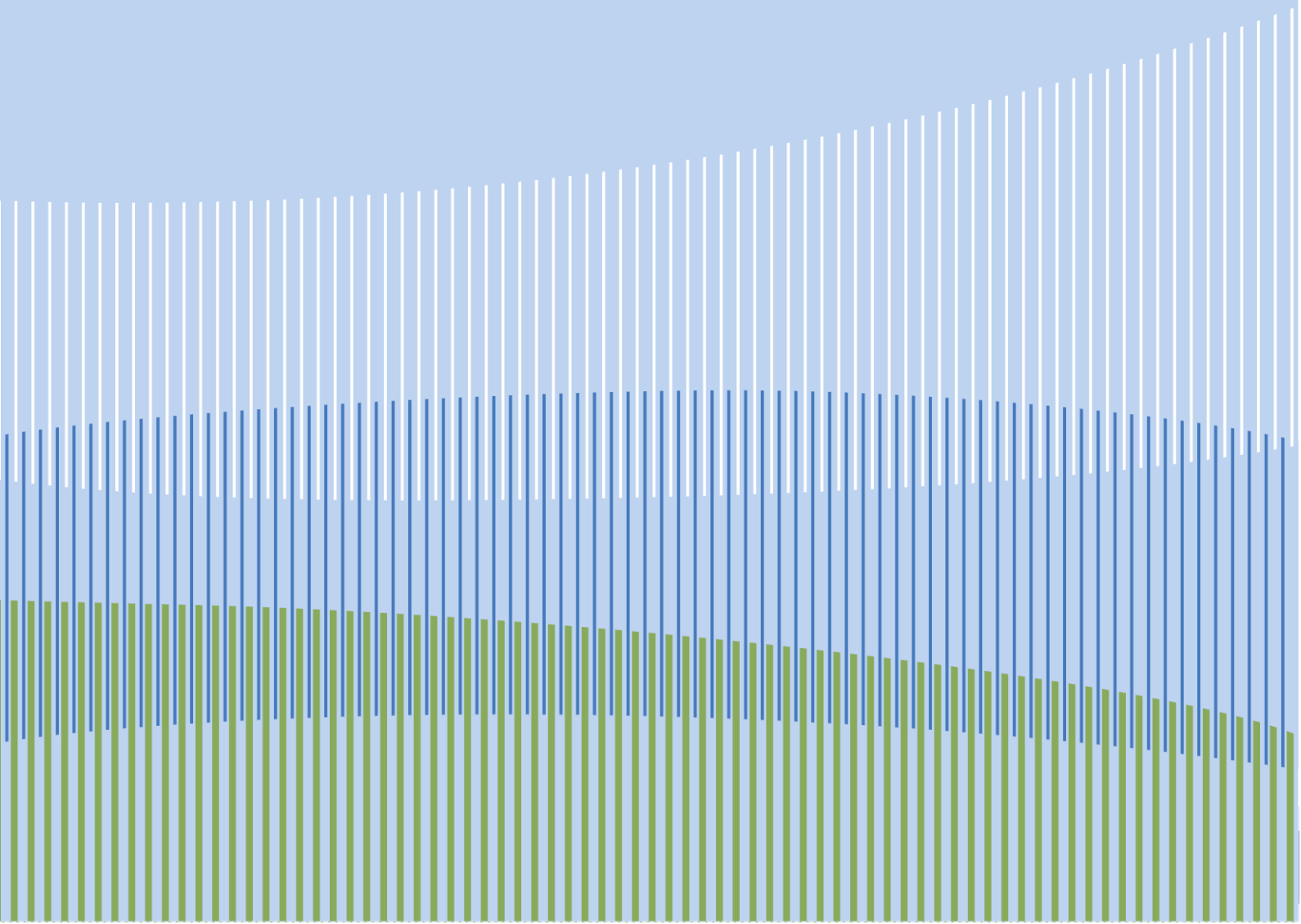
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# Long Term Financial Plan

## 2021/2022



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# Overview

The Shire of Murray Long Term Financial Plan (LTFP) is a planning tool that has been developed to map and ensure the financial sustainability of the Shire into the future. The LTFP is designed as a high-level summary document that outlines the future planning of Council's financial outcomes – particularly in relation to key components such as rate levels, service levels to the community, major infrastructure asset replacement/renewal, loan borrowings and cash reserves.

The Plan is a mechanism in determining financial projections for the period 2021/2022 to 2030/2031, and has been prepared based on a number of objectives and assumptions that are outlined throughout the document. Strategies, priorities, issues and risk are all dynamic influences in relation to any planning, and as such, the LTFP is reviewed and adjusted annually to reflect material changes. The Shire is challenged by growing community demands and expectations, and recognises the importance of growth, sustainability and livability. It is committed to effective governance and providing infrastructure and services that meet the needs of all user groups within the Local Government area.

The long term financial estimates are an integral part of Council's strategic planning process, informing the Corporate Business Plan which activates the Strategic Community Plan priorities. It indicates the long term financial sustainability and allows early identification of financial issues and their longer term impacts. This Plan addresses the operating and capital needs placed on the Shire over the next 10 years and is driven by the content of a range of strategic documents endorsed by the Council including:

- Strategic Community Plan – Murray 2031
- Corporate Business Plan 2021-2025
- Infrastructure Asset Management Plan

Financial risks are a key focus of the Plan, in particular:

- Management and renewal of assets
- Management of current and future liabilities
- Decreasing income sources, including grant funding
- Demand for new infrastructure

The overall objectives of Council's LTFP are to:

- Achieve a balance between meeting the service needs of the community and remaining financially sustainable
- Ensure rates and fees are prudent and based on sound analysis that are both manageable and sustainable
- Ensure loan borrowings are able to be serviced
- Maintain a positive cash position
- Maintain a positive liquidity ratio
- Achieve and maintain an underlying operational surplus
- Progressively reduce the asset renewal gap

The LTFP is a dynamic document that will be regularly updated as part of Council's annual strategic planning and budget process, and as major changes occur. While the LTFP is a financial plan for the next 10 years, it has been developed with a current state of knowledge. There are several factors that could influence the Plan significantly, including rating income fluctuations, and the timing of population growth, which could impact Murray in the medium term.

## Background

### Purpose

The purpose of the Long Term Financial Plan is to present a financial analysis of all strategic objectives and goals set out in the integrated planning framework documents over a ten year period. It is an integral part of Council's strategic planning process and is aligned to other core planning documents, including the Strategic Community Plan and the Shire's Corporate Business Plan.

Information contained in other strategic plans including the Asset Management and Workforce Plans have informed the LTFP, which is the basis for the preparation of the Shire's annual budget. Financial and social indicators are inherent to predicting future values. These include; the consumer price index, interest rates, employment levels, population growth and demographic trends. The LTFP analyses financial trends over a ten year period on a range of assumptions and provides the Shire with information to assess resourcing requirements to achieve its strategic objectives and to assist in ensuring long term financial sustainability.

The Plan includes income, expenditure, cash flow projections, assets, liabilities and equity. Council refers to this model when considering financial decisions, for example new borrowings, long-term operational projections as well as capital expenditure forecasts. The LTFP is revised following formal budget reviews, and in conjunction with the annual Corporate Business Plan development process.

This Plan is an element within the broader Financial Management Framework that includes the:

- Annual Budget
- Operational Plans
- Financial Policies
- Community Infrastructure Plan

## Shire Profile

At the centre of the Peel region and within an hour south of Perth, the Shire of Murray boasts thousands of square kilometres of natural beauty.

Bounded by the idyllic shores of Herron Point in the west, the adventure town of Dwellingup in the east and the equestrian playgrounds of North Dandalup and Coolup to the north and south respectively, the district offers an abundance of leisure opportunities as well as a diverse range of land use options.

Murray is home to enticing residential estates ranging from urban hubs and canal living to rural residential, offering a relaxed country lifestyle with convenient transport links to the freeway and several large urban centres.

As a rapidly evolving shire servicing the diverse social and economic needs of a growing community, Murray is grounded by its history and rural charm which guides its development. Smart planning and a focus on broadening our shire’s economic base are opening up significant opportunities for tourism, commercial investment, employment and education.

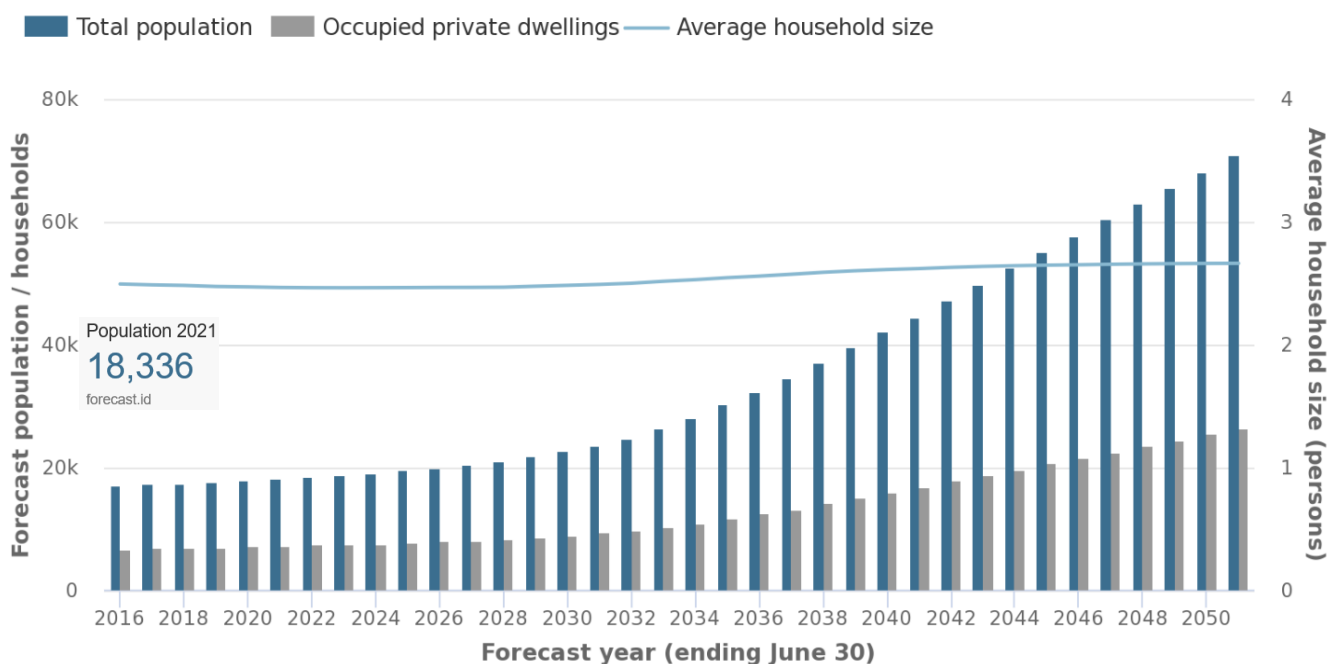
The long-term vision for Murray is to create a district distinctive by its creativity, liveliness, activity and vibrancy, attracting new investment, seizing opportunities to develop and expand its business sector and encouraging innovation and collaboration, while providing an enticing array of lifestyle attractions.

## Population

This Plan has been developed on the following demographic trends and forecast of residential population and dwelling increases.

### Forecast population, households and average household size

Murray Shire Council

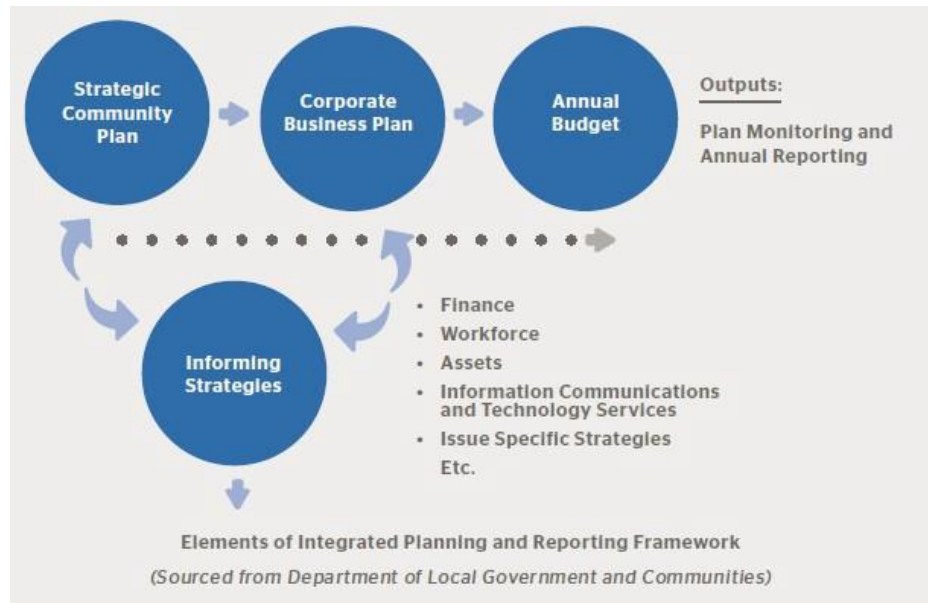


Source: Population and household forecasts, 2016 to 2051, prepared by .id (opens a new window) (informed decisions), October 2020.

## Integrated Planning Framework

Long term financial planning is a key element of the Integrated Planning and Reporting Framework. It enables the Shire to set priorities, based on the resourcing capabilities, for the delivery of short, medium and long term community objectives.

The following figure illustrates how the Long Term Financial Plan informs the Integrated Planning and Reporting Framework:



## Service Levels

Service level standards from the Strategic Community Plan relate primarily to the creation of a thriving economy, the protection of our environment and the enhancement of quality of life for all. The key focus areas are:

**Places for People**

In 2031 Murray will have created great places for people through strong partnerships with the community; innovative urban design; and improved the well-being and quality of life for residents.

**Thriving Economy**

In 2031 Murray will have a diverse and prosperous economy that supports innovation, training opportunities and provides a variety of business, tourism and employment opportunities.

**Environment, Character and Heritage**

In 2031 Murray will be effective stewards of our environment, history, heritage, natural landscape and rural character.

**Connected and Accessible**

In 2031 Murray will have enhanced our transport linkages and opportunities to share information using a variety of travel and technology options.

**Capable and Accountable**

In 2031 Murray will have further developed strong leadership through good governance, effective communication and ensuring value for money.

It is proposed that existing service levels will be maintained for all operational areas, and this concept has been incorporated into the formulation of this Plan. A key objective in the Long Term Financial Plan is the continuation of existing service levels in the longer term, while achieving annual operating surpluses to fund the provision and renewal of infrastructure.

## Asset Management

The Shire has developed a strategic approach to asset management and prepared an Infrastructure Asset Management Plan (IAMP) based on the total life cycle of assets. The IAMP assists the Council in predicting infrastructure consumption and asset renewal needs, and identifies the cost required to renew or preserve assets. This renewal requirement will continue to be addressed in the Long Term Financial Plan and be reflected in future budgets.

Funding for the renewal of assets needs to be the subject of ongoing focus, to ensure sustainability in the longer term. The continued allocation of funding towards the renewal of assets and funding for maintenance and upgrades will result in a positive investment for the community in the future. Asset acquisitions and capital works projects are funded from rate revenue, specific cash reserves, and sales of existing land assets, government grants or external borrowings.

# Long Term Financial Forecasts

## Informing Strategies and Price Indicators

### Informing Plans and Policies

To assist in the implementation and activation of the Shire's Strategic Community Plan this Financial Plan considers the Shire's current and future financial resource capacity. As previously stated, the Corporate Business Plan will assist in the realisation of the community's vision and aspirations in the medium term. It details the actions, services, operations and projects the Shire will deliver within a 4 year period, the resources available and associated costs. Other critical informing strategies associated with this plan are the Infrastructure Asset Management Plan and Workforce and Diversity Plan. Further informing plans include:

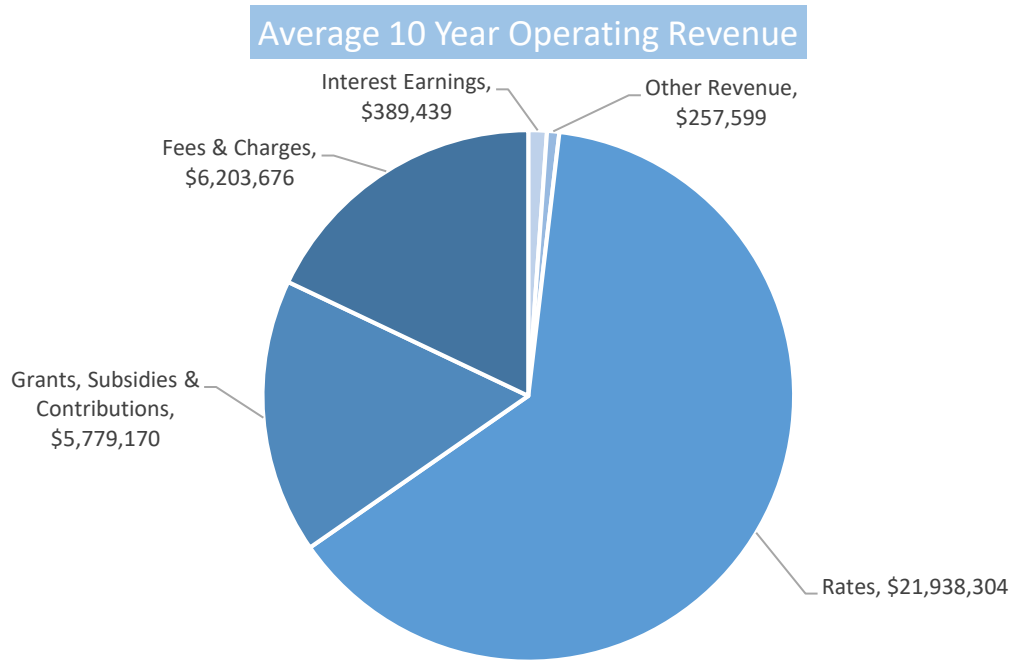
- Heritage Strategy
- Pinjarra Growth Strategy
- Pinjarra Revitalisation Plan
- Trails Master Plan
- Asbestos Management Plan
- South Yunderup Recreation Precinct Plan
- Sir Ross McLarty Complex Sport and Recreation Facilities Master Plan
- Edenvale Heritage Precinct Conservation Plan
- Edenvale Heritage Precinct Interpretation and Management Plan
- Tourism Strategy
- Community Infrastructure Plan
- Youth Strategy
- Community Safety and Crime Prevention Plan
- Disability Access and Inclusion Plan
- Age Friendly Strategy



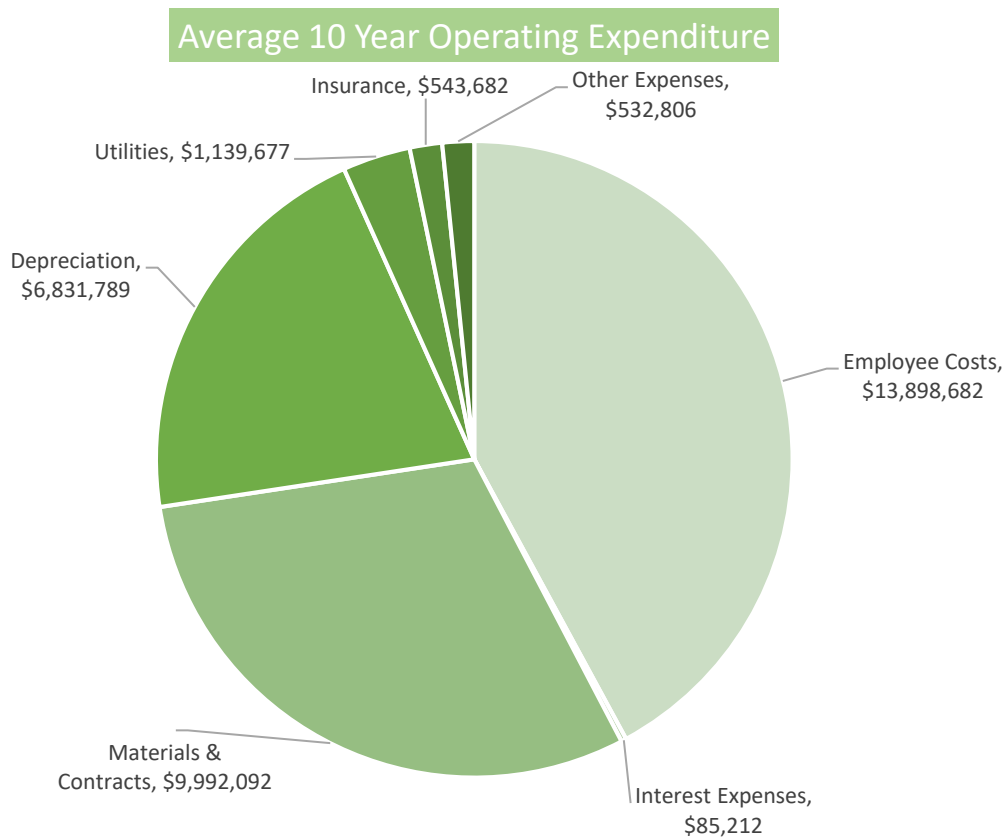


## Source and Application of Funds

The following graph shows the 10 year average of the source of operating revenue.



The application of funds to operating expenditure averaged over the 10 years is shown in the graph below.



### **Rates**

The Plan has applied an increase of 1.5% in 2021/22 in an aim to minimise any further economic impacts of COVID-19. The rating increases have been reduced from previous years through the pursuit of operational efficiencies and in light of the identified need to minimise the impact of rates increases on the community. Increases in rates are required to provide for the substantial future growth of the Shire, allowing the provision of services and infrastructure to be sufficient for community needs. These rating increases will be reviewed on an annual basis to consider the various economic drivers.

### **Fees and Charges**

An increase of 2% has been applied to Fees and Charges throughout the life of the Plan. Increases to the level of fees and charges income are based on the cost of providing the service, CPI Perth indicators, statutory increases and projected increases in population. Discretionary fees and charges are projected to also be increased by CPI, to match estimated additional costs in service delivery.

State controlled fees such as the application fees for building licences and planning and development approvals, are limited by regulations, preventing full cost recovery of these services. These fees and charges are not estimated to increase for the first two years of the Plan.

### **Grants and Contributions**

In developing this long term model, it is anticipated that using the CPI Perth Indicator to forecast Operating Grants and Contributions is a reasonable estimate over the ten year period.

In accordance with the financial sustainability strategy to maximise funding opportunities, the Shire will continue to pursue grant funding for strategic capital works from the State and Federal Government, as well as other funding bodies, as opportunities become available.

### **Interest Earnings**

Forecast on Councils investment portfolio are based on the Western Australian Treasury Corporation indicative rates, and are in line with the Council's Investment Policy and Strategy.

## Expenditures

### Employee costs

Estimates for employee costs are based on requirements outlined in the Workforce and Diversity Plan and estimates associated with growth drivers. Due to the impact of COVID-19, Shire staff voted to forego their Enterprise Bargaining Agreement increase of 2.1% in 2020/21. This increase will therefore take effect in 2021/22, making this year the final year of the current Enterprise Bargaining Agreement. A new Enterprise Bargaining Agreement will then be negotiated and come into effect in 2022/2023, where it is anticipated that the annual increase will return to a flat rate of 2% for the remaining years of this Plan, in line with the wage price index increase historically being slightly higher than the CPI.

The Shire will continue to pursue efficiencies through technology and refined work practices. Where staffing increases are needed, a conservative provision has been provided within the LTFFP.

### Material and Contracts

Materials and contracts represent a significant portion of the expenditure and have been capped at 2% for the life of the Plan.

### Utilities (gas electricity water)

Increases in utility costs for the life of the Plan have been set at 5% per annum.

### Insurance

Insurance expenditure increases have been based on historical movement, together with information provided by the Shire's insurance provider. An indexation rate of 2.5% is considered a reasonable estimate to forecast insurance expenses for the remainder of the ten year period.

### Depreciation

All fixed assets including buildings but excluding freehold land, are depreciated on a straight-line basis over the individual asset's useful life from the time the asset is held ready for use using rates based on 2020/21 depreciation rates. All classes of assets have been revalued to reflect the application of fair value as per Part 2 Regulation 17A of the Local Government (Financial Management) Regulations 1996.

### Interest Expense

Forecast borrowing (interest) costs are based on the forecast 10 year Western Australian Treasury Corporation Indicative Rates.

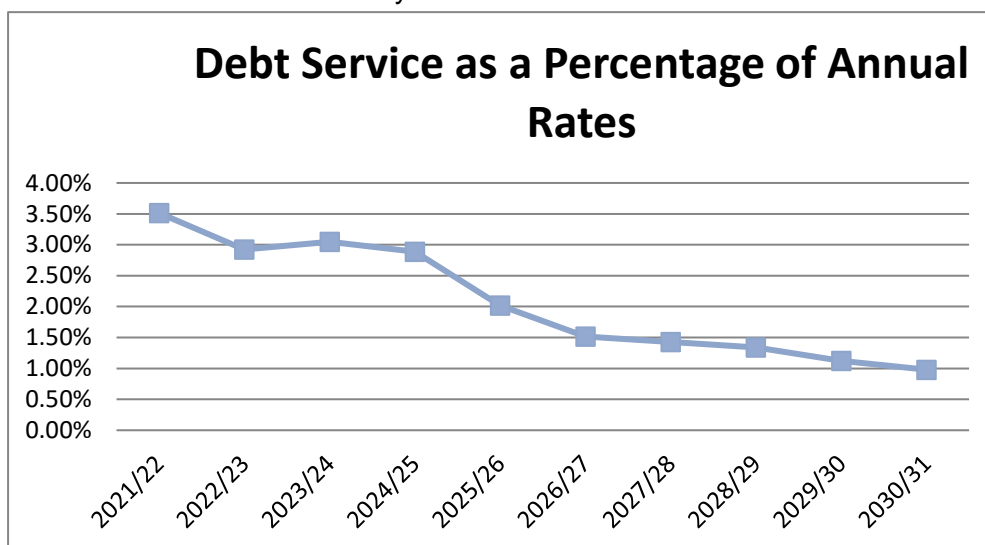
## Debt Management

The use of long-term borrowings is strongly influenced by the competing needs of building new community assets, upgrading infrastructure assets, investment decisions and funding growth projects where insufficient funds are accumulated to meet the capital outlays. The Shire has low levels of debt and has the capacity to use debt funding in future for large non-recurrent capital works projects that will deliver benefit to future generations.

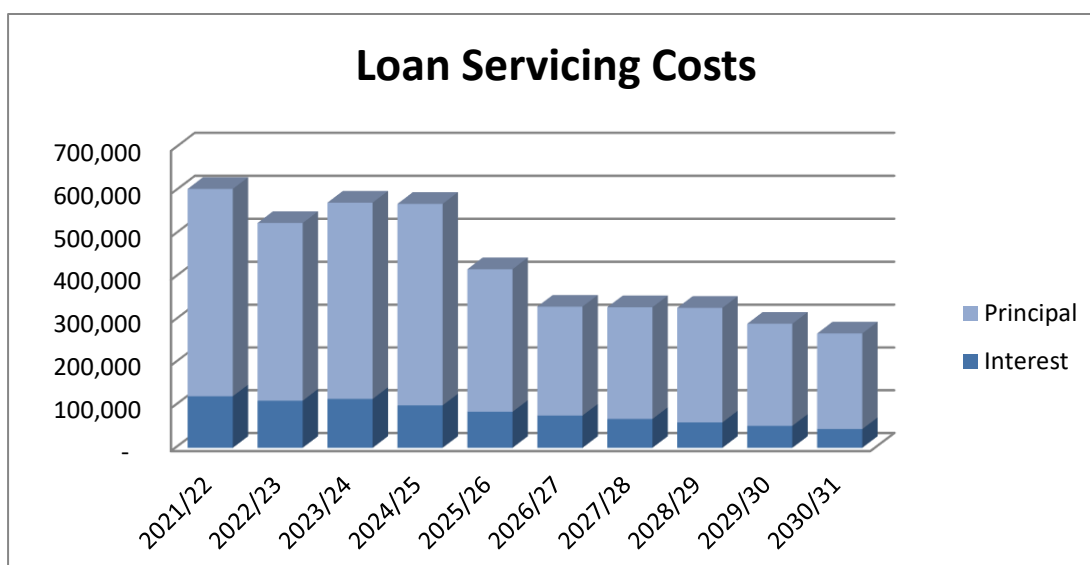
Two new loans are proposed over the life of the Plan.

	Proposed Year	Amount (\$)	Term (Years)
<b>Sir Ross McLarty Oval Multipurpose Facility</b>	2021/22	\$300,000	10
<b>Exchange Hotel</b>	2022/23	\$600,000	15

The level of debt ratio the ten years of the Plan continues to be well within industry benchmarks.



The projected loan servicing costs over the 10 years are outlined in the graph below.



## Cash Reserves

Cash Reserves are maintained by the Shire to ease the impact of future capital expenditures in any one year. The reserves proposed as a part of this Plan include:

Reserve	Purpose
Leave Entitlements Reserve	Provision for employees and ex-employees leave/termination entitlements.
Workers Compensation Reserve	Provision of contingency funds for the annual workers compensation insurance premium under the performance based contributions scheme.
Waste Management Reserve	To provide for current and future waste management services for the Murray district.
Yunderup Canal General Maintenance Reserve	To receive specified area rates to be used in maintaining the canal waterway and associated infrastructure and assisting with the dredging of the entrance channel.
Willow Gardens General Canal Maintenance Reserve	To receive specified area rates to be used in maintaining the canal waterway and associated infrastructure.
Murray Lakes General Canal Maintenance Reserve	To receive specified area rates to be used in maintaining the canal waterway and associated infrastructure.
Entrance Channel Reserve	To receive specified area rates for the purpose of dredging the entrance channel to Yunderup Estate and Murray Waters.
Austin Lakes Phase 2 Maintenance Reserve	To receive specified area rates for the purpose of maintaining the lake and public open space in Austin Lakes Phase 2.
Asset Enhancement Reserve	Provision for the construction, acquisition, upgrade or maintenance of property, plant and equipment, excluding heavy plant and light vehicles.
Heritage Rail Precinct Reserve	Provision for the upgrade and maintenance of the rail heritage building and surrounding precinct.
Plant & Vehicle Reserve	Provision for the replacement or purchase of heavy plant and light vehicles.

Road, Drainage & Pathway Reserve	Provision for the construction, upgrade or renewal of infrastructure assets.
General Developers Contributions Reserve	To receive developer's contributions to assist in the construction or upgrade of infrastructure associated with new land developments.
Parks & Recreation Reserve	Provision for the construction, upgrade or renewal of infrastructure assets associated with parks, recreation, waterways and streetscapes.
Austin Cove Lake Asset Replacement Reserve	To receive developer's contributions to assist in the repair, maintenance and replacement of major infrastructure associated with the lake development at Austin Lakes Estate and to assist in maintaining lake water quality.
Building Asset Renewal Reserve	For the provision of the renewal of building assets.
Herron Point Reserve	To receive excess revenue proceeds from the Herron Point Camping Grounds to assist in the future upgrade and development of the area.
Peel Mosquito Management Reserve	For the provision of contingency funds for the Peel Mosquito Control Group
Murray Leisure Centre Capital Reserve	To provide for the renewal of capital items at the Murray Leisure Centre
Unspent Grants, Contributions and Loans Reserve	For the purpose of holding unspent grant, contribution and loan funds

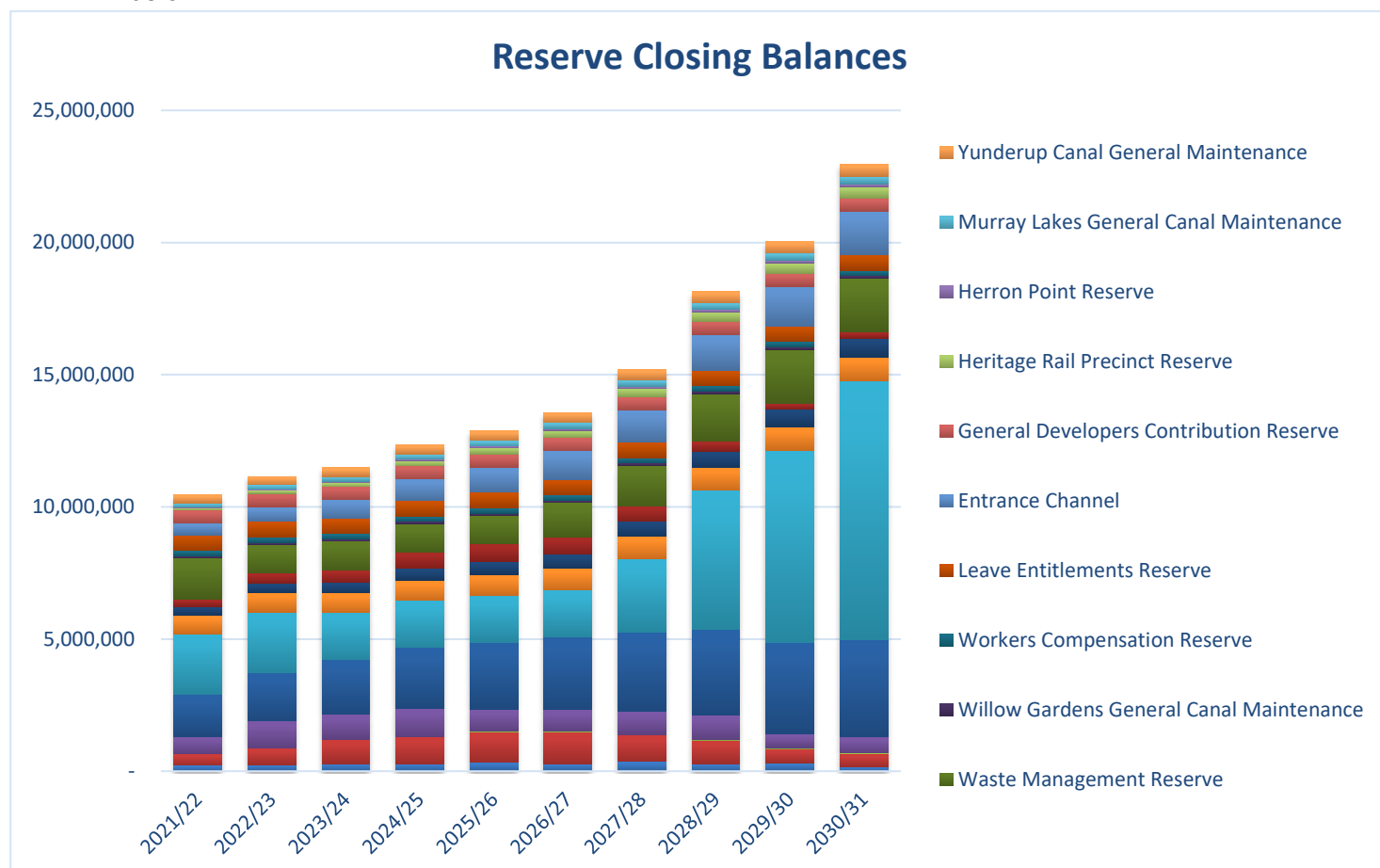
Reserve accounts are used to support the construction, operation and/or development of community assets and services. As the growth in the operating revenue base provides increases in net revenue, the reserves are utilised to accumulate funds for major capital refurbishment and replacement.

The plant and vehicle reserve is utilised to fund the purchase and replacement of plant and equipment according to the economic life of each asset. A residual amount is retained in this reserve to assist should there be a catastrophic failure of a major piece of heavy plant.

In future years the asset enhancement reserve will become a major supplier of funds for new facilities and infrastructure.

Reserves for the Yunderup canal maintenance, Willow Gardens maintenance, Murray Lakes maintenance, the Yunderup Entrance Channel and Austin Lakes Phase 2 maintenance are all established under the legislation to account for specified area rates.

The cumulative balance of all Shire Reserve Funds over the 10 years of this Plan is shown below.



A Reserve Strategy has been developed to guide the use and amount of the funds held in reserve. This Strategy will be enacted at the October budget review each year subject to Council approval. The transfer of funds to various reserve funds will be dependent on the final end of year position.

## Financial Planning Risks

The Shire of Murray has ensured that effective risk management practices across Council are aligned within a common framework. Councils Risk Management Strategy positions risk management as a critical driver of process, and is supported by values that are practiced by all staff. The risk management framework is aligned with the International Standard for Risk Management, ISO 31000:2018.

The reviewed Risk Management Strategy continues to provide an overview of the framework, arrangements and responsibilities for risk management within the Council. It provides the mechanism to integrate all of the previously developed tools and provide a strategy that is of relevance to Elected Members with responsibility for overseeing the Council's risk management arrangements, and members of the officer body charged with coordinating and facilitating development of the Council's risk management arrangements.

The Shire of Murray's reviewed Risk Management Strategy also continues to set the risk management direction for all service areas operating within Council. It provides a holistic, strategic and comprehensive approach to risk management that integrates the risk management activities across the Council and further positions risk management as a critical driver of our internal processes.



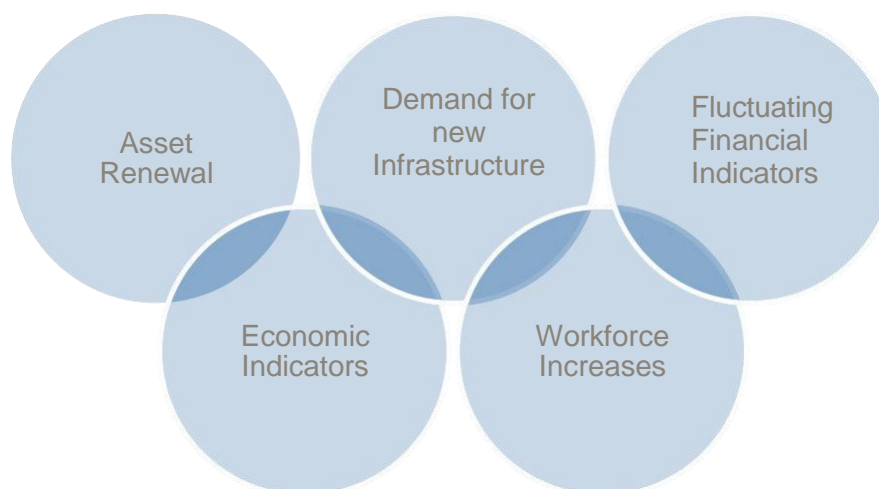
The Level of Risk, or Risk Rating, is calculated by cross referencing the Consequence and Likelihood ratings. For any risk, there may be a number of different likelihood/consequence scenarios across the different risk categories and – within each category – ranging from “likely but not serious” to “less likely but more serious”. It is important to rate the realistic worst-case scenario, which is the worst-case level of risk considering both consequences and likelihood. Where there are multiple ratings for a risk, the highest combination of Consequence/Likelihood is taken as the final rating.

			Consequence				
			Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
Likelihood	Almost Certain	5	M(5)	H(10)	H(15)	E(20)	E(25)
	Likely	4	M(4)	M(8)	H(12)	H(16)	E(20)
	Possible	3	L(3)	M(6)	M(9)	H(12)	H(15)
	Unlikely	2	L(2)	L(4)	M(6)	M(8)	H(10)
	Rare	1	L(1)	L(2)	L(3)	M(4)	M(5)

<b>L</b> Low	<b>M</b> Moderate	<b>H</b> High	<b>E</b> Extreme
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The key risks relating to the Long Term Financial Plan include:



## Implementation and Review of the Long Term Financial Plan

Council has considered the content of the Long Term Financial Plan when preparing the Annual Budget for 2021/22. In subsequent years adopted budgets will continue to be closely aligned with the proposals in the Long Term Financial Plan and assumptions underpinning this.

A review of the Long Term Financial Plan will occur each year prior to budgets being prepared to account for performance information and changing circumstances.

The Long Term Financial Plan provides a sound framework that will allow the Council to set priorities within its resourcing capabilities to sustainably deliver the assets and services required by the community.

## Summary of Financial Plan

The Plan will be continuously reviewed to reflect the prevailing economic conditions and changing community needs placed on the Shire. In compiling the Plan, consideration has been given to the economic drivers that will influence the future cost of providing facilities and services. The values disclosed in the Plan therefore represent estimated future prices and costs.

One of the key challenges for the Shire is to ensure it achieves ongoing financial sustainability in order to provide appropriate services and infrastructure for the community into the future. The long term financial estimates are an integral part of Council's strategic planning process and represent a ten year rolling plan that informs the Corporate Business Plan to activate Strategic Community Plan priorities. It indicates the Shire's long term financial sustainability, allows early identification of financial issues and their longer term impacts. This plan addresses the operating and capital needs placed on the Shire over the next 10 years. It also shows the linkages between specific plans and strategies, and enhances the transparency and accountability of the Shire to the community.

# Financial Statements

## Statement of Comprehensive Income – by program

	Projected Years									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
<b>Revenue</b>										
Governance	24,466	24,697	24,931	25,168	25,407	25,648	25,891	26,138	26,386	26,637
General Purpose Funding	19,340,743	21,135,202	22,017,783	22,951,093	23,923,306	24,990,117	26,160,762	27,405,334	28,551,301	29,225,570
Law, Order, Public Safety	725,265	543,650	547,323	551,072	554,897	558,801	562,786	566,852	571,003	572,489
Health	80,397	82,388	84,429	86,521	88,665	90,863	93,116	95,425	97,792	97,792
Education & Welfare	1,727	1,736	1,744	1,753	1,762	1,770	1,779	1,788	1,797	1,807
Housing	25,625	25,902	26,185	26,473	26,767	27,067	27,373	27,685	28,003	28,328
Community Amenities	3,430,613	3,433,979	3,437,438	3,440,982	3,444,613	3,448,333	3,452,145	3,456,050	3,460,052	3,460,275
Recreation & Culture	1,278,089	1,274,127	1,295,360	1,320,543	1,346,247	1,372,643	1,399,726	1,427,366	1,455,576	1,484,367
Transport	316,905	316,976	317,049	317,124	317,199	317,277	317,355	317,436	317,518	317,601
Economic Services	2,122,075	395,982	402,530	409,222	416,061	423,050	430,192	437,492	444,952	449,193
Other Property & Services	4,440,447	583,896	595,531	607,477	619,743	632,337	645,270	658,551	672,188	675,736
<b>Total Revenue</b>	<b>31,786,352</b>	<b>27,818,535</b>	<b>28,750,303</b>	<b>29,737,428</b>	<b>30,764,667</b>	<b>31,887,906</b>	<b>33,116,395</b>	<b>34,420,117</b>	<b>35,626,568</b>	<b>36,339,795</b>
<b>Expenses (excluding Finance Costs)</b>										
Governance	2,224,283	2,175,369	2,220,505	2,174,947	2,203,495	2,208,178	2,194,999	2,201,960	2,233,565	2,216,317
General Purpose Funding	363,385	364,798	616,239	367,709	369,208	670,738	372,297	373,889	675,512	377,167
Law, Order, Public Safety	1,748,529	1,572,294	1,579,646	1,587,162	1,594,847	1,602,627	1,610,581	1,618,713	1,627,028	1,635,531
Health	636,497	636,793	637,095	615,403	615,717	616,037	616,364	616,698	617,038	617,384
Education & Welfare	165,258	163,578	163,905	164,240	164,583	164,934	165,293	165,660	166,036	166,421
Housing	30,406	30,914	31,441	31,988	32,556	33,146	33,758	34,394	35,054	35,740
Community Amenities	5,573,492	5,588,399	5,423,745	5,433,303	5,443,127	5,453,227	5,463,611	5,474,290	5,485,274	5,496,574
Recreation & Culture	8,542,058	8,950,977	9,058,736	9,163,309	9,281,937	9,391,315	9,515,192	9,630,616	9,755,090	9,883,833
Transport	8,306,725	8,348,648	8,303,321	8,376,554	8,514,936	8,529,257	8,608,870	8,690,759	8,775,002	8,861,682
Economic Services	3,672,579	1,814,129	1,843,510	1,919,942	1,812,502	1,826,157	1,840,152	1,985,304	1,869,195	1,884,265
Other Property & Services	4,141,604	1,324,668	1,559,266	1,795,139	2,037,420	2,279,084	2,517,956	2,761,717	3,010,461	3,263,383
<b>Total Expenses (excluding Finance Costs)</b>	<b>35,404,816</b>	<b>30,970,567</b>	<b>31,437,409</b>	<b>31,629,696</b>	<b>32,070,328</b>	<b>32,774,700</b>	<b>32,939,073</b>	<b>33,554,000</b>	<b>34,249,255</b>	<b>34,438,297</b>
<b>Finance Costs</b>										
Governance	4,753	-	-	-	-	-	-	-	-	-
Law, Order, Public Safety	70	-	-	-	-	-	-	-	-	-
Housing	25,095	23,876	22,621	21,301	19,942	18,533	17,081	15,559	13,991	12,366
Recreation & Culture	46,726	44,423	34,097	23,635	14,074	10,706	8,512	6,269	4,256	3,090
Transport	305	202	95	7	-	-	-	-	-	-
Economic Services	48,209	45,369	60,240	56,256	52,187	48,010	43,738	39,313	34,787	30,139
Other Property & Services	921	687	451	212	15	-	-	-	-	-
<b>Total Finance Costs</b>	<b>126,079</b>	<b>114,557</b>	<b>117,504</b>	<b>101,411</b>	<b>86,218</b>	<b>77,249</b>	<b>69,331</b>	<b>61,141</b>	<b>53,034</b>	<b>45,595</b>
<b>Sub-total</b>	<b>(3,744,543)</b>	<b>(3,266,589)</b>	<b>(2,804,610)</b>	<b>(1,993,679)</b>	<b>(1,391,879)</b>	<b>(964,043)</b>	<b>107,991</b>	<b>804,976</b>	<b>1,324,279</b>	<b>1,855,903</b>
Non-operating Grants, Subsidies & Contributions	13,242,575	4,597,004	1,660,197	1,564,148	1,211,195	1,579,082	936,249	949,247	962,571	970,779
	<b>13,242,575</b>	<b>4,597,004</b>	<b>1,660,197</b>	<b>1,564,148</b>	<b>1,211,195</b>	<b>1,579,082</b>	<b>936,249</b>	<b>949,247</b>	<b>962,571</b>	<b>970,779</b>
<b>Total Comprehensive Income for the Year</b>	<b>9,498,032</b>	<b>1,330,415</b>	<b>(1,144,413)</b>	<b>(429,531)</b>	<b>(180,684)</b>	<b>615,039</b>	<b>1,044,240</b>	<b>1,754,223</b>	<b>2,286,850</b>	<b>2,826,682</b>

Statement of Comprehensive Income – by nature / type

	Projected Years									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
<b>Revenue</b>										
Rates	17,713,787	18,509,817	19,363,810	20,268,140	21,210,977	22,248,010	23,388,469	24,602,439	25,717,384	26,360,203
Fees & Charges	9,338,348	5,654,196	5,702,463	5,751,832	5,802,330	5,853,982	5,906,816	5,960,859	6,016,141	6,049,796
Specified Area Rates	189,274	193,059	196,921	201,844	206,890	212,062	217,364	222,798	228,368	234,077
Interest Earnings	355,661	362,774	370,029	377,430	384,979	392,678	400,532	408,542	416,713	425,048
Other Revenues	251,836	252,810	254,032	255,265	256,511	257,928	259,502	261,091	262,696	264,317
Operating Grants, Subsidies & Contributions	3,800,861	2,845,879	2,863,049	2,882,915	2,902,980	2,923,246	2,943,714	2,964,388	2,985,267	3,006,356
<b>Total Revenue</b>	<b>31,649,767</b>	<b>27,818,535</b>	<b>28,750,304</b>	<b>29,737,426</b>	<b>30,764,667</b>	<b>31,887,906</b>	<b>33,116,397</b>	<b>34,420,117</b>	<b>35,626,569</b>	<b>36,339,797</b>
<b>Expenses</b>										
Employee Costs	13,080,216	12,872,637	13,141,564	13,416,028	13,696,143	13,975,223	14,259,884	14,550,239	14,846,401	15,148,487
Interest Expenses	126,079	114,556	117,504	101,410	86,218	77,249	69,331	61,141	53,034	45,595
Materials & Contracts	13,802,096	9,236,622	9,368,098	9,245,646	9,341,116	9,698,453	9,507,167	9,757,550	10,079,119	9,885,057
Depreciation & Amortisation	6,482,590	6,870,589	6,870,589	6,870,589	6,870,589	6,870,589	6,870,589	6,870,589	6,870,589	6,870,589
Utilities	911,466	955,729	1,002,205	1,051,006	1,102,246	1,156,048	1,212,540	1,271,857	1,334,140	1,399,536
Insurance	495,582	503,178	513,985	525,063	536,418	548,056	559,986	572,214	584,747	597,594
Other Expenses	552,011	531,813	540,969	521,363	523,816	526,331	528,909	531,551	534,260	537,036
<b>Total Expenses</b>	<b>35,450,040</b>	<b>31,085,124</b>	<b>31,554,914</b>	<b>31,731,105</b>	<b>32,156,546</b>	<b>32,851,949</b>	<b>33,008,406</b>	<b>33,615,141</b>	<b>34,302,290</b>	<b>34,483,894</b>
<b>Sub-total</b>	<b>(3,800,273)</b>	<b>(3,266,589)</b>	<b>(2,804,610)</b>	<b>(1,993,679)</b>	<b>(1,391,879)</b>	<b>(964,043)</b>	<b>107,991</b>	<b>804,976</b>	<b>1,324,279</b>	<b>1,855,903</b>
Non-operating Grants, Subsidies & Contributions	13,242,575	4,597,004	1,660,197	1,564,148	1,211,195	1,579,082	936,249	949,247	962,571	970,779
Net Gains from the Disposal of Assets	136,586	-	-	-	-	-	-	-	-	-
Net Losses from the Disposal of Assets	(80,856)	-	-	-	-	-	-	-	-	-
	<b>13,298,305</b>	<b>4,597,004</b>	<b>1,660,197</b>	<b>1,564,148</b>	<b>1,211,195</b>	<b>1,579,082</b>	<b>936,249</b>	<b>949,247</b>	<b>962,571</b>	<b>970,779</b>
<b>Total Comprehensive Income for the Year</b>	<b>9,498,032</b>	<b>1,330,415</b>	<b>(1,144,413)</b>	<b>(429,531)</b>	<b>(180,684)</b>	<b>615,039</b>	<b>1,044,240</b>	<b>1,754,223</b>	<b>2,286,850</b>	<b>2,826,682</b>

Statement of Financial Activity (Rate Setting Statement)

	Projected Years									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
<b>Revenue (excluding Rates)</b>										
Fees & Charges	9,338,348	5,654,196	5,702,463	5,751,832	5,802,330	5,853,982	5,906,816	5,960,859	6,016,141	6,049,796
Specified Area Rates	189,274	193,059	196,921	201,844	206,890	212,062	217,364	222,798	228,368	234,077
Interest Earnings	355,661	362,774	370,029	377,430	384,979	392,678	400,532	408,542	416,713	425,048
Other Revenues	251,836	252,810	254,032	255,265	256,511	257,928	259,502	261,091	262,696	264,317
Operating Grants, Subsidies & Contributions	3,800,861	2,845,879	2,863,049	2,882,915	2,902,980	2,923,246	2,943,714	2,964,388	2,985,267	3,006,356
Non-operating Grants, Subsidies & Contributions	13,242,575	4,597,004	1,660,197	1,564,148	1,211,195	1,579,082	936,249	949,247	962,571	970,779
Net Gains from the Disposal of Assets	136,586	-	-	-	-	-	-	-	-	-
<b>Total Revenue (excluding Rates)</b>	<b>27,315,141</b>	<b>13,905,722</b>	<b>11,046,691</b>	<b>11,033,434</b>	<b>10,764,885</b>	<b>11,218,978</b>	<b>10,664,177</b>	<b>10,766,925</b>	<b>10,871,756</b>	<b>10,950,373</b>
<b>Expenses</b>										
Employee Costs	(13,080,216)	(12,872,637)	(13,141,564)	(13,416,028)	(13,696,143)	(13,975,223)	(14,259,884)	(14,550,239)	(14,846,401)	(15,148,487)
Interest Expenses	(126,079)	(114,556)	(117,504)	(101,410)	(86,218)	(77,249)	(69,331)	(61,141)	(53,034)	(45,595)
Materials & Contracts	(13,802,096)	(9,236,622)	(9,368,098)	(9,245,646)	(9,341,116)	(9,698,453)	(9,507,167)	(9,757,550)	(10,079,119)	(9,885,057)
Depreciation & Amortisation	(6,482,590)	(6,870,589)	(6,870,589)	(6,870,589)	(6,870,589)	(6,870,589)	(6,870,589)	(6,870,589)	(6,870,589)	(6,870,589)
Utilities	(911,466)	(955,729)	(1,002,205)	(1,051,006)	(1,102,246)	(1,156,048)	(1,212,540)	(1,271,857)	(1,334,140)	(1,399,536)
Insurance	(495,582)	(503,178)	(513,985)	(525,063)	(536,418)	(548,056)	(559,986)	(572,214)	(584,747)	(597,594)
Other Expenses	(552,011)	(531,813)	(540,969)	(521,363)	(523,816)	(526,331)	(528,909)	(531,551)	(534,260)	(537,036)
Net Losses from the Disposal of Assets	(80,856)	-	-	-	-	-	-	-	-	-
<b>Total Expenses</b>	<b>(35,530,896)</b>	<b>(31,085,124)</b>	<b>(31,554,914)</b>	<b>(31,731,105)</b>	<b>(32,156,546)</b>	<b>(32,851,949)</b>	<b>(33,008,406)</b>	<b>(33,615,141)</b>	<b>(34,302,290)</b>	<b>(34,483,894)</b>
<b>Net Result for the Year excluding Rates</b>	<b>(8,215,755)</b>	<b>(17,179,402)</b>	<b>(20,508,223)</b>	<b>(20,697,671)</b>	<b>(21,391,661)</b>	<b>(21,632,971)</b>	<b>(22,344,229)</b>	<b>(22,848,216)</b>	<b>(23,430,534)</b>	<b>(23,533,521)</b>
<b>Adjustments for Cash Budget Requirements - Non-cash Expenditure and Revenue</b>										
Profit/(Loss) on Disposal of Assets	(55,730)	-	-	-	-	-	-	-	-	-
Employee Leave Entitlement Accruals	225,960	225,887	230,405	235,013	239,713	244,508	249,398	254,386	259,473	264,663
Depreciation and Amortisation on Assets	6,482,590	6,870,589	6,870,589	6,870,589	6,870,589	6,870,589	6,870,589	6,870,589	6,870,589	6,870,589
<b>Sub-total</b>	<b>(1,562,935)</b>	<b>(10,082,926)</b>	<b>(13,407,229)</b>	<b>(13,592,069)</b>	<b>(14,281,359)</b>	<b>(14,517,874)</b>	<b>(15,224,242)</b>	<b>(15,723,241)</b>	<b>(16,300,472)</b>	<b>(16,398,269)</b>
<b>Capital Expenditure and Revenue</b>										
Purchase Property, Plant & Equipment - Land and Buildings	(12,372,111)	(4,440,543)	(203,017)	(46,378)	(136,324)	(528,686)	(287,445)	(389,536)	(1,209,237)	(20,186,402)
Purchase Property, Plant & Equipment - Plant and Equipment	(1,140,915)	(760,305)	(1,347,351)	(1,164,335)	(1,667,096)	(1,321,480)	(1,123,750)	(1,146,376)	(1,822,040)	(1,178,030)
Purchase Property, Plant & Equipment - Furniture and Equipment	(63,800)	(115,520)	(99,284)	(138,813)	(81,077)	(206,685)	(57,973)	(230,521)	(127,264)	(305,534)
Purchase Infrastructure Assets - Roads	(3,274,985)	(2,652,216)	(2,846,069)	(3,177,162)	(2,272,945)	(2,362,303)	(2,201,314)	(2,069,825)	(2,006,168)	(2,125,549)
Purchase Infrastructure Assets - Parks	(996,432)	(147,877)	(67,407)	(260,799)	(641,746)	(1,112,357)	(393,450)	(514,117)	(754,068)	(463,203)
Purchase Infrastructure Assets - Other	(859,504)	(729,745)	(1,241,306)	(1,081,605)	(1,586,631)	(1,200,872)	(2,210,817)	(1,333,349)	(1,338,768)	(2,608,653)
Proceeds Disposal of Assets	254,130	207,120	345,215	382,600	521,535	372,985	282,530	279,035	506,190	20,320,688
Repayment of Debentures	(483,493)	(414,615)	(457,843)	(470,156)	(333,131)	(254,724)	(261,289)	(268,036)	(238,858)	(223,530)
Repayment of Finance Leases	(83,982)	(73,444)	(74,618)	(36,037)	(6,497)	(1,709)	(1,746)	(1,783)	(1,821)	(1,860)
Proceeds from New Debentures	300,000	600,000	-	-	-	-	-	-	-	-
Self Supporting Loan Principal	44,698	23,876	23,999	24,123	24,248	-	-	-	-	-
Transfers to Reserves	(5,290,108)	(4,523,124)	(4,264,450)	(4,219,696)	(4,104,411)	(4,147,857)	(5,287,038)	(6,678,454)	(6,162,586)	(6,480,085)
Transfers from Reserves	4,968,332	3,821,787	3,934,235	3,353,130	3,580,270	3,449,389	3,658,354	3,738,613	4,262,218	3,552,907
	<b>(20,561,105)</b>	<b>(19,287,532)</b>	<b>(19,705,125)</b>	<b>(20,427,197)</b>	<b>(20,985,164)</b>	<b>(21,832,173)</b>	<b>(23,108,180)</b>	<b>(24,337,590)</b>	<b>(25,192,874)</b>	<b>(26,097,520)</b>
Estimated Surplus/(Deficit) July 1 B/Fwd	4,417,782	1,570,464	792,750	451,433	292,376	518,189	934,027	1,214,315	1,479,163	2,003,674
Amount Budgeted to be Raised from Rates	17,713,787	18,509,817	19,363,810	20,268,140	21,210,977	22,248,010	23,388,469	24,602,439	25,717,384	26,360,203
<b>Estimated Surplus/(Deficit) June 30 C/Fwd</b>	<b>1,570,464</b>	<b>792,749</b>	<b>451,435</b>	<b>292,376</b>	<b>518,189</b>	<b>934,026</b>	<b>1,214,316</b>	<b>1,479,164</b>	<b>2,003,673</b>	<b>2,266,357</b>

**Statement of Financial Position**

	Projected Years									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
<b>ASSETS</b>										
<b>Current Assets</b>										
Cash & Cash Equivalents	14,683,593	13,007,738	12,939,476	13,524,946	14,200,600	15,285,793	17,036,687	20,168,499	22,547,707	25,635,766
Trade & Other Receivables	1,985,797	2,043,704	2,129,012	2,219,593	2,314,026	2,393,702	2,508,253	2,630,697	2,743,026	2,809,056
Inventories	950,006	935,149	935,577	935,178	935,489	936,652	936,029	936,844	937,891	937,259
Other	177,805	121,002	122,744	120,985	122,198	126,655	124,318	127,452	131,469	129,099
<b>Total Current Assets</b>	<b>17,797,201</b>	<b>16,107,593</b>	<b>16,126,809</b>	<b>16,800,702</b>	<b>17,572,313</b>	<b>18,742,802</b>	<b>20,605,287</b>	<b>23,863,492</b>	<b>26,360,093</b>	<b>29,511,180</b>
<b>Non-Current Assets</b>										
Trade & Other Receivables	824,304	843,585	843,637	844,916	847,107	900,630	932,842	967,028	998,599	1,017,635
Property, Plant & Equipment	92,468,110	95,649,562	95,026,203	94,065,333	93,500,499	93,256,569	92,515,411	92,075,013	92,799,568	92,221,050
Infrastructure	237,154,783	235,787,384	235,044,929	234,667,258	234,271,343	234,049,638	233,957,982	232,978,036	232,179,803	232,479,971
Right of Use Assets	373,162	327,606	282,050	236,494	190,938	145,382	99,826	54,270	8,714	-
<b>Total Non-Current Assets</b>	<b>330,820,359</b>	<b>332,608,137</b>	<b>331,196,819</b>	<b>329,814,001</b>	<b>328,809,887</b>	<b>328,352,219</b>	<b>327,506,061</b>	<b>326,074,347</b>	<b>325,986,684</b>	<b>325,718,656</b>
<b>TOTAL ASSETS</b>	<b>348,617,560</b>	<b>348,715,730</b>	<b>347,323,628</b>	<b>346,614,703</b>	<b>346,382,200</b>	<b>347,095,021</b>	<b>348,111,348</b>	<b>349,937,839</b>	<b>352,346,777</b>	<b>355,229,836</b>
<b>LIABILITIES</b>										
<b>Current Liabilities</b>										
Trade & Other Payables	3,951,363	2,858,781	2,904,564	2,886,417	2,924,479	3,024,053	2,999,545	3,076,910	3,169,763	3,139,484
Contract Liabilities	1,900,430	1,422,939	1,431,524	1,441,458	1,451,490	1,461,623	1,471,857	1,482,194	1,492,634	1,503,178
Lease Liabilities	73,444	74,618	36,037	6,497	1,709	1,746	1,783	1,821	1,860	1,899
Borrowings	414,615	457,843	470,156	333,131	254,724	261,289	268,036	238,858	223,530	229,741
Provisions	2,600,569	2,805,326	3,014,178	3,227,207	3,444,497	3,666,133	3,892,201	4,122,790	4,357,992	4,597,897
<b>Total Current Liabilities</b>	<b>8,940,421</b>	<b>7,619,507</b>	<b>7,856,459</b>	<b>7,894,710</b>	<b>8,076,899</b>	<b>8,414,844</b>	<b>8,633,422</b>	<b>8,922,573</b>	<b>9,245,779</b>	<b>9,472,199</b>
<b>Non-Current Liabilities</b>										
Lease Liabilities	201,216	126,597	90,560	84,063	82,354	80,608	78,825	77,004	75,144	73,245
Borrowings	3,050,028	3,192,185	2,722,029	2,388,898	2,134,175	1,872,885	1,604,849	1,365,990	1,142,460	912,719
Provisions	268,371	289,501	311,054	333,038	355,461	378,334	401,663	425,459	449,731	474,489
<b>Total Non-Current Liabilities</b>	<b>3,519,615</b>	<b>3,608,283</b>	<b>3,123,643</b>	<b>2,805,999</b>	<b>2,571,990</b>	<b>2,331,827</b>	<b>2,085,337</b>	<b>1,868,453</b>	<b>1,667,335</b>	<b>1,460,453</b>
<b>TOTAL LIABILITIES</b>	<b>12,460,036</b>	<b>11,227,790</b>	<b>10,980,102</b>	<b>10,700,709</b>	<b>10,648,889</b>	<b>10,746,671</b>	<b>10,718,759</b>	<b>10,791,026</b>	<b>10,913,114</b>	<b>10,932,652</b>
<b>Net Assets</b>	<b>336,157,524</b>	<b>337,487,940</b>	<b>336,343,526</b>	<b>335,913,994</b>	<b>335,733,311</b>	<b>336,348,350</b>	<b>337,392,589</b>	<b>339,146,813</b>	<b>341,433,663</b>	<b>344,297,184</b>
<b>EQUITY</b>										
Retained Earnings	137,257,649	137,886,728	136,412,099	135,116,001	134,411,177	134,327,749	133,743,304	132,557,687	132,944,169	132,880,512
Reserves - Cash/Investment Backed	10,451,217	11,152,554	11,482,769	12,349,335	12,873,476	13,571,943	15,200,627	18,140,468	20,040,836	22,968,014
Reserves - Asset Revaluation	188,448,658	188,448,658	188,448,658	188,448,658	188,448,658	188,448,658	188,448,658	188,448,658	188,448,658	188,448,658
<b>Total Equity</b>	<b>336,157,524</b>	<b>337,487,940</b>	<b>336,343,526</b>	<b>335,913,994</b>	<b>335,733,311</b>	<b>336,348,350</b>	<b>337,392,589</b>	<b>339,146,813</b>	<b>341,433,663</b>	<b>344,297,184</b>

	Projected Years									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
<b>Cash Flows from Operating Activities</b>										
<b>Receipts</b>										
Rates	17,647,595	18,410,062	19,256,790	20,154,812	21,092,824	22,118,053	23,245,551	24,450,309	25,577,663	26,279,647
Fees & Charges	9,338,348	5,654,196	5,702,463	5,751,832	5,802,330	5,853,982	5,906,816	5,960,859	6,016,141	6,049,796
Service Charges	189,274	193,059	196,921	201,844	206,890	212,062	217,364	222,798	228,368	234,077
Interest Earnings	356,437	363,350	370,057	377,162	384,670	392,181	399,732	407,119	415,641	423,675
Operating Grants, Subsidies & Contributions	1,504,582	2,368,388	2,871,634	2,892,848	2,913,013	2,933,379	2,953,949	2,974,724	2,995,707	3,016,900
Other Revenue	644,330	207,787	262,055	263,889	265,560	267,721	270,174	272,576	273,056	269,101
<b>Total Receipts from Operating Activities</b>	<b>29,680,566</b>	<b>27,196,842</b>	<b>28,659,920</b>	<b>29,642,387</b>	<b>30,665,287</b>	<b>31,777,378</b>	<b>32,993,586</b>	<b>34,288,385</b>	<b>35,506,576</b>	<b>36,273,196</b>
<b>Payments</b>										
Employee Costs	(12,835,112)	(12,649,415)	(12,905,225)	(13,174,962)	(13,450,256)	(13,724,418)	(14,004,063)	(14,289,302)	(14,580,245)	(14,877,007)
Materials & Contracts	(13,784,690)	(10,212,826)	(9,338,132)	(9,275,949)	(9,320,263)	(9,621,845)	(9,547,329)	(9,703,681)	(10,010,082)	(9,925,766)
Utility Charges	(911,466)	(955,729)	(1,002,205)	(1,051,006)	(1,102,246)	(1,156,048)	(1,212,540)	(1,271,857)	(1,334,140)	(1,399,536)
Insurance Expenses	(495,582)	(503,178)	(513,985)	(525,063)	(536,418)	(548,056)	(559,986)	(572,214)	(584,747)	(597,594)
Interest Expenses	(127,152)	(113,473)	(120,181)	(104,159)	(88,166)	(78,738)	(70,859)	(62,708)	(54,431)	(46,902)
Other Expenditure	(552,011)	(531,813)	(540,969)	(521,363)	(523,816)	(526,331)	(528,909)	(531,551)	(534,260)	(537,036)
<b>Total Payments from Operating Activities</b>	<b>(28,706,013)</b>	<b>(24,966,434)</b>	<b>(24,420,697)</b>	<b>(24,652,502)</b>	<b>(25,021,165)</b>	<b>(25,655,436)</b>	<b>(25,923,686)</b>	<b>(26,431,313)</b>	<b>(27,097,905)</b>	<b>(27,383,841)</b>
<b>Net Cash provided (or used in) Operating Activities</b>	<b>974,553</b>	<b>2,230,408</b>	<b>4,239,223</b>	<b>4,989,885</b>	<b>5,644,122</b>	<b>6,121,942</b>	<b>7,069,900</b>	<b>7,857,072</b>	<b>8,408,671</b>	<b>8,889,355</b>
<b>Cash Flows from Investing Activities</b>										
<b>Receipts</b>										
Non-operating Grants, Subsidies & Contributions	13,242,575	4,597,004	1,660,197	1,564,148	1,211,195	1,579,082	936,249	949,247	962,571	970,779
Proceeds from Sale of Property, Plant & Equipment	254,130	207,120	345,215	382,600	521,535	372,985	282,530	279,035	506,190	20,320,688
<b>Payments:</b>										
Purchase of Property, Plant & Equipment	(13,576,826)	(5,316,368)	(1,649,652)	(1,349,526)	(1,884,497)	(2,056,851)	(1,469,168)	(1,766,433)	(3,158,541)	(21,669,966)
Purchase/Construction of Infrastructure	(5,130,921)	(3,529,838)	(4,154,782)	(4,519,566)	(4,501,322)	(4,675,532)	(4,805,581)	(3,917,291)	(4,099,004)	(5,197,405)
<b>Net Cash provided (or used in) Investing Activities</b>	<b>(5,211,042)</b>	<b>(4,042,082)</b>	<b>(3,799,022)</b>	<b>(3,922,344)</b>	<b>(4,653,089)</b>	<b>(4,780,316)</b>	<b>(5,055,970)</b>	<b>(4,455,442)</b>	<b>(5,788,784)</b>	<b>(5,575,904)</b>
<b>Cash Flows from Financing Activities</b>										
<b>Receipts:</b>										
Proceeds from New Debentures	300,000	600,000	-	-	-	-	-	-	-	-
Proceeds from Self Supporting Loans	44,698	23,876	23,999	24,123	24,248	-	-	-	-	-
<b>Payments:</b>										
Repayment of Debentures	(483,493)	(414,615)	(457,843)	(470,156)	(333,131)	(254,724)	(261,289)	(268,036)	(238,858)	(223,530)
Repayment of Finance Lease Liabilities	(83,982)	(73,444)	(74,618)	(36,037)	(6,497)	(1,709)	(1,746)	(1,783)	(1,821)	(1,860)
<b>Net Cash Flow provided (used in) Financing Activities</b>	<b>(222,777)</b>	<b>135,817</b>	<b>(508,462)</b>	<b>(482,070)</b>	<b>(315,380)</b>	<b>(256,433)</b>	<b>(263,035)</b>	<b>(269,819)</b>	<b>(240,679)</b>	<b>(225,390)</b>
<b>Net Increase/(Decrease) in Cash &amp; Cash Equivalents</b>	<b>(4,459,266)</b>	<b>(1,675,857)</b>	<b>(68,261)</b>	<b>585,471</b>	<b>675,653</b>	<b>1,085,193</b>	<b>1,750,895</b>	<b>3,131,811</b>	<b>2,379,208</b>	<b>3,088,061</b>
<b>Cash, Cash Equivalents - beginning of year</b>	<b>19,142,857</b>	<b>14,683,593</b>	<b>13,007,738</b>	<b>12,939,476</b>	<b>13,524,946</b>	<b>14,200,600</b>	<b>15,285,793</b>	<b>17,036,687</b>	<b>20,168,499</b>	<b>22,547,707</b>
<b>Cash &amp; Cash Equivalents - end of the year</b>	<b>14,683,591</b>	<b>13,007,736</b>	<b>12,939,477</b>	<b>13,524,947</b>	<b>14,200,599</b>	<b>15,285,793</b>	<b>17,036,688</b>	<b>20,168,498</b>	<b>22,547,707</b>	<b>25,635,768</b>
<b>Representing:</b>										
- External Restrictions	597,002	597,002	597,002	597,002	597,002	597,002	597,002	597,002	597,002	597,002
- Internal Restrictions	9,854,215	10,555,552	10,885,767	11,752,333	12,276,474	12,974,941	14,603,625	17,543,466	19,443,834	22,371,012
- Unrestricted	4,232,374	1,855,182	1,456,708	1,175,612	1,327,123	1,713,850	1,836,061	2,028,030	2,506,871	2,667,754
<b>Cash &amp; Cash Equivalents - end of the year</b>	<b>14,683,591</b>	<b>13,007,736</b>	<b>12,939,477</b>	<b>13,524,947</b>	<b>14,200,599</b>	<b>15,285,793</b>	<b>17,036,688</b>	<b>20,168,498</b>	<b>22,547,707</b>	<b>25,635,768</b>





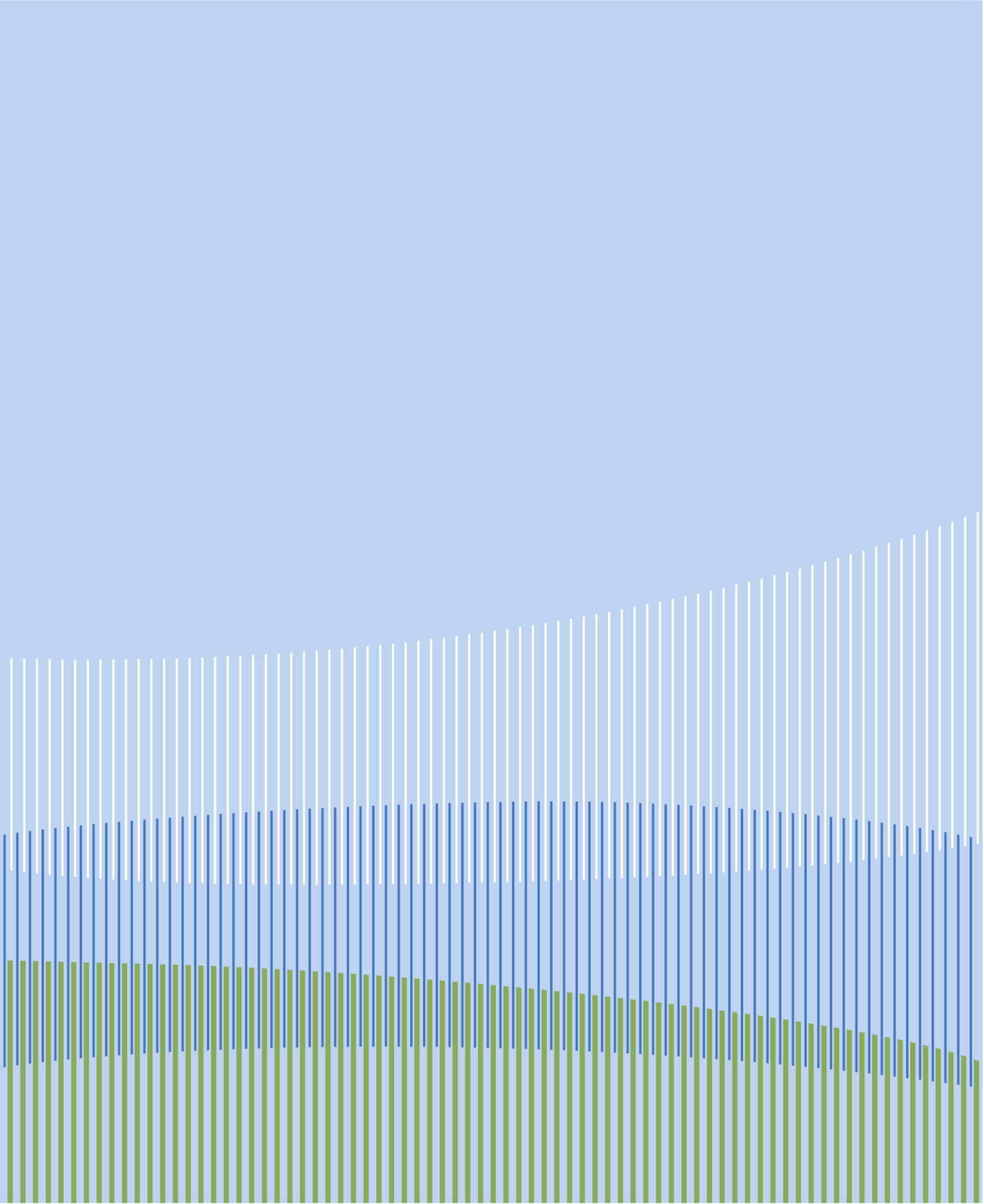
**Capital Expenditure**

	Projected Years									
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
<b>Land and Buildings</b>										
Administration Building Upgrade									344,628	11,239,767
CWA Hall North Yunderup	200,000									
Herron Point Toilets	150,000									
Coopers Mill Preservation Works						332,822				
Sir Ross McLarty Clubrooms	2,140,757									
WA Food Innovation Precinct	7,612,500									
Murray Leisure Centre Renewal	240,000									
Murray Library									496,953	6,244,315
Operations Centre Upgrade	16,971	275,427								2,497,726
Ravenswood Community Centre	900,000									
Exchange Hotel	981,507	4,088,744	119,208							
Edenvale Conservation Works	125,000									
Building Renewal & Upgrades	130,376	76,372	83,809	46,378	136,324	195,864	287,445	389,536	367,656	204,594
<b>Furniture &amp; Equipment</b>										
Murray Leisure Centre	63,800	115,520	99,284	138,813	81,077	206,685	57,973	230,521	127,264	305,534
<b>Plant &amp; Equipment</b>										
Plant Renewal	1,140,915	760,305	1,347,351	1,164,335	1,667,096	1,321,480	1,123,750	1,146,376	1,822,040	1,178,030
<b>Infrastructure</b>										
Visitor Signage & Wayfinding	15,000									
Edenvale Landscape Works			221,096		422,116		740,017			
Cemetery Upgrade	10,000									
CHRMAP Implementation										1,248,863
Waterways Renewal	731,237	6,427		7,408	31,896		209,324			
Parks Renewal	252,432	147,877	67,407	260,799	204,280	318,704	393,450	514,117	754,068	463,203
Parks & Reserves Upgrades	665,000				437,466	793,653				
Roadworks Renewal	2,073,913	2,291,069	2,326,553	1,774,947	1,731,195	1,759,239	1,787,983	1,817,447	1,841,607	1,866,250
Roadwork Upgrades	750,000			1,218,403						
Drainage Program	57,267	58,574	63,917	63,209	63,808	70,930	66,907	70,457	75,877	76,483
Pathway Renewal	109,724	138,420	186,777	47,028	218,599	238,654	265,032	89,338	21,118	200,925
Pathway Upgrades	300,000	200,000	300,000	100,000	300,000	300,000	100,000	100,000	100,000	
Kerbing Program	41,348	22,727	32,739	36,784	23,151	64,410	48,299	63,040	43,443	58,374
<b>Unallocated</b>										
Provision for Future Works		664,744	956,293	1,010,988	1,068,811	1,129,942	1,194,569	1,262,892	1,262,891	1,283,307
<b>Total Capital Works</b>	<b>18,707,747</b>	<b>8,846,206</b>	<b>5,804,434</b>	<b>5,869,092</b>	<b>6,385,819</b>	<b>6,732,383</b>	<b>6,274,749</b>	<b>5,683,724</b>	<b>7,257,545</b>	<b>26,867,371</b>
Capital Renewal Expenditure	6,559,030	3,892,718	4,548,141	4,758,104	4,579,542	4,508,788	4,980,180	4,320,832	5,053,073	8,099,982
Capital New Expenditure	12,148,717	4,953,488	1,256,293	1,110,988	1,806,277	2,223,595	1,294,569	1,362,892	2,204,472	18,767,389
<b>Total Capital Works</b>	<b>18,707,747</b>	<b>8,846,206</b>	<b>5,804,434</b>	<b>5,869,092</b>	<b>6,385,819</b>	<b>6,732,383</b>	<b>6,274,749</b>	<b>5,683,724</b>	<b>7,257,545</b>	<b>26,867,371</b>

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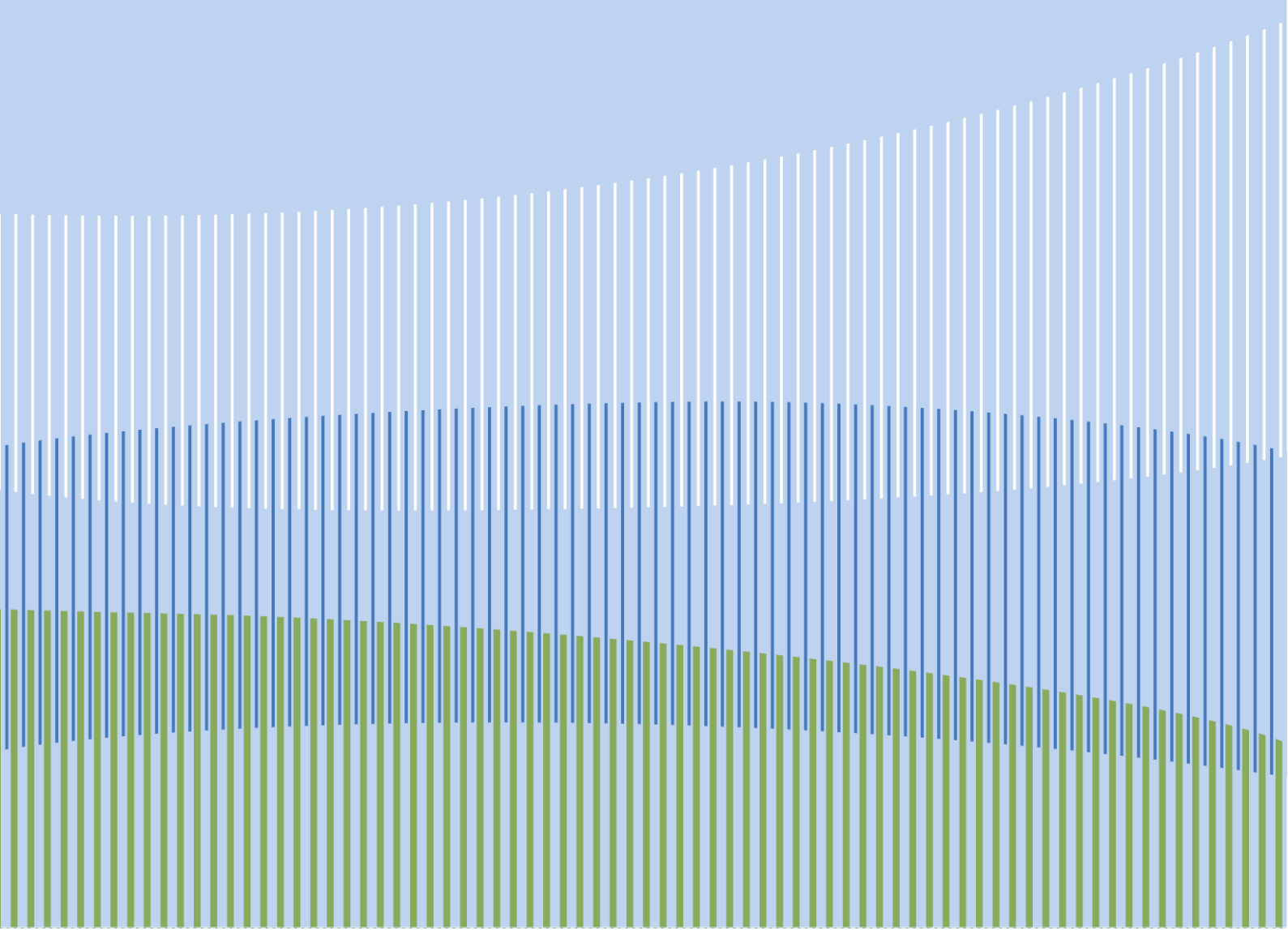
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# Infrastructure Asset Management Plan



<b>Version Control</b>			
<b>Version No</b>	<b>Date</b>	<b>Details</b>	<b>Author</b>
1.0	May 2017	Endorsement of Infrastructure Asset Management Plan	Asset Management Working Group
2.0	May 2017	Review of Infrastructure Asset Management Plan (Buildings & Roads)	Asset Management Working Group
3.0	May 2018	Review of Infrastructure Asset Management Plan (footpaths, drainage, bridges, parks and waterways)	Asset Management Working Group
4.0	May 2020	Consolidation of information – Infrastructure Asset Management Plan to include general information relevant to all asset classes. Asset-specific plans to be tailored to the specific asset class and form part of the Appendices.	Asset Management Working Group
5.0	July 2021	Inclusion of aspects from the Asset Management Improvement Strategy (previously a stand-alone document). Further refinement to make the document more concise.	Asset Management Working Group

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# 1. Executive Summary

The Shire of Murray is located in the centre of the Peel Region of Western Australia, approximately 80 kilometres south of Perth and has a total land area of approximately 1,700 square kilometres. A historically rural local government area, the Shire is currently experiencing pressure for new urban growth areas. This growth will place significant demand on existing community infrastructure available within the Shire and will require the provision of additional infrastructure to meet the needs of a growing community.

The Shire of Murray is responsible for providing a number of community focused services and in doing so must ensure that its infrastructure assets and community facilities are maintained in accordance with well-developed asset management programs and strategic forward plans to enable these services to meet community needs. Asset management is recognised as a practicable and financially responsible means of managing Council's assets by ensuring that the assets continue to provide a specified level of service delivery to defined standards over their entire life.

## 1.1. Purpose and Scope of Plan

The Shire of Murray owns and is responsible for the management, operation and maintenance of a diverse asset portfolio that provides services to the community. The Infrastructure Asset Management Plan (this document) is based on the Institute of Public Works Engineering Australia's (IPWEA) Infrastructure Management Manual and has been developed to ensure that Council continues to provide effective, comprehensive and sustainable management of its infrastructure and asset portfolios.

Council plans to operate and maintain its asset portfolio to achieve the following objectives:

- Communicate the current condition of all Shire infrastructure and review the budgets/practices used to operate and maintain them
- Undertake financial planning by adopting a life cycle approach to asset budgeting in order to ensure that infrastructure is delivered in a sustainable manner
- Develop cost effective management strategies for the long term
- Define a level of service for infrastructure assets to meet community needs
- Understand and meet the demands of growth through demand management and infrastructure investment
- Avoid disruptions to services by managing risk associated with asset failures

The Shire of Murray Infrastructure Asset Management Plan provides the framework to deliver optimum operational performance of Council's infrastructure assets in the most cost-effective manner. The plan aims to provide a more formalised and transparent approach to asset management. It provides mechanisms to clearly define its asset renewal and asset maintenance practices and to mitigate risk.

The Infrastructure Asset Management Plan is intended to provide advice to Council on the financial requirements for long-term sustainability of each asset class. This means understanding the impact of any funding 'gap' and a plan to manage that gap where it exists.

The Infrastructure Asset Management Plan is supported by asset management plans relating to the Shire’s individual asset classes. These are:

- Appendix A – Buildings
- Appendix B – Roads and Kerbs
- Appendix C – Bridges
- Appendix D – Footpaths
- Appendix E – Drainage
- Appendix F – Parks
- Appendix G - Waterways

### 1.1.1 Goals and Objectives of Asset Management

The Shire of Murray exists to provide services to its community. Some of these services are provided by infrastructure assets. The Shire has acquired infrastructure assets by purchase, contract, construction by Shire staff and by donation of assets constructed by developers and others to meet increased levels of service.

The Shire’s goal in managing infrastructure assets is to meet the required level of service in the most cost effective manner for present and future consumers. The goal of the Asset Management Plans is to:

- Document the services / levels of service to be provided and the costs of providing these services;
- Communicate the consequences for levels of service and risk, where desired funding is not available; and
- Provide information to assist decision makers in trading off levels of service, costs and risks to provide services in a financially sustainable manner

The benefits of improved asset management include:

Asset Management Process	Benefits
Strong Governance and Accountability	<ul style="list-style-type: none"> <li>- Demonstrating to owners, customers and stakeholders that services are being delivered effectively and efficiently</li> <li>- Providing a transparent and auditable basis for making service/risk/price trade-off decisions</li> <li>- Improving accountability for use of resources through performance and financial indicators</li> <li>- Providing the opportunity to benchmark results against similar organisations</li> </ul>
More Sustainable Services	<ul style="list-style-type: none"> <li>- Considering all viable options (including demand management) and all aspects of decisions</li> <li>- Ensuring all lifecycle costs are included in decision processes, so that the emphasis is on sustainable efficiencies not unsustainable short-term gains</li> </ul>
Enhanced Customer Service	<ul style="list-style-type: none"> <li>- Improved understanding of service requirements and options</li> <li>- Improved performance and control of service delivery to the required standards</li> <li>- A more holistic approach to asset management within the organisation, through multi-disciplinary management teams</li> </ul>



Asset Management Process	Benefits
Effective Risk Management	<ul style="list-style-type: none"> <li>- Understanding the risks relating to asset management and service delivery and applying a framework to prioritise mitigation</li> <li>- Applying business continuity practices</li> <li>- Addressing the inter-relationship between different networks</li> </ul>
Improved Financial Management	<ul style="list-style-type: none"> <li>- Improved decision making based on costs and benefits or alternatives</li> <li>- Prioritisation of investments, interventions and asset care activities</li> <li>- Justification of forward work programs and funding requirements</li> <li>- Recognition of all costs of owning/operating assets over the lifecycle of the assets</li> <li>- Selecting the most effective procurement method</li> <li>- Benchmarking condition and performance to promote innovation and efficiency</li> </ul>

The main goal of the Asset Management Plans is to ensure that assets acquired support and meet the strategic and annual objectives of the organisation and that the cost of providing the service to the community does not outweigh the benefits.

#### 1.1.2 Strategic and Corporate Goals

This Infrastructure Asset Management Plan, and supporting asset-specific Asset Management Plans, are prepared under the direction of the Shire’s vision, goals and objectives. The Shire has acknowledged the need to take an organisation wide approach to asset management and one which involves the community on a wider basis.

Asset Management Plans are a crucial component of the Shire’s planning process linking with the following corporate documents:

- Strategic Community Plan
- Corporate Business Plan
- Long Term Financial Plan
- Annual Report
- Risk Management Strategy
- Risk Management Policy
- Asset Management Policy
- Community Infrastructure Plan
- Workforce Plan

## 1.2 Legislative Requirements

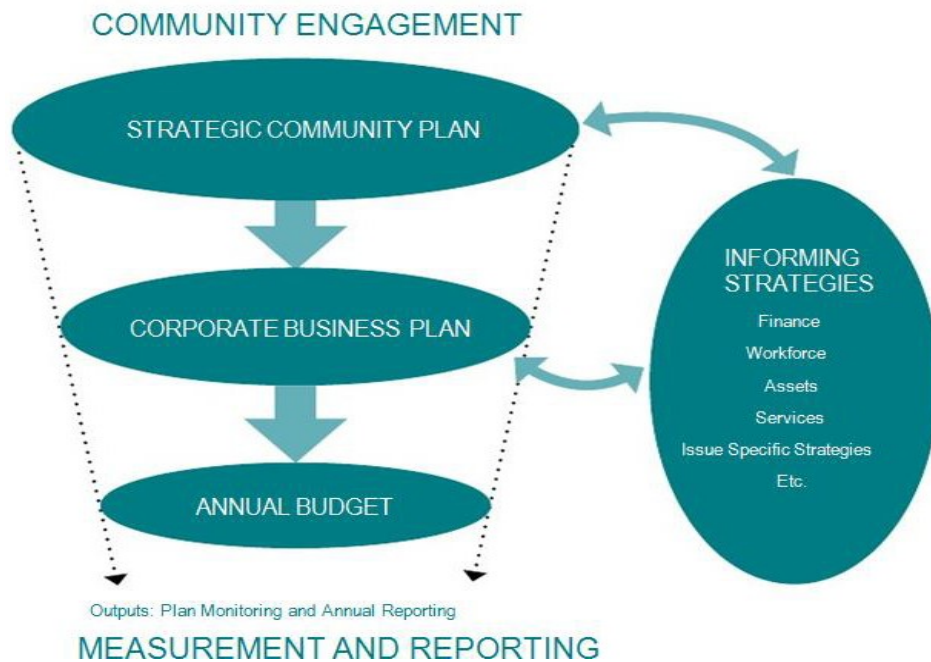
There are many legislative requirements that impact on the management of Shire infrastructure assets. The legislation requirements that relate to assets under the care control and responsibility of Local Government include the following:

Legislation	Requirements
Local Government Act 1995	Sets out the role, purpose, responsibilities and powers of local governments.
Local Government (Miscellaneous Provisions) Act 1960	An Act to deal with certain matters concerning local government. To be read as part of Local Government Act 1995
Land Administration Act 1997	An Act to consolidate and reform the law about Crown land and the compulsory acquisition of land generally
Town Planning and Development Act 2005	Defines the land use and zoning of facility infrastructure
Environment Protection and Biodiversity Act 1999	Regulations regarding noise, sustainability, landfill, stormwater and groundwater resources.
Occupational Health & Safety Act 1984	Provide a work environment that is safe and as far as practicable without risk to health.
Native Title (State Provisions) Act 1999	Recognises the traditional rights and interests to land and waters of Aboriginal and Torres Strait Islander people
Heritage of Western Australia Act 1990	Establishes the State Register of Heritage Places that are protected due to their cultural heritage significance
Conservation and Land Management Act 1984	An Act to make better provision for the use, protection and management of certain public lands and waters and the flora and fauna thereof, to establish the Conservation and Parks Commission, to confer functions relating to the conservation, protection and management of biodiversity and biodiversity components, and for incidental or connected purposes.
Aboriginal Heritage Act 1972	Provides a means to protect and preserve Aboriginal sites
Telecommunications Act 1997	Regulates the activities of a number of participants in the telecommunications industry, including 'carriers' and 'carriage service providers'
Local Government (Financial Assistance) Act 1995	An Act to provide for financial assistance for local government purposes by means of grants to the States, the Australian Capital Territory and the Northern Territory, and for related purposes
Australian Accounting Standards	These set out the financial reporting standards relating to Infrastructure assets. Standards of particular relevance to infrastructure assets include: <ul style="list-style-type: none"> <li>• AASB 116 Property, Plant and Equipment – prescribes requirements for recognition and depreciation of property, plant and equipment assets</li> <li>• AASB 136 Impairment of Assets – aims to ensure that assets are carried at amounts that are not in excess of their recoverable amounts</li> <li>• AASB 13 – Fair Value Measurement – defines a market based measurement system for 'Fair Value' measurement of assets</li> </ul>

### 1.2.1 Integrated Planning and Reporting Framework

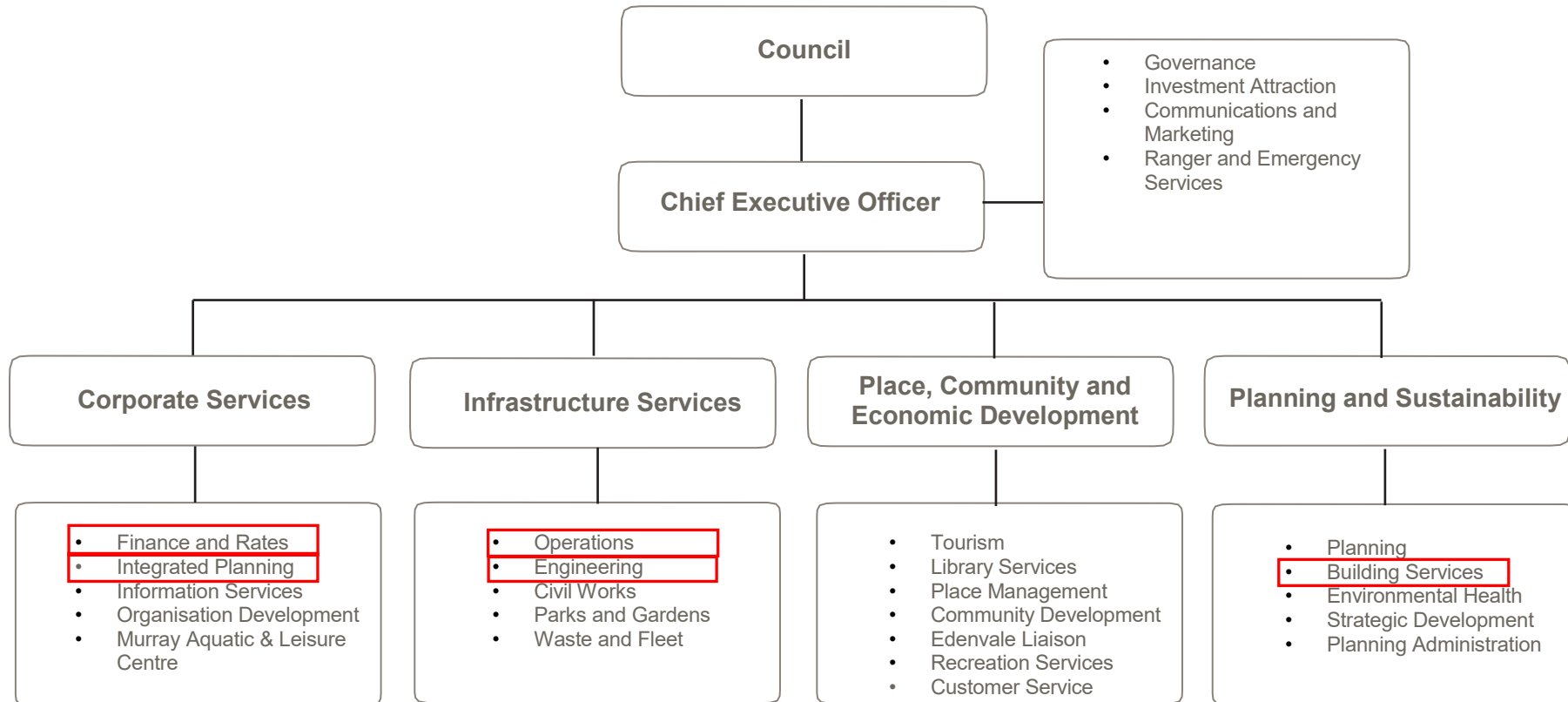
The Integrated Planning and Reporting Framework provides the basis for improving the practice of strategic planning in Local Government. Asset Management is a key component of the Integrated Planning and Reporting Framework, as it clearly links to the Strategic Community Plan, Corporate Business Plan and Annual Report, enabling these documents to be influenced by the development of integrated planning elements such as Asset Management Plans.

The figure below illustrates the different elements of the Integrated Planning Framework:



## 1.3 Organisational Structure

The Asset Management Plan recognises that Asset Management as a multidisciplinary approach. The following diagram below provides overall detail of where assessment management and maintenance staff sit in relation to the Shire's overall functional structure.



## 1.4 Core and Advanced Asset Management

### 1.4.1 Core Approach

This Asset Management Plan has been prepared as a 'Core' asset management plan in accordance with the International Infrastructure Management Manual. The plan has also been developed in accordance with the Department of Local Governments Integrated Planning and Reporting Framework to assist the Shire in driving future budgeting requirements whilst providing sustainable service delivery and long term financial planning and reporting. At the 'Core' level it is important to begin with an understanding of what level of service is currently provided. It is typically a case of selecting assets that are deemed to be most critical to the safety and wellbeing of the community and focusing on these to carry out the initial condition assessment inspection. Hence these might be located in older business precincts or on major transport corridors where the consequence or impact of failure coupled with a potentially higher probability of failure, make these a priority of investigation.

This will typically identify any hazards (and associated risks) requiring immediate mitigation. It will also provide some basis data on the condition that will enable analysis of renewal or replacement works required now and in the longer term. This then provides the necessary financial data to inform the Long Term Financial Plan. Works identified, immediate and future, can then be allocated to projects, both maintenance and capital in nature, to be carried out and the timeframe for such. Regularly repeating these basic steps with appropriate refinement of the process and as resources permit is part of the continuous improvement journey, leading to a more advanced asset management program.

### 1.4.2 Advanced Approach

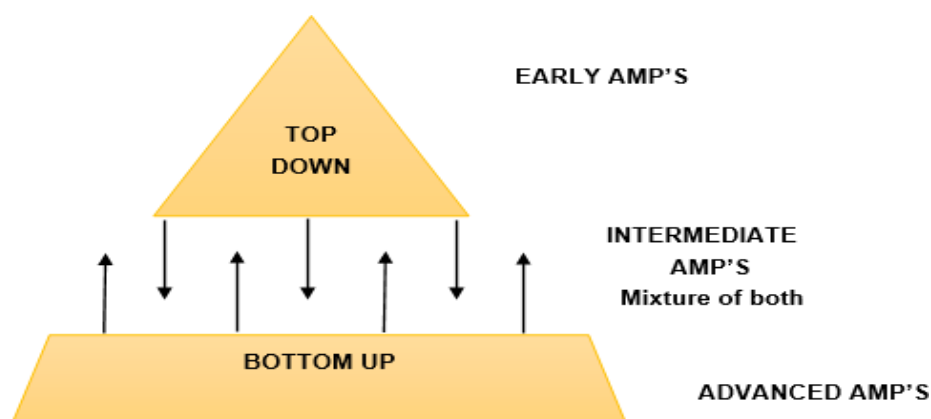
Each Asset Management Plan contains elements of advanced asset management practices to establish a 'bottom up' approach for gathering asset information for individual assets. With future revisions of these plans, the Shire will continue to move forward towards "Advanced" asset management to support the optimisation of activities and programs to meet agreed service levels.

Advanced asset management will show features such as:

- Long term optimised lifecycle
- Corporate objectives and asset performance are aligned and complimentary
- Information systems integrated and used effectively
- Competencies are aligned to roles and responsibilities
- Strategies are risk based, with appropriate use of predictive models, problem solving and iterative continuous improvement

As the Shire is moving into a more 'advanced' phase it will address the whole portfolio of its assets and more formally apply criticality and risk management principles to better determine the frequency and scope of condition assessment inspections. The Shire will collect more detailed data, with greater breakdown into various components and will apply quality standards to test the level of service being provided and use this to assist the condition assessment process in deciding on future needs.

The resultant data will be more rigorously analysed and optimised decision making typically employed to determine priorities for works. The analysis will give a more accurate picture on the remaining life of the assets down to their various components, their current replacement cost and their depreciated replacement cost.



## 2. Levels of Service

Levels of service are key business drivers and influence all asset management decisions. Levels of service typically relate to service attributes such as quality, reliability, responsiveness, sustainability, timeliness, accessibility and cost. Understanding the level of service required of an asset is essential for its lifecycle management, as this largely determines an asset's development, operation, maintenance, replacement and disposal. Levels of service are pivotal in asset management as they have a direct financial impact due to their importance in both operational and risk-based prioritisation.

Service levels are defined service levels in two terms, community levels of service and technical levels of service.

### 2.1 Community Levels of Service

Community Levels of Service relates to the function of the service provided and how the customer receives the service in terms of appearance, availability, comfort and safety.

Community levels of service measures used in the asset management plan are:

Quality	How good is the service?
Function	Does it meet users' needs? Capacity/Utilisation Is the service over or under used?

A key objective of each Asset Management Plan is to match the level of service provided by an asset category with expectations of stakeholders. This requires a clear understanding of needs, expectations, preferences and willingness to pay for any increase in the levels of service.

Function decides strategic importance and considers the key principles which impact in determining the functional level of service as part of providing a sustainable range of facilities to the community.

The levels of service for asset users are a combination of the Shire’s current service levels and service levels based on community input and feedback from the Community Infrastructure Surveys. Consistency is needed between the levels of service provided by the Shire and the expectation of the community. The communities’ willingness to pay determines the level of service. High community expectations need to be matched to both a willingness and ability to pay. These will be looked at in further detail in future revisions of the asset management plan.

## 2.2 Technical Levels of Service

Technical levels of service relate to the technical measures and the outputs the customer receives in terms of quality, quantity, maintainability, reliability and performance, responsiveness, capacity, environmental impacts and affordability.

These technical measures relate to the allocation of resources to service activities that the organisation undertakes to best achieve the desired community outcomes and demonstrate effective organisational performance.

Technical service measures are linked to annual budgets covering:

<b>Operations</b>	The regular activities to provide services such as opening hours, cleaning, mowing grass, energy, inspections, etc.
<b>Maintenance</b>	The activities necessary to retain an asset as near as practicable to an appropriate service condition (e.g. road patching, unsealed road grading, building and structure repairs)
<b>Renewal</b>	The activities that return the service capability of an asset up to that which it had originally (e.g. frequency and cost of road resurfacing and pavement reconstruction, pipeline replacement and building component replacement)
<b>Upgrade</b>	The activities to provide a higher level of service (e.g. widening a road, sealing an unsealed road, replacing a pipeline with a larger size) or a new service that did not exist previously (e.g. a new library).

Service and asset managers plan, implement and control technical levels of service to influence the customer service levels.

In developing the service levels, the Shire has generally applied the framework as set out in the International Infrastructure Management Manual.

The process broadly applies 5 steps, being:

- Identify service attributes important to customers;
- Define the customer service levels the Shire delivers;
- Develop performance measures;
- Consult with customers; and
- Make service level based decisions.

## 2.3 Customer Research and Expectations

Research and information pertaining to community expectations and perceptions for infrastructure is gained from Community Surveys. The Shire is committed to updating the levels of service according to the results of community feedback. As targets for levels of service provide the basis for lifecycle management strategies and capital programs, the previously stated levels of service have been reviewed to incorporate the identified requirements of the community. As continued work is undertaken to resolve disparities between renewal funding requirements and available funds, the link between service level and cost is an important area for investigation. Consultation with the community may show that, on identifying that significant rate rises are required to fund infrastructure, the community would prefer to consider a reduction in service level. The issue of community consultation is important for further development in all updates of this asset management plan.

Strategies that are used to seek feedback from the community include:

- Infrastructure asset management customer consultation surveys
- Shire-wide community feedback surveys
- Customer feedback / complaints submitted through the Shire's website, via email, phone or mail.
- Submitted Works Requests

## 2.4 Key Stakeholders

Stakeholders include any person, agency, body or group that have any interest or that are affected by the infrastructure and assets owned by Council.

Stakeholder	Expectations
Councillors	Meeting community needs, sound management and allocation of resources, good governance
Employees / Contractors	Safe working environment
Community Residents and Businesses	Value for money, equitable and responsible service, well maintained assets
Asset Users	Well maintained assets specific to users' needs
Insurers	Appropriate risk management policies and practices, safe working environments, well maintained assets
Tourists	Well maintained assets, accessible services, safe facilities
Government (Federal and State)	Systems in place to sustain infrastructure, accountability, transparency



## 2.5 Function and Hierarchy

An asset hierarchy provides a framework for structuring data in an information system to assist in collection of data, reporting information and making decisions. The hierarchy includes the asset class and component used for asset planning and financial reporting and service level hierarchy used for service planning and delivery.

# 3. Future Demand

## 3.1 Demand Forecasts and Drivers

The Shire of Murray is currently experiencing pressure for new urban growth areas. By 2031 the population of Perth and Peel is expected to grow by between 35 and 40 percent. This growth will place significant demand on existing community infrastructure available within the Shire and will require the provision of additional infrastructure to meet the needs of a growing community.

In 2011, a demographic study was commissioned by the Shire of Murray undertaking an analysis of possible demand, which has allowed anticipated impacts to be quantifiable and this data will be used extensively in predicting future demand levels for infrastructure assets.

This asset management plan considers a 10 year planning horizon and therefore the factors that may influence the potential demand of infrastructure must be recognised over this time. The following section provides commentary on the varying factors that may be subject to change and that in turn, may affect the demand for services that rely on this network.

Drivers affecting demand include population change, changes in demographics, seasonal factors, vehicle ownership rates, consumer preferences and expectations, technological changes, economic factors, agricultural practices and environmental awareness.

### 3.1.1 New Subdivision Activity

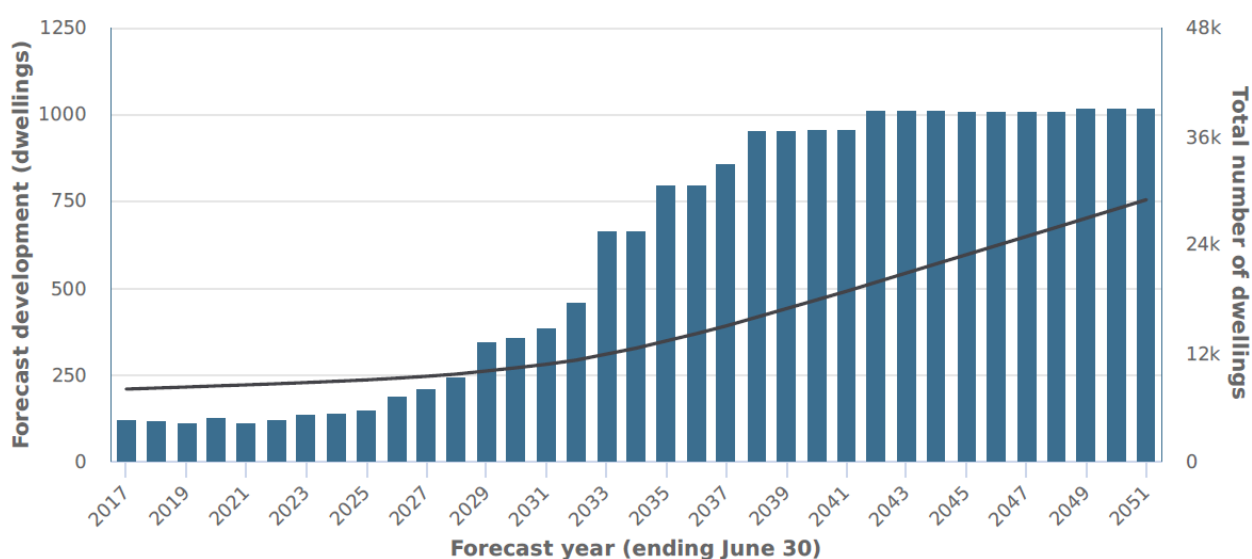
The growth in assets has mainly occurred through vested assets from subdivision developments. Over the next 20 years this development is expected to increase considerably as significant residential development is expected. The forecast development and total dwelling gain in the Shire of Murray is shown below. The principal forecast land assumptions 2016-2051 are:

### Forecast dwellings and development

Murray Shire Council	2016		2051		Change between 2016 and 2051	
Area	Number	%	Number	%	Number	%
Shire of Murray	7,861	100.0	28,958	100.0	+21,097	+268.4
Furnissdale	598	7.6	705	2.4	+107	+17.9
North Dandalup - Rural North	328	4.2	1,000	3.5	+672	+204.6
North Yunderup	473	6.0	972	3.4	+499	+105.6
Pinjarra	2,130	27.1	5,298	18.3	+3,168	+148.7
Point Grey	2	0.0	912	3.1	+910	+47,555.8
Ravenswood	908	11.6	2,130	7.4	+1,222	+134.6
Ravenswood North	20	0.3	5,956	20.6	+5,936	+29,138.4
Rural South	828	10.5	1,034	3.6	+206	+24.9
South Yunderup	1,781	22.7	6,758	23.3	+4,977	+279.4
Stake Hill - Barragup - Nambeelup	625	8.0	838	2.9	+213	+34.1
West Pinjarra	167	2.1	3,354	11.6	+3,187	+1,908.4

### Forecast Residential Development

Forecast development — Total dwellings



Source: Population and household forecasts, 2016 to 2051, prepared by .id (informed decisions), October 2020.



### 3.1.2 Political

Local government policy change, as well as state government service reallocation, can often affect the demand for community services. These services then often require infrastructure to support them. Whilst a number of policies could potentially affect demand, it is thought that those concerning infrastructure funding would potentially have the greatest impact on the Shire. For example, a cut in funding would place more pressure on municipal revenue to fund infrastructure projects. This could result in lower levels of service being delivered to the community. Conversely, increases in funding can also have a distinct effect. For example, many grants are often tied into the creation of new assets, or upgrading of existing ones. Where this situation occurs, the Shire will need to fully understand the whole of life cost implications of grant funding.

### 3.1.3 Economic

The Shire currently features a relatively small residential population, with the majority of residents located at the western end of the Murray River at South Yunderup, North Yunderup, Furnissdale and Ravenswood, as well as in Pinjarra. Other settlements of note include North Dandalup, Dwellingup and Coolup. The economic base of the Shire is strongly influenced by alumina refining at Pinjarra, with more than a third of all jobs carried out in the Shire of Murray associated with this industry. Other important industries include construction (driven by housing growth in the region) and other services, such as retail trade, education and health. Agriculture and forestry are the dominant land uses, but employ less than ten per cent of the population.

Predicted growth in the region will see increased demand for new infrastructure and greater wear on existing infrastructure as the population expands. This will likely lead to higher costs to the Shire as asset lives will be reduced.

### 3.1.4 Social

Total population figures were sourced from Forecast ID and are summarised in the table below for the Shire of Murray. The graph contains estimated resident populations from between 2016 and 2051.

The statistical data suggests that over the life of this asset management plan that significant population change will occur within the Shire of Murray. Therefore, it is expected that due to an increase in population there will be an effect on existing infrastructure demand due to population change. This may result in infrastructure not providing an appropriate level of service to the community if it is not managed appropriately.

### Population summary – 2016 – 2051

Murray Shire Council	Forecast year								Change between 2016 & 2051	
	2016	2021	2026	2031	2036	2041	2046	2051	Total change	Avg. annual % change
Shire of Murray	17,122	18,336	20,042	23,734	32,352	44,639	57,801	70,913	+53,791	+3.44
Furnissdale	1,065	1,152	1,236	1,274	1,304	1,334	1,363	1,392	+327	+0.64
North Dandalup - Rural North	787	985	1,149	1,375	1,595	1,812	2,026	2,241	+1,454	+2.52
North Yunderup	879	857	854	988	1,117	1,335	1,502	1,670	+791	+1.54
Pinjarra	5,021	5,133	5,697	6,865	8,213	9,551	10,943	12,354	+7,333	+2.17
Point Grey	4	4	4	35	333	827	1,302	1,768	+1,764	+15.61
Ravenswood	1,984	2,389	2,807	3,203	3,580	3,955	4,327	4,698	+2,714	+2.07
Ravenswood North	56	61	77	165	2,453	7,427	12,711	17,940	+17,884	+14.73
Rural South	1,810	1,798	1,803	1,854	1,913	1,973	2,029	2,085	+275	+0.34
South Yunderup	3,252	3,585	3,891	4,459	6,499	8,806	11,700	14,663	+11,411	+3.65
Stake Hill - Barragup - Nambelup	1,799	1,872	1,982	2,060	2,137	2,219	2,297	2,377	+578	+0.67
West Pinjarra	464	500	541	1,455	3,206	5,401	7,601	9,724	+9,260	+7.51

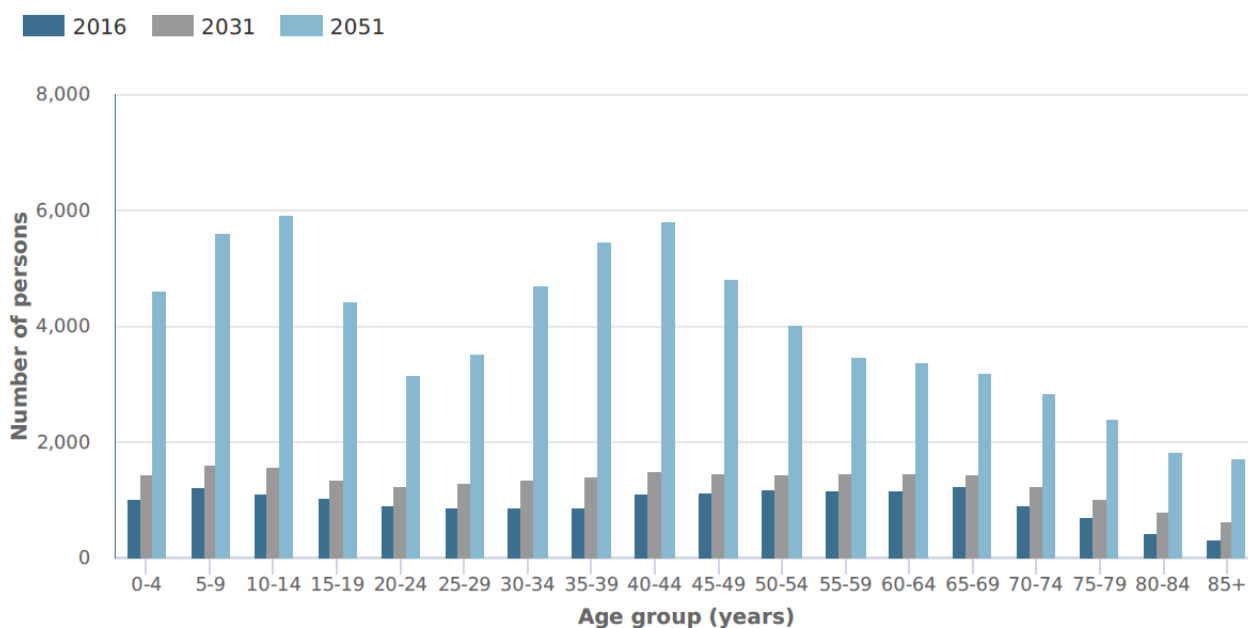
#### 3.1.5 Demographic Change

The primary housing market role that the Shire has played over the last two decades has been to provide relatively affordable housing for young and established families, as well as retirees and older adults. The age profile of the Shire's population over the next 20 years is shown in the figure below. This role is expected to continue and expand as the stocks of residential land in Mandurah are depleted.

The below table details the Shire's predicted population age distribution.

**Forecast age structure - 5 year age groups**

Murray Shire Council - Total persons	2016		2031		2051		Change between 2016 and 2051
	Number	%	Number	%	Number	%	Number
0 to 4	1,001	5.8	1,446	6.1	4,625	6.5	+3,624
5 to 9	1,199	7.0	1,603	6.8	5,607	7.9	+4,407
10 to 14	1,087	6.3	1,572	6.6	5,923	8.4	+4,836
15 to 19	1,035	6.0	1,355	5.7	4,430	6.2	+3,395
20 to 24	894	5.2	1,242	5.2	3,147	4.4	+2,253
25 to 29	884	5.2	1,285	5.4	3,533	5.0	+2,649
30 to 34	867	5.1	1,366	5.8	4,701	6.6	+3,834
35 to 39	880	5.1	1,419	6.0	5,452	7.7	+4,572
40 to 44	1,098	6.4	1,490	6.3	5,816	8.2	+4,718
45 to 49	1,137	6.6	1,467	6.2	4,816	6.8	+3,679
50 to 54	1,185	6.9	1,444	6.1	4,021	5.7	+2,835
55 to 59	1,146	6.7	1,470	6.2	3,477	4.9	+2,331
60 to 64	1,148	6.7	1,466	6.2	3,387	4.8	+2,239
65 to 69	1,232	7.2	1,443	6.1	3,177	4.5	+1,945
70 to 74	912	5.3	1,251	5.3	2,835	4.0	+1,922
75 to 79	706	4.1	1,009	4.3	2,404	3.4	+1,699
80 to 84	413	2.4	779	3.3	1,837	2.6	+1,424
85 and over	299	1.7	627	2.6	1,726	2.4	+1,427
<b>Total persons</b>	<b>17,122</b>	<b>100.0</b>	<b>23,734</b>	<b>100.0</b>	<b>70,913</b>	<b>100.0</b>	<b>+53,791</b>



Source: Population and household forecasts, 2016 to 2051, prepared by .id(opens a new window) (informed decisions), October 2020.



Factors affecting demand for infrastructure include population growth, changes in demographics, seasonal factors, vehicle ownership, customer preferences and expectations. If the Shire does not plan for population growth and manage the future urban form of the Shire, growth pressures and unfavorable patterns of development can have serious impacts on the community. These include a lack of access to essential infrastructure and services and increased response times for emergency services.

With an increase in the number of retirees moving to the area and the increase in life expectancy the ageing population is expected to increase the Shire’s need for appropriate facilities and infrastructure to cater for this age demographic. This may necessitate significant upgrade or development of infrastructure, as well as possible greater maintenance requirements.

An ageing population will mean a greater need for aged care facilities and disability access. Increase in age of population will also require improvements to public transport infrastructure and services.

The Shire of Murray is predominantly rural, with rural-residential areas in the main township of Pinjarra, the small townships of Dwellingup and North Dandalup, and numerous smaller settlements. Land is used predominantly for agriculture (mainly cattle, with some pigs and horses and orcharding), mining, forestry and conservation. Major features of the Shire include Peel Inlet, Harvey Estuary, the Murray River, the Serpentine River, Lake Banksiadale, Peel Zoo, Hotham Valley Tourist Railway, Forest Discovery Centre, Alcoa Alumina Refinery, Huntly Bauxite Mine, WA Skydiving Academy (Pinjarra Dropzone), Fairbridge Village, Edenvale Heritage Precinct, Forest Heritage Centre, Murray Aquatic and Leisure Centre, Dwellingup Trails and Visitor Centre, Pinjarra Golf Club, Pinjarra Park Racecourse, Pinjarra PACEWAY, Murray District Hospital, Pinjarra Junction Shopping Centre, Austin Bay Nature Reserve, North Dandalup Dam, South Dandalup Dam, the Bibbulmun Track, the Munda Biddi Trail and several wineries.

It is reasonable to expect tourism demand to grow at a rate above that forecasted for the State. With sensible strategic investment into key tourist assets, as well as in assets that contribute to overall town site aesthetics (e.g. well maintained roads), the Shire could see tourism growth figures higher than the expected state average of 3.9% by 2025. However, any future tourism growth will be strongly linked to both governmental and private industry investment within the Shire.

### 3.1.6 Changes in Technology

Changes in material and construction techniques could lead to improved service levels and infrastructure standards, and ultimately reduced maintenance requirements. However, it is difficult to predict whether newer materials, construction and maintenance techniques will affect demand. Therefore, none are currently predicted.

### 3.1.7 New Assets from Growth

The new assets required to meet growth will be acquired from land developments and constructed by the Shire. Acquiring these new assets will commit the Shire to fund ongoing operations and maintenance costs for the period that the service provided from the asset is required.

### 3.1.8 Legislation

The Shire is bound to meet a range of legislative obligations which if altered, could affect the Shire's management obligations.

Another current legislative driver of change is the amendment of the Local Government Act 1995. The Act promotes integrated planning and ensures that long term financial planning, asset management planning and workforce planning become standard business practices for all local governments. This means that the majority of WA local government organisations will have to notably improve their current practices and processes, which the Shire is currently working towards.

### 3.1.9 Tourism Growth

Tourism can have a major effect on infrastructure. An increase in tourism will result in higher utilisation of infrastructure, and this in turn would mean that the Shire will incur higher costs for asset replacement.

Whilst the impact of the COVID-19 pandemic on tourism numbers in the Shire of Murray is still unknown, it is anticipated that the majority of visitors over the next 18 months will be from the domestic market.

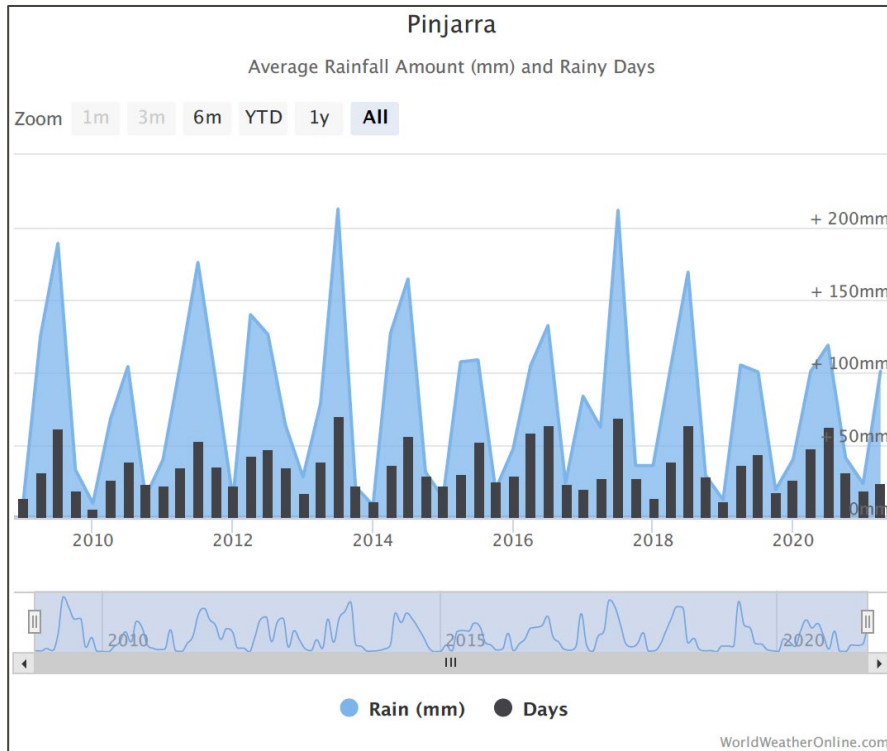
Currently, the market within the Peel Development Commission Region consists of 89% domestic travel, 7% Interstate (a 2% fall from 2017) and 5% International. The majority of the intrastate market is from Perth and a large proportion of these visitors will be day trip, weekend and school holiday visitors.

### 3.1.10 Climate Change

There is an increasing body of evidence that the earth's climate is changing. Climate change can have direct and indirect impacts on assets. The direct impacts are due to the effects of the environment. The indirect impacts of climate change on assets are due to the effects on the location of population and human activity altering the demand for assets.

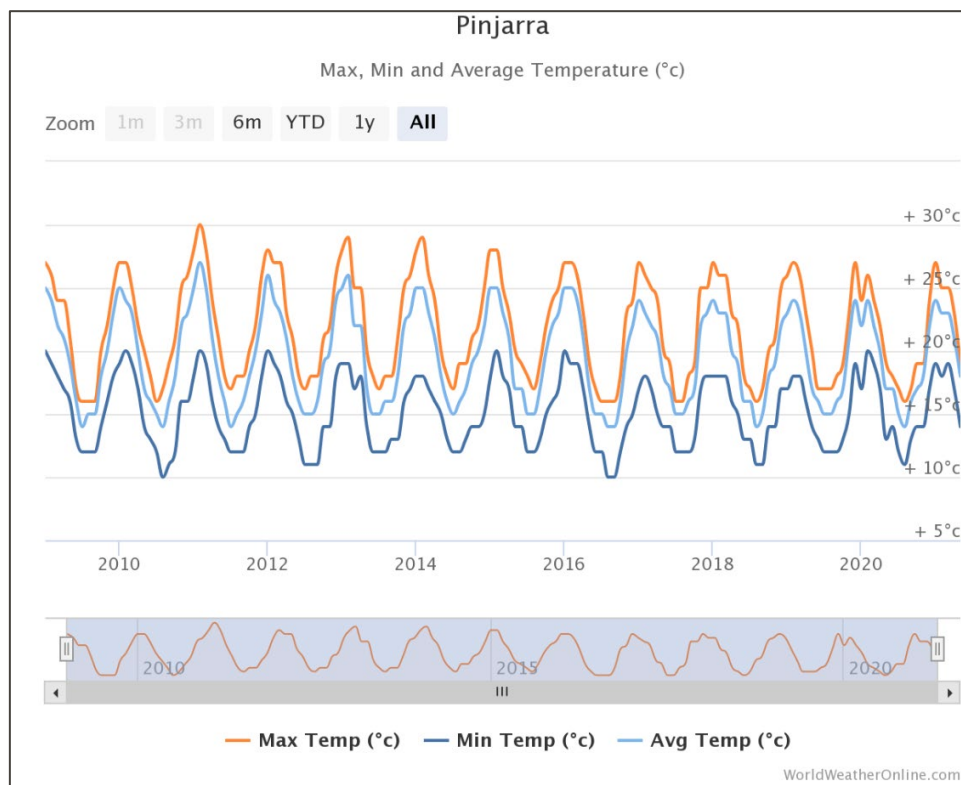
There is continuing discussion about changing climatic conditions, increased rainfall, rising sea levels, fluctuations in wet/dry season and periods. Continued variation in weather patterns and extremes is forecast to occur. This is likely to impact on condition of assets, place pressure on asset lifecycle costs and potentially reduce asset life e.g. increased moisture in ground and road pavements. This could also potentially lead to more frequent asset failures. An understanding of the expected impacts of future climate change by the Shire could enable considerable cost savings in the long term.

The figure below summarises the annual rainfall change (mm) in Pinjarra from 2009-2021.





The figure below summarises the annual mean maximum and minimum temperatures from 2009-2021.



The Shire currently has the following processes in place to monitor the effects of climate change:

- Regular condition inspections of infrastructure
- Programmed maintenance activities
- Business Continuity Plan in place if natural disaster was to occur e.g. flood

## 3.2 Demand Impacts and Management Plan

Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets and providing new assets to meet demand and demand management. Demand management practices include non-asset solutions, insuring against risks and managing failures.

Non-asset solutions focus on providing the required service without the need for the organisation to own the assets and management actions including reducing demand for the service, reducing the level of service (allowing some assets to deteriorate beyond current service levels) or educating customers to accept appropriate asset failures. Examples of non-asset solutions include providing services from existing infrastructure such as aquatic centres and libraries that may be in another community area or public toilets provided in commercial premises.

The objective of demand management is to actively seek to modify customer demands for services in order to:

- Optimise the utilisation / performance of existing assets
- Reduce or defer the need for new assets
- Meet the organisations strategic objectives
- Deliver a more sustainable service
- Respond to customer needs

It is vital to the success of the Infrastructure Asset Management Plan that demand factors be analysed comprehensively, and their impact quantified in terms of the following:

- The effect of the growth of the asset network;
- Any possible future need to increase or decrease infrastructure; and
- The implementation of non-asset solutions, such as managing demand.

In addition to the factors mentioned above, risk affects demand for services and consequently the following must be taken into account:

- The methodology and accuracy of forecasts;
- The currency of forecasts;
- The uncertainty of forecasts; and
- Any unforeseen natural factors

The forecasts for the Shire of Murray indicate significant population growth in the area. This growth trend is expected to cause an increase in the asset base due to the creation of new assets, as a result of increased demand.

### 3.3 Demand Management Strategy

Demand management strategies provide alternatives to the creation of new assets through modifying customer demands. A key long term strategy is to manage demand so that there are funds in place for the renewal, operation and maintenance of future services. Demand management practices include non-asset solutions, insuring against risks and managing failures. The key long term strategy is to manage the demand so that services can still be provided into the future at a reasonable cost to the community. These strategies include:

Demand Driver	Impact on Services	Demand Management Plan
New Subdivision Activity	Increase in vested assets from subdivision developments	Maintain detailed records and undertake an inspection of assets prior to hand over.
Political	Changes in government policy or service allocation could result in more pressure on municipal revenue	Continue to fund high priority projects. Investigate new & cost-efficiency technologies and seek external funding.
Economic	Increased demand for new infrastructure and greater wear on existing infrastructure as the population expands. This will likely lead to higher costs to the Shire as asset lives will be reduced.	Monitor through regular condition assessments, customer works requests analysis and community consultation
Social	Demand for more walkway, park and recreation facilities	Identify needs and incorporate in an Open Space Strategy
Demographic Change	Appropriate facilities and infrastructure will need to be constructed (or upgraded) to cater for the age demographic. An ageing population will mean a greater need for aged care facilities and disability access. Increase in age of population will also require improvements to public transport infrastructure and services.	Monitor through Forecast ID statistics and other sources that are available

Demand Driver	Impact on Services	Demand Management Plan
Changes in Technology	New technology may allow for cost savings and protect the environment	These technical factors need to be assessed in determining the scoping requirements for capital and maintenance works
Legislation	Improvement required to current process and practices	Regularly update process and practices to ensure they are aligned with current legislation
Tourism Growth	Increased need for the construction of public car parks, traffic calming devices / signage, public amenities such as toilets etc.	Monitor through Forecast ID statistics and other sources that are available
Climate Change	Likely to result in more maintenance works being required to maintain standard of assets requiring level of service review.	Monitor through regular condition assessments, customer works requests analysis
Increased construction costs	Cost increases are anticipated to continue, and will likely be at a higher rate than CPI. Cost of renewing infrastructure assets is increasing	Continue to fund high priority projects. Investigate new & cost-effective technologies, seek external funding and investigate alternative ways that the construction can be delivered within the funding limitations.

Demand drivers that will have an impact on each asset class are summarised in each of the Appendices, with management strategies in place to manage these drivers/impacts

The Shire of Murray will need to carefully analyse and establish alternatives to the use of assets in some circumstances where the relative demand cannot justify the replacement of some infrastructure for what they were originally intended. In addition, removal of some infrastructure from the Shire's asset register may need to be undertaken where it can be demonstrated that assets would be better managed and controlled by others, or the demand level is so low that allocation of funds toward infrastructure cannot be justified.

## 4. Risk Management

The Shire of Murray has acknowledged that Risk Management is an integral part of its organisation. The Risk Management Policy is a statement of commitment to ensure that the interests of the community, its employees and contractors are protected by minimising loss arising from Shire activities and services.

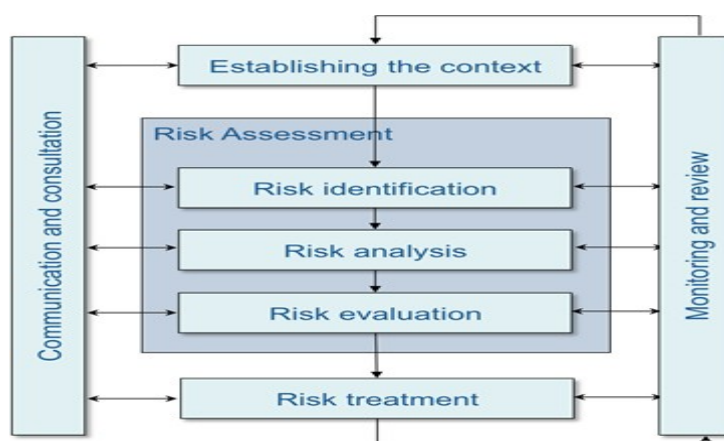
The Risk Management Policy is supported by a Risk Management Strategy, which sets the risk management direction for all projects, strategic and operational areas within the Shire. The management of risk is crucial to achieving the objectives in the Shire's Strategic Community Plan and an integral part of good management practice.

The primary objectives of risk management in Local Government are to:

- Ensure that environmental, social and financial costs are considered as part of decision making processes. As a result, the Shire's assets - people, financial, property and reputation are safeguarded.
- Create an environment that enables the Shire to deliver services and meet performance objectives in a timely, efficient, cost effective manner.
- Formally assign ownership of risks and controls within each area of the Shire of Murray, ensuring management and staff take ownership of, and manage risks within their respective areas.
- Demonstrate transparent and responsible risk management processes, which align with best practice.

## 4.1 Risk Management Process

The process outlined in the International Standard ISO 31000:2018 as illustrated in the below, is utilised in order for the Shire to achieve the objectives of risk management.



## 4.2 Risk Management Framework

The Shire of Murray has developed an organisational wide approach to risk management. This risk management framework consists of a risk management policy, a risk management strategy supported by a corporate risk register. The framework is designed to ensure that:

- All significant operational and organisational risks are understood and identified.
- The highest risks are identified and addressed.
- Risk reduction treatments are implemented which best meet business needs.
- Responsibilities for implementing, evaluating and managing risks are allocated to specific staff and reporting regimes adopted.

## 4.3 Risk Assessment

The key risk management criteria relating to Shire assets include:

- Public health and safety
- Environmental and legal compliance
- Image reputation, political and public relations
- Financial risk – escalating costs in deterioration
- Damage through flooding or fire
- Natural hazard

### Step 1: Risk Identification

As part of its operational procedures, the Shire undertakes a review of potential risks. Any risks identified are assessed to determine their potential impacts. The current and required controls are documented in the Corporate Risk Register.

The Shire of Murray Risk Categories are outlined in the table below:

Category	Possible Risk Areas
Financial	<ul style="list-style-type: none"> <li>• Tasks going over budget</li> <li>• Legal costs/fines</li> <li>• Insurance claims</li> <li>• Overpayments</li> <li>• Inappropriate use of resources</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>• Regulatory compliance</li> <li>• Contamination</li> <li>• Inadequate environmental practices in processes and procedures</li> </ul>
Operational	<ul style="list-style-type: none"> <li>• Adverse effects on core business</li> <li>• Business continuity</li> <li>• Human resources risks</li> <li>• Loss of knowledge</li> </ul>
Reputational	<ul style="list-style-type: none"> <li>• Public and internal staff perception</li> <li>• Poor customer service</li> <li>• Substandard works</li> <li>• Corruption</li> <li>• Misuse of confidential information</li> </ul>
Health	<ul style="list-style-type: none"> <li>• Exposure to health risks</li> <li>• Injuries (both physical or mental) or adverse health effects to the public or staff within Council buildings or on Council property</li> <li>• Injuries or adverse health effects to staff</li> </ul>
Project	<ul style="list-style-type: none"> <li>• Delays to the start or completion</li> <li>• Variations to scope</li> <li>• Variations to budget</li> <li>• Insufficient resources</li> </ul>

### Step 2: Risk Analysis and Evaluation

Risk analysis and evaluation follows the principles as set out by the international standards on risk management. The analysis considers both the likelihood and consequence of events and other risks. The below table shows the Shire's adopted consequence table with descriptions of the different level of impact that could result. The officer undertaking a risk assessment would select the most relevant consequence level.

**Consequence Rating Scale**

Level	Description	Financial Impact	Health (physical and psychological)	Reputation	Operation	Environment	Project
1	Insignificant	Less than \$10 000	Near miss / negligible injuries or health effect	Low impact, low profile, minor complaint.	Little impact – objectives still achieved with minimum extra cost or inconvenience	Contained, little and reversible impact managed by on site personnel	Insignificant impact on the project. It is not possible to measure the impact on the project as it is minimal
2	Minor	\$10 000 to \$50 000	Minor injury or health effect / First aid treatment	Heightened concern by community, several complaints.	Inconvenient delays – partial achievement of objectives with some compensating action taken	Contained, minor damage or contamination that is reversible and managed by on site personnel	<5% deviation in scope, scheduled end-date or project budget requiring Managers approval
3	Moderate	\$50 000 to \$250 000	Moderate injury or health effect / Medical treatment	Low level local news profile.	Significant delays to major deliverables – additional costs required and or time delays to achieve objectives. Adverse impacts on KPI's and targets.	Contained, significant contamination and damage that is reversible, managed by on site personnel	5-10% deviation in scope, scheduled end-date or project budget requiring Senior Management approval
4	Major	\$250 000 to 1 million	Serious health effect, death or extensive injuries	Major coverage in local media, low profile in state media.	Unable to achieve corporate objectives or statutory obligations resulting in significant visible impact on service provision such as closure of facilities	Uncontained, significant contamination and damage that is reversible but requires third party assistance, minor breach of legislation	10-25% deviation in scope, scheduled end-date or project budget requiring restructure of project and Senior Management or Council approval
5	Catastrophic	More than 1 million	Multiple deaths or severe permanent disablements	High state or national news profile.	Organisation unable to function.	Extensive contamination and damage that is irreversible, major breach of legislation	>25% deviation in scope, scheduled end-date or project budget requiring the project to be deferred or redeveloped.

The next process is to estimate the likelihood of a risk actually occurring. The table below shows the Shire of Murray's adopted level of likelihood.

### Likelihood Rating Scale

Level	Description	Probability
5	Almost Certain	Expected to occur in most circumstances E.g. More than once per year or greater than 90% chance
4	Likely	Will probably occur in most circumstances E.g. At least once per year or between 60% and 90%
3	Possible	Should occur at some time E.g. At least once in three years or between 30% and 60%
2	Unlikely	Could occur at some time E.g. At least once in ten years or between 5 and 30%
1	Rare	May occur, only in exceptional circumstances E.g. Less than once in fifteen years or less and 5%.

With the consequence and likelihood levels chosen, the risk is then assigned a risk rating and actions taken as required.

### Risk Level

		Consequence				
		Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
Likelihood	Almost Certain 5	M(5)	H(10)	H(15)	E(20)	E(25)
	Likely 4	M(4)	M(8)	H(12)	H(16)	E(20)
	Possible 3	L(3)	M(6)	M(9)	H(12)	H(15)
	Unlikely 2	L(2)	M(4)	M(6)	M(8)	H(10)
	Rare 1	L(1)	L(2)	L(3)	M(4)	M(5)

<b>L</b> Low	<b>M</b> Moderate	<b>H</b> High	<b>E</b> Extreme
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**Risk Evaluation**

Once the level of risk has been determined, the risk is evaluated and a decision made as to where the risk fits against the organisation's overall risk criteria. The Shire's Risk Acceptance Criteria table is shown below. This gives guidance as to the action to be taken, acceptability of the risk, the review frequency, and who the Risk Owner needs to be.

Risk Rating	Descriptor	Action Required	Criteria for Risk Acceptance	Review Frequency		Risk Owner	
				Strategic/Operational	Project Risks	Strategic/Operational	Project Risks
<b>Low</b>	Acceptable	Accept the risk	Risk acceptable with adequate controls	Annual	If the scope / context changes	Operational Manager	Project Manager
<b>Moderate</b>	Monitor	Monitor the risk but consider Risk Treatments	Risk acceptable with adequate controls	Semi-annual	If the scope / context changes	Operational Manager	Project Manager
<b>High</b>	Treat	Treat the risk. Reduce either the likelihood, consequence or both by improving existing controls or adding new controls	Risk acceptable with excellent controls	Quarterly	Monthly	Executive Management	Steering Committee where relevant or Project Director
<b>Extreme</b>	Treat	Treat the risk. Reduce either the likelihood, consequence or both by improving existing controls or adding new controls	Risk only acceptable with excellent controls and all treatment plans to be explored and implemented where possible	Monthly	Monthly	CEO	Steering Committee where relevant or Project Director



## 5. Critical Assets

Critical assets are those assets which have a high consequence of failure but are not necessarily a high likelihood of failure. By identifying critical assets and critical failure modes, the Shire can target and investigative activities, maintenance plans and capital expenditure plans at the appropriate time.

The definition of a critical asset is “an asset having potential to impact on the achievement of an organisation’s objectives”. Critical Assets are also essential for supporting the business and social needs of both the local and national economy, and have a high consequence in the event they fail. Assets can be safety-critical, environment-critical or performance-critical, and can relate to legal, regulatory or statutory requirements. Critical assets can refer to those assets necessary to provide services to the community. Asset systems can be distinguished as being ‘critical’ in a similar manner to individual assets. The critical assets for each asset class are identified in each of the Appendices.

## 6. Lifecycle Management Plan

The lifecycle management plan details how the organisation plans to manage and operate its infrastructure assets at the agreed levels of service (defined in Section 3) while optimising life cycle costs.

The Life Cycle Management Plan details how Council plans to manage and operate assets at an agreed level of service whilst minimising lifecycle costs and exposure to risk and loss. These assets are operated and maintained throughout their useful life, and their performance and condition are monitored to ensure they deliver the necessary service. Over the life of the asset, there will come a point where the asset is no longer performing at a satisfactory level and may be rehabilitated or improved. This can be repeated several times, however, eventually the asset will be disposed of and potentially replaced.

Life Cycle Analysis is to ensure sustainability of assets. Sustainability can be achieved by ensuring adequate investment in both short term maintenance needs and long term replacements, renewals, upgrades and new works to continuously meet the needs of asset users in terms of the level of service they expect from these assets.

The recurrent costs of operations and maintenance, the capital expenditure for rehabilitation, and the one-off cost of replacement all form part of the asset’s lifecycle costs. This section identifies and describes the four key phases of the asset management life cycle of local government assets, namely: acquisition, operation and maintenance, renewal and disposal.



The Shire of Murray has implemented a Corporate Asset Management System (AssetMaster) to record and manage its network. The software was developed by Open Office and is a Corporate Asset Repository and Asset Management System for all local government asset classes, including condition management based on the National Framework, long term planning based on the International Infrastructure Management Manual (IIMM), asset accounting based in AAS116, in-built reporting for government reporting, strategic maintenance planning and lifecycle costing.

## 6.1 Asset Condition

Infrastructure assets have a vast range of factors that influence their usability. From an asset management perspective, the various factors fall into one of the following groups:

- Fitness for Use
- Fitness for Purpose

Fitness for Use is a measure of an assets physical condition relative to its condition when first constructed or refurbished. This measurement takes account of the current condition of the structure, finishes and services supporting the assets use by the occupants. Fitness for Use has been the basis of the assets condition audit undertaken.

Condition is measured using a 1 – 10 grading system. The below gradings give an indication of a generic condition description:

Condition Grading Model:

Condition Rating	Condition Description
1	A new asset designed and constructed to current standards.
2	An asset in excellent overall condition, with sound structural integrity, no defects and new appearance. Often moved from a Condition 1 based on the time since construction rather than observed condition decline.
3	An asset in very good condition with sound structural integrity, superficial wear and tear and some deterioration to finishes. No serviceability problems.
4	An asset in good overall condition, with some minor wear and tear issues or deterioration to finishes. Serviceability may be impaired very slightly.
5	An asset in fair overall condition. Deterioration in condition would be obvious, with minor defects occurring. There will generally be some aspects of serviceability loss and minor maintenance.
6	An asset in fair to poor overall condition. The condition deterioration would be very obvious. Asset serviceability in general would now be affected and maintenance cost would be rising.
7	An asset in poor overall condition. Deterioration would be quite severe and would be starting to limit the serviceability of the asset. Maintenance cost would be high.
8	An asset in very poor overall condition with serviceability now heavily impacted. Maintenance cost would be very high and the asset would need to be rehabilitated. Minor risk of public injury.
9	An asset in extremely poor condition with severe serviceability problems and needing rehabilitation immediately. User safety and comfort very likely to be affected.
10	An asset that has failed, is no longer serviceable and should not remain in service. There would be an extreme risk in leaving the asset in service.

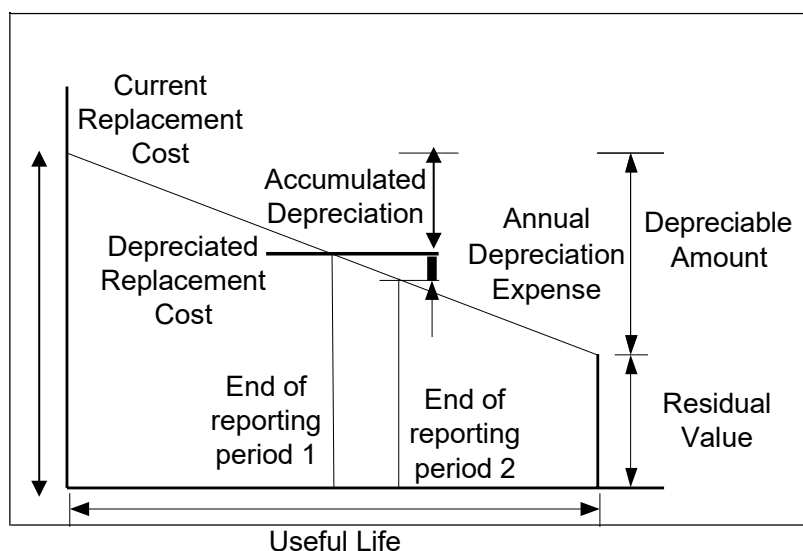
A Condition Assessment Manual has been developed for each asset class to ensure that there is consistency in the gradings.

## 6.2 Intervention Levels

Intervention levels support the service levels provided to the community as they define the trigger points for certain works to be carried out. They are also very useful in the development of ongoing maintenance programs. Having defined intervention levels also assists the Shire in being able to organise maintenance works on a risk priority basis, rather than be susceptible to carrying out works on a chronological basis, or as a result of pressure from individuals within the community. Intervention levels assist in providing a sound legal argument as to why certain works were, or were not carried out.

## 6.3 Asset Valuations

The Shire's Corporate Asset Management System values its infrastructure assets based on the current condition of each asset/component and in reference to a standard set of uniform unit rates of construction in respect of the work required to return the asset to new condition.



## 6.4 Useful Life

Useful life is used to determine the current value of the asset. Lifecycles have been based on the IPWEA's International Infrastructure Management Manual, industry standard publications, and Australian Standards, as well as verification through the collection of evidence based useful data with an analysis undertaken based on age and condition and local environmental factors. This data is collated and enhanced each year to gain a better understanding on how assets are performing.

To validate the estimated useful life of assets, a sample of assets are selected to represent the asset portfolio. The age of each component is used to determine what length of time the component takes to move from condition 1 to condition 10. This assessment is based on the assumption that deterioration rates remain approximately equal throughout the life of the asset. The assessment sample will be extended and deterioration rates analysed further in future revisions of this plan. The results of the initial assessment are summarised in each of the Appendices.

## 6.5 Operations and Maintenance

### 6.5.1 Operational Activities

Operational activities affect service levels including quality and function through activities such as street sweeping and grass mowing frequency, intensity and spacing of street lights and cleaning frequency and opening hours of buildings and other facilities. Operational activities keep the asset utilised but have no effect on condition.

### 6.5.2 Maintenance Activities

Maintenance includes all actions necessary for retaining an asset as near as practicable to an appropriate service level including regular ongoing day-to-day work necessary to keep assets operating, e.g. road patching but excluding rehabilitation or renewal. Maintenance may be classified into reactive, planned and specific maintenance work activities.

<b>Reactive maintenance</b>	Unplanned repair work carried out in response to service requests and management/supervisory directions. This is governed by the urgency of what is required
<b>Proactive (planned) maintenance</b>	Repair work that is identified and managed through a maintenance management system (MMS). MMS activities include inspection, assessing the condition against failure/breakdown experience, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance. These are generally more extensive repairs that are undertaken as part of a program of works to either prevent the breakdown of elements or components of a property or to bring those elements up to an acceptable condition. The extent of this program largely depends on funding allocations.
<b>Specific maintenance</b>	Replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including repainting, replacing air conditioning units, etc. This work falls below the capital/maintenance threshold but may require a specific budget allocation
<b>Backlog maintenance</b>	Backlog maintenance activities refers to an accumulation of uncorrected or deferred deficiencies in an asset. This is governed by available funding and any future plans for a particular asset

Maintenance expenditure levels are considered to be adequate to meet projected service levels, which may be less than or equal to current service levels. Where maintenance expenditure levels are such that will result in a lesser level of service, the service consequences and service risks have been identified and service consequences highlighted in the asset management plans and service risks considered in the risk management plan.

### 6.5.3 Operations and Maintenance Plan

In seeking to ensure that the Shire’s infrastructure continues to meet the needs and expectations of the community, a Maintenance and Operational Plan has been developed. It is tailored to suit asset class and considers the affordability in delivering a reasonable level of service of maintenance on a day to day basis. The Maintenance and Operational Plan is a management tool for the discharge of the Shire’s routine activities to inspect, maintain and repair the Shires infrastructure. The Shire, through proactive maintenance, will endeavour to ensure that the target levels of service are achieved within the constraints of available resources. The maintenance strategies that have been developed are anticipated to reduce both risk and reactive maintenance associated with the infrastructure.

### 6.5.4 Temporary Measures / Emergency Works

Where a potential risk is identified as a result of a customer request, officer report or maintenance report, an inspection will be carried out and temporary works effected or erection of appropriate barriers will be undertaken until such time as maintenance works can be completed.

Emergency works are works required to be undertaken immediately, outside routine maintenance and works programs, to ensure the safety of asset users and the public as a result of emergency incidents. Emergency works may include response to fires, flooding, storms and spillages. In the event of emergency works, these works shall take precedence over other maintenance and inspection regimes.

#### 6.5.5 Inspections

Inspections are a critical component of the asset management process and are undertaken to assess the overall condition of each individual asset and identify any defects that have the potential to create a risk or inconvenience to the public. The target inspection regimes for each asset class is outlined in each of the Appendices and the frequency and nature of the inspections are based on the hierarchy. In determining the frequency of programmed inspections, the Shire has taken into account the functional hierarchy classification of the asset and its construction type.

Personnel undertaking the inspections have been trained in house to undertake the activity and are conversant with the organisations inspection procedures and safety requirements. A three-tier inspection regime has been implemented covering safety, incidents, defects and condition.

<b>Responsive Inspections</b>	Identify defects outside the tolerable level and likely to create danger or serious inconvenience to users of the asset or the wider community. They are ad hoc by nature and are undertaken following notification to the Shire by members of the community through Works Requests or by Shire employees while undertaking their normal work duties. These notifications are of defects and safety deficiencies. The inspection is conducted by an appropriate Shire officer.
<b>Programmed Inspections</b>	Determine if the asset complies with the levels of service in terms of being within tolerable level of defects as specified in the Asset Management Plan. These inspections are carried out on a regular basis by a shire officer with the necessary skills to assess defects.
<b>Condition Inspections</b>	Identify deficiencies in the structural integrity of the assets which if untreated, are likely to adversely affect asset values. The deficiencies may impact short-term serviceability as well as the ability of the component to continue to perform for the duration of its intended life span. The condition inspections are undertaken in accordance with a Condition Assessment Manual for each asset class.

Council has developed a systematic inspection process, including unscheduled inspections in response to community advice. The inspections will identify defects and key maintenance items. The maintenance items identified will be assessed, prioritised and added to maintenance works programs, to ensure that the highest risk maintenance items are attended to in order of priority.

In addition to the formal inspection regime listed, Council's field staff and the community report any risk or maintenance issues observed as they move around the municipality, using works requests.

#### 6.5.6 Operations and Maintenance Strategies

The organisation will operate and maintain assets to provide the defined level of service to approved budgets in the most cost-efficient manner. The operation and maintenance activities include:

- Scheduling operations activities to deliver the defined level of service in the most efficient manner,
- Undertaking maintenance activities through a planned maintenance system to reduce maintenance costs and improve maintenance outcomes. Undertake cost-benefit analysis to determine the most cost-effective split between planned and unplanned maintenance activities (50 – 70% planned desirable as measured by cost),

- Maintain a current infrastructure risk register for assets and present service risks associated with providing services from infrastructure assets and reporting high and extreme and residual risks after treatment to management and Council,
- Review current and required skills base and implement workforce training and development to meet required operations and maintenance needs,
- Review asset utilisation to identify underutilised assets and appropriate remedies, and over utilised assets and customer demand management options,
- Maintain a current hierarchy of critical assets and required operations and maintenance activities,
- Develop and regularly review appropriate emergency response capability,
- Review management of operations and maintenance activities to ensure Council is obtaining best value for resources used.

It should be noted when undertaking the lifecycle modelling, maintenance and operational costs are taken into consideration by assuming that, each year, a percentage of these distresses will be repaired as part of the Shire's routine maintenance. If these assets are left to deteriorate (i.e. sufficient capital expenditure is not allocated), then the amount of distresses being fixed under routine maintenance will increase and the routine maintenance expenditure required will also increase. Equally, if the condition of these assets improves then the routine maintenance expenditure required will decrease.

## 6.6 Renewals and Replacements

Renewal and replacement work is work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original or lesser required service potential ("as new" condition). Work over and above restoring an asset to original service potential is considered upgrade/expansion or new works.

### 6.6.1 Renewal Strategy and Plan

Assets requiring renewal are identified from analysis of the asset condition and estimates of remaining life. Renewal will be undertaken using low cost renewal methods where practical. The aim of low cost renewals is to restore the service potential or future economic benefits of the asset by renewing the assets at a cost less than replacement cost.

As a result of the information gathered in the condition assessments, an annual financial modelling analysis is undertaken and a 10 year Capital Works Program is developed. The ranking criteria used to determine priority of identified renewal proposals is based on asset hierarchy and intervention levels.

Two modelling scenarios are run in relation to the relevant asset class based on an unlimited budget (like for like) and also using a proposed budget allocation within the Long Term Financial Plan over a 10 year planning period. Modelling scenario results are summarised in each of the Appendices.

The following options can be considered when funding renewal:

- 1) Raising rates to fund the renewal requirement to ensure these facilities are maintained to an appropriate level of condition and are fit for purpose.
- 2) Decreasing service levels which will result in a lower level of service provided to the community.
- 3) Reducing the infrastructure asset portfolio i.e. identifying infrastructure assets that no longer meets community needs. Factors to consider:
  - Is the asset still required by the community?
  - Can the need be satisfied by a less expensive or alternative asset?
  - Is it the role of the Shire to provide a particular service delivered by the asset?

### 6.6.2 Renewal and Replacement Strategies

The organisation will plan capital renewal and replacement projects to meet level of service objectives and minimise infrastructure service risks by:

- Planning and scheduling renewal projects to deliver the defined level of service in the most efficient manner,
- Undertaking project scoping for all capital renewal and replacement projects to identify:
  - the service delivery 'deficiency', present risk and optimum time for renewal/replacement,
  - the project objectives to rectify the deficiency,
  - the range of options, estimated capital and life cycle costs for each option that could address the service deficiency,
  - and evaluate the options against evaluation criteria adopted by the organisation, and
  - select the best option to be included in capital renewal programs,
- Using 'low cost' renewal methods (cost of renewal is less than replacement) wherever possible,
- Maintain a current infrastructure risk register for assets and service risks associated with providing services from infrastructure assets and reporting high and extreme risks and residual risks after treatment to management and Council,
- Review current and required skills base and implement workforce training and development to meet required construction and renewal needs,
- Maintain a current hierarchy of critical assets and capital renewal treatments and timings required,
- Review management of capital renewal and replacement activities to ensure Council is obtaining best value for resources used.

### 6.6.3 Predicted 10 Year Renewal Funding Requirements

Projected future renewal and replacement expenditures are forecast to increase over time as the asset stock increases from growth. This is detailed in the respective asset class appendix for LTFP funding requirements.



10 Year Renewal Requirements and Funding										
<b>Buildings (Appendix A)</b>	<b>2021/22</b>	<b>2022/23</b>	<b>2023/24</b>	<b>2024/25</b>	<b>2025/26</b>	<b>2026/27</b>	<b>2027/28</b>	<b>2028/29</b>	<b>2029/30</b>	<b>2030/31</b>
AMP (Actual)	\$319,517	\$87,658	\$93,848	\$50,666	\$145,298	\$203,665	\$291,603	\$385,533	\$355,002	\$192,735
AMP (Modified)	\$153,384	\$253,792	\$93,848	\$50,666	\$145,298	\$203,665	\$291,603	\$385,533	\$355,002	\$192,735
LTFP	\$130,376	\$215,723	\$79,771	\$43,066	\$123,503	\$173,115	\$247,863	\$327,703	\$301,752	\$163,825
AMP Average	\$212,552	\$212,552	\$212,552	\$212,552	\$212,552	\$212,552	\$212,552	\$212,552	\$212,552	\$212,552
LTFP Average	\$180,670	\$180,670	\$180,670	\$180,670	\$180,670	\$180,670	\$180,670	\$180,670	\$180,670	\$180,670
<b>Roads (Appendix B)</b>	<b>2021/22</b>	<b>2022/23</b>	<b>2023/24</b>	<b>2024/25</b>	<b>2025/26</b>	<b>2026/27</b>	<b>2027/28</b>	<b>2028/29</b>	<b>2029/30</b>	<b>2030/31</b>
AMP	\$4,806,421	\$2,067,488	\$1,711,272	\$2,431,144	\$2,269,882	\$1,535,937	\$1,906,831	\$2,693,008	\$2,188,062	\$1,792,703
LTFP	\$1,791,685	\$1,718,303	\$1,744,915	\$1,331,210	\$1,298,396	\$1,319,429	\$1,340,988	\$1,363,085	\$1,385,736	\$1,385,736
AMP Average	\$2,340,275	\$2,340,275	\$2,340,275	\$2,340,275	\$2,340,275	\$2,340,275	\$2,340,275	\$2,340,275	\$2,340,275	\$2,340,275
LTFP Average	\$1,467,948	\$1,467,948	\$1,467,948	\$1,467,948	\$1,467,948	\$1,467,948	\$1,467,948	\$1,467,948	\$1,467,948	\$1,467,948
<b>Kerbing (Appendix B)</b>	<b>2021/22</b>	<b>2022/23</b>	<b>2023/24</b>	<b>2024/25</b>	<b>2025/26</b>	<b>2026/27</b>	<b>2027/28</b>	<b>2028/29</b>	<b>2029/30</b>	<b>2030/31</b>
AMP	\$48,645	\$26,085	\$36,660	\$40,185	\$24,675	\$66,975	\$48,998	\$62,393	\$41,948	\$54,990
LTFP	\$41,348	\$22,172	\$31,161	\$34,157	\$20,974	\$56,929	\$41,648	\$53,034	\$35,655	\$46,742
AMP Average	\$45,155	\$45,155	\$45,155	\$45,155	\$45,155	\$45,155	\$45,155	\$45,155	\$45,155	\$45,155
LTFP Average	\$38,382	\$38,382	\$38,382	\$38,382	\$38,382	\$38,382	\$38,382	\$38,382	\$38,382	\$38,382

<b>Bridges (Appendix C)</b>	The renewal for traffic bridges is 100% funded by Main Roads WA. The renewal requirement for pedestrian bridges is currently funded via discretionary budget allocations									
<b>Footpaths (Appendix D)</b>	<b>2021/22</b>	<b>2022/23</b>	<b>2023/24</b>	<b>2024/25</b>	<b>2025/26</b>	<b>2026/27</b>	<b>2027/28</b>	<b>2028/29</b>	<b>2029/30</b>	<b>2030/31</b>
AMP	\$129,087	\$158,875	\$209,149	\$51,377	\$232,988	\$248,159	\$268,866	\$88,420	\$20,391	\$189,278
LTFP	\$109,724	\$135,044	\$177,777	\$43,671	\$198,040	\$210,935	\$228,536	\$75,157	\$17,333	\$160,886
AMP Average	\$159,659	\$159,659	\$159,659	\$159,659	\$159,659	\$159,659	\$159,659	\$159,659	\$159,659	\$159,659
LTFP Average	\$135,710	\$135,710	\$135,710	\$135,710	\$135,710	\$135,710	\$135,710	\$135,710	\$135,710	\$135,710
<b>Drainage (Appendix E)</b>	<b>2021/22</b>	<b>2022/23</b>	<b>2023/24</b>	<b>2024/25</b>	<b>2025/26</b>	<b>2026/27</b>	<b>2027/28</b>	<b>2028/29</b>	<b>2029/30</b>	<b>2030/31</b>
AMP	\$67,372	\$67,230	\$71,573	\$69,054	\$68,008	\$73,755	\$67,875	\$69,733	\$73,266	\$72,050
LTFP	\$57,267	\$57,145	\$60,837	\$58,696	\$57,807	\$62,692	\$57,694	\$59,273	\$62,276	\$61,242
AMP Average	\$69,992	\$69,992	\$69,992	\$69,992	\$69,992	\$69,992	\$69,992	\$69,992	\$69,992	\$69,992
LTFP Average	\$59,493	\$59,493	\$59,493	\$59,493	\$59,493	\$59,493	\$59,493	\$59,493	\$59,493	\$59,493
<b>Parks (Appendix F)</b>	<b>2021/22</b>	<b>2022/23</b>	<b>2023/24</b>	<b>2024/25</b>	<b>2025/26</b>	<b>2026/27</b>	<b>2027/28</b>	<b>2028/29</b>	<b>2029/30</b>	<b>2030/31</b>
AMP	\$276,391	\$149,643	\$55,885	\$265,797	\$199,075	\$313,200	\$381,388	\$491,514	\$711,218	\$419,867
LTFP	\$234,932	\$127,197	\$47,502	\$225,928	\$169,213	\$266,220	\$324,180	\$417,787	\$604,535	\$356,887
AMP Average	\$326,398	\$326,398	\$326,398	\$326,398	\$326,398	\$326,398	\$326,398	\$326,398	\$326,398	\$326,398
LTFP Average	\$277,438	\$277,438	\$277,438	\$277,438	\$277,438	\$277,438	\$277,438	\$277,438	\$277,438	\$277,438

<b>Waterway Facilities (Apepdix F)</b>	<b>2021/22</b>	<b>2022/23</b>	<b>2023/24</b>	<b>2024/25</b>	<b>2025/26</b>	<b>2026/27</b>	<b>2027/28</b>	<b>2028/29</b>	<b>2029/30</b>	<b>2030/31</b>
AMP	\$135,777	\$6,270	\$0	\$6,879	\$28,896	\$0	\$180,500	\$0	\$0	\$0
LTFP	\$135,777	\$6,270	\$0	\$6,879	\$28,896	\$0	\$180,500	\$0	\$0	\$0
AMP Average	\$35,832	\$35,832	\$35,832	\$35,832	\$35,832	\$35,832	\$35,832	\$35,832	\$35,832	\$35,832
LTFP Average	\$35,832	\$35,832	\$35,832	\$35,832	\$35,832	\$35,832	\$35,832	\$35,832	\$35,832	\$35,832

## 6.7 New, Upgrade and Disposal

### 6.7.1 New

New works are those that create, expand or upgrade assets to cater for growth or additional levels of service. New works create an asset that did not exist or extend an asset beyond its original size or capacity. Typical new works activities include:

- Works which create an asset that did not exist such as in a new land development
- Works which improves an asset beyond its original size or capacity
- Works which increase the service of an asset such as the sealing of an unsealed road

The strategy for the Shire acquiring new assets or undertaking significant refurbishment is to firstly complete a project submission which will address issues such as:

- relevance to corporate goals
- alignment to core business
- community need
- anticipated benefits
- environmental impacts
- risk identification and treatment
- total life cycle costs
- impact on existing services / infrastructure
- analysis as to whether service can be delivered without asset acquisition
- forecasted usage rates
- value for money

### 6.7.2 Upgrade

Upgrade refers to works which improve an existing asset beyond its current capacity. This may result from growth, social or environmental needs. Upgrade/expansion of infrastructure will contribute to the overall infrastructure inventory and will require ongoing maintenance and renewal. Recognition of the impact that this activity has on the future sustainability of infrastructure should be considered for all projects. As such, any potential upgrades should undergo a whole of life analysis to ensure the overall viability of the project.

### 6.7.3 Disposal

Disposal of an asset refers to its decommissioning, whether by sale, demolition, decommission, relocation or transfer of ownership. A key component of an asset management plan is the identification and disposal of surplus assets. This involves assessment of strategic goals and the recognition that some assets may be under-performing or surplus to operating requirements. Some disposals will attract no costs as they will either be transferred to a user group or the costs of demolition will be covered by the value of the materials.

A disposal strategy for the Shire of Murray's assets has been developed and is based around the following principles:

1. If the Shire has a particular asset that is not aligned to its core services then that asset should be considered for disposal or opportunities to transfer the responsibility to a relevant entity should be investigated.
2. The Shire will look for opportunities to appropriately dispose of assets that are surplus to current and anticipated future requirements. The use of facilities in each township should be optimised to provide ratepayers with a value for money service. Any underutilised asset identified as being surplus will be disposed of by consulting the relevant parties and investigating options to consolidate and co-locate services and/or

user groups.

3. Assets that are underperforming or are unsafe will be demolished and not replaced if there is no demonstrated ongoing need.
4. Council will ultimately make the determination as to whether an asset is disposed of.

The Assets identified for disposal are covered in each of the Appendices.

### **Asset Disposal Process**

Surplus asset disposal is a three step process whereby the asset is evaluated from a strategic perspective, the disposal process is implemented where required, and the disposal process is reviewed. The emphasis is on ensuring that under-performing and non-essential assets are identified and disposed.

### **Asset Evaluation**

The disposal process begins with identifying surplus assets. The Shire should conduct regular strategic evaluations of its asset needs. During this process, assets are evaluated against the asset disposal principles outlined above. Where it is identified that an asset does not meet these criteria, it is to be identified as surplus and disposed. The evaluation process will also take into account public interest considerations. Examples of public interest considerations would be:

- where an asset has some form of significance to the community and there could be expected to be significant public resistance to disposal or transfer of ownership of the asset;
- where an asset has strategic significance for future infrastructure development. In such instances, a clear and demonstrated future planning requirement is needed to support continued ownership. Speculation on future usage does not constitute a clear and demonstrated future requirement;
- where there are significant heritage, environmental or public usage requirements that require ongoing local government ownership and management.

The overall financial performance of the asset should also be evaluated. Where it is identified that the financial performance of an asset does not meet targets established, it should be identified as under-performing and considered for disposal.

### **Implementation of Disposal**

The method of disposal will be assessed against the principle of achieving the maximum benefit to the community through the disposal, including social, financial, economic and strategic factors.

In circumstances where a transfer to a user group is proposed, consideration will be given to the group's requirement for the property, linkages to strategic objectives and core business.

### **Review of Disposal Process**

Following the disposal process, the Shire should review outcomes and identify ways to improve performance for future processes. This would include, at appropriate times, a review of internal processes and structures that deal with asset disposal.

Asset disposal performance can be monitored through the development of appropriate measures, such as:

- average time for disposal process; and / or
- impact of disposal on organisation's finances.

## 7. Financial Projections

Financial forecast models assist in predicting the future financial requirements based upon the presumption that infrastructure assets will be replaced when the condition ratings reach a predetermined intervention level. Each Appendix contains the financial requirements for the asset class.

The financial summary will be reviewed annually and continue to be refined as planning studies, strategies and increased financial analysis are completed.

The financial modelling carried out is based on the life of the asset and the current annual expenditure for asset renewal. The forecast makes no allowance for renewal expenditure required in the future on any new assets that are added to the network. Forecasts are based on current construction cost and will be influenced by cost increases in materials and labour.

The Shire will utilise clear prioritisation methods for capital works expenditure. This will include the requirement to report expenditure in the following classifications to ensure that discretionary and non-discretionary expenditure is identified:

- Renewal (non-discretionary)
- Upgrade (discretionary)
- New (discretionary)
- Operational (discretionary)
- Maintenance (non-discretionary)

### 7.1. Asset Ratios

Various ratios of asset consumption and expenditure have been prepared to help guide and gauge asset management performance and trends over time.

The Shire is committed to monitoring progress towards achievement of the Strategic Community Plan. Ratios of asset consumption, renewal and sustainability have been prepared to help guide and gauge asset management performance and trends over time and are based on Roads, Buildings, Footpaths, Drainage and Parks and Other Infrastructure.

Indicator	2020	2019	2018	2017	2016	2015	DLG Standard
<b>Asset Consumption Ratio –</b> The ratio highlights the aged condition of the Shire's stock of physical assets.	76%	73%	78%	77%	76%	74%	<b>50% or &gt;</b> Standard is improving if the ratio is between 60% and 75%
<b>Asset Renewal Funding Ratio –</b> This indicates whether the Shire has the financial capacity to fund asset renewal as required and can continue to provide existing levels of services in future, without additional operating income, reductions in operating expenses; or an increase in net financial liabilities above that currently projected.	93%	67%	82%	82%	101%	24%	<b>75% to 95%</b> Standard is improving if the ratio is between 95% and 105%, and the ASR falls within the range 90% to 110%, and ACR falls within the range 50% to 75%

Indicator	2020	2019	2018	2017	2016	2015	DLG Standard
<b>Asset Sustainability Ratio –</b>  This measures the extent to which assets managed by the Shire are being replaced as they reach the end of their useful lives.	133%	72%	75%	112%	100%	18%	<b>90%</b> Standard is improving if this ratio is between 90% and 110%

To provide services in a financially sustainable manner, as a minimum, the Shire will need to ensure that it is renewing assets at the rate they are being consumed over the medium-long term, and funding the life cycle costs for all new assets and services within its long term financial plan.

## 7.2. 10 Year Forecasts

A 10 year financial forecast has been developed for all asset classes to predict performance of the Shire’s infrastructure. The model is based on the asset condition data and shows the funding required to achieve the desired level of service. Renewal projections are based on the default assumptions that all existing infrastructure is to be renewed when a particular condition intervention is reached, and that they will be renewed using components that are substantially the same as those existing.

### 7.2.1. Key Assumptions made in Financial Forecasts

Key assumptions are made in presenting the information contained in this Asset Management Plan and in preparing forecasts of projected operating and capital expenditure and asset values and depreciation expense estimates. It is presented to gain an understanding of the levels of confidence in the data behind the financial forecasts. The most significant potential changes to the financial projections shown will result from the factors below:

- Assumptions have been made as to the average useful lives of assets based on current local knowledge, evidence based useful life analysis, experience and historical trends. These will be continuously reviewed and the accuracy improved based on real time assessments of asset deterioration.
- Changes in levels of service from those identified in this asset management plan.
- Significant fluctuation in the cost of construction / maintenance of assets
- Changes in level of asset deterioration due to natural factors such as storms as well as increases in use

## 7.3. Funding Options & Strategy

The Long Term Financial Plan (LTFP) is the 10 year financial planning document of the Shire that is governed by a series of financial strategies and accompanying performance indicators that the Council considers and adopts. The plan establishes the strategic financial direction for the Shire to meet the funding and investment challenges that are forecast for the next 10 years.

Each year the Shire will develop a Capital Works Budget for asset renewals, upgrades and new works and a recurrent budget allocation for maintenance & operations expenditure for its infrastructure.

It is intended that the expenditure will be in accordance with this Asset Management Plan, policies named within in, corporate goals, Shire Asset Management System, government legislation and regulations and the needs of the community within financial constraints.

Where the required expenditure exceeds that in which the LTFP is able to cater for, the following options are available:

- Focus increasingly on a proactive approach to asset maintenance. This will be undertaken in accordance with the Maintenance and Operational Plans relevant to each asset class. Proactive maintenance is anticipated to result in an extension of the life of the asset components.
- Decrease the responsibility for maintenance and renewal of the portfolio in accordance with the disposal strategy.
- Utilise grant funding to renew existing assets rather than construct additional infrastructure where possible.
- Allocate funding to a renewal reserve in the years leading up to the spike in renewal requirements.

## 7.4. Confidence Level

The confidence in the data used as a basis for the financial forecasts has been assessed using the following grading system:

### Confidence Level

Confidence Grade	General Meaning
<b>A</b>	<b>Highly Reliable:</b> Data based on sound records, procedure, investigations and analysis that is properly documented and recognised as the best method of assessment.
<b>B</b>	<b>Reliable:</b> Data based on sound records, procedures, investigations, and analysis which is properly documented but has minor shortcomings for example the data is old, some documentation is missing and reliance is placed on unconfirmed reports or some extrapolation.
<b>C</b>	<b>Uncertain:</b> Data based on records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolation from a limited sample for which grade A or B data is available
<b>D</b>	<b>Very Uncertain:</b> Data based on unconfirmed verbal reports and/or cursory inspection and analysis

### Confidence Grade

The confidence level for this report is “B” overall



# 8. Practices, Performances, Monitoring and Improvement

## 8.1. Asset Management Practices

Asset management practices are the processes, analysis and evaluation techniques needed to support lifecycle asset management. This includes the following asset management functions.

- Knowledge of assets
- Levels of service
- Condition assessments
- Asset accounting - valuation, revaluation, depreciation
- Lifecycle planning
- Asset operations and maintenance
- Asset creation and disposal
- Performance monitoring
- Quality assurance and continuous improvement
- Risk management
- Design and project management
- Reviews and audit processes

Weaknesses in the current asset management processes have been identified by this document. The improvements identified and prioritised in each of the Appendices and the Asset Management Improvement Strategy, will improve the processes the Shire utilises to manage its assets, enabling greater accuracy in demand and financial forecasting.

### 8.1.1. Data Systems

The Shire of Murray Asset Data Systems are outlined below:

Data	Current Practice	Responsibility
Financial	Data is stored in Dynamics NAV and AssetMaster. Financial reporting is prepared in accordance with the requirements of the Local Government Act 1995 and relevant Australian Accounting Standards.	Finance
Asset Inventory	Data stored within Corporate Asset Management System (AssetMaster) and the Shire's Geographical Information System (GIS).	Asset Management
Financial modelling	The Shires asset financial prediction data is produced by software called myPredictor, which enables the Shire to optimise capital works programming.	Integrated Planning

## 8.2. Asset Management Improvement Strategy

Asset management is a journey involving continuous monitoring and improvement. There are significant benefits including informed decision making, improved focus on core business, better financial planning, enhanced risk management and process improvements. The Asset Management Improvement Program aims to:

- determine the Shire’s asset management aims for the short to medium term;
- assess the current state of asset management operations;
- undertake a gap analysis of desired state against the current state;
- develop an action plan to close any identified gaps;
- ensure the organisational commitment to asset management is ongoing; and
- ensure that the Shire of Murray’s commitment to asset management is adequately resourced.

The actions identified as part of the Improvement Strategy are listed in the Asset Management Improvement Actions in section 8.2.2 and are monitored by the Asset Management Working Group.

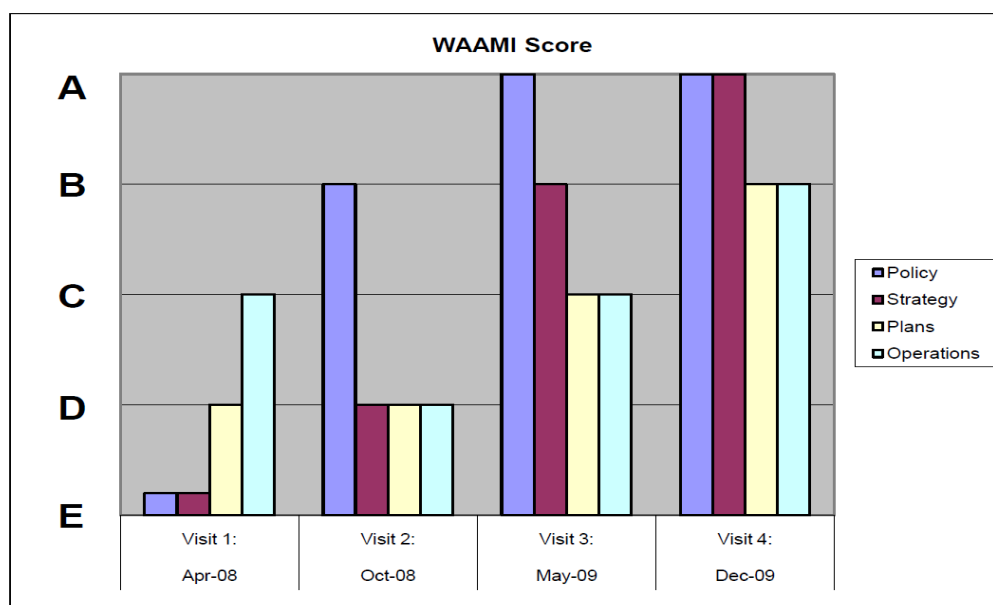
### 8.2.1. WA Asset Management Improvement Program

The Shire of Murray participated in the Western Australian Asset Management Improvement (WAAMI) program to assist in the initial development of its asset management framework. WAAMI was developed by a Western Australian Industry working group based on similar work undertaken in other states and seeks to facilitate local government asset management in Western Australia.

#### *National Asset Management Core and Advanced Report Card*

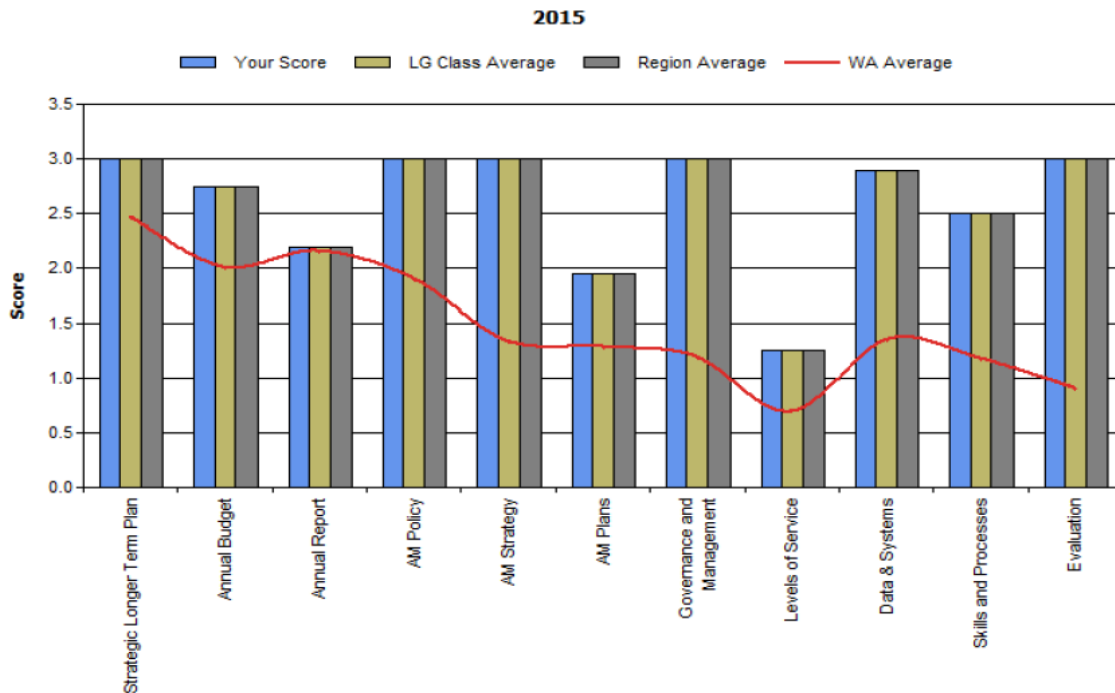
In 2011 an Asset Management National Assessment Framework was introduced across Australia. This framework significantly expanded the quantity and detail of measures. Each of these competency areas are measured by a scorecard approach, and the aim is to assess the overall status of the Shire’s asset management practices.

Significant progress was made under the WAAMI program. The following scorecard shows the progress made from the first assessment in April 2008 to the final assessment in December 2009 under the WAAMI program.

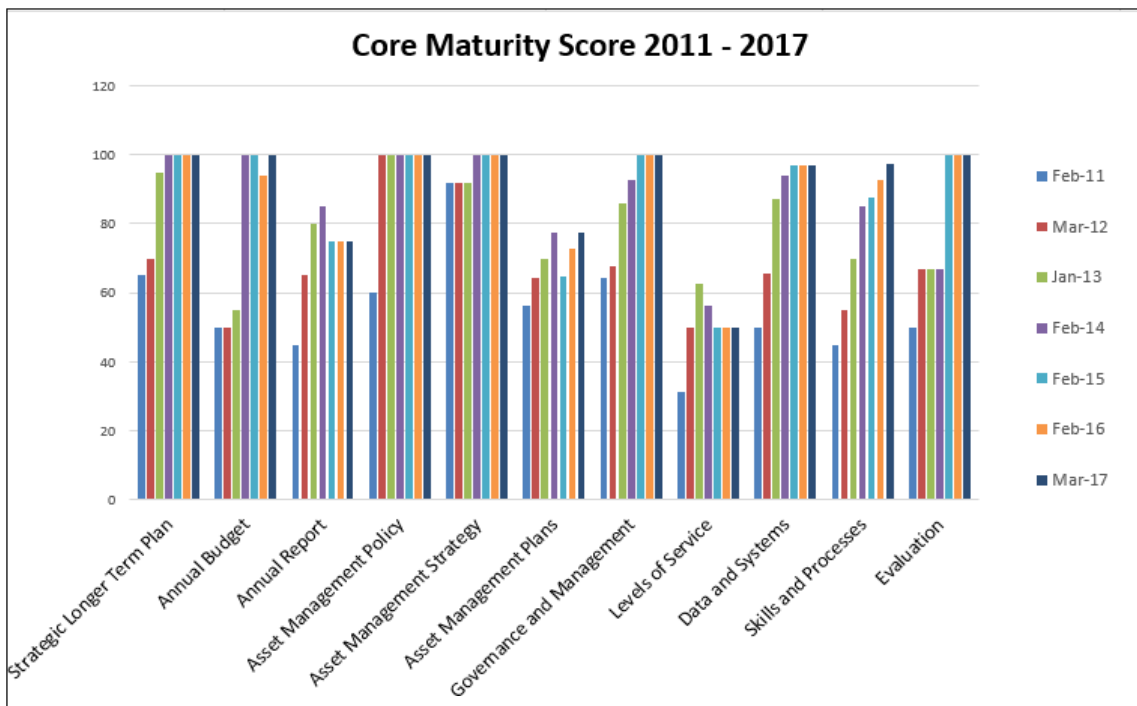


In 2015, a review of the National Assessment Framework Scorecard was undertaken by a consultant, Asset Infrastructure Services (AIM), as part of a Department of Local Government Condition Rating and Assessment Project, with results entered into the NAF Portal and documented below.

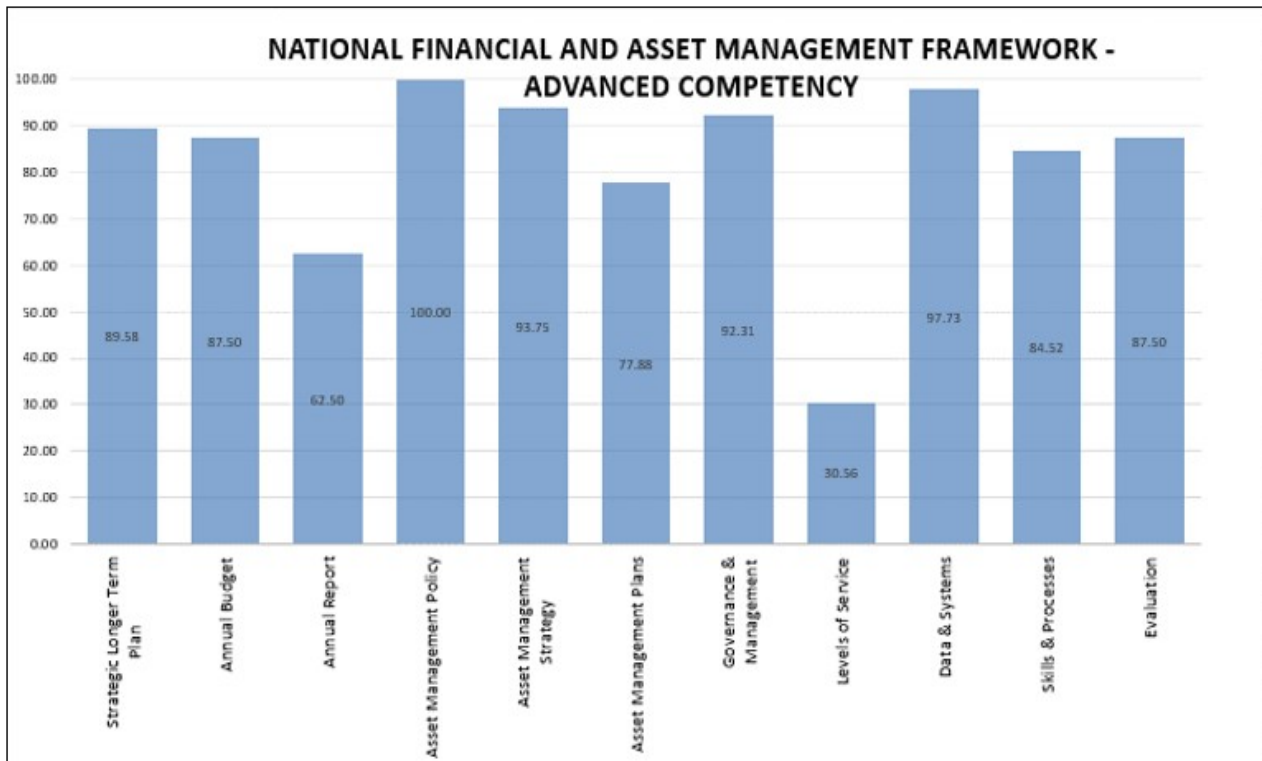
The graph summarises the Shire’s performance against its peers. Against the WA average (red line), it can be observed that the Shire was at or above average in all focus areas. Comparison within its local government class and region average was not currently possible as it appears that no other peers had undertaken an assessment within 2015.



The graph below shows the progress the Shire has made at Core Level between the periods of February 2011 to March 2017. Fluctuations within the graph are due to varying interpretation of scores given by external consultants and increasing asset management compliance standards.



In 2017 the Shire has assessed itself against the criteria of 'Advanced Maturity', with progress at this level summarised below.



It has been a number of years since an assessment has been undertaken, therefore a re-assessment has been listed as a priority within the Asset Management Improvement Actions.

8.2.2 Asset Management Improvement Actions

Action	Responsibility	2021/2022	2022/2023	2023/2024	Notes
<b>Documentation</b>					
Review and Maintain Asset Management policies, procedures, and other documentation	Integrated Planning and relevant Asset Owner	X	X	X	The review of Asset Management Plans and the community surveys that influence them may result in additional actions to be added to the Improvement and Action Plan
Incorporate the Maintenance and Operational Plans into the respective Asset Management Plans	Integrated Planning	X	X	X	Previously, the Maintenance and Operational Plans were separate to the Asset Management Plans. The Maintenance and Operational Plans will progressively be integrated into the Plans for each asset class.
Buildings AMP Action: Investigate if there is a need to develop Asset Management Plans for single entities e.g. MALC, WAFIP	Integrated Planning and relevant Asset Owner		X	X	Individual renewal models could potentially be produced for these buildings in an aim to assist with budgeting.
Investigate if there is any value in consolidating asset classes and therefore Asset Management Plans	Integrated Planning	X			The Parks and Waterways Asset Management Plans will be consolidated into a Public Open Space and Waterways Asset Management Plan. Investigate if there are any other asset classes that could be consolidated.
Buildings AMP Action: Develop Conservation Management Plans for Heritage Buildings	Planning & Sustainability and Building Services	X	X	X	
<b>Reporting</b>					
Complete the State of the Assets Report covering asset condition, asset condition, asset performance, intervention levels, level of service monitoring and future financial sustainability options	Integrated Planning	X	X	X	To be reported to the Strategic Leadership Group on an annual basis to help inform renewal funding decisions.

Action	Responsibility	2021/2022	2022/2023	2023/2024	Notes
Council to Benchmark its asset management performance improvements against State and National indicators and report on its asset management improvement performance against set targets.	Integrated Planning	X			This audit will likely result in addition actions to be added to the Improvement Action Plan
<b>Inspections / Assessments</b>					
Investigate resourcing for asset condition assessments and determine if there is any value in extending the condition inspections for those asset classes which only have part of the network assessed each year.	Integrated Planning	X			The condition assessments for most asset classes are performed on a rolling basis or only a portion of the network is assessed.
<b>Levels of Service</b>					
Undertake an asset rationalisation and consolidation exercise by investigating capacity / utilisation / functionality assessments	Integrated Planning and relevant Asset Owner	X			Review Levels of Services and consider if assets should be repurposed
Develop a Framework to measure Asset Utilisation Levels	Integrated Planning and relevant Asset Owner		X		
Undertake a process of defining, quantifying and documenting current community levels of service and technical levels of service.	Integrated Planning and relevant Asset Owner		X		Undertake a process of identifying the costs associated with each level of service, including the increased cost or decreased cost associated with increasing or decreasing each level of service respectively to assist in scenario modelling. Levels of service to be based options on performance criteria / needs and affordability, rather than intervention level treatments.
Target community levels of service are defined through community consultation, considering population and demographic change projections, trend analysis and customer feedback and requests.	Integrated Planning		X		

Action	Responsibility	2021/2022	2022/2023	2023/2024	Notes
Roads AMP Action - Develop levels of service based options on road performance criteria / road needs and affordability, rather than intervention level treatments	Integrated Planning and Infrastructure Services				
<b>Asset Financials</b>					
Investigate an approximate baseline lifecycle cost of assets (e.g. maintenance, operational, renewal) that can be used when determining the actual cost of taking on assets / constructing new assets	Integrated Planning and Finance	X			
<b>Other</b>					
Improve organisational awareness of Asset Management	Integrated Planning and relevant Asset Owner	X	X	X	
Identify significant / critical assets for each asset class and ensure adequate risk mitigation methods are in place	Integrated Planning and relevant Asset Owner	X			This will progressively be completed as part of the review of the Asset Management Plans. There may be an opportunity to trigger works on a significant asset sooner through the modelling process. Consider increased condition assessments, maintenance, renewal and a more detailed risk analysis (potentially in risk area of AssetMaster).
Buildings AMP Action: Clarify maintenance and renewal responsibilities in leases	Manager Governance / Building Services	X			Currently, there is no clear direction regarding the maintenance and renewal responsibilities for Shire buildings that are leased. It is proposed that a clear responsibilities document be developed and included in all leases, so that adequate budgeting can be undertaken by both the lessee and lessor.
Improve the length of time that it takes to receive As Constructed Plans and data following works on Shire assets	Integrated Planning				

Action	Responsibility	2021/2022	2022/2023	2023/2024	Notes
Input the organisations non-infrastructure asset registers into AssetMaster	Integrated Planning and relevant Asset Owner				There is an opportunity to consolidate all asset registers e.g. portable and attractive, vehicles etc into Asset Master. This will enable maintenance work to be recorded against the asset and prepare for future linking with the financial system NAV.
Integrate AssetMaster with other aspects of the Corporate Business System such as the CRMS, Work Orders and NAV modules.	Integrated Planning, Customer Service, Operations	X	X		
Consider comparing the Shire's asset inspection methodologies with other similar local governments. Identify whether changes can be made to improve efficiency, effectiveness, service levels etc	Integrated Planning and relevant Asset Owner	X			
Determine which boardwalks should be reclassified as pedestrian bridges and therefore form part of the bridges asset class	Parks and Waterways	X			Boardwalks are captured under the footpaths asset class. There are some boardwalks which may meet the criteria of a pedestrian bridge and should therefore be subject to different inspection regimes etc.
Undertake a review of the hierarchy assigned to each Public Open Space	Parks and Waterways				
Undertake an assessment of each asset class to determine if any additional asset components are required to be captured within AssetMaster	Integrated Planning and relevant Asset Owner	X	X		As the Shires asset maturity evolves, there is a need to capture additional infrastructure assets in the Shires network
Roads AMP Action - Undertake a transport assessment of the Shire of Murray road network, as proposed under the South Metropolitan Sub Regional Planning Framework	Infrastructure Services	X			



## 8.3. Monitoring & Review Procedures

The Infrastructure Asset Management Plan will be reviewed annually by the Asset Management Working Group. The asset management plans specific to each asset class is updated in accordance with the revaluation cycle (every 4 or 5 years depending on the asset type). The reviews will allow short and long term financial requirements to be updated to recognise any changes in service levels and/or the addition of new infrastructure to the Shire's portfolio.

### 8.3.1. Asset Management Working Group

The AMWG will drive the implementation of asset management across the entire organisation and ensure a team approach. Members will include representatives of all sections of the organisation that have a direct interest in asset management whether it is as an asset owner, maintainer or user. This will ensure each representative will have ownership of the outcomes of the working group.

This cross-functional multi discipline group provides a corporate and integrated approach to asset management problem solving, resource sharing, understanding of financial asset management philosophies and overall ownership of asset management plan outputs.

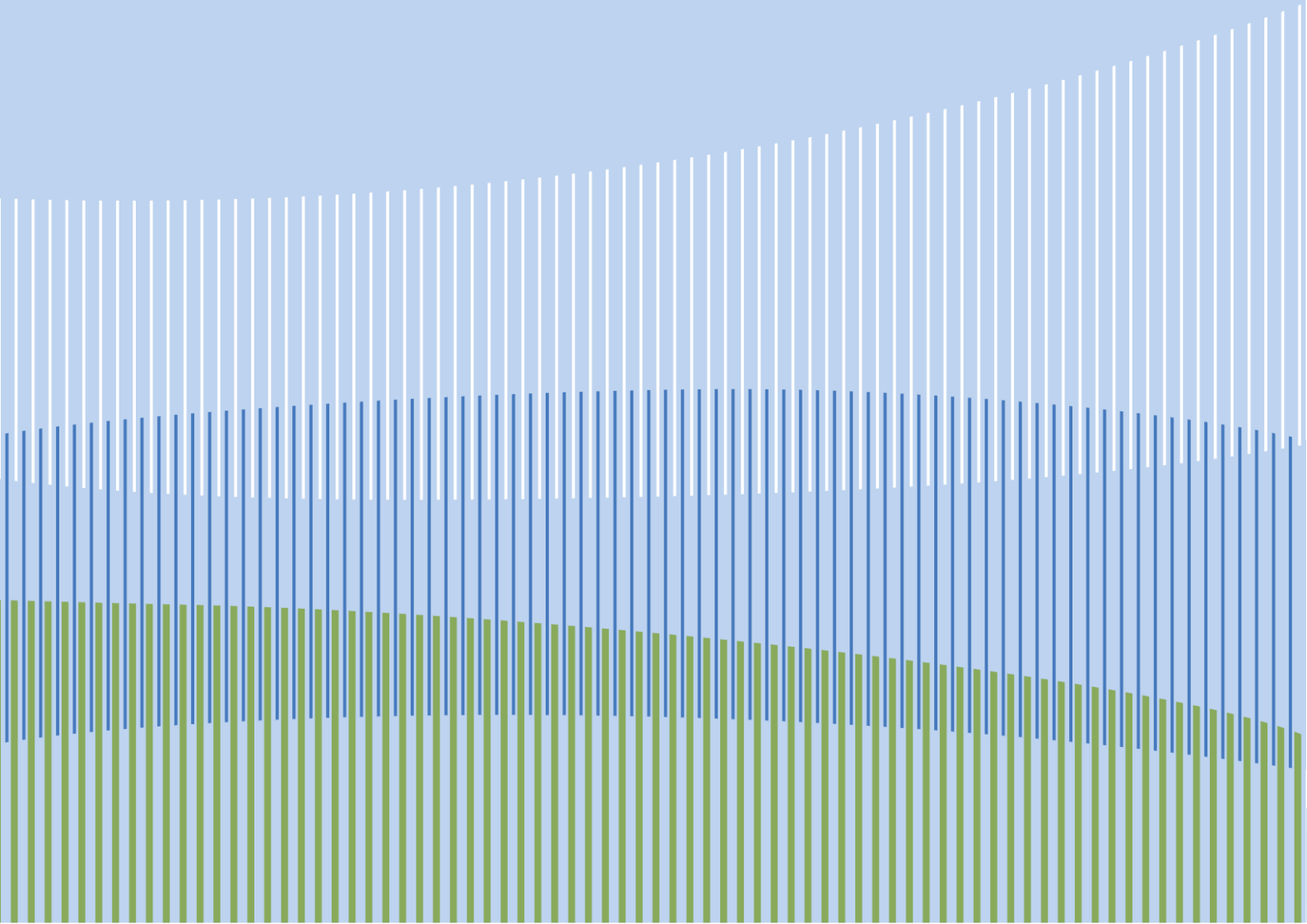
## 8.4. Performance Measures

The effectiveness of this Asset Management Plan can be measured in the following ways:

- The degree to which the required cash flows identified in this asset management plan are incorporated into the Shire's Long Term Financial Plan and Strategic Community Plan;
- The degree to which 1-5 year detailed maintenance and capital programs, budgets, business plans and organisational structures take into account processes and principles outlined in the asset management plan;
- The performance of Council against the Levels of Service documented in each of the Appendices;
- Financial ratios documented within the Asset Management Plan / Long Term Financial Plan; and
- The Annual Report which is the prescribed reporting requirement that ensures that the short and long term service delivery levels being provided by a local government's asset portfolio are adequately reported back to the community.



# Appendix A - Buildings Asset Management Plan



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Version Control			
Version No	Date	Details	Author
1.0	April 2009	Adopted Plan	Asset Management Working Group
2.0	March 2010	Review of Buildings Asset Management Plan	Asset Management Working Group
3.0	March 2013	Review of Buildings Asset Management Plan	Asset Management Working Group
4.0	May 2017	Review of Buildings Asset Management Plan	Asset Management Working Group
5.0	July 2021	Review of Buildings Asset Management Plan, consolidation of information.	Asset Management Working Group

# 1. Introduction

The Shire of Murray is committed to maintaining a quality Building network, which meets the needs of the community.

The Buildings Asset Management Plan forms part of the Shire of Murray's overarching Infrastructure Asset Management Plan. The two documents therefore must be read together.

## 1.1 Purpose and Scope of Plan

The Buildings Asset Management Plan specifies the life cycle requirements for effective management, inspection and replacement of this asset group and outlines the financial implications of these requirements. It demonstrates how the Shire will achieve this outcome by applying the principles of responsible asset management planning.

The following buildings are covered by the Buildings asset class:

Building Type	Number	Building Type	Number
Animal Control Buildings	1	Library and Information Buildings	2
Childcare Buildings	1	Museum and Cultural Buildings	33
Commercial Buildings	3	Office and Depot Buildings	14
Community Halls	10	Public Amenities Buildings	20
Emergency Service Buildings	10	Residential Buildings	4
Landfill Buildings	5	Sports and Recreation Buildings	44
		Total Buildings	147

Of the buildings listed above, some of these may be leased and therefore the Shire's responsibilities with regards to the operations, maintenance and renewal requirements will vary. The specifics of each arrangement are outlined in the lease for that building.

## 1.2 Legislative Requirements

Legislation	Requirements
Local Government Act 1995	Sets out the role, purpose, responsibilities and powers of local governments.
The Building Act 2011	Sets the head of power for Building Legislation and Building Regulations
Building Code of Australia 2016	Code of Practice relevant for all building design and construction
Building Regulations 2012	Defines specific requirements for building works, practices and processes
Premises Standard	Sets the standard for building design to ensure compliance for access for persons with disabilities
Australian Standards and Codes of Practice	Referenced in the Building Code of Australia. Covers a cast range of building construction and management.
Disability Discrimination Act 1992	To ensure that persons with disabilities have the same rights as the rest of the community (including access to premises).
Health Act 1911	Relates to the handling and disposal of hazardous materials including asbestos
Environment Protection Act 1986	Regulations regarding noise, sustainability, land fill, stormwater and groundwater resources.
Heritage Act of WA 2018	Protection of historic buildings, structures and precincts.
Occupational Health & Safety Act 1984	Provide a work environment that is safe and as far as practicable without risk to health.

## 2. Levels of Service

### 2.1 Community Levels of Service

Key Performance Indicator	Level of Service	Performance Measurement Process	Target Performance	Current Performance
<b>Quality and Safety</b>	Assets are attractive, clean and maintained adequately according to user requirements	Customer service requests	< 5 per year	2020 - 3 per annum reported
		Satisfaction level derived from surveys	75% satisfaction level	2016 - 89% of community satisfied with accessibility and attractiveness of buildings
	Assets are safe and free from hazards	Insurance claims received due to defects	< 5 per year	No insurance claims received.
		Incident and hazard reports relating to defects	< 5 per year	No incidents directly caused by unsafe buildings. 1 hazard report received in 2021.
<b>Function</b>	Assets are fit for purpose and available when needed	Results of customer satisfaction surveys	>75% satisfaction level	2016 - 76% of community satisfied with functionality of buildings
	Council's high use public buildings to be made accessible to all	Number of high use buildings identified as accessible in accordance with AS1428.1.	100% high use buildings to be accessible	Ongoing audits. 2020 - 3 buildings identified as accessible
		Number of complaints received regarding lack of accessibility	Less than 5 complaints per year regarding lack of accessibility	2021 - 1 complaint received. Complaint related to confusing signage at Dwellingup Public toilets
<b>Capacity and Utilisation</b>	Facilities are utilised to their optimum potential and lifecycle cost	Performance measures are yet to be determined	Performance measures are yet to be determined	Performance measures are yet to be determined

## 2.2 Technical Levels of Service

Key Performance Indicator	Level of Service	Performance Measurement Process	Target Performance	Current Performance
<b>Quality and Safety</b>	Condition of assets is known	Compliance with inspection schedules	100% of buildings have a condition audit undertaken as scheduled	2020/2021 - 100% of buildings scheduled for condition inspection completed
	All assets will be in good condition	Components at intervention level	Less than 5% of assets at intervention level	0.77% at intervention level as at July 2021
	Customer perception of asset condition	Customer satisfaction	70% of customers satisfied with condition	2016 - 71% of customers satisfied or highly satisfied with condition
<b>Serviceability and Maintenance</b>	All assets will be serviced within appropriate timeframes to ensure maximisation of life of asset	Percentage of assets maintained in accordance with the Maintenance and Operational Plan	95% of activities completed within set timeframes	Cleaning and maintenance schedules not currently measured
<b>Environment</b>	To ensure that buildings are as environmentally efficient as practical	Environmental impact assessment for all new facilities	100% of new buildings to be designed to minimise environmental impacts and to comply with the Building Code energy efficiency requirements	2020 - All new buildings assessed by environmental officers. 100% of new buildings comply with Building Code energy efficiency requirements.

## 2.3 Customer Research and Expectations

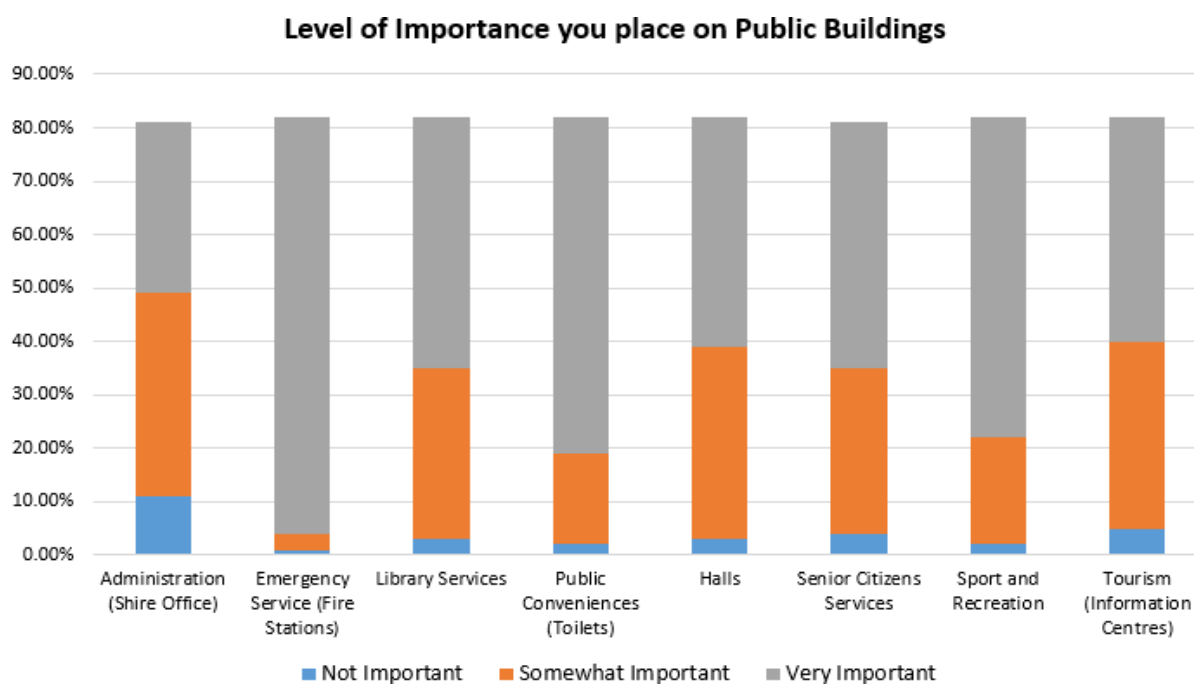
The following stakeholders have been identified in relation to Building infrastructure:

Stakeholder	Expectations
Councillors	Meeting community needs, sound management and allocation of resources, good governance
Employees / Contractors	Safe, practical and comfortable working environment
Community residents and businesses	Value for money, equitable and responsible service, well maintained assets
Facility Users	Well maintained assets specific to users' needs, that are accessible and safe
Insurers	Appropriate risk management policies and practices, safe working environments, well maintained assets
Tourists	Well maintained assets, accessible services, safe facilities
Government (Federal and State)	Systems in place to sustain building infrastructure, accountability, transparency
Lessee (where applicable)	That the Shire fulfils their obligations under the lease.

### 2.3.1 Customer Consultation Survey

In 2016 a survey was undertaken to obtain an understanding of the community's level of satisfaction in relation to building infrastructure. The survey had a total of 64 respondents. Details of the survey results are summarised below:

#### Level of Importance of Public Buildings





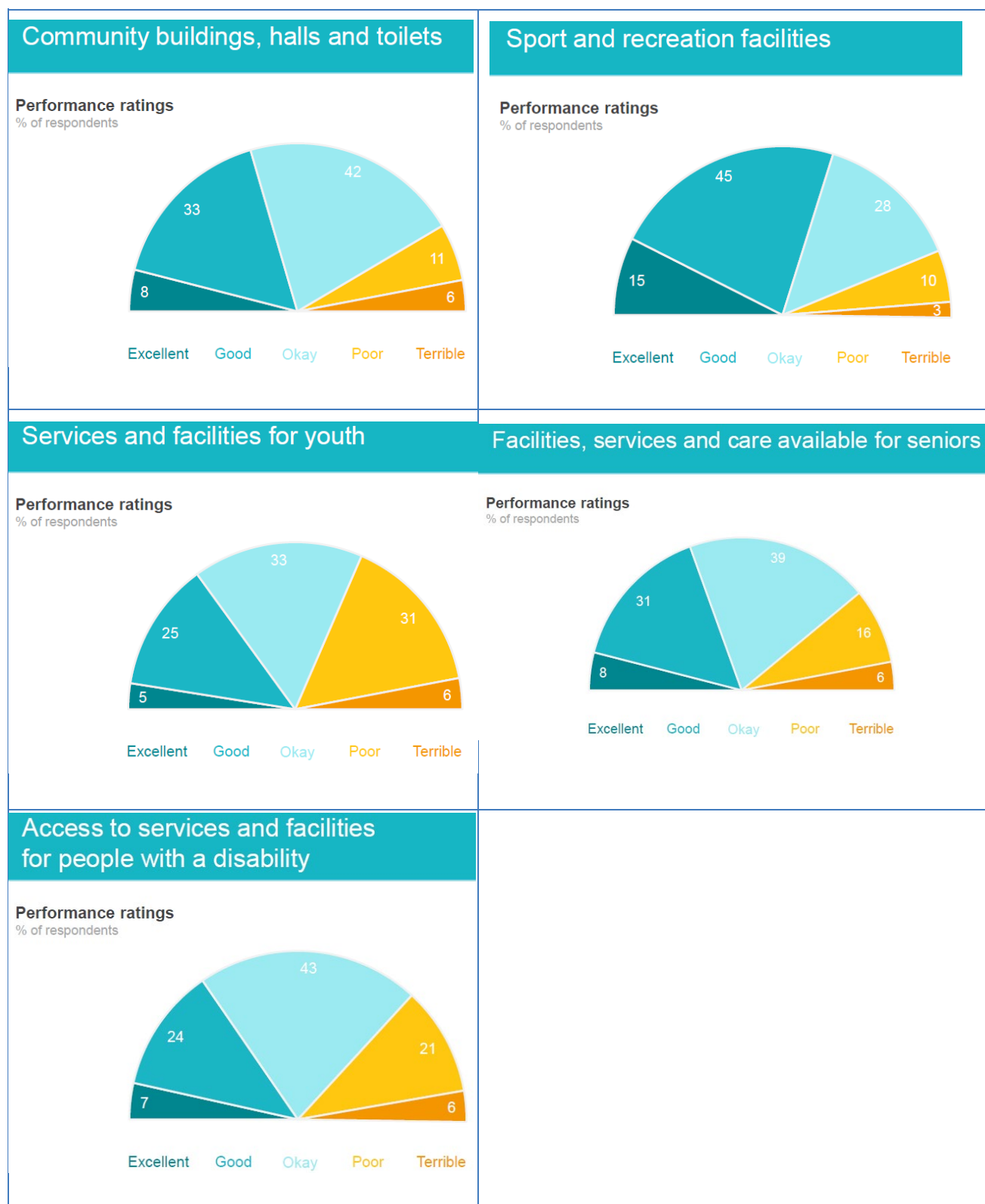
<b>Customer Research:</b>																							
<b>Overall Condition of Public Buildings</b>	<b>Availability of Facilities – Public Buildings</b>																						
<p><b>Community Survey 2017 - Public Buildings</b>                      Level of Satisfaction of Overall Condition of Public Buildings</p> <table border="1"> <caption>Level of Satisfaction of Overall Condition of Public Buildings</caption> <thead> <tr> <th>Satisfaction Level</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Highly Unsatisfied</td> <td>7%</td> </tr> <tr> <td>Unsatisfied</td> <td>22%</td> </tr> <tr> <td>Satisfied</td> <td>59%</td> </tr> <tr> <td>Highly Satisfied</td> <td>12%</td> </tr> </tbody> </table>	Satisfaction Level	Percentage	Highly Unsatisfied	7%	Unsatisfied	22%	Satisfied	59%	Highly Satisfied	12%	<p><b>Community Survey 2017 - Public Buildings</b>                      Availability of Facilities</p> <table border="1"> <caption>Availability of Facilities</caption> <thead> <tr> <th>Satisfaction Level</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Highly Unsatisfied</td> <td>2%</td> </tr> <tr> <td>Unsatisfied</td> <td>15%</td> </tr> <tr> <td>Satisfied</td> <td>67%</td> </tr> <tr> <td>Highly Satisfied</td> <td>16%</td> </tr> </tbody> </table>	Satisfaction Level	Percentage	Highly Unsatisfied	2%	Unsatisfied	15%	Satisfied	67%	Highly Satisfied	16%		
Satisfaction Level	Percentage																						
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Unsatisfied	7.0%																						
Satisfied	39.0%																						
Highly Satisfied	18.0%																						

**Customers were primarily concerned with services and assets such as:**

- Pinjarra Civic Centre frontage is dull and outdated, very old and run down
- Lack of Parking at the Murray Public Library
- Murray Public Library is too small
- North Dandalup Hall and its surrounding areas are not well maintained
- Acoustics at North Dandalup Hall
- Toilets at North Dandalup Hall are outdated and not user friendly
- Kitchen is old at North Dandalup Hall and requires electrical checks
- No Community Hall in Ravenswood
- Lack of Air Conditioning in Shire Halls
- Maintenance of Heritage Buildings
- North Pinjarra Hall and facilities need upgrading
- Upgrading of the outside of the Coolup Community Hall
- South Yunderup Public Toilets need painting and modernising

Some of these issues have since been addressed.

In May 2018 a community-wide survey was sent to all households within the Shire of Murray to evaluate community priorities and measure Council’s performance against key indicators in the Strategic Community Plan. 746 responses were received. There were a number of questions within this survey that touched on the serviceability and functionality of Shire buildings. This feedback is indicated below:



## 2.4 Function and Hierarchy

### 2.4.1 Building Function

The table below provides a general statement about the target level of service according to building function.

Building Type	Target Functional Level of Service
Animal Control Buildings	Provide safe and secure building for impounded animals.
Childcare Buildings	Building where the community can access childcare or playgroup services for their children.
Commercial Buildings	Building used for commercial activities. Generally under a lease arrangement.
Community Halls	To provide the community with reasonable access to hall facilities that are safe, convenient and comfortable and enable the conduct of community activities and events.
Emergency Service Buildings	To provide buildings that enable emergency services organisations such as the State Emergency Service or local Fire Brigades to provide emergency services to the community.
Landfill Buildings	Provide facilities that enable the community to dispose of waste safely and effectively.
Library and Information Buildings	To provide the opportunity for the community to access information and meet within a safe, convenient and comfortable environment.
Museum and Cultural Buildings	Buildings that aid in celebrating the artistic, cultural, historical, or scientific aspects of the community.
Office and Depot Buildings	Provides a place for governance and opportunity for residents and visitors to gain information on the Shire within a safe, convenient and comfortable environment.
Public Amenities Buildings	Provide the community with clean and accessible toilet facilities.
Residential Buildings	Building used for accommodation purposes.
Sports and Recreation Buildings	To provide opportunity for residents and visitors to the community to meet and undertake sport and recreational activities.

### 2.4.2 Building Hierarchy

All buildings are ranked according to a hierarchy. The hierarchy aims to aid in the prioritisation of maintenance and renewal activities when conflicts such as timing and resources arise.

The ratings are reviewed as part of the Asset Management Plan review, as well as when any significant works are performed on the building.

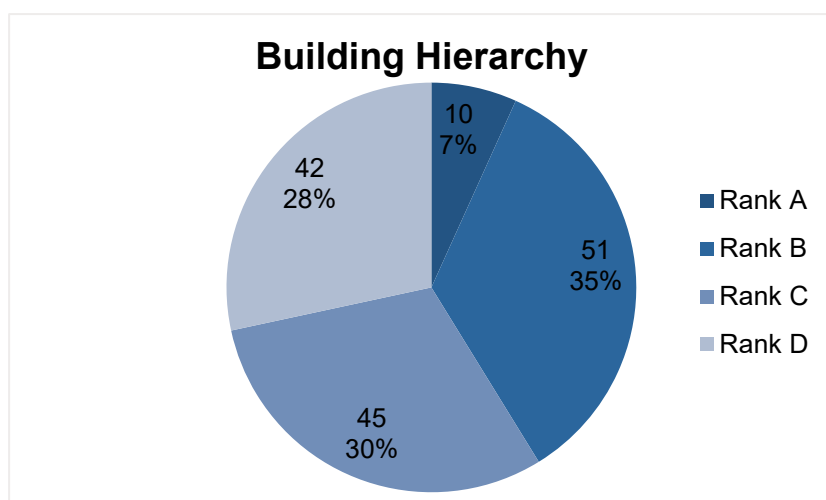
Factors that are considered when determining the hierarchy of buildings are:

Key Driver	Score
<b>Building occupancy and usage</b>	
High use and support	4
Meets the needs <b>and</b> age group	3
Meets either the needs <b>or</b> the age group	2
Low use and support	1
<b>Functional Purpose - Community profile of the building</b>	
Essential facility – Major local or regional facility	4
Important in demographic sense (socially and culturally) but not essential	3
Has individuality due to culture & social impact, but not so important	2
Other accessible alternatives to the facility	1
<b>Level of Significance</b>	
State / National Significance	4
Inter-shire Significance	3
District Significance	2
Neighbourhood / Local Significance	1

Based on the total score, a rank or either A, B, C or D is assigned to the building, where A is the highest rank:

Ranking	A	B	C	D
Score	11-12	8-10	6-7	3-5

The number of buildings in each rank (hierarchy) is indicated below:



## 3.1 Demand Forecasts and Drivers

Demand forecasts and drivers specific to building infrastructure include:

### 3.1.1 Legislative Change

There is an increased need to adhere to Work Health and Safety requirements by providing (and designing) safe buildings and workplaces. Examples of these requirements include progressive asbestos removal and increased security requirements (ensuring crime prevention through environmental design).

There is also an increased need to ensure that buildings to meet access and inclusion requirements by ensuring that they are fit for purpose and cater for people with reduced mobility or a disability. This needs to be considered in the design for new buildings, but will require also additional funds to upgrade and retro-fit items such as accessibility ramps to existing buildings which may have been built when the access and inclusion requirements were not in place or as prescriptive.

### 3.1.2 Environmental

There is a growing need to invest in renewable energy such as solar, waste management and energy efficiency improvements on all new and upgraded buildings. Some existing buildings are also undergoing modifications to include these requirements.

### 3.1.3 Aging Population

With the ageing population, there will be a greater need for aged care facilities. These are facilities are likely to be provided and managed by private organisations but the Shire may choose to provide an advocacy role.

## 3.2 Future Requirements

The future building assets that are expected in the next 10 years are covered under section 6.8.

## 4. Risk Management

Risks with regard to building infrastructure are documented and recorded in the Shire's corporate risk register. The following risks have been identified in relation to building assets.

Risk Details	Risk Assessment			Treatment Strategy	Responsibility
	Likelihood	Consequence	Risk Rating		
Asset deteriorates at a greater than acceptable rate due to failure to adequately fund preventative maintenance or renewal programs	Possible	Moderate	Moderate	<ul style="list-style-type: none"> <li>Regular condition inspections</li> <li>Annual allocation of sufficient funding and resources</li> <li>Maintain appropriate insurances</li> <li>Scheduled maintenance program</li> </ul>	Asset Management / Building Services SLG / Council
Significant asset loss from disaster (fire, flood, bushfire etc)	Unlikely	Catastrophic	High	<ul style="list-style-type: none"> <li>Sufficient insurance coverage</li> <li>Ensure key buildings are adequately covered by the Business Continuity Plan</li> <li>Continued maintenance of protective infrastructure assets (fire protection equipment)</li> <li>Maintain adequate insurances</li> </ul>	Corporate Services Risk Management
Asset in poor condition causes serious injury to staff or community member	Possible	Moderate	Moderate	<ul style="list-style-type: none"> <li>Prioritise capital and maintenance works based on condition and hierarchy</li> <li>Submit appropriate funding requests for building inspections and maintenance</li> </ul>	Building Services
Inadequate values used for insurance purposes (financial & reputation risk)	Unlikely	Major	High	<ul style="list-style-type: none"> <li>Undertake professional valuations of buildings every 5 years</li> </ul>	Finance
Building non-compliant with new legislation or regulations	Likely	Minor	Moderate	<ul style="list-style-type: none"> <li>Non-compliance works to be given priority</li> <li>Undertake regular inspection and maintenance regimes</li> <li>Allocate sufficient funding and resources.</li> </ul>	Building Services  SLG / Council

Risk Details	Risk Assessment			Treatment Strategy	Responsibility
	Likelihood	Consequence	Risk Rating		
Heritage Buildings not adequately protected / funded	Possible	Major	High	<ul style="list-style-type: none"> <li>Actively seek funding for heritage projects</li> <li>Develop conservation management plans for heritage buildings</li> <li>Seek advice from appropriate agency when performing significant works on heritage buildings</li> </ul>	Planning & Sustainability Building Services
Inconsistent and unsatisfactory management of user groups	Likely	Moderate	High	<ul style="list-style-type: none"> <li>Define the responsibility for renewal and maintenance in council leases</li> <li>Ensure that all user groups sign and agree to relevant tenancy agreements</li> </ul>	Governance

## 5. Critical Assets

The Shire provides a number of critical services to the community out of its many buildings. As it is these services that are critical and not the building itself, and given the organisation business continuity arrangements, there are no critical building assets to note as part of this asset management plan.

All buildings are, however, ranked according to a hierarchy. The hierarchy aims to aid in the prioritisation of maintenance and renewal activities when conflicts such as timing and resources arise.

## 6. Life Cycle Management Plan

### 6.1 Physical Parameters

The types of buildings owned by the Shire of Murray are detailed in the table below. Of the buildings listed, some of these may be leased and therefore the Shire's responsibilities with regards to the operations, maintenance and renewal requirements will vary. The specifics of each arrangement are discussed in the lease for that building.

The Shire's Corporate Asset Management System contains a listing of all building components and has the capacity to include the following details:

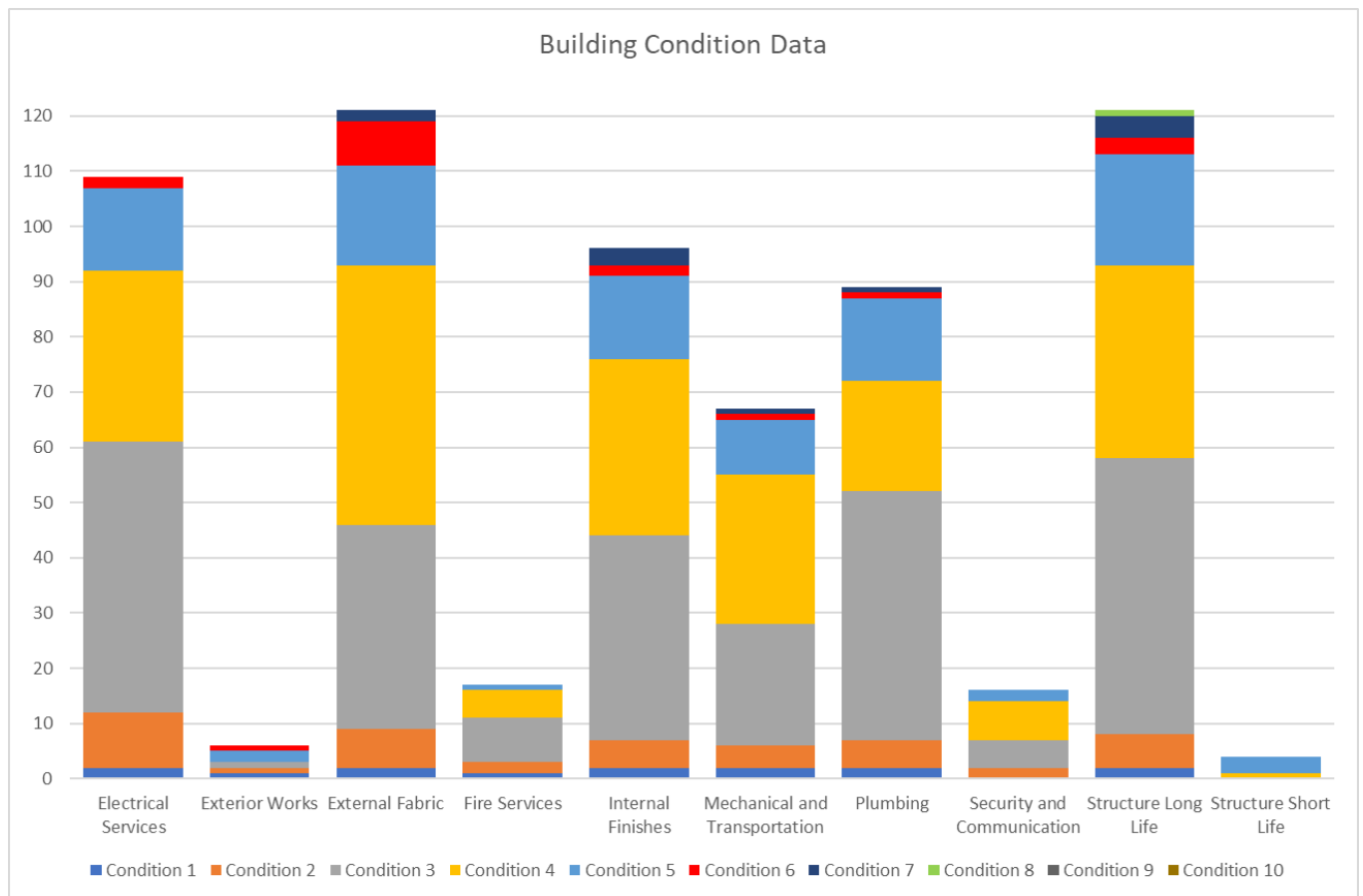
- Date of construction
- Construction material
- Size
- Hierarchy classification
- Condition ratings
- Asbestos status
- Replacement value



## 6.2 Asset Condition

Building condition assessments are to be carried out every 3 years on a rolling basis. The objective of a condition assessment is to provide sufficient information on building components to allow informed strategic asset planning and management decisions to be made. Each building component is to be given a condition rating on a scale of 1 – 10, where 1 = New and 10 = Total Deterioration.

A summary of the condition of building components is below. Note that these conditions are provided for all Shire of Murray buildings, including those that are leased. For those buildings that are leased, some components are yet to be captured and assessed.



## 6.3 Intervention Levels

### 6.3.1 Intervention Level for Rank A and Rank B Buildings:

Asset Category	Condition
Electrical Services	7.0
Exterior Works	7.0
External Fabric	7.0
Fire Services	7.0
Internal Finishes	7.0
Mechanical and Transportation	7.0
Plumbing	7.0
Security and Communication	7.0
Structure Long Life	7.0
Structure Short Life	7.0

### 6.3.2 Intervention Level for Rank C and D Buildings

Asset Category	Condition
Electrical Services	8.0
Exterior Works	8.0
External Fabric	8.0
Fire Services	8.0
Internal Finishes	8.0
Mechanical and Transportation	8.0
Plumbing	8.0
Security and Communication	8.0
Structure Long Life	8.0
Structure Short Life	8.0

## 6.4 Asset Valuations

A valuation of the Shires building assets is conducted every 5 years by an external contractor. This is performed at Fair Value.

The Shires building assets have a replacement cost of \$48,993,824 and Fair Value of \$40,697,209 as at 30 June 2017.

## 6.5 Useful Life

Useful life is used to determine the current value of the assets and are summarised below:

Asset Category	Useful Life
Electrical Services	30 years
Exterior Works	50 years
External Fabric	40 years
Fire Services	15 years
Internal Finishes	40 years
Mechanical and Transportation	20 years
Plumbing	35 years
Security and Communication	15 years
Structure Long Life	100 years
Structure Short Life	50 years

The useful lives of building assets are validated by contractors performing the financial valuations every 5 years.

## 6.6 Operations and Maintenance

Operational activities keep the asset utilised but have no effect on condition. Typical operational activities include cleaning, pest control and utilities.

For those buildings that are leased, the operational activities are generally the responsibility of the lessee.

Maintenance activities are those routine works which keep assets operating to the required service levels. They fall into two broad categories:

1. Planned Maintenance (proactive): inspection and maintenance works planned to prevent asset failure.
2. Unplanned Maintenance (reactive): Reactive action to correct asset malfunctions and failures on an as required basis (i.e. emergency repairs).

For those buildings that are leased, the maintenance responsibilities are outlined within the lease.

The annual operating and maintenance costs for buildings in 2020/2021 is summarised below:

Operational Costs	Maintenance Costs
\$743,857	\$659,214

6.6.1 Operations and Maintenance Plan

The Operations and Maintenance Plan for buildings infrastructure is below:

Operations and Maintenance Program - Inspections

Activity	Inspection Regimes	Hierarchy	Inspection Schedule
Condition Survey	<b>Condition survey</b> undertaken to determine the condition of the asset, its useful life, and, if relevant, any asset renewal requirements.	i) Rank A ii) Rank B iii) Rank C iv) Rank D v) Assets that have a component at condition 7 or above	Every 3 years, rolling basis  Annually
Routine Inspection	<b>Routine condition and maintenance inspections</b> undertaken to identify key defects and maintenance items.	i) Rank A ii) Rank B iii) Rank C iv) Rank D	Every 6 months Annually Annually Every 2 years
Reactive Inspections	<b>Responsive inspections</b> are undertaken in response to customer, cleaner, or officer reports, in accordance with the buildings hierarchy. The risk level is based on the officer's interpretation of the information provided.	Extreme Risk i) Rank A ii) Rank B iii) Rank C iv) Rank D	As soon as possible, but within 4 hours
		High Risk i) Rank A ii) Rank B iii) Rank C iv) Rank D	Within 1 working day
		Moderate Risk i) Rank A ii) Rank B iii) Rank C iv) Rank D	Within 4 working days
		Low Risk i) Rank A ii) Rank B iii) Rank C iv) Rank D	Within 1 week

Operations and Maintenance Program - Maintenance

Activity	Maintenance Level	Hierarchy	Maintenance Schedule
Gutter Cleaning	Clean all debris from gutters. Works to be completed prior to the onset of winter (March/April) and toward end of winter (October/November).	i) Rank A ii) Rank B iii) Rank C iv) Rank D	At least biannually or as determined.
Painting - Internal	All internal painted surfaces to be prepared as required (wash, sand, patching) and two coats of suitable paint applied (i.e. gloss to doors, frames and skirting boards, low sheen to walls, flat white to ceilings).	i) Rank A ii) Rank B iii) Rank C iv) Rank D	Every 5 years Every 7 years Every 10 years Every 10 years
Painting - External	All external painted surfaces to be prepared as required (wash, sand, patching) and two coats of suitable paint applied (i.e. gloss to doors, frames and skirting boards, low sheen to walls, flat white to ceilings).	i) Rank A ii) Rank B iii) Rank C iv) Rank D	Every 7 years Every 10 years Every 10 years Every 10 years
Termite Inspections/Treatment	Inspection to be carried out by reputable pest control operator (refer to Shire contractor list) With report to be submitted at completion. Where treatment works are required these will be completed in accordance with general maintenance guidelines.	i) Rank A ii) Rank B iii) Rank C iv) Rank D	Annually Annually Annually Annually
Floor Sanding (as required)	Buildings with timber floors will have entire floor surface sanded by a series of course through to fine (180 grit) grade sanding paper, then finished as appropriate.	i) Rank A ii) Rank B iii) Rank C iv) Rank D	Annually At least every 5 years At least every 8 years N/A
Fire Equipment Servicing	Inspection to be carried out by reputable company (refer to Shire contractor list) With report to be submitted at completion. Where treatment works are required these will be completed in accordance with general maintenance guidelines.	All Hierarchies i) Fire Fighting Equipment ii) Fire indicator panels	Biannually Monthly
Air Conditioning Servicing	Servicing of air-conditioning units to include: - Visual inspection of all components of systems; - Testing of cooling and heating functions; and Cleaning and inspection of all filters. Where repair works are required these will be completed in accordance with general maintenance guidelines.	i) Rank A ii) Rank B iii) Rank C iv) Rank D	Quarterly (all)

Activity	Maintenance Level	Hierarchy	Maintenance Schedule
Panic Alarm Testing	Testing of panic alarms on a monthly basis to ensure all installed panic alarms in occupied buildings are functioning properly.	i) Rank A ii) Rank B iii) Rank C iv) Rank D	Monthly Monthly Monthly Not applicable
Emergency Lighting and Exit Lighting	Inspection to be carried out by reputable company (refer to Shire contractor list) with report to be submitted at completion. Where treatment works are required these will be completed in accordance with general maintenance guidelines.	i) Rank A ii) Rank B iii) Rank C iv) Rank D	Annually Annually Annually Annually
General Maintenance	General maintenance will apply to all items that come from action requests, reports from user groups and inspections that do not from a part of scheduled works, e.g. vandalism damage, breakdowns, leaking taps and, blown lamps. Where repair works are required these will be completed in accordance with guidelines.	<b>Extreme Risk</b> i) Rank A ii) Rank B iii) Rank C iv) Rank D	As soon as possible, but within 4 hours
		<b>High Risk</b> i) Rank A ii) Rank B iii) Rank C iv) Rank D	Within 1 working day
		<b>Medium Risk</b> i) Rank A ii) Rank B iii) Rank C iv) Rank D	If the risk is not accepted: Within 1 week Within 1 month Within 3 months Within 6 months
		<b>Low Risk</b> i) Rank A ii) Rank B iii) Rank C iv) Rank D	If the risk is not accepted: Within 3 months Within 6 months Within 9 months Within 12 months

6.6.2 Future Operational and Maintenance Expenditure

The projected Operational and Maintenance Expenditure for buildings is:

Year	Building Operational Expenditure – Existing Buildings	Building Maintenance Expenditure – Existing Buildings
2021 / 2022	\$803,434	\$637,019
2022 / 2023	\$812,522	\$641,655
2023 / 2024	\$832,288	\$650,486
2024 / 2025	\$853,001	\$659,493
2025 / 2026	\$874,883	\$668,680
2026 / 2027	\$897,562	\$678,051
2027/2028	\$921,058	\$687,609
2028/2029	\$945,407	\$697,358
2029/2030	\$970,643	\$707,303
2030/2031	\$996,806	\$717,446

## 6.7 Renewals and Replacements

Renewal work is the replacement or refurbishment of an asset (or its components) which returns it to an “as new” condition.

Actual past renewal expenditure for Building infrastructure is shown in the table below.

Year	Renewal
2016/2017	\$366,419
2017/2018	\$1,350,000
2018/2019	\$2,292,000
2019/2020	\$349,036
2020/2021	\$349,288



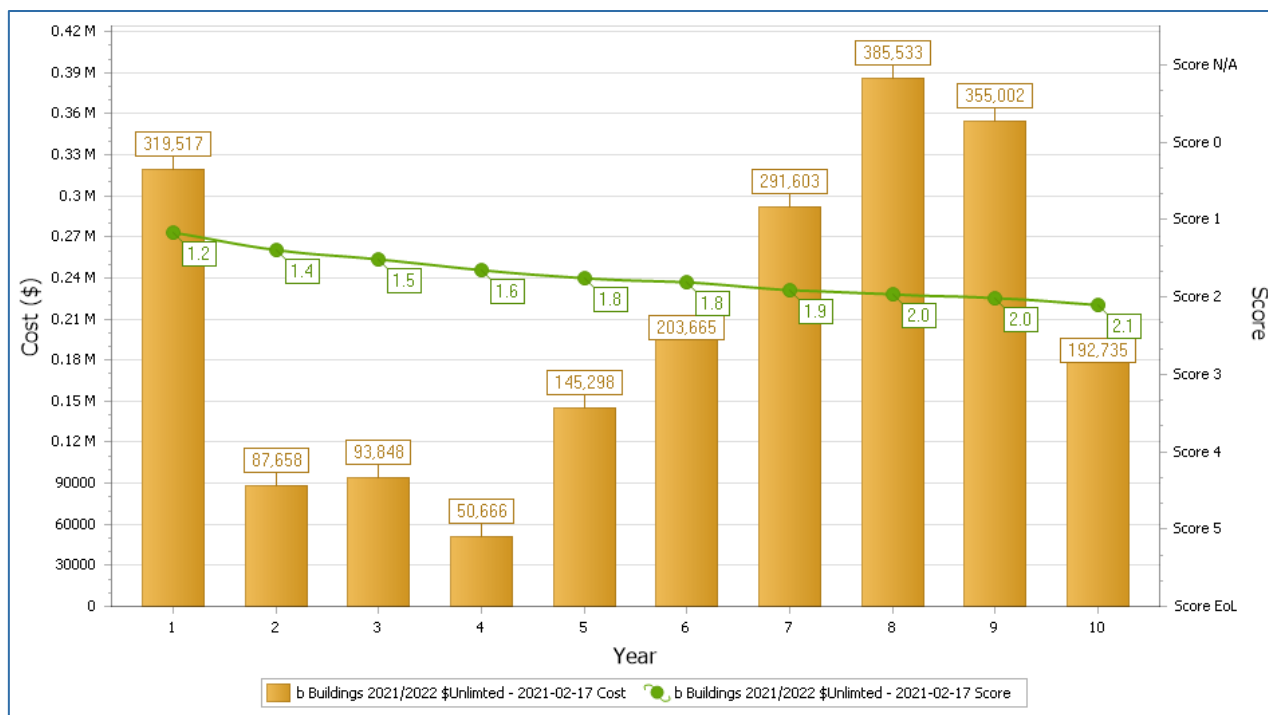
A financial modelling analysis has been undertaken for Building infrastructure based on the following scenarios:

- **Scenario 1** – Unlimited budget (like for like replacement)
- **Scenario 2** – Proposed funding (Long Term Financial Plan)
- **Scenario 3** – Funding Comparison (Like for Like Replacement versus Proposed LTFP Budget Allocation)

Note that some assets have been excluded (or partially excluded) from the renewal modelling for various reasons. The Modelling Parameters document for each renewal year provides an explanation into the decision making behind this.

6.7.1 Scenario 1 - Unlimited budget (like for like)

The following graph summarises the renewal requirement for building infrastructure based on like for like replacement using an unlimited budget allocation (ie funding 100% of renewal). The renewal requirement over a 10 year period is \$2,125,525, which equates to an average of \$212,552 per annum. The condition index for buildings is very good, with the service level remaining steady in overall condition index at the end of 10 years if the proposed funding is able to be achieved.

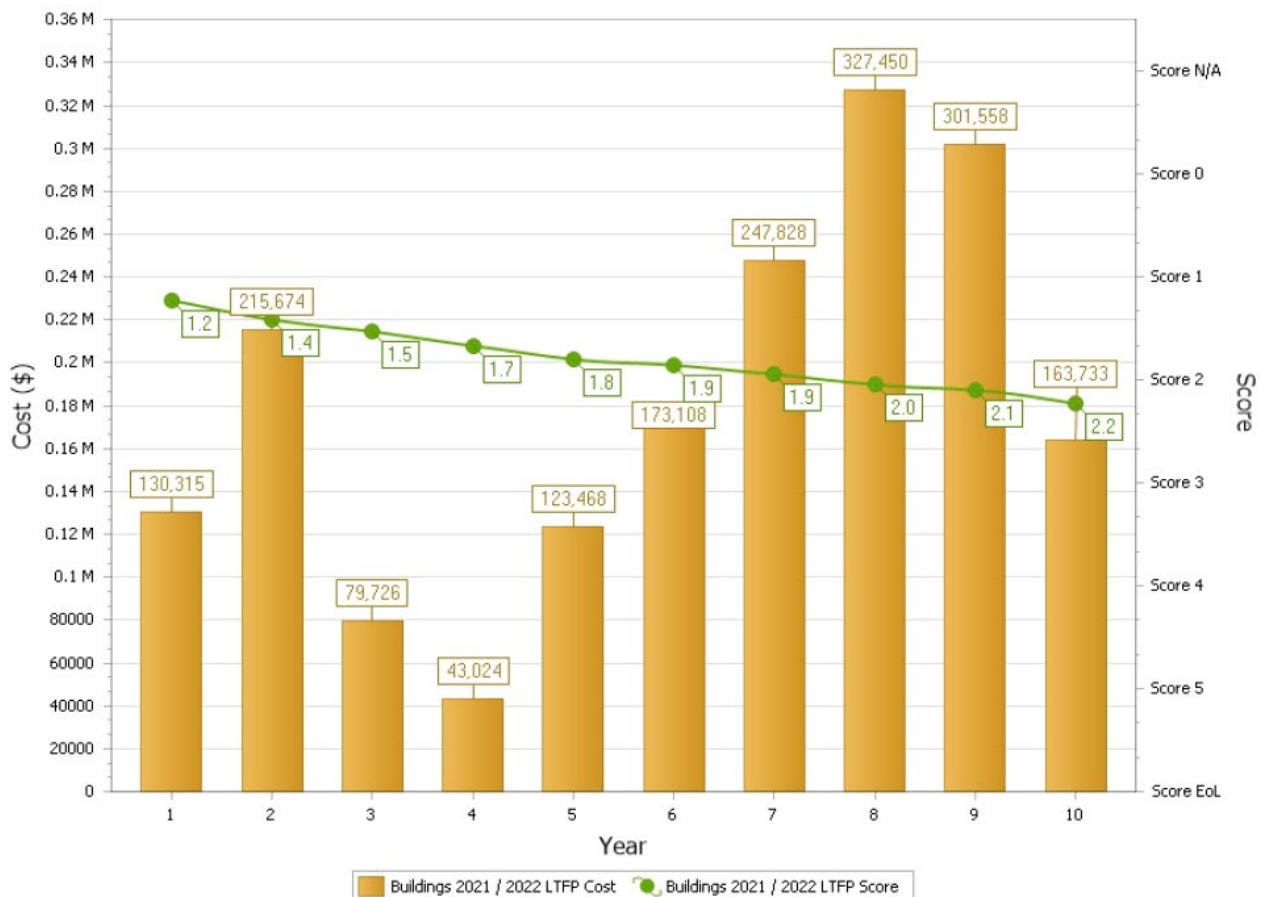


Year	2021/2022 \$Unlimited Renewal Figures	Year	2021/2022 \$Unlimited Renewal Figures
2021/2022	\$319,517	2026/2027	\$203,665
2022/2023	\$87,658	2027/2028	\$291,603
2023/2024	\$93,848	2028/2029	\$385,533
2024/2025	\$50,666	2029/2030	\$355,002
2025/2026	\$145,298	2030/2031	\$192,735
<b>10 Year Average</b>	<b>\$212,552</b>	<b>10 Year Total</b>	<b>\$2,125,525</b>

6.7.2 Scenario 2 – Proposed Funding (Long Term Financial Plan)

The following graph summarises the renewal requirement for building infrastructure using the proposed budget allocation within the Long Term Financial Plan over the 10 year planning period. Due to funding constraints, it is not possible to fund 100% of the required renewal, therefore the Long Term Financial Plan proposes an 85% renewal for building infrastructure, equating to an average of \$180, 670 per year.

This will result in the renewal requirements of buildings to be prioritised based on risk, service levels and building hierarchy. The impact that this has on the overall condition of buildings is indicated in the graph below. It shows that the condition index for buildings is still very good, although the graph is indicating a gradual decline in overall condition index at the end of 10 years if the proposed funding is able to be achieved.



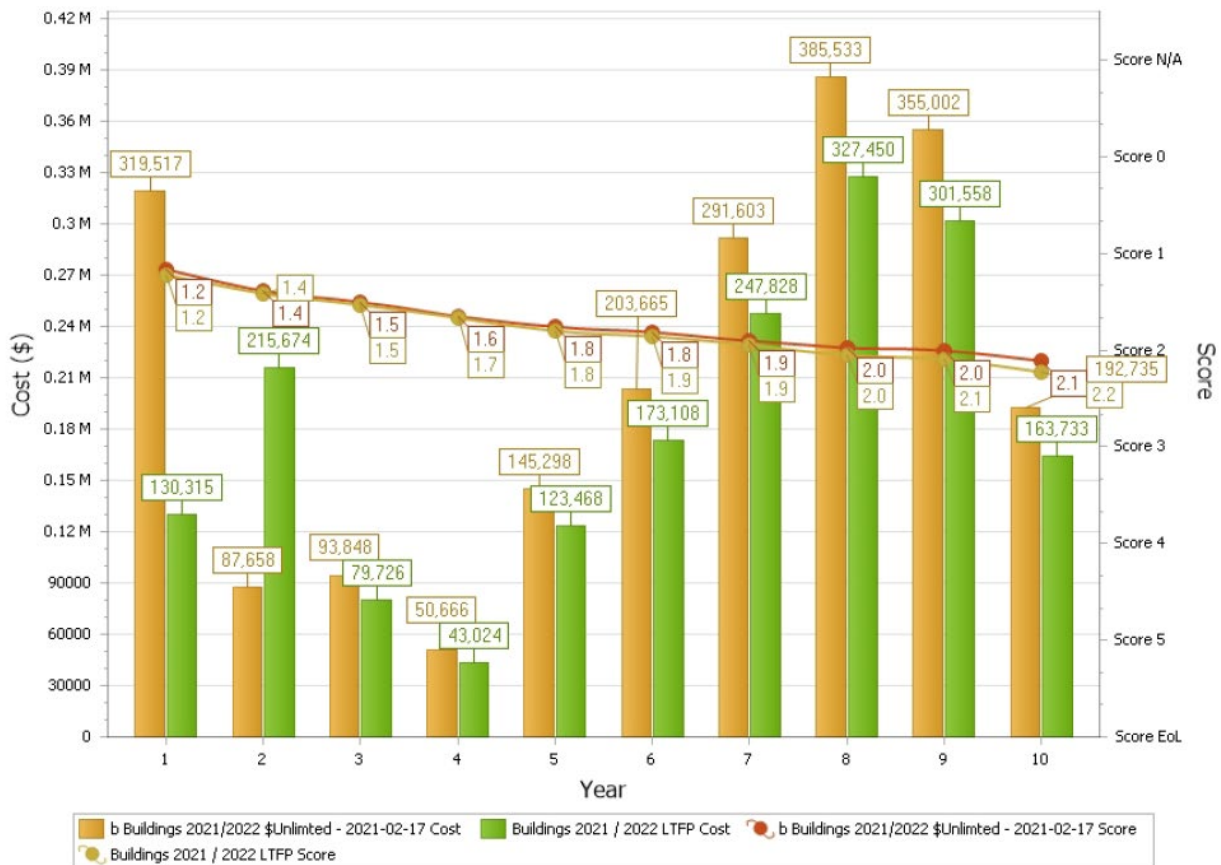
The planned renewal expenditure as expressed in the Long Term Financial Plan for the period from 2021 – 2031 is shown in the tables below.

Year	2021/2022 LTFP Renewal Figures	Year	2021/2022 LTFP Renewal Figures
2021/2022	\$130,376	2026/2027	\$173,115
2022/2023	\$215,723	2027/2028	\$247,863
2023/2024	\$79,771	2028/2029	\$327,703
2024/2025	\$43,066	2029/2030	\$301,752
2025/2026	\$123,503	2030/2031	\$163,825
<b>10 Year Average</b>	<b>\$180,669</b>	<b>10 Year Total</b>	<b>\$1,806,697</b>

6.7.3 Scenario 3 – Funding Comparison (Like for Like Replacement versus Proposed LTFP Budget Allocation)

A comparison of the two modelling scenarios (based on an unlimited budget versus the 10 year proposed 10 years Long Term Financial Plan allocation) for building infrastructure is below.

The comparison shows an average renewal funding gap of \$31,882.83 per year.



Based on future projections in the Long Term Financial Plan, the following additional building assets are expected to be covered by the Buildings Asset Management Plan:

Location	Year	Approx. Project Cost	Nature
WA Food Innovation Precinct	2021/2022	\$7,612,500	LTFP Major Project
South Yunderup Oval Change Rooms	2021/2022	\$1,608,108	LTFP Major Project
Sir Ross McLarty Oval Multipurpose Facility	2021/2022	\$2,110,757	LTFP Major Project
Ravenswood Community Centre	2021/2022	\$900,000	LTFP Major Project
Heron Point Toilets	2021/2022	\$150,000	Reserve Funded
New Existing Assets			
North Yunderup CWA Hall	2021/2022	\$195,000	Transfer of Responsibility
Austin Lakes toilet block and major structure	Post 2025	\$80,000	Transfer of Responsibility
<b>Total</b>		<b>\$12,656,365</b>	

Once constructed or transferred to the Shire, the Fair Value and Replacement Costs of the buildings will be revised.

#### 6.8.2 Upgrade

Based on future projections in the Long Term Financial Plan, the following building assets are expected to be upgraded are:

Location	Year	Approx. Project Cost	Nature
Exchange Hotel	2021/2022 to 2023/2024	\$4,088,744	LTFP Major Project
Operations Centre	2021/2022, 2022/2023 and 2030/2031	\$16,971, \$275,427, \$2,497,726	LTFP Major Project
Murray Library	2029/2030 and 2023/2031	\$344,628, 6,244,315	LTFP Major Project
Administration Building	2029/2030 and 2030/2031	\$496,952, \$11,239,767	LTFP Major Project
<b>Total</b>		<b>\$25,204,530</b>	

6.8.3 Disposal

The following building assets have been identified for disposal:

Asset	Year	Approx. Project Cost	Reason for Disposal
Old CWA Hall, George Street	Approx. 3-5 years	\$30,000	Building no longer fit for purpose
9 Roe Avenue, Pinjarra	Subject to SRMO Master Plan, within approx. 3 years	\$30,000	SRMO Master Plan
Lovegrove Street Club Rooms (Pinjarra Tennis Club)	Subject to SRMO Master Plan, within approx. 5 years	\$30,000	SRMO Master Plan
George Beacham Pavilion	Subject to SRMO Master Plan, within approx. 5 years	\$30,000	SRMO Master Plan
Forest Street Storage Facility (Old SES)	Approx. 3-5 years	\$30,000	Building no longer fit for purpose
Peel Street Hall (old Girl Guides)	Approx. 3-5 years	\$30,000	Building no longer fit for purpose
<b>Total</b>		<b>\$180,000</b>	

Council will ultimately make the determination as to whether an asset is disposed of.

## 7. Financial Projections

This section contains the financial requirements resulting from all of the information presented in the previous sections of this asset management plan. Financial projections are performed annually and both inform and are informed by the Long Term Financial Plan.

### 7.1 10 Year Forecasts

The total 10 year approximate projected costs for the operation, maintenance, renewal, new, upgrade and disposal of building assets is noted below:

10 Year Approximate Projected Costs	Total
Operational Expenditure	\$8,907,604
Maintenance Expenditure	\$6,745,100
Renewal (based on unlimited budget)	\$2,125,525
New	\$12,656,365
Upgrade	\$25,204,530
Disposal	\$180,000
<b>Total</b>	<b>\$55,819,124</b>

### 7.2 Funding Strategy

The funding strategy is detailed in the Shire's 10 year Long Term Financial Plan. Projected expenditure identified in Section 7 is to be funded from future operating and capital budgets, with grant funding. There are several funding sources that are available to the Shire in order to operate, maintain, renew, upgrade and build the Shire's building assets. These sources are, but are not limited to, the following:

Source	Explanation
Municipal Revenue from Rates	The Shire seeks to maximise funding from non-municipal sources in order to help minimise the cost.
Financial Assistance Grants (FAGS)	The Financial Assistance Grants are currently provided under the Local Government (Financial Assistance) Act 1995 and have the following components: <ul style="list-style-type: none"> <li>a general purpose component which is distributed between the States and Territories according to population (i.e., on a per capita basis), and</li> </ul>

	<ul style="list-style-type: none"> <li>• an identified local road component which is distributed between the States and Territories according to fixed historical shares.</li> <li>• Both components of the grants are united in the hands of local government, allowing councils to spend the grants according to local priorities</li> </ul>
Developer Contributions	The Shire negotiates with property developers in order to receive contributions for the future provision of significant public infrastructure that is necessitated because of development. These arrangements can include the provision of land for the construction of community buildings in the future.
Developer Funded Infrastructure	In some instances new or upgraded public infrastructure is fully funded and constructed by developers.
Community Sporting and Recreation Facilities Fund	<p>The purpose of the program is to provide Western Australian Government financial assistance to community groups and local government authorities to develop basic infrastructure for sport and recreation.</p> <p>The program aims to increase participation in sport and recreation, with an emphasis on physical activity, through rational development of sustainable, good quality, well-designed and well-utilised facilities</p>
Building Better Regions Fund	The Fund supports projects that involve construction of new infrastructure, or the upgrade or extension of existing infrastructure in an aim to create jobs, drive economic growth and build stronger regional communities into the future.
Lotterywest Grants	<p>Grants can be used for infrastructure that meets the Lotterywest priority areas:</p> <ul style="list-style-type: none"> <li>• Inclusive thriving community – Supporting the diversity of Western Australians to actively engage in community life.</li> <li>• Connected cultural experiences - Bringing people together through the arts, heritage and cultural activities</li> <li>• Protected sustainable ecosystems - Supporting our community to sustain and enhance our unique species and environments</li> <li>• Smart innovative society - Optimising our community's talent and capability.</li> <li>• Active healthy people - Assisting our community to be more active and support initiatives which promote healthy lives</li> </ul>

# 8. Practices, Performance Monitoring and Improvement

## 8.1 Asset Management Improvement Strategy

In an aim to continually improve Asset Management practices, the following improvement actions relating to buildings infrastructure have been identified:

Task	Responsibility	Resources / Frequency	Due
Buildings Condition Assessment	Building Services	Internal / Three year rolling inspections	1 December annually
Revaluation of Buildings	Finance	External / Every 5 years	30 June 2026
Develop Conservation Management Plans for Heritage Buildings	Planning & Sustainability and Building Services	Internal / Ongoing	Ongoing
Investigate if there is a need to develop Asset Management Plans for single entities e.g. MALC, WAFIP	Integrated Planning and relevant Asset Owner	Internal / One-off	2022/2023 / 2023/2024
Clarify maintenance and renewal responsibilities in leases	Governance / Building Services	Internal / One-Off	2021/2022
Review Buildings Asset Management Plan	Integrated Planning / Building Services	Internal / Every 5 years	31 August 2026

These actions have been added to the Asset Management Improvements Actions Plan and will be continually reviewed and monitored by the Asset Management Working Group and may be subject to change as the organisations priorities evolve.

## 8.2 Monitoring and Review Procedures

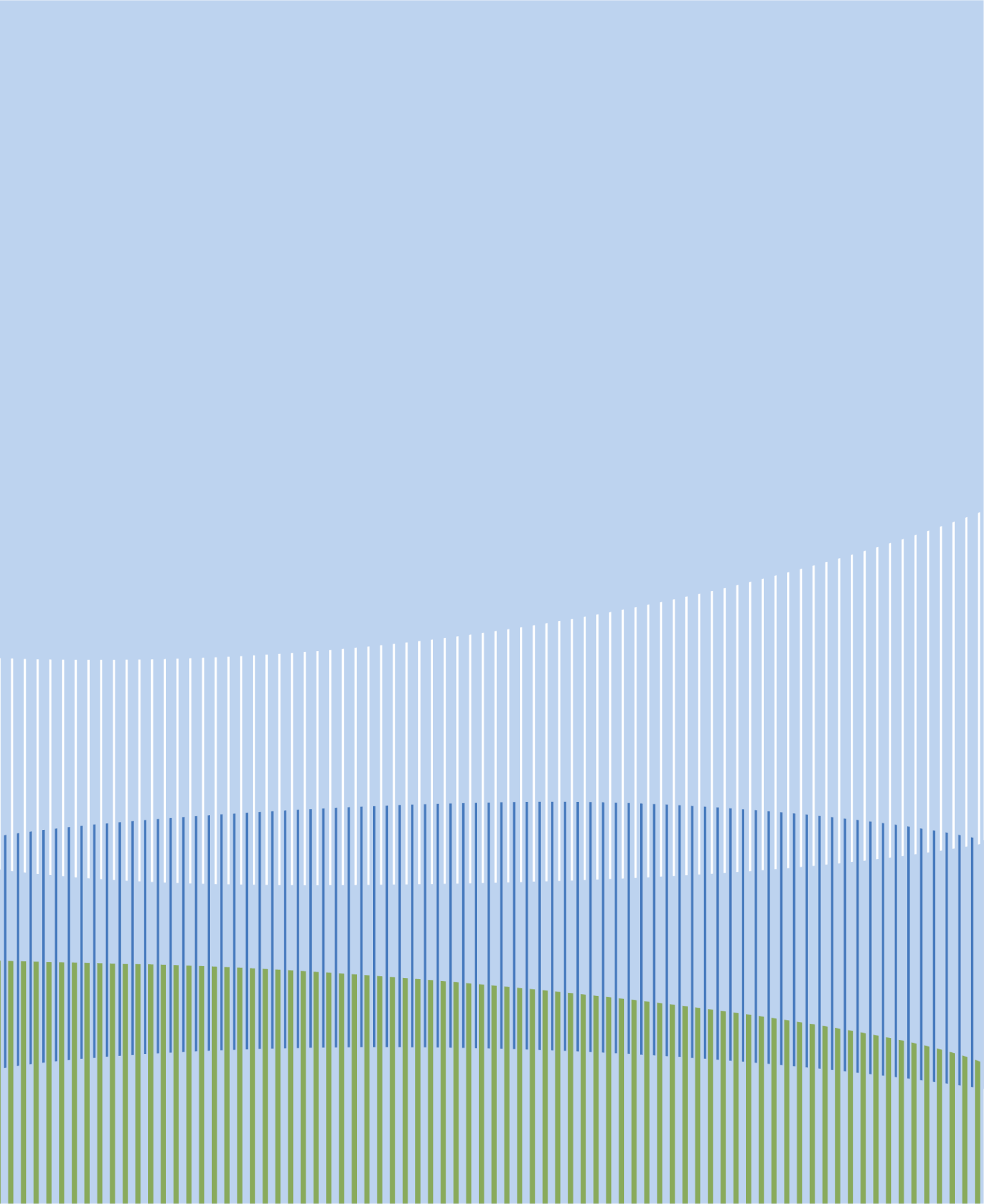
The Buildings Asset Management Plan will be reviewed in accordance with the buildings revaluation cycle, every 5 years.



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Pinjarra WA 6208  
PO Box 21 Pinjarra WA 6208

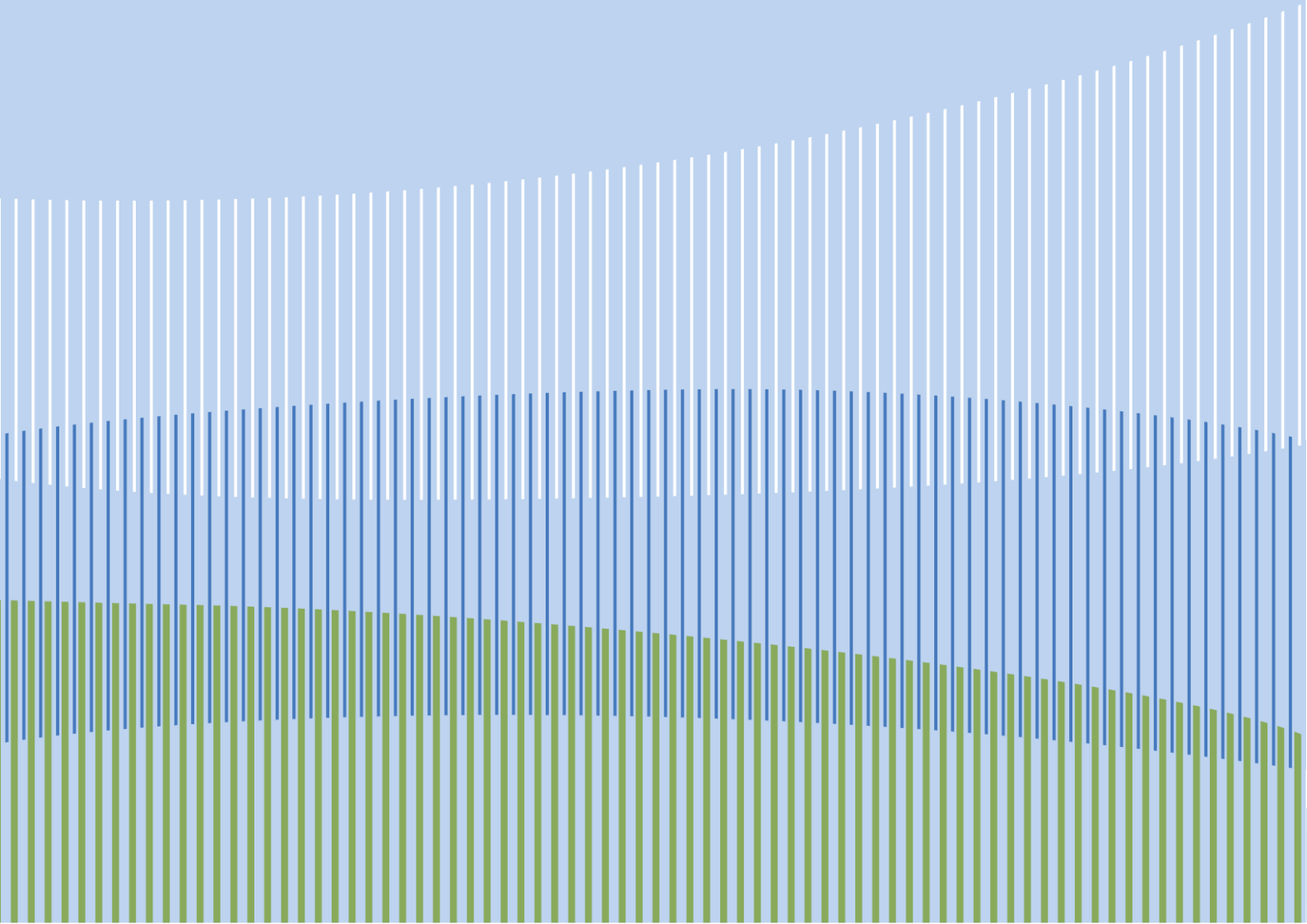
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# Appendix B - Roads and Kerbs Asset Management Plan



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Version Control			
Version No	Date	Details	Author
1.0	July 2009	Adopted Plan	Asset Management Working Group
2.0	March 2013	Review of Roads Asset Management Plan	Asset Management Working Group
3.0	August 2016	Review of Roads Asset Management Plan	Asset Management Working Group
4.0	May 2020	Review of Roads Asset Management Plan	Asset Management Working Group

# 1. Introduction

The Shire of Murray is responsible for the management of 753km of road infrastructure and 234.8km of kerbing infrastructure. These networks are an important component of the Shire's asset portfolio, as it is essential to have a well-planned roads system providing access to community, educational and recreational facilities.

The Roads and Kerbs Asset Management Plan forms part of the Shire of Murray's Infrastructure Asset Management Plan. The two documents therefore must be read in conjunction.

## 1.1 Purpose and Scope of Plan

This Roads and Kerbs Asset Management Plan covers sealed roads (including asphalt and chip seal), unsealed roads (including gravel and formed), and also kerbing. The Shire of Murray manages and maintains local and regional roads, and Main Roads WA (MRWA) maintains state roads (also known as arterial roads). The Shire must ensure that there is an appropriate level of funding to enable this category of assets to be maintained and renewed to an acceptable standard. The plan specifies the life cycle requirements for effective management, inspection and replacement of this asset group and outlines the financial implications of these requirements. It demonstrates how the Shire will achieve this outcome by applying the principles of responsible asset management planning.

The Shire of Murray, as custodian of the local road network is responsible for a number of functions. The ownership functions include:

- Providing and maintaining the integrity of pavements, wearing courses and kerbing
- Keeping road surfaces clear of rubbish and debris (e.g. street sweeping).
- Maintaining landscaped areas within designated areas within the road reserve.
- Providing and maintaining street name plate signs for the local road network.
- Providing and maintaining parking signs associated with parking on the local road network.
- Providing and maintaining line marking associated with delineating parking bays on the local road network.
- Providing and maintaining decorative street lighting in streetscape areas.
- Installing and maintaining advisory signs (yellow diamond warning signs).

The Shire of Murray is not responsible for:

- Line marking of regulatory lines (such as double white road divider lines and broken road divider lines) and raised reflective pavement markers. These are provided and maintained by MRWA. In the case of road upgrades, the Shire of Murray is responsible for the upfront cost of this work, however if the design is approved, MRWA will inherit all future responsibility for maintenance.

- Regulatory lines and signs such as “Stop” and “Giveaway” and “Keep Left” signs and holding lines. These are provided and installed by Main Roads Western Australia.
- Traffic control signals. These are installed and controlled by MRWA
- Standard Street lighting. This is provided and maintained by Synergy. The Shire of Murray pays the installation and operation costs of these lights.
- Level crossings of train lines. These are provided and maintained by Westrail.
- Maintenance and capital requirements of primary distributor roads are the responsibility of MRWA. The Shire of Murray can request changes at locations where Shire of Murray controlled infrastructure interfaces with MRWA infrastructure.

## 1.2 Legislative Requirements

Legislation	Requirements
Road Traffic Act 1974	An Act to make provision in relation to the driving and use of vehicles, the regulation of traffic and for incidental and other purposes.
Main Roads WA Act 1930	An Act to consolidate and amend the law relating to and making provision for the construction, maintenance, and supervision of highways, main and secondary roads, and other roads, the control of access to roads and for other relative purposes.
Land Transport Infrastructure Amendment Act 2014	To provide for the funding of projects related to land transport matters, and for related purposes

## 2. Levels of Service

### 2.1 Community Levels of Service

Key Performance Indicator	Level of Service	Performance Measurement Process	Target Performance	Current Performance
<b>Accessibility</b>	The road network is accessible to properties within the Shire	Customer complaints regarding access to private properties	Access to 100% of private properties	2018/19 - No complaints on record regarding access to properties
<b>Quality</b>	Road provides a comfortable ride	4* yearly customer satisfaction survey	80% of responses are satisfied with the condition of the sealed road network	2015/2016 - 82% of responses were highly satisfied or satisfied with the sealed road network
			80% of responses are satisfied with the condition of the unsealed road network	2015/2016 - 66% of responses were highly satisfied or satisfied with the unsealed road network
<b>Safety</b>	The road network maximises safety for users	Percentage of reported road defects	100% compliance with maintenance timelines outlined in the Road Maintenance and Operational Plan	2018/19 – 87% compliance with maintenance timelines
	All roads have even and consistent kerbs free from hazards	Customer Service Requests	Less than 20 kerb related defects per year	2018/19 - 3 defects were reported in relation to kerb hazards

## 2.2 Technical Levels of Service

Key Performance Indicator	Level of Service	Performance Measurement Process	Target Performance	Current Performance
<b>Compliance</b>	Road network is managed to at least meet statutory obligations and applicable standards	The percentage of road (km) that is compliant with the Shire's Hierarchy Standard	100% of roads have correct hierarchy – verified by Traffic Count Data	Verified by Traffic Count Program
<b>Function</b>	Meets road construction standards outlined in Liveable Neighbourhoods (urban) and Shire Policy No W6 (rural)	Access Roads minimum 6.0m seal width	All roads meet construction standards	254.8km to standard (76.8%) 77.1km below standard (23.2%)
		Local Distributor minimum 7.0m seal width	All roads meet construction standards	42.6km to standard (49.5%) 43.4km below standard (50.5%)  (Note – 94.3% of Local Distributor roads are currently a minimum of 6.0m wide)
		Regional Distributor between 7.0m and 9.0m seal width based on Main Roads WA requirements	All roads meet construction standards	48.2km to standard (61.1%) 30.6km below standard (38.9%)  (Note - all Regional Distributor roads are currently a minimum of 6.0m wide)
<b>Function</b>	Road infrastructure to be maintained in accordance with the Road Maintenance and Operational Plan	Inspection schedules outlined in Road Maintenance and Operational Plan	100% compliance with inspection schedule	100% of inspection schedule met
		Maintenance standards	100% compliance with	2018/19 - 87% compliance with



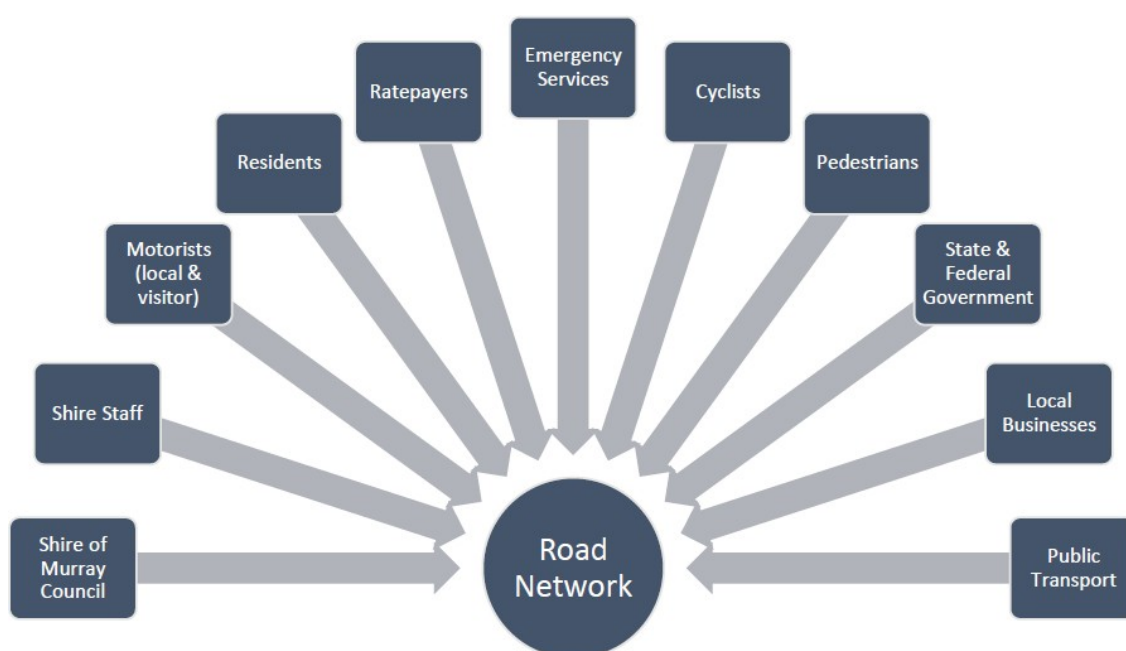
Key Performance Indicator	Level of Service	Performance Measurement Process	Target Performance	Current Performance
		outlined in Road Maintenance and Operational Plan	maintenance standards	maintenance standards
<b>Quality</b>	The road network is of a suitable quality for its purpose	The percentage of roads (by km) that are at or above their renewal intervention level	70% of sealed road infrastructure to be in good condition or better (rating of 5 or better on a 1-10 condition scale)	2019/2020 – 89.4% of sealed road infrastructure in good condition or better
<b>Safety</b>	Adequately consider black spot locations during the prioritisation of civil works	Incorporate black spot within the assessment criteria score for road assets	100% of black spot locations considered during prioritisation of civil works	2018/19 – 100% considered
	Provide road infrastructure that maximises safety for staff and contractors	Number of reported injuries or accidents	Zero reported injuries or accidents	2018/2019 – 0 lost time injuries
	Provide effective roadside kerbs free from hazards	Condition rating (undertaken every 4 years)	70% of kerbs infrastructure to be in good condition or better (rating of 5 or better on a 1-10 condition scale)	2019/2020 – 96.4% of kerbs in satisfactory condition

## 2.3 Customer Research and Expectations

An internal review of Levels of Service for Roads has been undertaken and enhanced identifying road service stakeholders, identifying stakeholder needs and wants to establish more robust service levels.

Analysis of the Shire's road network revealed that there were 11 key stakeholder groups. These stakeholders are identified below and while there may be other minor stakeholders, they have not been specifically considered by the asset management plan.

The below figure summarises Shire of Murray road network stakeholders.



Stakeholders have been identified and then segmented into groups. Each stakeholder group has different interests and may seek different service outcomes. The identification of these service outcomes and interests was undertaken internally by taking on each group's position. In this instance no stakeholder consultation occurred, however stakeholder consultation will be included in future revisions of this asset management plan.

Using the values that were developed, key drivers/service levels were selected. These provided the basis from which the final service level table was produced. Typically, those service levels which were frequently occurring or were "needed" (as opposed to "wanted"), were selected.

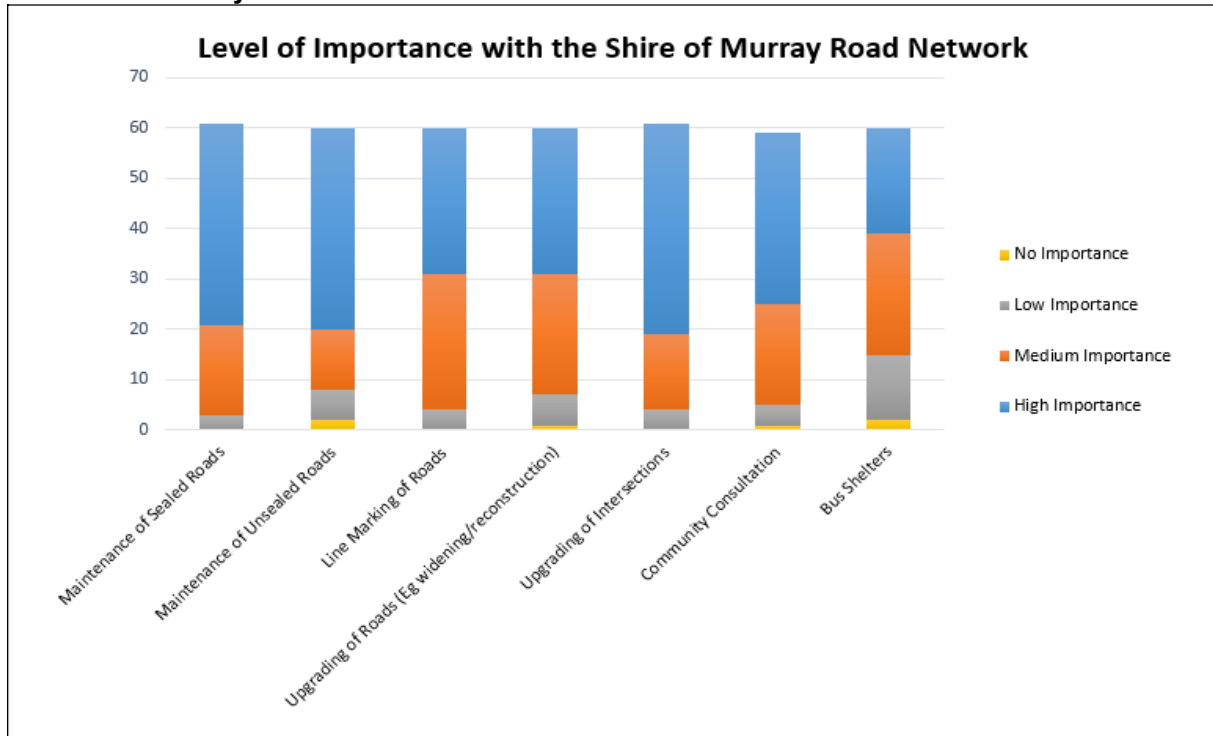
### 2.3.1 Customer Consultation Survey

Research and information pertaining to community expectations and perceptions on road infrastructure has been gained from the 2016 Community Roads Survey. The Shire is committed to updating the levels of service according to the results of community feedback. As targets for levels of service provide the basis for lifecycle management strategies and capital programs, the previously stated levels of service have been reviewed to incorporate the identified requirements of the community. As continued work is undertaken to resolve disparities between renewal funding requirements and available funds, the link between service level and cost is an important area for investigation. Consultation with the community may show that, on identifying that significant rate rises are required to fund infrastructure, the community would prefer to consider a reduction in

service level. The issue of community consultation is important for further development in all updates of this asset management plan.

In February 2016, a Community Roads Survey was undertaken to obtain an understanding of the community’s level of satisfaction in relation to the local road network. The survey had a total of 64 respondents. Details of the survey results are summarised below:

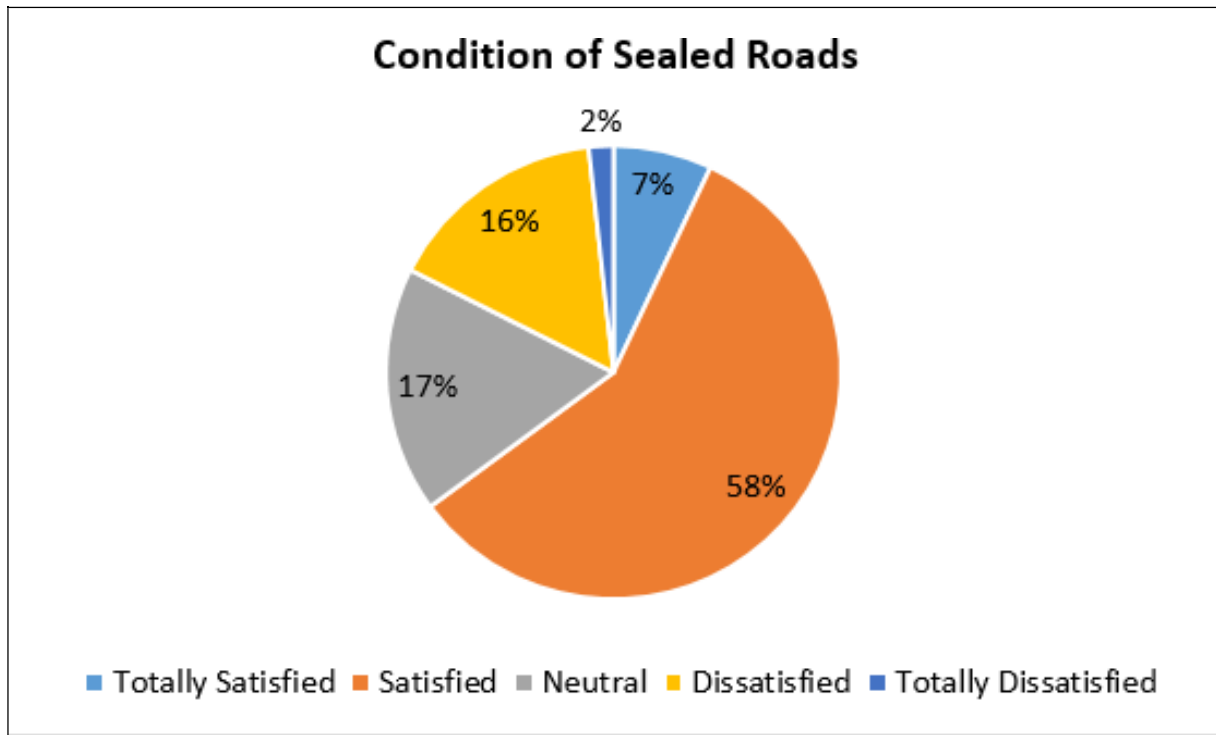
**Customer level of Importance it places on the following aspects of the Road Network within the Shire of Murray:**



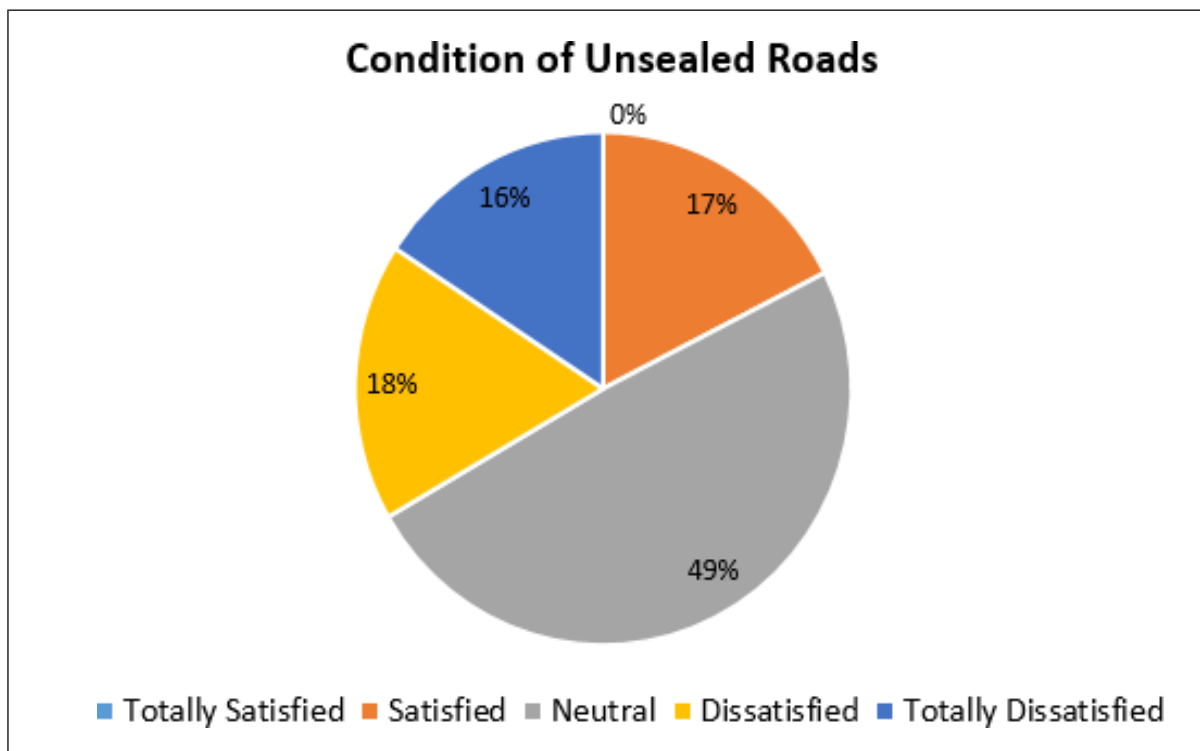
Description	High	Medium	Low	Neutral
Maintenance of Sealed Roads	66%	29%	5%	0%
Maintenance of Unsealed Roads	67%	20%	10%	3%
Line Marking of Roads	48%	45%	7%	0%
Upgrading of Roads (e.g. widening/reconstruction)	48%	40%	10%	2%
Upgrading of Intersections	69%	25%	6%	0%
Community Consultation	57%	34%	7%	2%
Bus Shelters	35%	40%	22%	3%

**Customer Satisfaction with the Road Network within the Shire of Murray:**

**Condition of Sealed Roads - 2016**



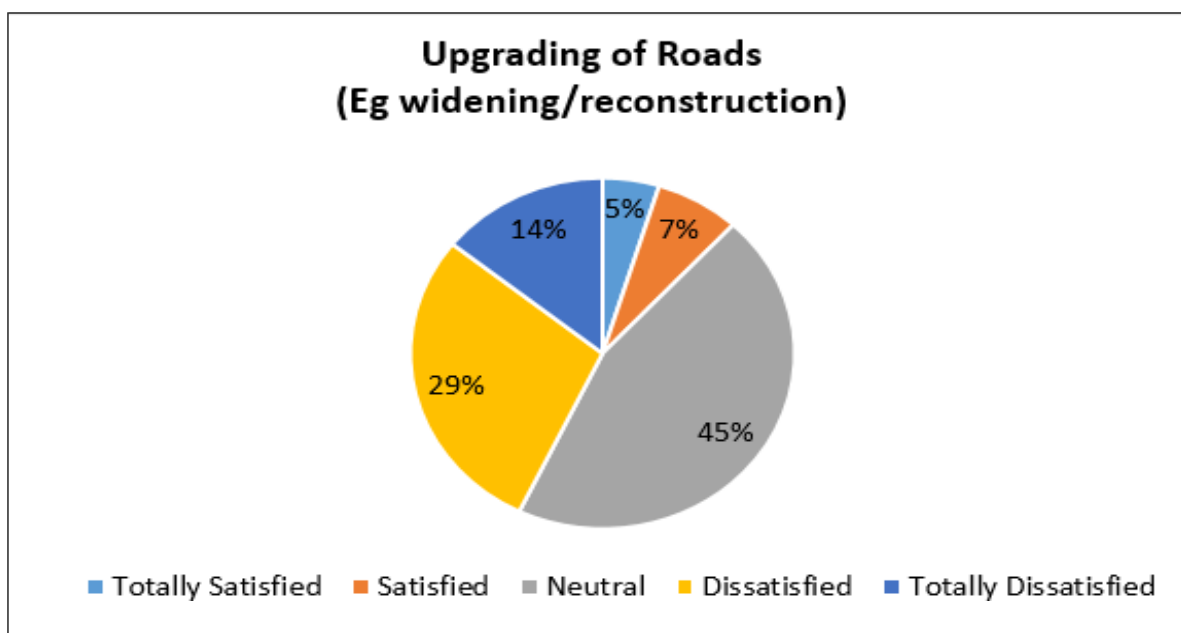
**Condition of Unsealed Roads - 2016**



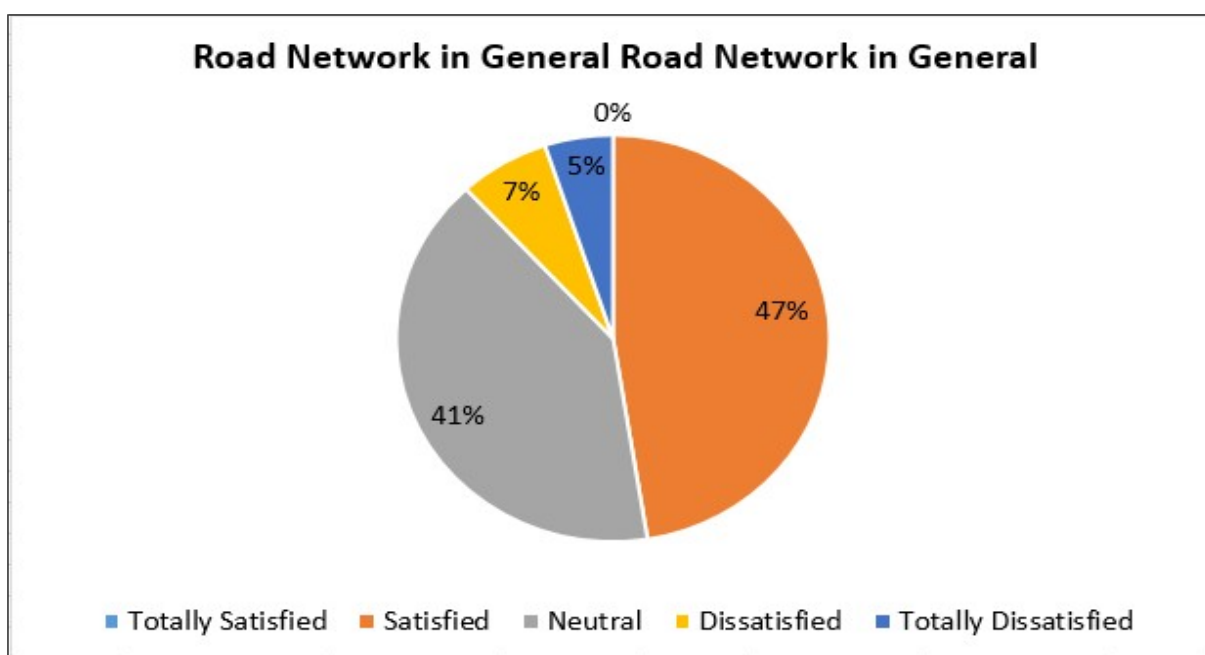
**2016 Community Roads Survey Results relating to customer satisfaction with the condition of Sealed and Unsealed Roads:**

Road Type	Totally Satisfied	Satisfied	Neutral	Dissatisfied	Totally Dissatisfied
<b>Sealed</b>	7%	58%	17%	16%	2%
<b>Unsealed</b>	0%	17%	49%	18%	16%

**Customer Satisfaction with the Upgrading of Roads (e.g. widening / reconstruction)**



**Customer Satisfaction with Road Network in General**



Additional criteria was captured in relation to customer satisfaction with the Road Network within the Shire of Murray and is summarised below:

Description	Totally Satisfied	Satisfied	Neutral	Dissatisfied	Totally Dissatisfied
Line Marking of Roads	5%	45%	38%	10%	2%
Upgrading of Intersections	0%	29%	36%	23%	12%
Traffic Control Devices (e.g. Traffic Islands/Slow Points)	7%	36%	31%	14%	12%
Traffic Signs	4%	41%	36%	12%	7%
Parking Bays/Car Parks	5%	44%	34%	14%	3%
Bus Shelters	0%	21%	55%	21%	3%

Levels of service expected from members of the community can vary considerably. Some members will have a high level of expectation regarding the availability and quality of road infrastructure, and others are less demanding. The community was asked to provide general comments in relation to road infrastructure and responses are summarised below.

Customers are primarily concerned with services and assets such as:

- Upgrading of gravel roads to sealed roads
- Road reseals
- Road grading/maintenance
- Road widening of narrow roads
- Roughness / smoothness of roads
- Speed bumps required on some roads
- Upgrading dangerous intersections (traffic lights) – the Pinjarra Road / Forrest Street intersection has been continuously mentioned throughout the survey as dangerous
- Safety crossings for children going to school
- More street lighting required on roads
- Visibility on corners
- Linemarking

## 2.4 Measuring Levels of Service

The table below summarises the response time to works requests received from the community in relation to Roads - 1 July 2018 to 30 June 2019.

Category	Work Activity	Hierarchy	Work Activity Achieved	Total	Target Response Time	Achieved Rate	Response Time Average
Roads (IRIS)	Clear Vegetation Total		<b>12</b>	<b>16</b>	<b>10 Days</b>	<b>75.00%</b>	<b>9 days 12 hours</b>
	Clear Vegetation	Access Road	7	10	10 Days	70.00%	9 days 20 hours
		Local Distributor	2	3	10 Days	66.67%	10 days 0 hours
		Regional Distributor	3	3	10 Days	100.00%	7 days 9 hours
	Dead Animal Removal (Total)		<b>26</b>	<b>29</b>	<b>2 Days</b>	<b>96.43%</b>	<b>1 day 3 hours</b>
	Dead Animal Removal	Access Road	18	19	2 Days	100.00%	1 days 8 hours
		Local Distributor	5	7	1 Day	75.00%	1 day 1 hours
		Regional Distributor	3	3	1 Day	100.00%	1 day 0 hours
	Inspect / Investigate (Total)		<b>15</b>	<b>17</b>	<b>21 Days</b>	<b>88.24%</b>	<b>10 days 2 hours</b>
	Inspect / Investigate	Access Road	12	14	21 Days	85.71%	13 days 17 hours
		Local Distributor	2	2	10 Days	100.00%	5 days 0 hours
		Regional Distributor	1	1	5 Days	100.00%	3 days 3 hours
	Maintenance Grading	Access Road	38	45	28 Days	84.44%	25 days 8 hours
	Make Safe	Access Road	5	5	1 Day	100.00%	1 Day
	Pothole Patching (Total)		<b>29</b>	<b>33</b>	<b>14 Days</b>	<b>87.88%</b>	<b>12 days 7 hours</b>
	Pothole Patching	Access Road	23	24	14 Days	90.00%	14 days 0 hours
		Local Distributor	4	5	5 Days	80.00%	6 days 0 hours
		Regional Distributor	2	4	3 Days	50.00%	4 days 0 hours
	Remove / Clear Tree (Total)		<b>27</b>	<b>35</b>	<b>10 Days</b>	<b>77.14%</b>	<b>12 days 0 hours</b>
	Remove / Clear Tree	Access Road	23	31	10 Days	74.19%	Remove / Clear Tree
Local Distributor		2	2	10 Days	0.00%		
Regional Distributor		2	2	10 Days	100.00%		
Repair / Replace Kerbing	Access Road	2	2	280 Days	100.00%	Repair / Replace	

Category	Work Activity	Hierarchy	Work Activity Achieved	Total	Target Response Time	Achieved Rate	Response Time Average
							Kerbing
	Road Sweeping (Total)		<b>13</b>	<b>13</b>	<b>21 Days</b>	<b>100.00%</b>	<b>18 days 17 hours</b>
	Road Sweeping	Access Road	9	9	21 Days	100.00%	Road Sweeping
		Local Distributor	3	3	14 Days	100.00%	
		Regional Distributor	1	1	7 Days	100.00%	
	Shoulder Maintenance	Local Distributor	1	1	21 Days	100.00%	Shoulder Maintenance Grading



## 2.5 Function and Hierarchy

The Shire's road hierarchy has been developed according to functionality in order to clarify the presentation of the road network. The hierarchy defines the difference in road use parameters, i.e. traffic volumes, speed and mass of vehicles. The road hierarchy adopted for the Shire of Murray places all roads into the following classifications:

MRWA Functional Road Hierarchy	Liveable Neighbourhoods or Subdivision Guide	IRIS FC*	Owner	Function	VPD**	Speed (kph)	FRH***	Colour	Minimum Level of Service
Primary Distributor	Primary Distributor	1	MRWA	Freeway / Highway	>15000	60-110	Blue		Assessed by MRWA
Regional Distributor	N/A (rural)	2	LGA	2025 "Local Govt Significant Road". Link to significant destinations and designed for efficient movement of people and goods. Connects to primary and other rural distributors. Intersections controlled with measures such as signing and line marking of intersection.	>100	50-110	Red		2 lanes sealed
District Distributor A	Integrator A (urban/metro)	6	LGA	Frequent connections to local streets. Intersections controlled with appropriate measures including traffic signals. Low percentage of trucks. Usually bus routes.	>8000	60-80	n/a		4 lanes sealed
District Distributor B	Integrator B (urban/metro)	6	LGA	Connections to local streets. Intersections controlled with appropriate Local Area Traffic Management.	>6000	60-70	n/a		2 lanes sealed
Local Distributor	Neighbourhood Connector (urban)	7	LGA	Residential access. Intersections controlled with Local Area Traffic Management.	<6000	50-60	Yellow		2 lanes sealed
Local Distributor	Neighbourhood Connector (rural)	3	LGA	Distributor road carrying trucks, machinery, tourists and sometimes has slower moving traffic. Connects to other distributor and access roads. Intersections controlled with measures such as signing.	<100	60-110	Yellow		2 lanes sealed
Access Roads	Access Streets (urban)	8	LGA	Limited access traffic. Forms part of local distribution network. Intersections self controlling with minor measures.	<3000	40-50	Grey		2 lanes sealed
	Access Roads (rural)	4	LGA	<b>A.</b> Main function is access. Local distribution network to individual properties. Generally connects to rural distributors and properties. Intersections self controlling with minor measures.	<75	50	Grey		2 lanes sealed

MRWA Functional Road Hierarchy	Liveable Neighbourhoods or Subdivision Guide	IRIS FC*	Owner	Function	VPD**	Speed (kph)	FRH** * Colour	Minimum Level of Service
		4	LGA	<b>B.</b> Main function is access. Local distribution network to individual properties. Intersections self controlling with minor measures.	<75	50-110	Grey	1 lane sealed
		5	LGA	<b>C.</b> Main function is access. Local distribution network to individual properties. Intersections self controlling with minor measures.	<75	50-110	Grey	Gravel
		5	LGA	<b>D.</b> Main function is access. Local distribution network to individual properties. Intersections self controlling with minor measures.	<75	50-110	Grey	Dirt track
	Laneways (urban)	9	LGA	Provide access to the side or rear of lots, principally for access to garages.	<300	15	Grey	1 lane sealed
* Integrated Road Information System Functional Class (from Main Roads WA) ** Vehicles per day *** Functional Road Hierarchy								

## 3. Future Demand

### 3.1 Demand Forecasts and Drivers

Demand forecasts and drivers specific for roads infrastructure are travel patterns (heavy haulage, car usage, traffic volumes), transport mode changes and environmental factors.

#### 3.1.1 Travel Patterns

Travel patterns of residents and those who travel through the municipality to other destinations will vary over time. These travel patterns will be influenced by factors such as land use and development, public transport initiatives and the provision of arterial road infrastructure.

#### 3.1.2 Transport Mode Changes

The push for communities to be environmentally sustainable continues to grow, and at some future point, reliance on fossil fuels for automotive travel must reduce. However, during the timeframe of this asset management plan, it is not expected that major changes to transport modes will occur.

#### 3.1.3 Environmental

By their nature, roads have considerable impacts on both the natural environment and nearby communities. People and properties may be in the direct path of road works and affected in a significant way. Others may be indirectly affected by the construction, through the disruption to livelihood, loss of familiar travel routes and community linkages, noise and pollution, and increased road accidents. Changes to the natural environment may include changes to streams and underground water, soil erosion, and interference with fauna and flora. The environment is considered in the design of road works including permits for vegetation removal and replacement programs.

### 3.2 Future Requirements

Based on current outline development plans and subdivision applications, the following additional road assets are expected within the next 3-5 years and 5-10 years respectively:

#### 3.2.1 Additional Roads (3 – 5 years)

Location	Addition Road
Lot 28 Shanns Road, North Dandalup	8.81km
Austin Cove / Austin Lakes, South Yunderup - future stages	4.25km
Murray River Country Estate - Stage 8	2.02km
Riverland Waters, Ravenswood - future stages	4.79km
Ravenswood Green Estate	2.3km
Greenlands Road / Forrest Highway, West Pinjarra	3km
Lot 600 Lakes Road Nambelup (Peel Business Park)	5kms
<b>TOTAL</b>	<b>30.17km</b>

3.2.2 Additional Roads (5 – 10 years)

Location	Addition Road
Lots 1 & 2 Lakes Road, North Dandalup	5.28km
Lot 530 Lakes Road, Stake Hill/Nambeelup	6.80km
Avoca Retreat, North Dandalup	3.79km
Paul Street/Furnissdale Road, Furnissdale	1.76km
Point Grey Development	7.21km
Pollard Street / Alderson Street, Pinjarra	3.88km
Lots 1 & 2 Pinjarra Road, Pinjarra	1.39km
Murray River Country Estate - Stage 9	0.36km
Murray River Country Estate - Stage 10	4.03km
Greenlands Road / Forrest Highway, West Pinjarra	6.7km
Lot 42 Hampton Road, Pinjarra	0.36km
Moores Road, Pinjarra (Industrial) - future stage	0.85km
Lot 602 Beacham Road, Pinjarra	1.89km
<b>TOTAL</b>	<b>44.3km</b>

### 3.3 Demand Impacts and Management

The impact and demand drivers that may affect future service delivery and utilisation of assets are shown in the table below.

#### Demand Management Planning Summary

Demand Drivers	Present Position	Projection	Impact on Services	Demand Management Plan
New Subdivisional Activity	5.74km - next 12 months	30.17km – 3 to 5 years 44.3km – 5 to 10 years	Increase in the lifecycle costs of the Roads assets group	Costs to be considered at budget review and also renewal models
Economic Changes	2018 – 1,065 local businesses	Increase in facilities such as retail trade, education and health.	Predicted growth in the region will see increased demand for new infrastructure and greater wear on existing infrastructure as the population expands. This will likely lead to higher costs to the Shire as asset lives will be reduced.	Continue to monitor and manage ongoing costs
Population Changes / Density	2020 – 19,369	2021 – 20,150 2031 – 37,356 2041 – 80,781	Additional demand for roads infrastructure will increase the lifecycle costs for the Roads asset group. It could also lead to an increase in traffic loads which will reduce pavement useful life.	Funding priority works. Continue to seek grant funding for projects identified in the Strategic Community Plan and Asset Management Plans. Improve understanding of costs and capacity to maintain current service levels  Continue to analyse the cost of providing services and the capacity to fund the current level of service

Demand Drivers	Present Position	Projection	Impact on Services	Demand Management Plan
Changes in Demographics	The majority of the population falls within the 65-69 five-year age bracket (7.4%)	Number of people per household is expected to increase	Increase in population will require improvements to public transport infrastructure.	Monitor community expectations and community service levels and financial capacity with the community to balance priorities for infrastructure with what the community is prepared to pay for
Changes in Demographics	<p>People aged 65 years and above account for approximately 21.5% of the population</p> <p>Community demand for more accessible public transport</p>	<p>Number of people aged 65 and over is expected to increase.</p> <p>Residential areas being converted to bus routes</p>	Increase in population will require improvements to public transport infrastructure.	Monitor community expectations and community service levels and financial capacity with the community to balance priorities for infrastructure with what the community is prepared to pay for
Changes in Technology	New methods regularly available	Changes in road construction methods and the materials used	May increase the life of road components by reducing the cost of construction and maintenance	Look at opportunities to reduce ongoing costs for construction and maintenance
Travel Patterns (heavy haulage, car usage, traffic volumes)	Increase in number of larger vehicles on roads i.e. heavy haulage	Pavements will need to be more substantial and will therefore be more costly	Heavy vehicles have adverse impact on road pavement and road seals	Monitor through Traffic Count Program. Seek alternative transport routes.
Environmental	Increase in number of larger vehicles on roads i.e. heavy haulage	Pavements will need to be more substantial and will therefore be more costly	Higher costs associated with construction methods that are environmentally sustainable e.g. dealing with disposal of contaminated soils, using warm asphalt mix	Continue to consider the environment in the design of road works and ongoing costs

## 4. Risk Management

Risks with regard to roads and kerbs infrastructure are documented and recorded in the Shire's corporate risk register. The following risks have been identified in relation to roads assets.

Risk Details	Risk Assessment			Treatment Strategy	Responsibility
	Likelihood	Consequence	Risk Rating		
Ongoing deterioration of roads/kerbs infrastructure i.e. damage from freight industry	Likely	Major	High (16)	<ol style="list-style-type: none"> <li>Regular condition inspections</li> <li>Annual allocation of sufficient funding and resources</li> <li>Development and regular update of 10 year Roads Capital Works Plan</li> </ol>	Infrastructure Services Infrastructure Services / Executive Leadership Group/ Council
Insufficient funding allocated to road/kerb renewal	Possible	Moderate	Moderate (9)	<ol style="list-style-type: none"> <li>Financial modelling undertaken</li> <li>Workshops with Executive and Council</li> </ol>	Infrastructure Services Corporate Services
Asset loss from disaster (flood, bushfire etc.)	Possible	Moderate	Moderate (9)	<ol style="list-style-type: none"> <li>Disaster Relief and Recovery Coverage (NDRRA)</li> <li>Business Continuity Plan in place</li> </ol>	Corporate Services Risk Management
Roads/kerbs in poor condition causes serious injury to staff or community member	Possible	Moderate	Moderate (9)	<ol style="list-style-type: none"> <li>Undertake roads inspections and maintenance as per Road Maintenance and Operational Plan</li> <li>Workflows monitored through the AssetMaster Requests and Work Orders</li> </ol>	Infrastructure Services
Road design non-compliant with current legislation or regulations	Possible	Moderate	Moderate (9)	<ol style="list-style-type: none"> <li>Non-compliance works to be given priority</li> <li>Undertake regular inspection and maintenance regimes</li> <li>Allocate sufficient funding and resources</li> </ol>	Infrastructure Services Executive Leadership Group/ Council
Road/kerb construction and maintenance non-compliant with current legislation or regulations	Possible	Moderate	Moderate (9)	<ol style="list-style-type: none"> <li>Non-compliance works to be given priority</li> <li>Undertake regular inspection and maintenance regimes</li> <li>Allocate sufficient funding and resources</li> </ol>	Infrastructure Services Infrastructure Services Executive Leadership Group/ Council
Maintenance practices not environmentally sustainable	Unlikely	Moderate	Moderate (6)	<ol style="list-style-type: none"> <li>Ensure maintenance practices are carried out in accordance with environmentally sensitive procedures.</li> <li>Undertake post construction inspection / assessment.</li> </ol>	Infrastructure Services
Failure to maintain and develop rural road network for changing non-local road users	Possible	Moderate	Moderate (9)	<ol style="list-style-type: none"> <li>Asset Management Review and Renewal Programs.</li> <li>Development and regular update of 10 year Roads Capital Works Program</li> </ol>	Infrastructure Services
Operation of plant and equipment within road reserve	Possible	Moderate	Moderate (9)	<ol style="list-style-type: none"> <li>Compliance with OSH (e.g. Traffic Management) civil legislation and Australian Standards</li> </ol>	Infrastructure Services
Road/kerbs Levels of Service not delivered	Possible	Moderate	Moderate (9)	<ol style="list-style-type: none"> <li>Undertake road inspections and maintenance as per the Roads Maintenance and Operational Plan</li> <li>Road and kerbs level of service monitored through AssetMaster Requests and Work Orders</li> <li>Annual allocation of sufficient funding and resources</li> </ol>	Infrastructure Services Infrastructure Services / AMWG Infrastructure Services / Executive Leadership Group/ Council

## 5. Critical Assets

A critical asset is “an asset having potential to impact on the achievement of an organisation’s objectives”. Critical Assets are also essential for supporting the business and social needs of both the local and national economy, and have a high consequence in the event they fail.

Critical Road assets include those that provide a single entry/exit point to a particular suburb or area. These include:

- Nanga Road/Nanga Bridge
- South Yunderup Road/Bridge
- North Yunderup Road/Bridge
- East Coolup Road/Bridge
- Burnside Road
- Fiegert Road
- Patterson Road/Bridge

## 6. Life Cycle Management Plan

### 6.1 Physical Parameters

The Shire’s Corporate Asset Management System contains a listing of all road and kerb segments and has the capacity to include the following details:

- Date of construction
- Pavement, surface and formation area
- Surface/Material type
- Road width and length
- Kerb length
- Hierarchy classification
- Condition ratings
- Cross section type
- Traffic count data

Methods for collection and collation of road and kerb inventory data have varied over time. Original construction plans have been used, where available, to allocate the year of construction, road pavement, surface type and road dimensions to each segment. Where construction plans are not available, officer knowledge has been used to estimate dates in relation to road components. Data is confirmed and updated after each 4 yearly inspection program. The information contained in this plan is based on the data currently contained within the Corporate Asset Management System and is up to date for the Shire’s sealed roads.



The following table shows the extent in terms of the total network of each of the classifications of the road hierarchy both by area and length:

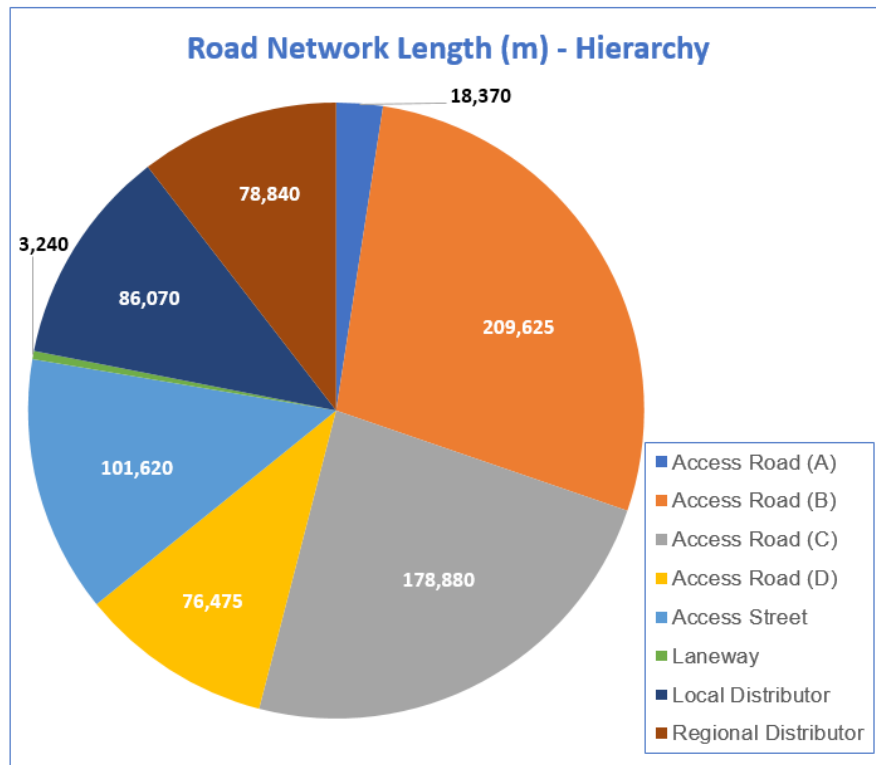
Asset Type	Hierarchy	Surface Area (sqm)	Pavement Area (sqm)	Formation Area (sqm)	Length (m)
Access Road – Rural	Access Road (A)	126,063	162,358	204,093	18,370
	Access Road (B)	1,240,703	1,662,889	2,194,807	209,625
	Access Road (C)	0	978,946	1,403,275	178,880
	Access Road (D)	0	1,020	280,268	76,475
<b>Access – Rural Total</b>		<b>1,366,766</b>	<b>2,805,213</b>	<b>4,082,443</b>	<b>483,350</b>
Access Road – Urban	Access Street	727,537	768,054	800,667	101,620
	Laneway	12,348	13,931	17,973	3,240
<b>Access – Urban Total</b>		<b>739,885</b>	<b>781,985</b>	<b>818,640</b>	<b>104,860</b>
Distributor Road	Local Distributor	600,474	795,962	970,121	86,070
	Regional Distributor	595,189	746,545	78,840	78,840
<b>Distributor Total</b>		<b>1,195,663</b>	<b>1,542,507</b>	<b>1,914,540</b>	<b>164,910</b>
<b>Roads Grand Total</b>		<b>3,302,314</b>	<b>5,129,705</b>	<b>6,815,623</b>	<b>753,120</b>
Kerb	All				234,791

The plan covers pavement, seal and kerbing that fall under the care, control and responsibility of the Shire of Murray. Assets covered by this plan include:

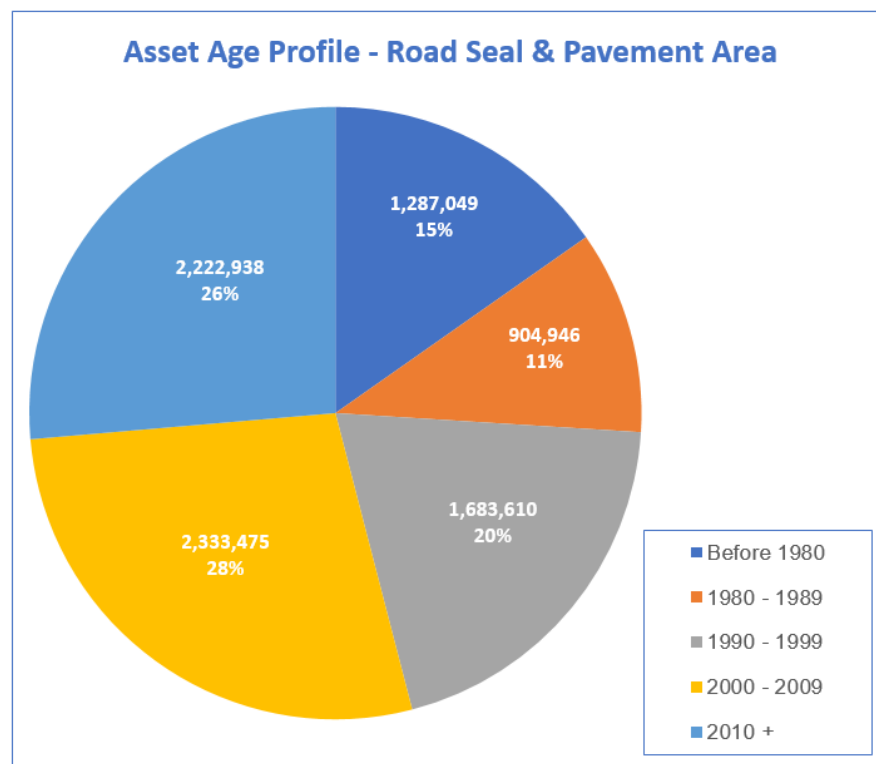
Asset Type	Surface Replacement Value (\$)	Pavement Replacement Value (\$)	Formation Replacement Value (\$)	Total Replacement Value (\$)
Access Road	25,138,029	66,164,660	21,412,601	112,715,290
Laneway	198,982	288,057	80,519	567,558
Local Distributor	6,325,546	16,826,637	4,346,142	27,498,325
Regional Distributor	6,517,350	15,781,961	4,230,997	26,530,308
<b>Roads Total</b>	<b>38,179,907</b>	<b>99,061,315</b>	<b>30,070,260</b>	<b>167,311,481</b>
Kerb				6,085,783
<b>Grand Total</b>				<b>173,397,264</b>

The values listed above are based on Unit Replacement Rates that were compiled in June 2017. New values will be available in June 2020.

The figure below summarises the extent in terms of the total network of each of the classifications of road hierarchy by segment length.



The figure below summarises the Asset Age Profile of Shire of Murray Roads.



The road network comprises three main components being wearing course, pavement and kerbing.

## 6.2 Asset Condition

In November 2019, the Shire of Murray engaged Consultants to undertake a visual condition assessment of the road network. The Shire now has a 100% understanding of the extent and condition of its sealed road network. Road assets include pavement, seal and kerbing.

WALGA/RoMan data collection and condition scaling methods are used to assess the current condition of individual characteristics of roads. A condition rating on a scale of 1 – 5 is used at this level, where 1 = new and 5 = total deterioration. These individual characteristics include:

Condition Characteristic	Severity	Extent
Cracking Crocodile Linear Transverse	1. Very Good: None 2. Good: <2mm 3. Fair: 2 - <6mm 4. Poor: 6 - <8mm 5. Very Poor: >8mm	1. No Area Affected 2. Affected Area >0 - <10% 3. Affected Area 10 - <30% 4. Affected Area 30 - <50% 5. Affected Area >50%
Surface Defects	1. None 2. Slight 3. Moderate 4. Heavy 5. Extreme	1. No Area Affected 2. Affected Area >0 - <5% 3. Affected Area 5 - <10% 4. Affected Area 10 - <20% 5. Affected Area >20%
Surface Defect Occurrence	N/A	Spread across segment Localised defect(s) Intersection only
Patches	1. Very Good 2. Good 3. Fair 4. Poor 5. Very Poor	1. No Area Affected 2. Affected Area >0 - <5% 3. Affected Area 5 - <10% 4. Affected Area 10 - <20% 5. Affected Area >20%
Rutting	1. Very Good: <5mm 2. Good: 5 - <10mm 3. Fair: 10 - <20mm 4. Poor: 20 - <30mm 5. Very Poor: >30mm	1. No Area Affected 2. Affected Area >0 - <5% 3. Affected Area 5 - <10% 4. Affected Area 10 - <20% 5. Affected Area >20%
Surface Texture Deficiencies Stripping Ravelling Flushing Polishing	1. None 2. Slight 3. Moderate 4. Heavy 5. Extreme	1. No Area Affected 2. Affected Area >0 - <10% 3. Affected Area 10 - <30% 4. Affected Area 30 - <50% 5. Affected Area >50%

Seal Conditions	Description
Binder Condition	1. Very Good 2. Good 3. Fair 4. Poor 5. Very Poor
Binder Stone	1. No Area Affected 2. Affected Area >0 - <5% 3. Affected Area 5 - <10% 4. Affected Area 10 - <20% 5. Affected Area >20%
Asphalt Condition	1. Very Good 2. Good 3. Fair 4. Poor 5. Very Poor

Perimeter Conditions	Description
Shoulder	1: Very Good 2: Good 3: Fair 4: Poor 5: Very Poor
Edge Breaks	1: Very Good: <20mm 2: Good: 20 - <75mm 3: Fair: 75 - <150mm 4: Poor: 150 - <250mm 5: Very Poor: >250mm
Drain	1: Very Good 2: Good 3: Fair 4: Poor 5: Very Poor

Unsealed Roads	Description	Extent
Unsealed Shape	1 Very Good	Crown >1m above table drain
	2 Good	Crown 0.75m to 1m above table drain
	3 Fair	Crown 0.5m to 0.75m above table drain
	4 Poor	Crown 0.25m to 0.5m above table drain
	5 Very Poor	Crown <0.25m above table drain
Depth of Base	1 Very Thick	Gravel depth > 200mm
	2 Thick	Gravel depth 150 and 200mm
	3 Moderate	Gravel depth 100 and 150mm
	4 Thin	Gravel depth 50 and 100mm
	5 Very Thin	Gravel depth < 50mm

### 6.2.1 Wearing Course

The wearing course is the visible surface of the road. Within the Shire of Murray, this is normally a 30mm thick layer of asphalt or a two coat chip seal made of bitumen that is sprayed directly onto the road pavement and then covered in a 7, 10 or 14mm stone. The second coat is applied the same way approximately 12 months after the first coat. While significantly cheaper to use, chip seals are not used in residential streets due to the fact that asphalt has a higher aesthetic appeal and lower noise characteristics.

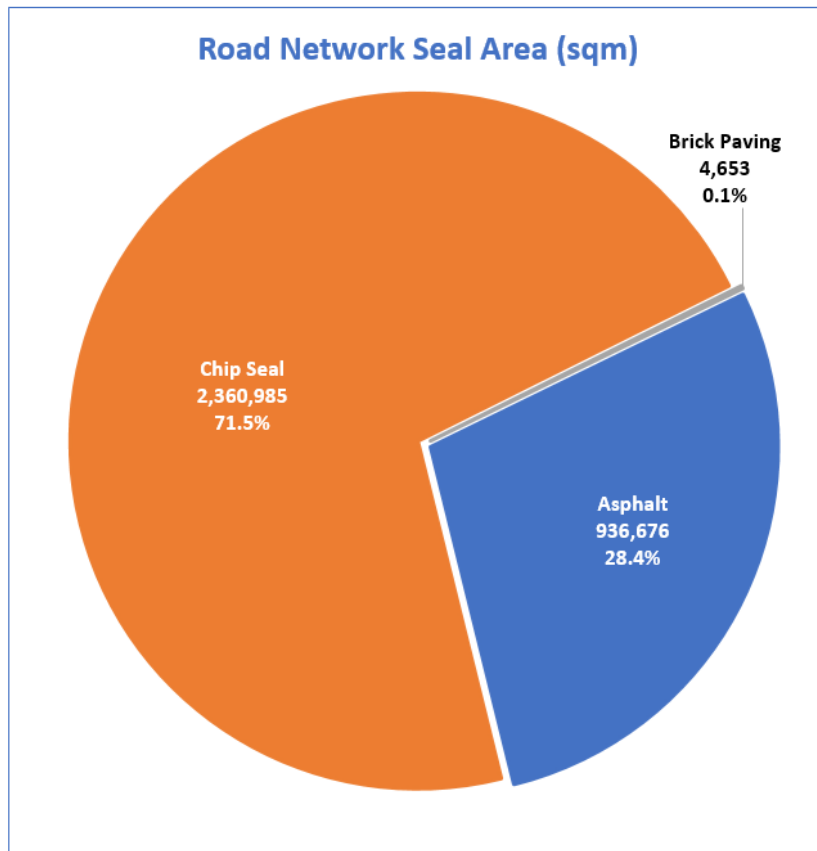
The wearing course provides a hard bound surface, resulting in a smooth, low noise, ride for vehicles. It protects the road pavement from water, provides good run-off properties to direct storm water to the kerb line and also provides good skid resistance for vehicles when cornering and/or braking.

It is vitally important that the integrity of the wearing course is maintained. Defects in the wearing course through cracking and loss of stone and/or binder will lead to pot holes forming in the pavement. While pot holes themselves are a danger to traffic and an inconvenience, they also allow water to penetrate the pavement which can lead to structural destabilisation of the pavement. This in turn can lead to further potholing and localised failure of the whole road structure, hence the need to consistently monitor the performance of the wearing course.

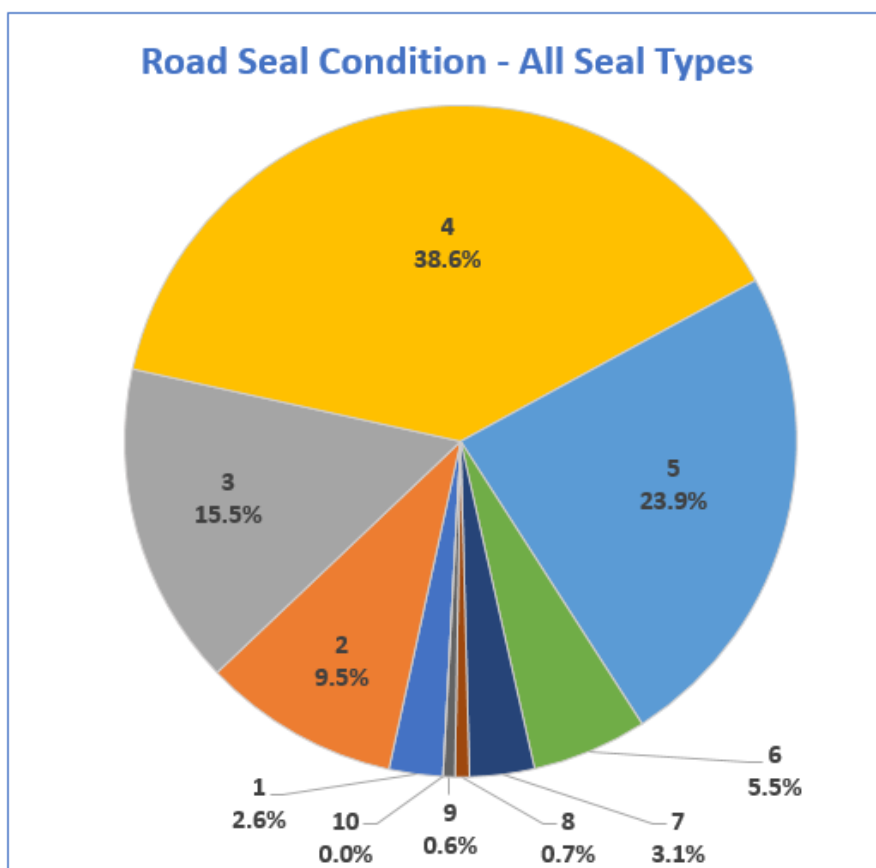
The following table shows the breakdown of the wearing course by seal type.

Asset Type	Seal Type	Surface Area (sqm)	Pavement Area (sqm)	Formation Area (sqm)	Length (m)
Sealed Road	Asphalt	936,676	1,031,721	1,145,985	125,660
	Chip Seal	2,360,985	3,112,170	3,976,185	370,505
	Brick Paving	4,653	4,665	4,665	640
<b>Sealed Road Total</b>		<b>3,302,314</b>	<b>4,148,556</b>	<b>5,126,835</b>	<b>496,805</b>
Unsealed Road	Unsurfaced		981,149	1,688,788	256,315
<b>Grand Total</b>		<b>3,302,314</b>	<b>5,129,705</b>	<b>6,815,623</b>	<b>753,120</b>

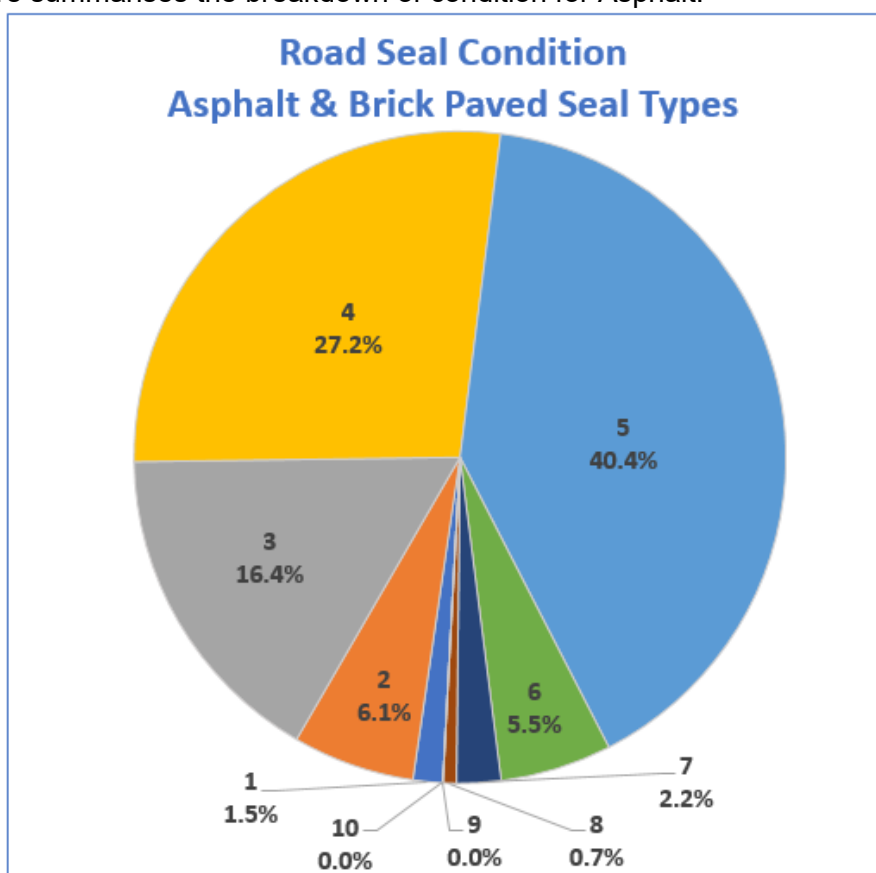
The below figure summarises Road network broken down by seal type (sqm)



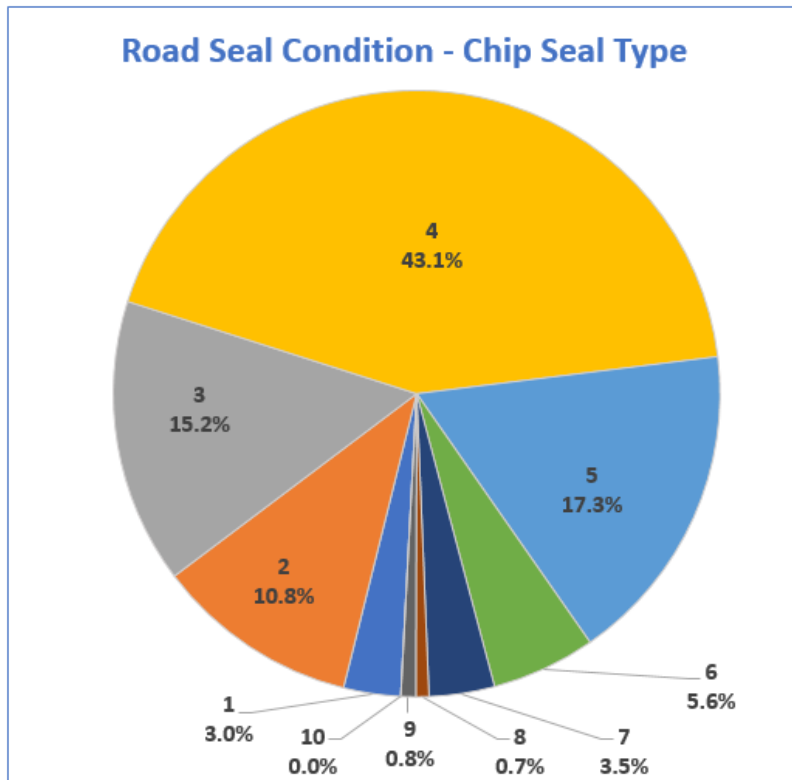
Within the Shire of Murray, asphalt and brick paving makes up approximately 28.5% of the sealed network, chip seal makes up approximately 71.5%. The following graph indicates the combined condition of the wearing course layer with 1 being new condition and 10 being total deterioration.



The below figure summarises the breakdown of condition for Asphalt.



The below figure summarises the breakdown of condition for Chip Seal.



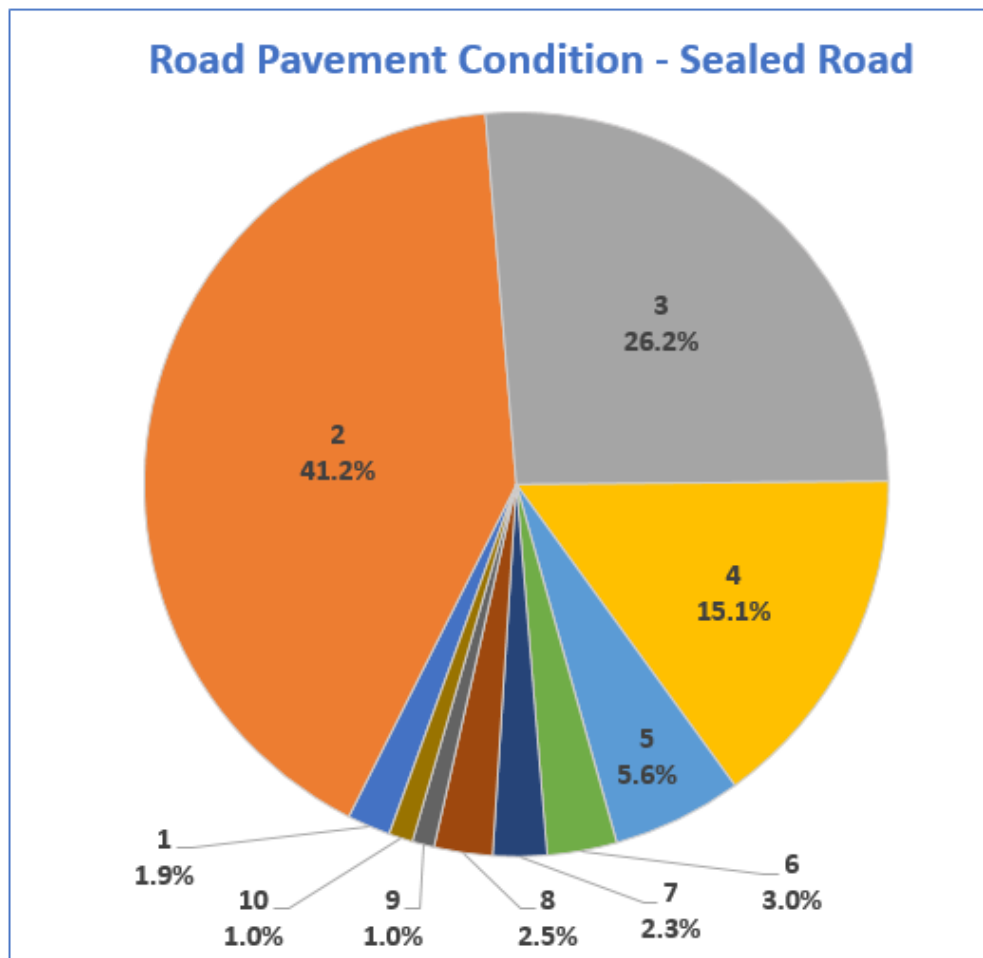
The main two contributing factors to deterioration are traffic (in particular, heavy vehicles) and the high water table. In addition, long periods of daylight throughout the year and high surface temperatures in the summer period, coupled with intense rainfall during winter storms, creates ideal conditions for deterioration of the seal binder. Once the seal binder starts to break down, the wearing course starts to lose surface stone allowing greater opportunity for water to ingress the pavement leading to pot holes. Early intervention through a regular reseal program can prevent extensive pot holing occurring. As noted previously, allowing pot holes to form can lead to ingress of water to the road pavement. If the integrity of the pavement is compromised, repair cost can be significantly more expensive than the cost of the wearing course reseal that could have prevented it.

Given that the life of an asphaltic cement wearing course is approximately 30 years, it can be expected that 3.33% of the road network should be resealed every year. In the case of the Shire of Murray this equates to 31,379m<sup>2</sup> of asphalt reseal each year. Assuming a rate of \$13.47/m<sup>2</sup>, this equates to an annual renewal expenditure requirement of approximately \$422,656 on asphalt reseals.

With a life of 25 years, 4% of the networks chip seals will reach the end of their life annually. This equates to 94,439m<sup>2</sup> per year. Assuming a rate of \$10.13/m<sup>2</sup>, the annual renewal expenditure requirement is approximately \$956,671 for chip seal reseals.

The pavement is the hard material that forms the road and supports the wearing course. It is usually made of hard granular material such as gravel, road base or limestone. It is vitally important that the pavement is kept free from water entry as water changes the structural integrity of the pavement. Pavements need to be not only protected from surface water but also ground water by the use of table drains or sub-soil drainage. Water penetration of either the pavement or sub grade is the single biggest contributor to pavement failure.

The figure below summarises the breakdown of pavement condition for sealed roads.





By combining the conditions of key individual characteristics of roads, the Shire is able to calculate an Overall Condition Index (OCI) for the road components using a scale of 1 – 10. Other characteristics can be utilised to better refine capital works programs. The following formulas have been developed, based on advice from consultants and on site verification:

Road Component	Formula	
Surface Condition Index	[(asphalt/binder condition x 0.7) + (linear cracking extent x 0.25) + (local surface defects extent x 0.05)] x 2	
Sealed Road Pavement Condition Index	[(crocodile cracking extent x 0.3) + (rutting extent x 0.3) + (local surface defects extent x 0.25) + (transverse cracking extent x 0.15)] x 2	
Unsealed Pavement	[(depth of base x 0.7) + (unsealed shape x 0.3)] x 2	
Kerbing	Roman Score	1-10 Score
	1	2 or 3 if seal/pavement is at or approaching intervention
	2	4 or 5 if seal/pavement is at or approaching intervention
	3	6 or 7 if seal/pavement is at or approaching intervention
	4	8 or 9 if seal/pavement is at or approaching intervention
	5	10

Overall Condition Index scores begin at 2, leaving a score of 1 available to be applied to newly constructed roads.

The matrix below is used for the more complex scores, which have a severity and an extent score:

Severity	Extent				
	1	2	3	4	5
1	2	2	2	2	2
2	2	3	4	5	6
3	2	4	5	6	8
4	2	5	6	7	9
5	2	6	7	8	10

The Shire of Murray inputs and updates road inventory information on an “as constructed” basis. The Shire also carries out a visual condition rating of the network approximately every 4 years, with the most recent survey being completed in November 2019.

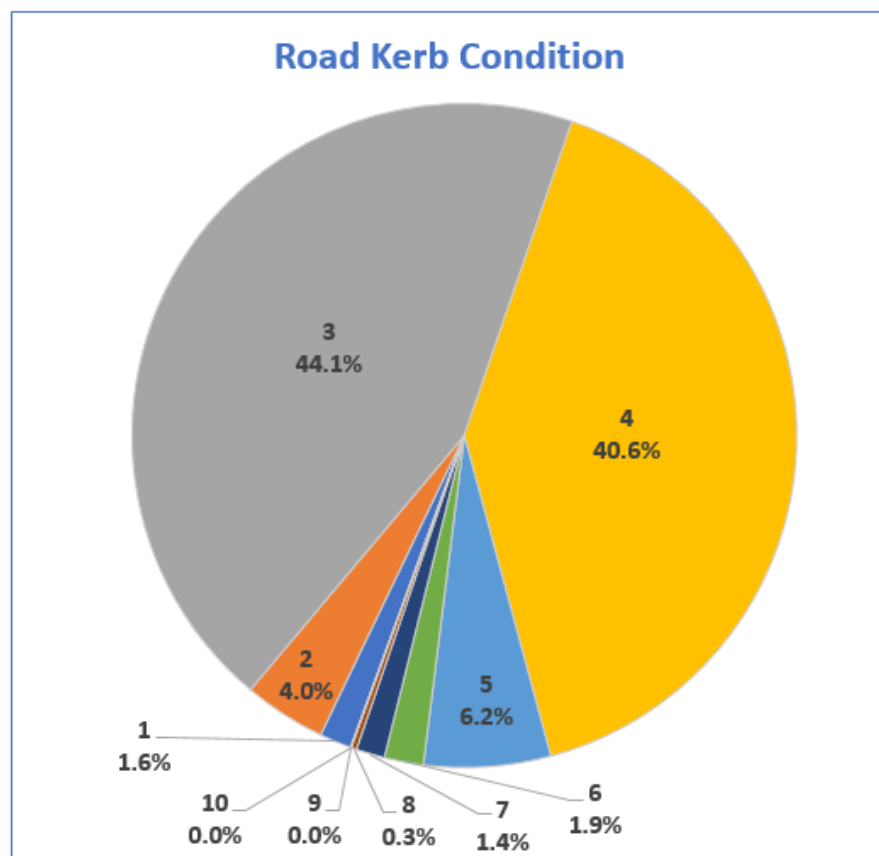
Kerbing is the concrete structure that generally runs down both sides of the road. The repair of existing or construction of new kerb in townsites assists with the efficient movement of storm-water, protection of residences from flooding and protection of the road pavement from water infiltration. In addition to this, damaged sections have the potential to pose a significant hazard to pedestrians and cause damage to vehicles.

Kerb Condition	Consultants	Details
IPWEA Practice Note 2	1 Very good	New or as new, no defects, kerb face well proud of surface.
	2 Good	Signs of wear and tear, no intervention, no risk.
	3 Fair	Isolated defects, areas of kerb face lower than 50mm, routine maintenance required, minimal risk.
	4 Poor	General cracking and/or low kerb face, areas require replacement with potential risk to user safety.
	5 Very Poor	Significant defects, requires replacement, high risk.

A recent condition assessment of kerbs has also been undertaken by consultants, using a scale 1 – 5 condition rating criteria. An example of the rating criteria is summarised in Table 1.

The Shire of Murray uses a standard scale of 1 – 10, where 1 = new and 10 = total deterioration. This data has been converted to a scale 1 – 10 and results recorded in the Corporate Asset Register.

The figure below summarises the breakdown of condition for kerbs.



## 6.3 Intervention Levels

The intervention levels are based on the Western Australian Asset Management Improvement Programme scoring method, and are as follows:

Asset Category	Condition
Pavement (Distributor Roads)	7.0
Pavement (Access Roads)	8.0
Unsealed Roads	8.0
Asphalt Seal	7.0
Chip Seal	7.0
Kerbing (Distributor Roads / Industrial Areas)	7.0
Kerbing (Access Roads)	8.0

## 6.4 Asset Valuations

The Shire's Corporate Asset Management System values the road network based on the current condition of each road section and in reference to a standard set of uniform unit rates of construction in respect of the work required to return the section of road to a new condition.

The value of Roads infrastructure as at 20 April 2020 covered by this asset management plan is summarised below.

Roads	
Current Replacement Cost	\$ 167,311,481

The value of Kerbing infrastructure as at 20 April 2020 covered by this asset management plan is summarised below.

Kerbs	
Current Replacement Cost	\$ 6,085,783

## 6.5 Useful Life

To validate the estimated useful life of assets, a sample of roads components were selected to represent the asset portfolio. The age of each component was used to determine what length of time the component takes to move from condition 1 to condition 10. This assessment is based on the assumption that deterioration rates remain approximately equal throughout the life of the asset. The assessment sample will be extended and deterioration rates analysed further in future revisions of this plan. The results of the initial assessment are summarised below.

Road Pavement – Distributor Road							
Asset ID	Asset Name	Pave Year	Condition Rating	Rating Date	Actual Age at Rating	Condition Based Age	Expected Life
RSG3516	Del Park Road 14500 - 15000	1987	5	7/10/2019	32	30	62
RSG2196	Hopeland Road 920 - 1420	1993	5	7/10/2019	26	30	56
RSG2187	Lakes Road 17880 - 18030	1994	4	7/10/2019	25	24	61
RSG2139	Herron Point Road 1600 - 2400	1995	4	7/10/2019	24	24	60
RSG2523	Old Mandurah Road 2640 - 3140	1998	3	7/10/2019	21	18	63
RSG2994	Corio Road 5830 - 6560	2000	3	7/10/2019	19	18	61
RSG2539	Riverside Drive 1110 - 1280	2002	3	7/10/2019	17	18	59
RSG2113	North Yunderup Road 420 - 820	2003	3	7/10/2019	16	18	58
Average:							<b>60</b>

Road Pavement – Access Road							
Asset ID	Asset Name	Pave Year	Condition Rating	Rating Date	Actual Age at Rating	Condition Based Age	Expected Life
RSG2261	Hart Road 4260 - 4850	1957	8	7/10/2019	62	64	78
RSG2434	Hines Road 1590 - 2340	1980	5	7/10/2019	39	40	79
RSG2369	Congdon Avenue 0 - 290	1984	4	7/10/2019	35	32	83
RSG3043	Sollya Crescent 0 - 340	1986	4	7/10/2019	33	32	81
RSG2109	Greenlands Road 5170 - 6410	1988	4	7/10/2019	31	32	79
RSG2266	Mayfield Road 30 - 700	1993	3	7/10/2019	26	24	82
RSG2415	Thomas Street 360 - 460	1995	3	7/10/2019	24	24	80
RSG3642	Green Grove Loop 0 - 370	1997	3	7/10/2019	22	24	78
Average:							<b>80</b>

Road Surface - Asphalt							
Asset ID	Asset Name	Seal Year	Condition Rating	Rating Date	Actual Age at Rating	Condition Based Age	Expected Life
RSG3655	Sanctuary Drive 0 - 200	1997	7	7/10/2019	22	21	31
RSG2436	Hines Road 3080 - 3270	2001	6	7/10/2019	18	18	30
RSG2112	North Yunderup Road 20 - 420	2003	5	7/10/2019	16	15	31
RSG2538	Riverside Drive 480 - 1110	2005	5	7/10/2019	14	15	29
RSG3830	Warrior Boulevard 20 - 210	2006	4	7/10/2019	13	12	31
RSG2507	Edward Street 140 - 240	2007	4	7/10/2019	12	12	30
RSG3058	Osborne Place 0 - 70	2008	4	7/10/2019	11	12	29
RSG3389	Sunshine Place 350 - 380	2011	3	7/10/2019	8	9	29
Average:							<b>30</b>

Road Surface – Chip Seal							
Asset ID	Asset Name	Seal Year	Condition Rating	Rating Date	Actual Age at Rating	Condition Based Age	Expected Life
RSG2259	Hart Road 2890 - 3670	1997	9	7/10/2019	22	22.5	24.5
RSG3135	Fawcett Street 0 - 540	1998	8	7/10/2019	21	20	26.0
RSG3001	Smith Street 340 - 660	2001	7	7/10/2019	18	17.5	25.5
RSG2934	Deeble Road 0 - 390	2006	5	7/10/2019	13	12.5	25.5
RSG2201	Hopeland Road 3830 - 4420	2007	5	7/10/2019	12	12.5	24.5
RSG2303	Readheads Road 4180 - 4220	2010	8	7/10/2019	21	20	26.0
RSG2124	Fishermans Road 3270 - 3690	2011	3	7/10/2019	8	7.5	25.5
RSG3145	Murray Street (Coolup) 0 - 20	2012	3	7/10/2019	7	7.5	24.5
Average:							<b>25.0</b>

The above information provides a basis for future allocation of useful life for road components. It is concluded that the samples were generally representative of the deterioration rate of the Shire's roads and that the estimated useful lives for the components accurately represent the actual performance of useful lives for these assets. The estimated useful life of road components based on the sample remains unchanged from the original asset management plan, and is as follows:

Component	Type	Useful Life
Road Surface	Asphalt	30 years
Road Surface	Chip Seal	25 years
Road Pavement	Distributor Road	60 years
Road Pavement	Access Road	80 years
Kerbing	Concrete	50 years

## 6.6 Operations and Maintenance

### 6.6.1 Operations

Operational activities keep the asset utilised but have no effect on condition. Typical operational activities include:

- Street sweeping
- Inspections
- Roadside vegetation clearance

### 6.6.2 Maintenance

Maintenance activities are those routine works which keep assets operating to the required service levels. They fall into two broad categories:

1. Planned Maintenance (proactive): inspection and maintenance works planned to prevent asset failure.
2. Unplanned Maintenance (reactive): Reactive action to correct asset malfunctions and failures on an as required basis (i.e. emergency repairs). Typical maintenance activities include:
  - Potholes
  - Patching Surface Defects
  - Edge Breaks
  - Shoulder "Drop Off"
  - Grading
  - Grading & Patrol Works
  - Replacement of Signage
  - Roadside Vegetation Clearance
  - Repair washouts (flooding)

Maintenance work is carried out in accordance with the following Standards and Specifications:

- Austroads standards and specifications;
- Australian Standards;
- Main Roads WA
- IPWEA
- A-Spec;
- Local policy and specifications

Road and kerb maintenance activities undertaken by the Shire of Murray can be defined as:

Activity	Purpose	Maintenance Type
Spray Seal	Intervention and Safety	Programmed
Asphalt	Intervention and Safety	Programmed
Line Marking (Roads)	Safety	MRWA Responsibility
Patching	Intervention and Safety	Programmed
Maintenance Grading	Intervention and Safety	Programmed
Edge Repairs	Intervention and Safety	Reactive
Road Maintenance (i.e. pot holes, surface defects etc.)	Intervention and Safety	Reactive
Cartage	Safety	Reactive
Kerbing	Intervention and Safety	Programmed

Roads annual operating and maintenance costs for 2018/2019 are summarised below:

Activity	Cost
Re-sheeting Works	\$39,778
Maintenance Grading	\$307,509
Regional Road Maintenance	\$35,457
Road Patching	\$226,959
Edge Repairs	\$81,032
Street Sweeping	\$46,995
Other Road Maintenance	\$68,734
Bus Routes Maintenance	\$23,883
Haulage Route Maintenance	\$43,173
Kerbing Maintenance	\$13,059
<b>TOTAL</b>	<b>\$886,579</b>

Reactive work has historically encompassed the repair or replacement of road elements as they wear out or are damaged. By its nature, reactive work must be carried out as the need arises and cannot be scheduled in advance. Work is prioritised as it arises on the basis of defined intervention levels and response times. The Shire of Murray will aim to move towards a decreased percentage of reactive maintenance, as this will lead to increased savings through economies of scale which are able to be achieved in relation to planned maintenance activities.

Response times define a reasonable time frame within which it can be expected for the Shire to remedy the defect. The Shire's maintenance strategy defines the target response times in relation to the action of all identified hazards/defects.

### 6.6.3 Operations and Maintenance Plan

In seeking to ensure that the Shire's road network continues to meet the needs and expectations of the community, a Roads Maintenance and Operational Plan has been developed. It is tailored to suit the Shire's road infrastructure and considers the affordability in delivering a reasonable level of service of road maintenance on a day to day basis. The Road Maintenance and Operational Plan (below) is a management tool for the discharge of the Shire's routine activities to inspect, maintain and repair the local road network for which the Shire is responsible. The Shire through proactive maintenance, will endeavour to ensure that the target levels of service are achieved within the constraints of available resources. The maintenance strategies that have been developed are anticipated to reduce both risk and reactive maintenance associated with road infrastructure.

Inspections – Roads

Activity	Level of Service	Inspection Regimes	Inspection Schedule	
<p>The undertaking, by suitably qualified and experienced staff, regular inspections of the road asset to determine condition, compliance with maintenance standards and risk.</p>	<p>Council will maintain its transport infrastructure in a sustainable manner so that it is safe and fit for purpose. This will be achieved by regularly assessing condition in ongoing inspection regimes.</p>	<p>a) <b>Condition assessment survey</b> undertaken to determine the condition of the asset, its useful life and, if relevant, any asset renewal requirements.</p> <p>b) <b>Routine Condition and Maintenance Inspections</b> are undertaken in conjunction with routine maintenance patrols to determine compliance with maintenance target intervention levels and to identify defects against standards in this plan. Maintenance works are programmed in accordance with the maintenance table in this document.</p> <p>c) <b>Responsive inspections</b> are undertaken in response to customer reports, officer reports or maintenance staff reports. Identified defect works are rectified in accordance with the maintenance table in this document. Identified maintenance works are programmed in accordance with the maintenance table in this document.</p>	Primary Distributors	Responsibility of Main Roads WA
			Regional Distributors	<p>a) 4 years</p> <p>b) 12 months</p> <p>c) as appropriate</p>
			Local Distributors	<p>a) 4 years</p> <p>b) 12 months</p> <p>c) as appropriate</p>
			Access Streets	<p>a) 4 years</p> <p>b) 12 months for those roads identified as being close to intervention level</p> <p>c) as appropriate</p>
			Laneways	<p>a) 4 years</p> <p>b) 12 months for those roads identified as being close to intervention level</p> <p>c) as appropriate</p>



**Maintenance Target Levels of Service – Roads**

**Sealed Roads – Maintenance**

Defect	Level of Service	Risk Assessment Intervention Levels/ Repair Activity	Timeliness of Maintenance From Date of Request	
<p><b>Potholes</b>                      These are defined as small breaks and depressions in the sealed surface where loss of pavement wearing surface has occurred</p>	<p>Reasonably smooth sealed driving surface with no dangerous deformations</p>	<p><b>M001 Repair Pothole:</b> As soon as identified (no minimum size)</p>	Regional Distributors	2-3 working days
			Local Distributors	5 working days
			Access Streets	2 weeks
			Laneways	4 weeks
<p><b>Surface Defects</b>                      Defined as rough surface caused by rutting, depressions or failed areas of pavement</p>	<p>Reasonably smooth sealed driving surface with no dangerous deformations.                       Sealed surface shall provide reasonable friction level for vehicles.</p>	<p>Rectify when the failed area reaches the following intervention levels</p> <p>a) <b>M002 Rectify rutting &amp; depression</b> Rutting &amp; depressions &gt;5m<sup>2</sup>                      Rutting more than 30mm deep</p> <p>b) <b>M003 Rectify broken out pavement</b>                      Broken out pavement &gt;5m<sup>2</sup></p> <p>c) <b>M004 Sweep loose stones</b>                      Loose stones (&gt;10mm stone) &gt;10m<sup>2</sup> at intersections</p>	Regional Distributors	a) 2 weeks b) 2 weeks c) 5 days
			Local Distributors	a) 3 weeks b) 3 weeks c) 10 working days
			Access Streets	a) 6 weeks b) 6 weeks c) 2 weeks
			Laneways	a) 10 weeks b) 10 weeks c) 2 weeks

Defect	Level of Service	Risk Assessment Intervention Levels/ Repair Activity	Timeliness of Maintenance From Date of Request	
<p><b>Water Over Road</b> Defined as areas where isolated localised flooding makes roads impassable or may obscure hazards.</p> <p>Note: Does not include water over road from storm/flood events, (which results in water over road for 2 hours or less).</p>	<p>Provision of warning to road users of hazard or potential hazards.</p>	<p>a) <b>M005 Localised flooding</b> where road is still trafficable.</p> <p>b) <b>M006 Localised flooding</b> where road is not trafficable.</p>	Regional Distributors	<p>a) Warning sign within 4 hours b) Close road within 4 hours</p>
			Local Distributors	<p>a) Warning sign within 12 hours b) Close road within 12 hours</p>
			Access Streets	<p>a) Warning sign within 24 hours b) Close road within 24 hours</p>
			Laneways	<p>a) Warning sign within 24 hours b) Close road within 24 hours</p>
<p><b>Edge Breaks</b> These are defined as fretting along the seal edge resulting reduced seal width. Usually associated with eroded or weak shoulders in the vicinity of the bitumen edge.</p>	<p>Consistent nominal sealed width with no dangerous deformations.</p>	<p><b>M007 Repair edge break</b> when edge break exceeds 150mm laterally, for a 20m length including compromise driver safety.</p>	Regional Distributors	1 week
			Local Distributors	4 weeks
			Access Streets	12 weeks
			Laneways	12 weeks
<p><b>Shoulder “Drop Off”</b> These are defined as the result of erosion of the unsealed road shoulder adjacent to the seal edge resulting in a “drop off” at the seal edge.</p>	<p>Relatively consistent surface level between seal and the edge of the adjacent road shoulder.</p>	<p><b>M008 Repair “drop off”</b> when the drop off from pavement exceeds 100mm (vertically) for a 20m length</p>	Regional Distributors	2 weeks
			Local Distributors	3 weeks
			Access Streets	6 weeks
			Laneways	10 weeks

Defect	Level of Service	Risk Assessment Intervention Levels/ Repair Activity	Timeliness of Maintenance From Date of Request	
<p><b>Roadside Vegetation - Trees</b>                      The cyclic maintenance of trees and shrubs within the road reserves (outside of urban areas)</p>	<p>Provide safe clearance for large vehicles.</p> <p>Provide sufficient unobstructed view to ensure vision and safe entry to intersections.</p> <p>Provide unobstructed view of regulatory and cautionary signs.</p>	<p><b>M009 Prune trees</b> to maintain vehicle clearance limits of 5.5m vertically and clear sight lines at intersections and bends.</p>	Regional Distributors	10 working days
			Local Distributors	10 working days
			Access Streets	10 working days
			Laneways	10 working days
<p><b>Signs (non regulatory) and Delineation</b>                      Covers the replacement of damaged or missing signs, guideposts, marker posts and delineators.</p>	<p>Delineation as necessary to enhance safety.</p> <p>Signs to be visible and legible.</p>	<p><b>M010 Replace guideposts</b></p> <p><b>M011 Replace signs</b>                      NB: Additional 3 weeks if new signs are to be ordered</p>	Regional Distributors	5 working days
			Local Distributors	10 working days
			Access Streets	21 working days
			Laneways	21 working days
<p><b>Regulatory Signs</b>                      Covers the replacement of damaged or missing regulatory signs.</p>	<p>Regulatory signs to be visible and legible.</p>	<p><b>M028 Report to MRWA</b></p>	All Roads	MRWA

Defect	Level of Service	Risk Assessment Intervention Levels/ Repair Activity	Timeliness of Maintenance From Date of Request	
<b>Kerbing Defect</b> Cover damage to kerbs, lifting or lateral movement of kerb.	Kerbing to function as a edge protection, guide runoff water to gullies.	<b>Repair or Replace Kerbing</b>  Replace or remove kerbs when it results in a safety concern to pedestrians and vehicles, to prevent further damage to road.	Regional Distributors	10 Weeks
			Local Distributors	10 - 20 Weeks
			Access Streets	> 20 Weeks
			Laneways	> 20 Weeks
<b>Linemarking defect</b> Covers line marking in car parks and parking bays. (All other linemarking MRWA responsibility)	Line marking visible and legible.	<b>Remark Linemarking Parking areas</b>  All other linemarking to be referred to MRWA	Regional Distributors	MRWA
			Local Distributors	MRWA
			Access Streets	MRWA
			Parking Areas	20 Weeks
<b>Illegal Dumping</b> Covers dumping within road reserves.	Provide a clean environment and reduction of hazards within the road reserve.	<b>Remove illegal dumping</b>	Regional Distributors	2 Weeks
			Local Distributors	2 Weeks
			Access Streets	2 Weeks
			Laneways	2 Weeks

Defect	Level of Service	Risk Assessment Intervention Levels/ Repair Activity	Timeliness of Maintenance From Date of Request	
<p><b>Sweeping required</b>                      Covers buildup of sand, gravel, stone and organic materials within the road surface and footpaths. Result in safety concerns.</p>	<p>Provide a clean environment and reduction of hazards within the road reserve.</p>	<p><b>Street and Footpath Sweeping</b>                       Roadside street and footpath sweeping is undertaken on a rotational schedule, however, environmental debris that are considered a risk will be removed on a case by case basis</p>	Regional Distributors	1 Week
			Local Distributors	2 Weeks
			Access Streets	3 Weeks
			Laneways	4 Weeks
<p><b>Remove Dead Animal</b>                      Pick up of dead native animals and livestock.</p>	<p>Remove dead animal when advised</p>	<p><b>Remove dead animal</b> when advised                       NB: dead animals are not removed on weekends unless the animal poses a risk to road users</p>	Regional Distributors	1 Day
			Local Distributors	1 Day
			Access Streets	2 Days
			Laneways	2 Days

Gravel Roads – Maintenance

Defect	Level of Service	Risk Assessment Intervention Levels/ Repair Activity	Timeliness of Maintenance From Date of Request	
<p><b>Grading &amp; Patrol Works</b> The regular maintenance grading and reshaping of gravel surfaced roads in accordance with appropriate intervention standards to remove corrugations, rutting and potholes and provide for proper drainage of the unsealed surface.</p>	<p>Provide a smooth riding surface with good drainage.</p>	<p><b>M021 Maintenance Grading:</b> Road surface scoured, potholed, rutted, corrugated to a depth of 100mm in excess of 20m length.</p> <p>Maintenance grading is undertaken on a rotational basis across sub-regions of the Shire and if remobilising the grader to an alternative region is counter productive then the timeframes may not be met. Each request will be risk assessed</p>	Access Streets	4 weeks
			Laneways	8 weeks
<p><b>Water Over Road</b> Defined as areas where isolated localised flooding makes roads impassable or may obscure hazards</p> <p>Note: Does not include water over road from storm/flood events, (which results in water over road for 2 hours or less).</p>	<p>Provision of warning to road users of hazard or potential hazards.</p>	<p>a) <b>M022 Localised flooding</b> where road is still trafficable.</p> <p>b) <b>M023 Localised flooding</b> where road is not trafficable.</p>	Access Streets	a) Warning sign within 24 hours b) Close road within 24 hours
			Laneways	a) Warning sign within 24 hours b) Close road within 24 hours
<p><b>Roadside Vegetation - Trees</b> The cyclic maintenance of trees and shrubs within the road reserves</p>	<p>Provide safe clearance for large vehicles.</p> <p>Provide sufficient unobstructed view to ensure vision and safe entry to intersections.</p> <p>Provide unobstructed view of regulatory and cautionary signs.</p>	<p><b>M024 Prune trees.</b> Maintain vehicle clearance limits of 5.5m vertically and clear sight lines at intersections and bends.</p>	Access Streets	10 working days
			Laneways	10 working days

Defect	Level of Service	Risk Assessment Intervention Levels/ Repair Activity	Timeliness of Maintenance From Date of Request	
<b>Patching</b> The application of gravel or crushed rock to the wearing surface to strengthen and reshape the surface	Restore loss of pavement / running surface to a smooth and safe condition	<b>M025 Restore gravel</b>  * Major works may be subject to budget approval	Access Streets	*10 working days
			Laneways	*10 working days
<b>Signs (non regulatory) and Delineation</b> Covers the replacement of damaged or missing signs, guideposts and marker posts.	Guideposts as necessary to enhance safety. Visible.  Signs to be visible and legible.	<b>M010 Replace guideposts</b>  <b>M011 Replace signs</b> NB: Additional 3 weeks if new signs are to be ordered	Access Streets	10 working days
			Laneways	10 working days
<b>Regulatory Signs</b> Covers the replacement of damaged or missing regulatory signs.	Regulatory signs to be visible and legible.	<b>M028 Report to MRWA</b>	All Roads	MRWA
<b>Illegal Dumping</b> Covers dumping within road reserves.	Provide a clean environment and reduction of hazards within the road reserve.	<b>Remove illegal dumping</b>	Regional Distributors	2 Weeks
			Local Distributors	2 Weeks
			Access Streets	2 Weeks
			Laneways	2 Weeks
<b>Remove Dead Animal</b> Pick up of dead native animals and livestock.	Remove dead animal when advised	<b>Remove dead animal</b> when advised NB: dead animals are not removed on weekends unless the animal poses a risk to road users	Regional Distributors	1 Day
			Local Distributors	1 Day
			Access Streets	2 Days
			Laneways	2 Days

#### 6.6.4 Future Operational and Maintenance Expenditure

It should be noted when undertaking the lifecycle modelling, these types of costs are taken into consideration by assuming that, each year, a percentage of these distresses (such as potholes) will be repaired as part of the Shire's routine maintenance. If these assets are left to deteriorate (i.e. sufficient capital expenditure is not allocated), then the amount of distresses being fixed under routine maintenance will increase and the routine maintenance expenditure required will also increase. Equally, if the condition of these assets improves then the routine maintenance expenditure required will decrease.

#### Projected Operational and Maintenance Expenditure

Year	Road Operational Expenditure – Existing Roads	Road Maintenance Expenditure – Existing Roads	Kerb Maintenance Expenditure – Existing Kerbs
2020 / 2021	\$50,123	\$1,171,052	\$14,826
2021 / 2022	\$51,251	\$1,191,422	\$15,129
2022 / 2023	\$52,532	\$1,215,288	\$15,476
2023 / 2024	\$53,845	\$1,239,799	\$15,832
2024 / 2025	\$55,191	\$1,264,970	\$16,198
2025 / 2026	\$56,571	\$1,290,820	\$16,573
2026 / 2027	\$57,985	\$1,317,370	\$16,957
2027/2028	\$59,435	\$1,344,635	\$17,351
2028/2029	\$60,921	\$1,372,637	\$17,756
2029/2030	\$62,444	\$1,401,397	\$18,170

## 6.7 Renewals and Replacements

### 6.7.1 Renewal Strategy and Plan

Renewal work is the replacement of an asset or a significant component to restore its original size and capacity. Typical renewal activities include:

- Resheeting
- Reseals
- Rehabilitation/Reconstructions

Assets requiring renewal are identified from analysis of the network condition and estimates of remaining life. Renewal will be undertaken using low cost renewal methods where practical. The aim of low cost renewals is to restore the service potential or future economic benefits of the asset by renewing the assets at a cost less than replacement cost.



As a result of the information gathered in the Roads Condition Assessment a financial modelling analysis has been undertaken and a 10 year Capital Works Program has been developed and will be prioritised. The ranking criteria used to determine priority of identified renewal proposals is based on road hierarchy, road condition and traffic count data.

Actual past renewal expenditure for Roads infrastructure is shown in the table below.

Year	Renewal
2016/2017	\$366,419
2017/2018	\$1,350,000
2018/2019	\$2,292,000

The planned renewal expenditure as expressed in the 10 Year Capital Works Program for the period from 2020 - 2030 is shown in the tables below.

Planned Renewal Expenditure for Road Infrastructure:

Year	Planned Renewal Expenditure LTFP (Sealed Roads)
2020/21	\$1,681,731
2021/22	\$1,742,240
2022/23	\$1,750,134
2023/24	\$1,822,546
2024/25	\$1,411,457
2025/26	\$1,469,016
2026/27	\$1,530,133
2027/28	\$1,594,013
2028/29	\$1,660,787
2029/30	\$1,730,594

Planned Renewal Expenditure for Kerb Infrastructure:

Year	Planned Renewal Expenditure
2020/21	\$32,508
2021/22	\$22,115
2022/23	\$22,366

2023/24	\$34,697
2024/25	\$43,821
2025/26	\$23,760
2026/27	\$38,032
2027/28	\$18,466
2028/29	\$43,463
2029/30	\$14,730

Renewal work is carried out in accordance with the following Standards and Specifications.

- Austroads standards and specifications;
- Australian Standards;
- Main Roads WA
- IPWEA
- ASPEC;
- Local policy and specifications.

## 6.8 New, Upgrade and Disposal

### 6.8.1 New

The known roads that will be acquired in the next 12 months through transfer of responsibility are:

Asset Details	Reason for Acquisition	Timing of Acquisition
Lot 600 Lakes Road Nambelup - Peel Business Park (3kms)	Handover from Developer	Next 12 months
Austin Lakes – Stage 2 (440m)	Handover from Developer	Next 12 months
Avoca Retreat (300m)	Handover from Developer	Next 12 months
Lot 803 Greenlands Road Pinjarra (2kms)	Handover from Developer	Next 12 months

### 6.8.2 Upgrade

The planned expenditure figures are difficult to project as the Shire generally delivers upgrade projects through other road funding programmes such as Roads to Recovery, Regional Roads Group, State and Federal Blackspot Programme. The funding structure of these programmes generally have the following matching funding arrangements:

Road Funding Programmes:

Funding Source	Funding Arrangement
Roads to Recovery	100%
Regional Roads Program	2/3 funded
Blackspot (State Funding)	2/3 funded
Blackspot (Federal Funding)	100%

### 6.8.3 Disposal

No roads assets have been identified for disposal through either an excess in the asset base or a transfer of responsibility of assets.

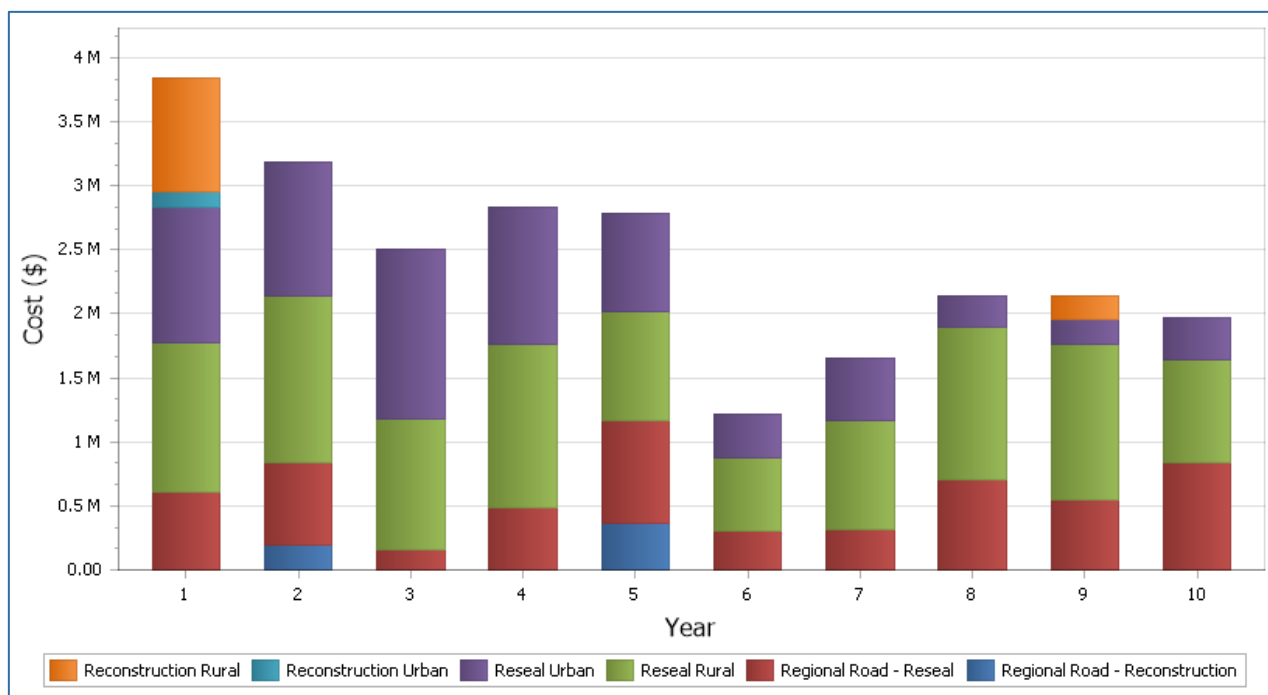
## 7. Financial Projections

This section contains the financial requirements resulting from all of the information presented in the previous sections of this asset management plan. The financial summary will be reviewed annually and continue to be refined as planning studies, strategies and increased financial analysis are completed.

All costs exclude inflation and GST.

### 7.1 Sealed Roads

The figure below summarises the 10 year predicted renewal expenditure required for all road pavement and reseals where like for like replacement would occur including regional roads.



The total requirement to address the renewal backlog (assets above the current intervention level) is \$3,845,881 in year 1 and decreases as the backlog is addressed.

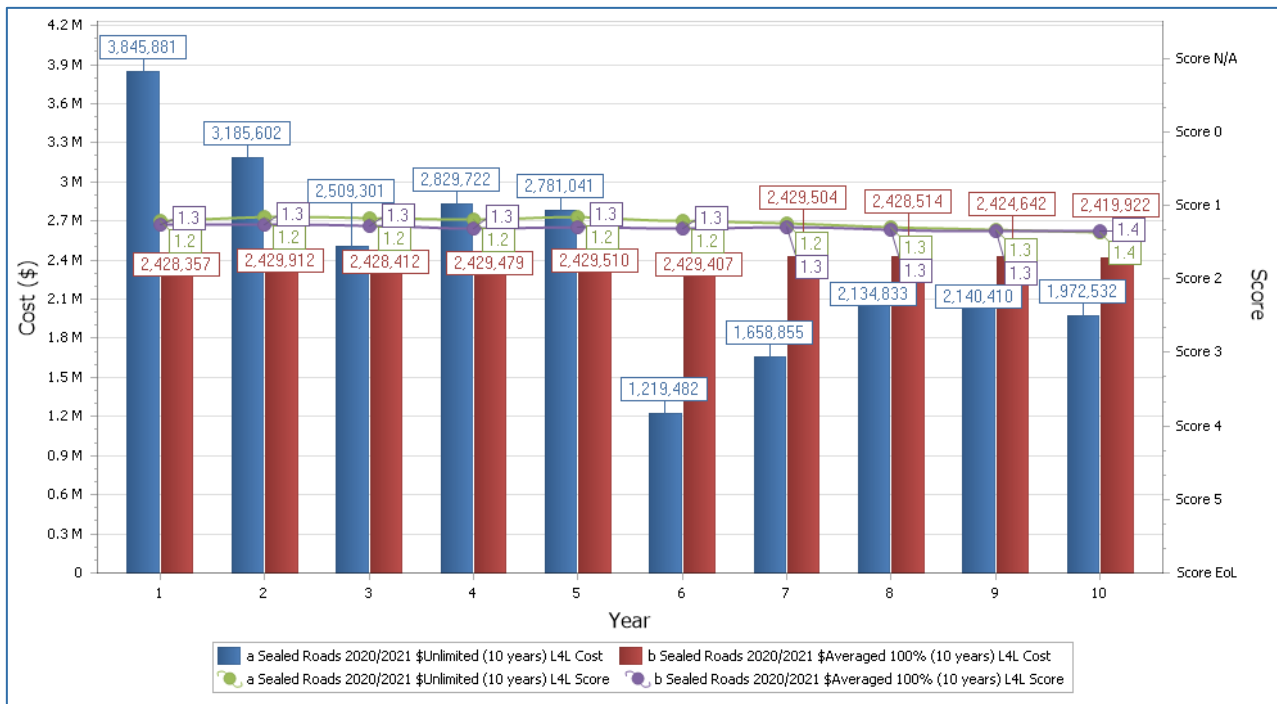
This figure demonstrates that the majority of the funding gap is in relation to road reseals. Specifically:

- A backlog of reseal renewal works. These are reseals which are currently above the intervention level requiring immediate works.

A financial modelling analysis has been undertaken for Roads infrastructure based on the following scenarios:

- Scenario 1** – Unlimited budget (Sealed Roads with like for like replacement)
- Scenario 2** – Averaged budget (Sealed Roads with like for like replacement)
- Scenario 3** – Unlimited budget (Regional Roads with upgrades)
- Scenario 4** – Unlimited budget (Rural / Urban Roads with upgrades)

The figure below summarises the 10 year renewal requirement for Roads infrastructure based on the first two scenarios above. Roads Condition Assessments are undertaken every 4 years. Future condition surveys may change the renewal requirement significantly and will be closely monitored.



7.1.1 Scenario 1 - Unlimited budget (like for like)

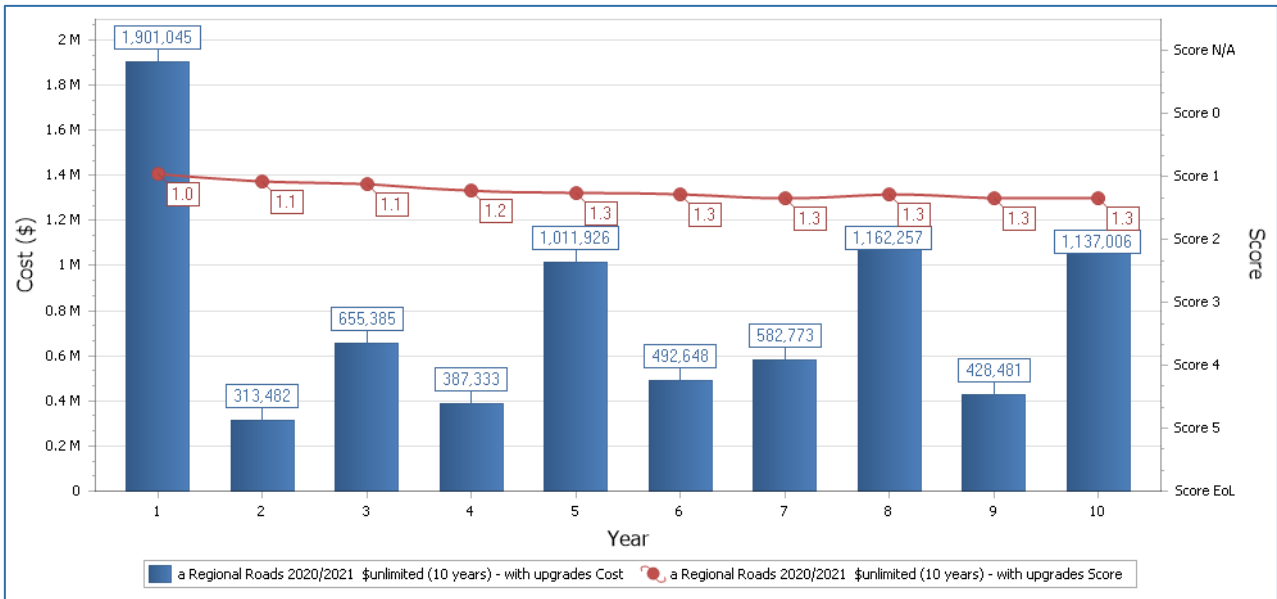
The total requirement to address the renewal backlog (assets above the current intervention level) is \$3,845,881 in Year 1 and \$3,185,601 in Year 2. This decreases as the backlog is addressed. The financial projections show total renewal costs for Shire roads using an unlimited budget over the next 10 years to be \$24,277,658. This amounts to \$2,427,766 per annum when spread evenly over the 10 years.

7.1.2 Scenario 2 – Averaged budget (like for like)

This scenario is based on the average annual expenditure identified in Scenario 1 of \$2,427,766. Overall condition index projections show only a slight delay in achieving the condition levels projected using an unlimited budgeted.

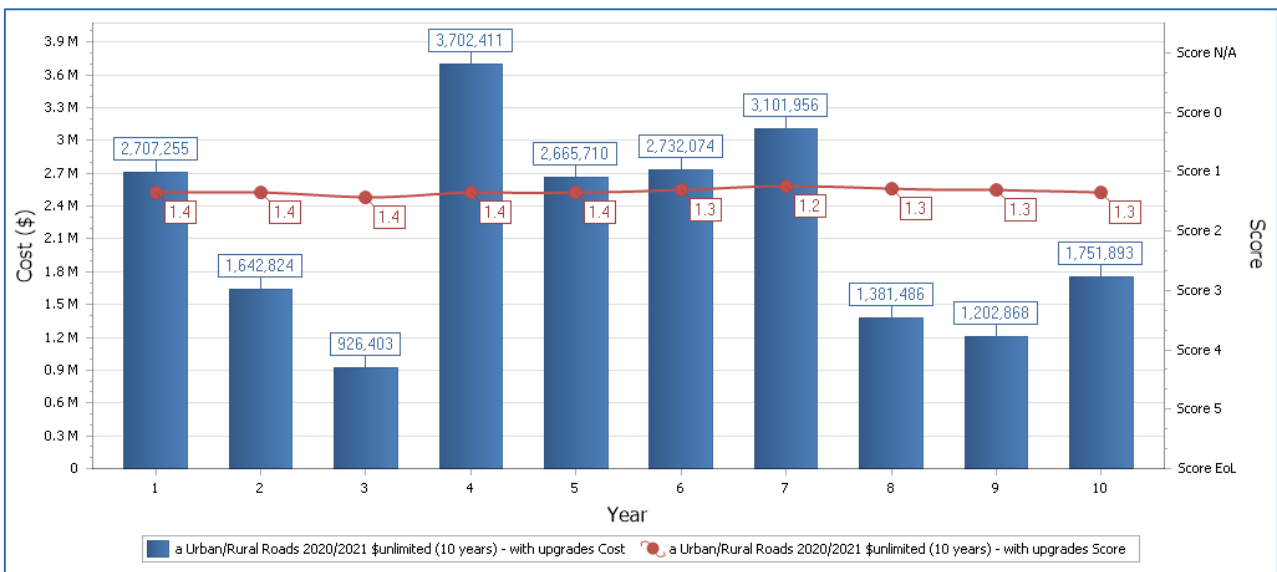
7.1.3 Scenario 3 - Unlimited budget (Regional Roads with upgrades)

Many roads require upgrading to meet current standards and therefore would not be renewed like for like when they reach intervention. The figure below summarises the 10 year renewal requirement for Regional Roads with upgrades and is based on an unlimited budget.



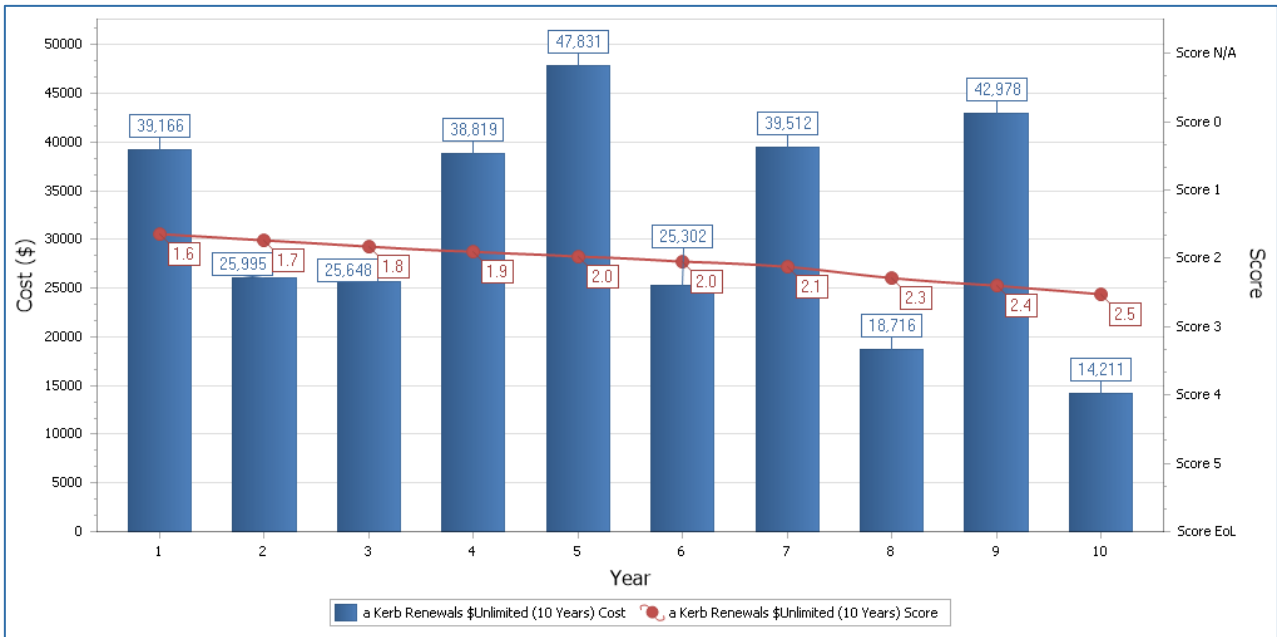
7.1.4 Scenario 4 - Unlimited budget (Rural / Urban Roads with upgrades)

The figure below summarises the 10 year renewal requirement and service level for Urban / Rural Roads with upgrades and is based on an unlimited budget.



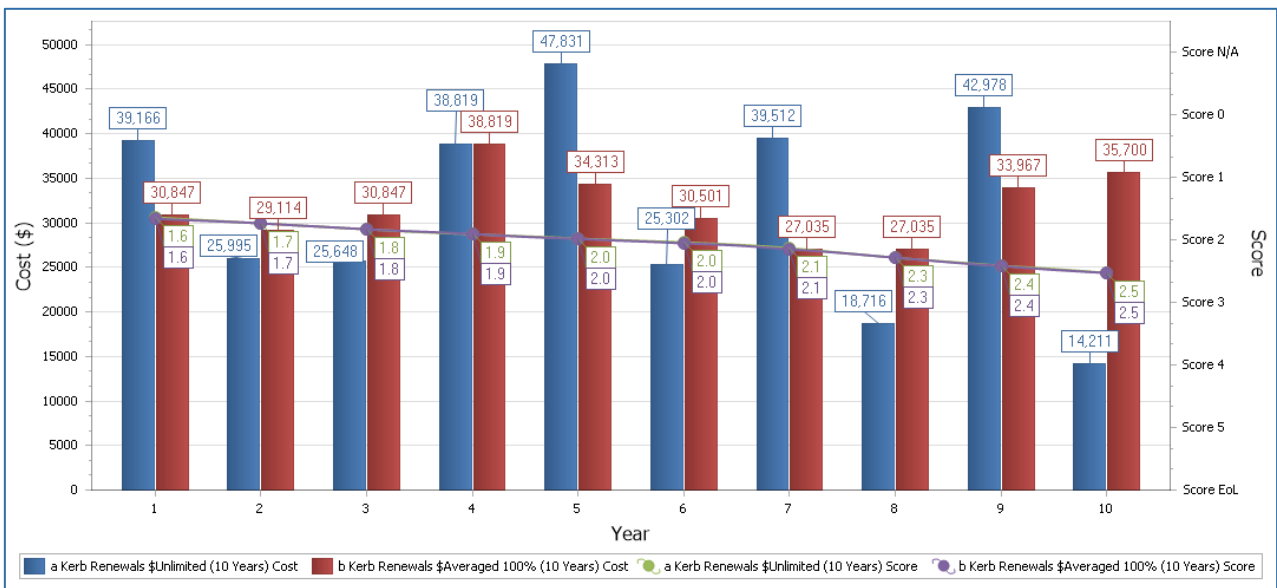
7.2 Kerbs

The figure below summarises the 10 year renewal requirement and service level for Kerb infrastructure based on an unlimited budget.



The financial projections show total renewal costs for Shire's kerb infrastructure over the next 10 years to be \$318,179. This amounts to \$31,818 per annum when spread evenly over the 10 years. The service level line indicates that there is a gradual decrease in overall condition index at the end of 10 years.

The figure below provides a comparison of the 10 year renewal requirement and service level for kerb infrastructure based on an unlimited budget and an averaged budget.



Overall, the condition index for kerbs is good overall, although the service level line indicates a gradual decline in overall condition index at the end of 10 years as the kerb network ages.

## 7.3 Funding Strategy

The funding strategy is detailed in the Shire's 10 year Long Term Financial Plan. Projected expenditure identified in Section 7 is to be funded from future operating and capital budgets, with grant funding. There are several funding sources that are available to the Shire in order to operate, maintain, renew, upgrade and build the road network. These sources are, but are not limited to, the following:

Funding Source	Description
<b>Municipal Revenue from Rates</b>	The Shire seeks to maximise funding from non-municipal sources in order to help minimise the cost of roads on Shire rates and is required to match funding sources from Roads to Recovery and Regional Roads Group.
<b>Roads to Recovery</b>	The Roads to Recovery Program operates uniformly across Australia. Under current arrangements, each council is guaranteed a share of the total available funding. Under simple administrative procedures whereby spending decisions are made locally and reported to the government, money is paid directly from the Australian Government to each council. Under the guidelines the Shire of Murray has to commit to an amount of \$1,253,810 of own source expenditure annually.
<b>Financial Assistance Grants (FAGS)</b>	The Financial Assistance Grants are currently provided under the Local Government (Financial Assistance) Act 1995 and have the following components: <ul style="list-style-type: none"> <li>– a general purpose component which is distributed between the States and Territories according to population (i.e., on a per capita basis), and</li> <li>– an identified local road component which is distributed between the States and Territories according to fixed historical shares.</li> <li>– Both components of the grants are united in the hands of local government, allowing councils to spend the grants according to local priorities.</li> </ul>
<b>Regional Road Group (RRG) Grants</b>	The RRG operates two grant funding programmes, one for improvement projects and one for rehabilitation. Improvement grants are available, on a two-thirds (grant)/one-third (Council) basis, for either upgrade projects (i.e. road widening) or new projects (new roads). Rehabilitation grants operate on the same basis for road renewal projects (resurfacing or reconstruction).
<b>Blackspot Funding (Federal and State)</b>	The Black Spot Program is part of the commitment to reduce crashes on Australian roads. Road crashes are a major cost to Australians every year. Black Spot projects target those road locations where crashes are occurring. By funding measures such as traffic signals and roundabouts at dangerous locations, the program reduces the risk of crashes. Black spot programs are typically small scale localised upgrade projects.
<b>Developer Contributions</b>	The Shire negotiates with property developers in order to receive contributions for the future provision of significant public infrastructure that is necessitated because of development. This includes funding for the provision of new and upgraded roads.
<b>Developer Funded Infrastructure</b>	In some instances where new or upgraded public infrastructure in existing road reserves is necessitated because of development, it is fully funded and constructed by developers.



Funding Source	Description
<b>Commodity Route Supplementary Funding</b>	The Commodity Routes Supplementary Fund Program forms part of a number of programs administered by the State Road Funds to the Local Government Advisory Committee under a five year agreement Grants up to \$0.25m per project are available on a two-thirds (grant)/one-third (Council) basis. Commodity routes are defined as routes where there is a significant high priority transport associated with the transport of a commodity such as grain, timber, agricultural lime, iron ore, etc.

The following options can be considered for road and kerb renewal:

- 1) Raising rates to fund the renewal requirement for roads to ensure these facilities are maintained to an appropriate level of condition and are fit for purpose.
- 2) Decreasing service levels which will result in a lower level of service provided to the community.
- 3) Reducing the roads and kerbs portfolio i.e. identifying roads and kerb infrastructure that no longer meets community needs. Factors to consider:
  - Is the asset still required by the community?
  - Can the need be satisfied by a less expensive or alternative asset?
  - Is it the role of the Shire to provide a particular service delivered by the asset?

To reduce this financial requirement the following options are available:

- Focus increasingly on a proactive approach to road and kerb maintenance. This will be undertaken in accordance with the Roads Maintenance and Operational Plan. Proactive maintenance is anticipated to result in an extension of the life of the asset components.
- Decrease the responsibility for maintenance and renewal of the portfolio in accordance with the disposal strategy.
- Utilise grant funding to renew existing assets rather than construct additional infrastructure where possible.
- Allocate funding to a road and kerb infrastructure renewal reserve in the years leading up to the spike in renewal requirements.

# 8. Practices, Performance Monitoring and Improvement

## 8.1 Data Systems

Main Roads WA (MRWA) require the Shire to submit their inventory database to them on an annual basis to enable them to build a representation of the entire WA network. IRIS reporting requirements have been incorporated into the Corporate Asset Management System (AssetMaster) to enable this to happen. The information is used as a basis from which to award funding allocations across all Councils.

## 8.2 Asset Management Improvement Program

The following projects have been identified as the most urgent and important for improving the management of Shire road assets:

Task	Responsibility	Resources / Frequency	Due
Roads Condition Assessment	Infrastructure Services	External / Every 4 years	30 November 2023
Revaluation of Roads	Finance	Internal / Every 4 years	30 June 2020 30 June 2024
Validate unit replacement rates for Roads infrastructure to enable predictive modelling analysis to be undertaken for Roads	Asset Management Infrastructure Services	Internal	30 November 2023
Develop 10 year Road infrastructure model to enable Forward Capital Works programming	Asset Management Infrastructure Services	Internal	End of February annually
Transport assessment of the Shire of Murray road network, as proposed under the South Metropolitan Sub Regional Planning Framework	Infrastructure Services	External	30 June 2021
Develop levels of service based options on road performance criteria / road needs and affordability, rather than intervention level treatments	Asset Management	Internal	30 June 2024

Task	Responsibility	Resources / Frequency	Due
Consultation with the community to review the levels of service and determine the wider community willingness to pay for the continued levels of service or improve those levels of service	Asset Management Infrastructure Services	Internal	31 March 2024
Ongoing collection of evidence based useful life data for road infrastructure	Asset Management	Internal	31 March 2024
Review Roads Asset Management Plan	Asset Management	Internal / Every 4 years	31 May 2024

## 8.3 Monitoring and Review Procedures

The Roads Asset Management Plan will be reviewed in accordance with the revaluation cycle, every 4 years.

## 8.4 Asset Capacity/Performance

Asset capacity and performance in respect of the road network is generally a function of traffic. It relates to the ability of the asset to perform over time to meet its intended purpose. The greater the number of vehicles using the road the higher the design criteria of the road must be. Traffic is also a significant determinant when it comes to accelerated deterioration of road infrastructure.

### 8.4.1 Traffic Counts

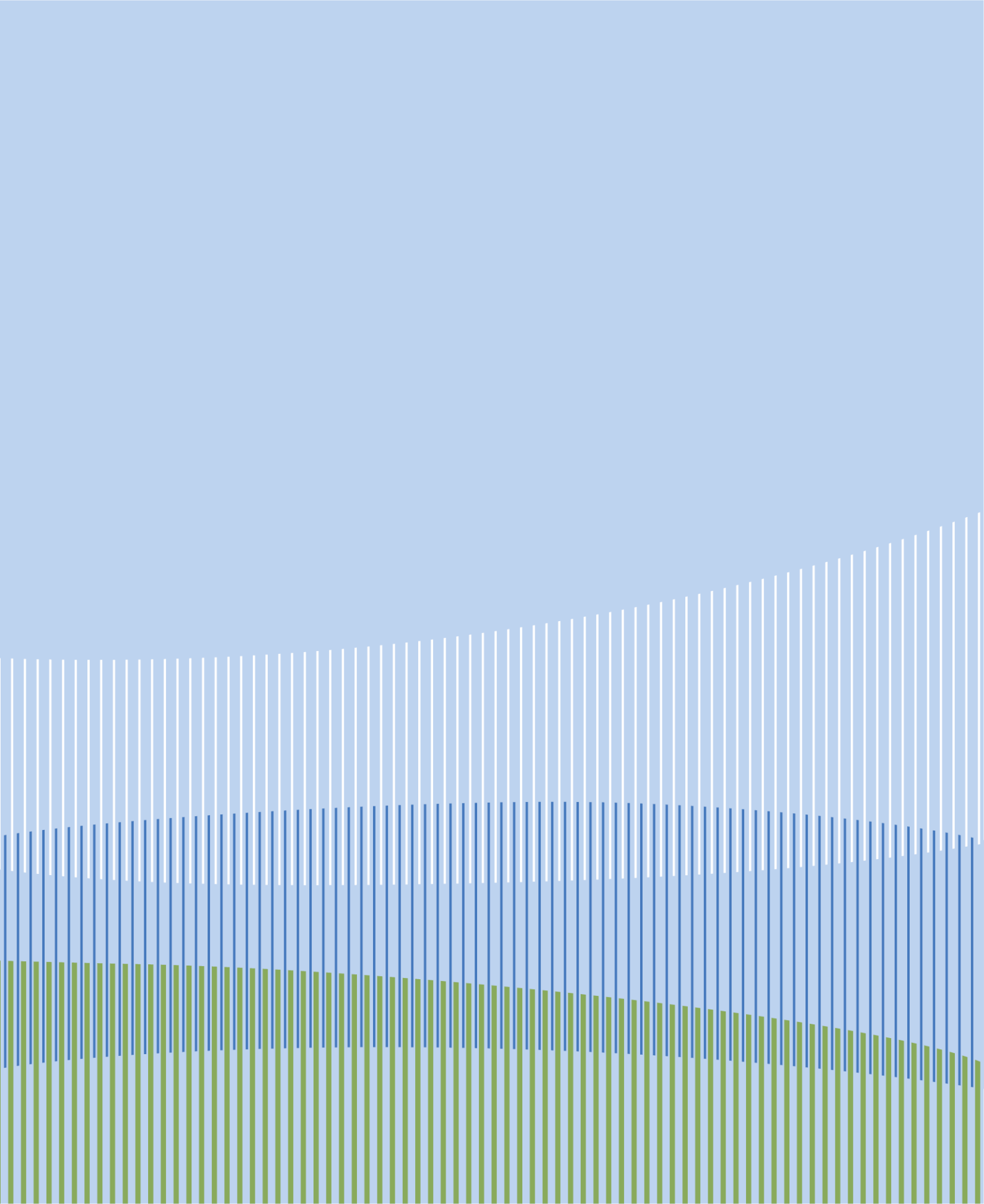
The Shire of Murray has a yearly Traffic Count Program in place for the collection of vehicle volume that effectively targets roads needing traffic classification data and includes:

- Road Hierarchy - Distributor roads and 'suburb feeder' roads - checked annually
- Future and expanding subdivisions - roads which have an increase in use
- Road conditions / civil work program - based on latest condition audit and programs
- Crash statistics - captured data near crash sites
- Annual projects that require traffic count information, e.g. bridge upgrades, road widening.

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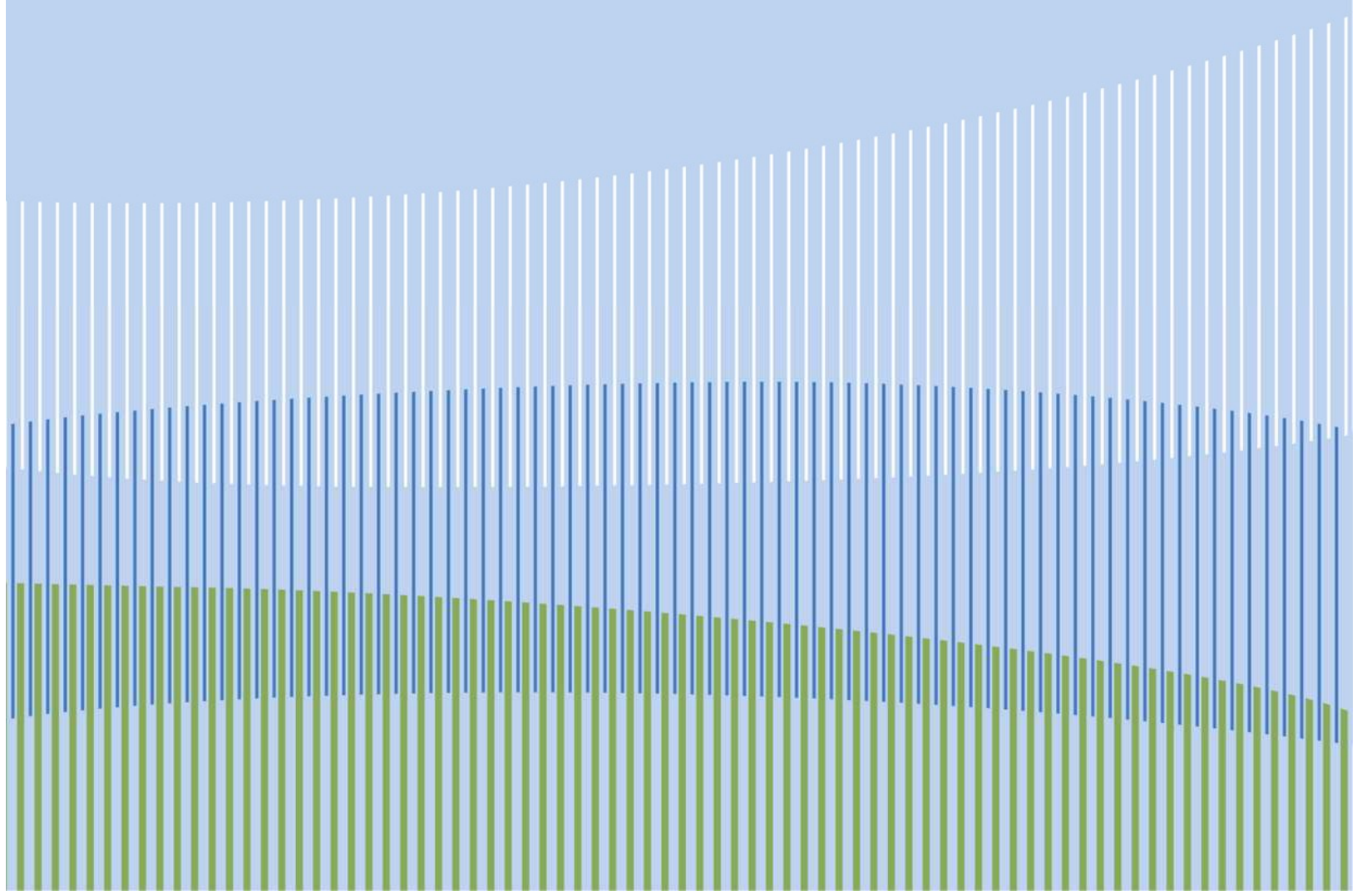
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 @ShireofMurray





# Appendix C

## Bridges Asset Management Plan 2017 - 2037



## Executive Summary

The Shire of Murray (The Shire) is responsible for providing many community services and in doing so must ensure that its infrastructure assets are maintained by well-developed strategic plans and asset management programs. What services are provided, and how they are provided will depend on the agreed level of service.

The Bridges Asset Management Plan (BRAMP) has been developed to document the Shire's asset management processes, to guide the planning, acquisition, operation, maintenance, renewal and disposal of Bridges assets, with an objective to maximise service delivery outcomes with the lowest lifecycle cost.

One of the Shire's core functions is to provide quality fit for purpose assets throughout the municipality by demand requirements, engineering standards and planning objectives. The BRAMP has been prepared by Shire of Murray's Strategic Community Plan 'Murray 2023' (SCP) to meet the strategy: "Continue to develop and implement best practice asset management".

The Shire has 26 Bridges within its control. Bridges are an important component of the Shire's asset portfolio as they provide an opportunity for residents and visitors to the community to meet and undertake recreational activities within a safe, convenient and comfortable environment. Recreational facilities are seen by the community as essential infrastructure.

The Shire has gathered a significant amount of Bridges data as part of the development of this plan. This information, including the condition, value, age, type and location of Bridges infrastructure, has provided the foundation for this document. As a result of the data collection exercise, Shire now has a very good understanding of the extent and current condition of Bridges and recreation assets.

The proactively managed Bridges network comprises the following key subgroups:

- Pedestrian Bridge
- Traffic Bridge

Some subgroups are not included in this plan due to the lack of data available and time constraints. These include:

- Pedestrian Underpass

These infrastructure assets covered in this plan have a replacement value of \$ 41,724,267 as of 30 June 2017.

**What does it Cost?**

The projected outlays necessary to provide the services covered by this Asset Management Plan includes renewal of existing assets over the ten year planning period is \$14,250,889 or \$1,425,089 on average per year.

Estimated available funding for this period is \$14,250,889 or \$ \$1,425,089 on average per year, which is 100% of the cost to provide the service.

What Does It Cost?	
10 year total renewal cost	\$14,250,889
10 year average cost	\$1,425,089
10 year total LTFP renewal budget	\$14,250,889
10 year average LTFP renewal budget	\$1,425,089
10 year AM financial indicator	100%
10 year average shortfall	\$0

We plan to provide services for the following:

- Operation, maintenance, renewal and upgrade of Bridges to meet service levels agreed by Council in annual budgets.
- Asset Renewal at the agreed intervention level within the 10 year planning period.

### ***Managing the Risks***

There are risks associated with providing the service and not being able to complete all identified activities and projects. We have identified major risks as:

- Deterioration of infrastructure
- Asset loss from disaster (fire, flood etc.)
- Insufficient funding allocated to asset renewal
- Design/construction non-compliant with current legislation or regulations
- Maintenance practice's not environmentally sustainable
- Personal Injury and legal liabilities.

We will endeavour to manage these risks within available funding by:

- Regular condition inspections
- Business Continuity Plan in place
- Non-compliance works to be given priority
- Ensure maintenance practices are carried out by environmentally sensitive procedures.

### ***Confidence Levels***

This AM Plan is based on Medium level of confidence information.

### ***The Next Steps***

The actions resulting from this asset management plan are:

- Continue to assess and rate the condition of Bridges assets to better inform future revisions of this BRAMP
- Annually develop a 10 year Capital Works Program (CWP)
- Maintain assets to a safe condition within available funding constraints
- Consultation with the community to define levels of service options, which can be delivered to the community at various funding levels
- Analyse future demand drivers/impacts
- Revaluation of assets in line with Fair Value

### ***Questions you may have:***

#### ***What is this plan about?***



The BRAMP is the means for documenting management, financial and technical practises to ensure that:

- The agreed level of service is provided at the lowest long-term cost
- The proactive management of Assets and services provided by these assets
- Compliance with legislative requirements
- Adequate funding.

### ***What is an Asset Management Plan?***

Asset management planning is a comprehensive process to ensure delivery of services from infrastructure is provided in a financially sustainable manner.

An asset management plan details information about infrastructure assets, including actions required to provide the agreed level of service in the most cost-effective manner. The plan defines the services to be provided, how the services are provided and what funds are required to provide the services.

### ***Why is there a funding shortfall?***

The Shire's Bridges assets were largely purchased and constructed by Council, occasionally with external funding support from the state and federal governments, or were gifted by developers as required by planning legislation. Many of these assets are approaching the end of their expected serviceable life, and they require replacement. As a result, service provision through these assets is decreasing, and maintenance costs are increasing. Our present funding levels are sufficient to continue to provide existing services at current levels in the medium term.

***What options do we have?***

Resolving the funding shortfall involves several steps:

1. Improving asset knowledge so that data accurately records the asset inventory, how assets are performing and when assets are not able to provide the required service levels
2. Improving our efficiency in operating, maintaining, renewing and replacing existing assets to optimise lifecycle costs
3. Identifying and managing risks associated with providing services from infrastructure
4. Making trade-offs between service levels and costs to ensure that the community receives the best return from infrastructure
5. Identifying assets surplus to needs for disposal to make saving in future operations and maintenance costs
6. Consulting with the community to ensure that Bridges services and costs meet community needs and are affordable,
7. Developing partnership with other bodies, where available to provide services
8. Seeking additional funding from governments and other bodies to better reflect a 'whole of government' funding approach to infrastructure services.

***What happens if we don't manage the shortfall?***

It is likely that we will have to reduce service levels in some areas unless new sources of revenue are found. For Bridges, the service level reduction may include asset rationalisation.

***What can we do?***

We can develop options, costs and priorities for future Bridges services, consult with the community to plan future services to match the community service needs with the ability to pay for services and maximise community benefits against costs.

### Bridges' Asset Management Plan

**Objective 4 - Well planned, integrated and active places that embrace and respect our rural lifestyle, built and natural environment and heritage**

**Outcome 4.5** - Plan for and build facilities and infrastructure that will meet the needs of a growing community

**Strategy – 4.5.1** - Effectively manage infrastructure through its lifecycle

### Asset Inventory

Assets covered by this plan include:

Asset Category	Total Replacement Value (\$)
Pedestrian Bridge	\$ 2,201,815
Traffic Bridge	\$ 39,522,453
<b>Total</b>	<b>\$ 41,724,267</b>

#### Current Replacement Cost:

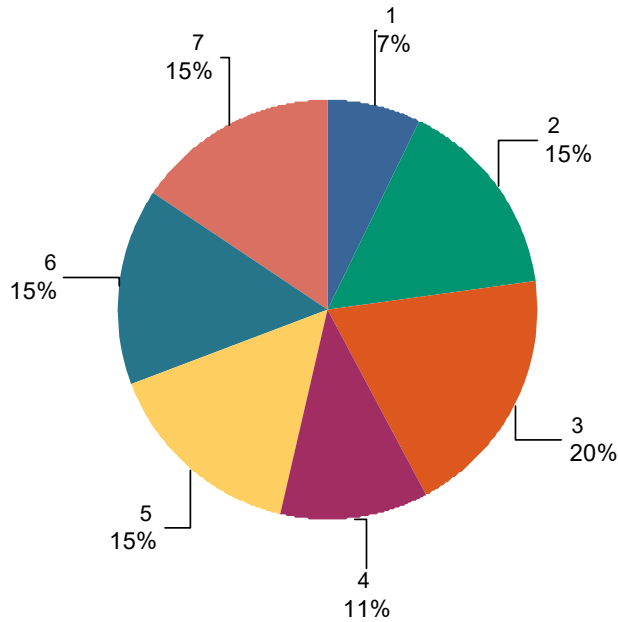
### CRC



■ Pedestrian Bridge	\$2,201,814	5.3%
■ Traffic Bridge	\$39,522,453	94.7%
Total:	\$41,724,267	100.0%

**Bridges Infrastructure Condition**

**Condition Distribution**



Condition 8,9 and 10=Nil

**Simplified Condition Grading Model (1 – 10):**

<b>1</b>	An <b>new</b> asset designed and constructed to current standards.
<b>2</b>	An asset in <b>excellent</b> overall condition, with sound structural integrity, no defects and new appearance. Often moved from a Condition 1 based on the time since construction rather than observed condition decline.
<b>3</b>	An asset in <b>very good</b> condition with sound structural integrity, superficial wear and tear and some deterioration to finishes. No serviceability problems.
<b>4</b>	An asset in <b>good</b> overall condition, with some minor wear and tear issues or deterioration to finishes. Serviceability may be impaired very slightly.
<b>5</b>	An asset in <b>fair</b> overall condition. Deterioration in condition would be obvious, with minor defects occurring. There will generally be some aspects of serviceability loss and minor maintenance.
<b>6</b>	An asset in <b>fair to poor</b> overall condition. The condition deterioration would be very obvious. Asset serviceability in general would now be affected and maintenance cost would be rising.
<b>7</b>	An asset in <b>poor</b> overall condition. Deterioration would be quite severe and would be starting to

	limit the serviceability of the asset. Maintenance cost would be high.
8	An asset in <b>very poor</b> overall condition with serviceability now heavily impacted. Maintenance cost would be very high and the asset would need to be rehabilitated. Minor risk of public injury.
9	An asset in <b>extremely poor</b> condition with severe serviceability problems and needing rehabilitation immediately. User safety and comfort very likely to be affected.
10	An asset that has <b>failed</b> , is no longer serviceable and should not remain in service. There would be an extreme risk in leaving the asset in service.
<b>Assets Excluded from Plan:</b>	
Bus Shelters, Irrigation, CBD Streetscapes & Trees	

<b>Condition / Renewal Intervention:</b>	
Intervention levels are based on the Western Australian Asset Management Improvement Programme scoring method, and are as follows:	
<b>Asset Category</b>	<b>Intervention Condition</b>
- All Assets	8 (5)

<b>Useful Life:</b>	
<b>Element</b>	<b>Years/Life</b>
<b>Traffic bridges</b>	
Long Life Bridges	100
Short Life Bridges	60
<b>Pedestrian bridges</b>	
Structure	60
Surface	35
Rail	50

**Hierarchy**

Bridges assume the functional hierarchy level of the road or pathway upon which they lie. All roads and pathways within the municipal network are classified according to a hierarchy that takes into account function and user numbers. This hierarchy reflects the Local Government Guidelines for Subdivisional Development – Edition 2.2, 2012. Bridges that are ranked higher are considered to be of greater significance and/or have higher usage rates, therefore attracting a higher level of service to keep them in the appropriate condition than those of lesser significance. The hierarchy classification is used to assist in prioritising works programs and also intervention responses to remedy defects.

The following table illustrates the road hierarchy that determines the hierarchy of the bridge network according to the classification of the road the bridge is located on.

MRWA Functional Road Hierarchy	Liveable Neighbourhoods or Subdivision Guide	IRIS	Owner	Function	VPD*	Speed (kph)	FRH** Colour	Minimum Service Level
		FH #						
Primary Distributor	Primary Distributor	1	MRWA	Freeway / Highway	>15000	60-110	Blue	Assessed by MRWA
Regional Distributor	n/a (rural)	2	LGA	2025 "Local Govt Significant Road". Link to significant destinations and designed for efficient movement of people and goods. Connects to primary and other rural distributors. Intersections controlled with measures such as signing and line marking of intersection.	>100	60-110	Red	2 lanes sealed
District Distributor A	Integrator A (urban)	6	LGA	Frequent connections to local streets. Intersections controlled with appropriate measures including traffic signals. Low percentage of trucks. Usually bus routes.	>8000	60-70	n/a	4 lanes sealed
District Distributor B	Integrator B (urban)	6	LGA	Connections to local streets. Intersections controlled with appropriate Local Area Traffic Management.	>6000	40-60	n/a	2 lanes sealed
Local Distributor	Neighbourhood Connector (urban)	7	LGA	Residential access. Intersections controlled with Local Area Traffic Management.	<6000	50-60	Yellow	2 lanes sealed
Local Distributor	Neighbourhood Connector (rural)	3	LGA	Distributor road carrying trucks, machinery, tourists and sometimes has slower moving traffic. Connects to other distributor and access roads. Intersections controlled with measures such as signing.	<100	<90	Yellow	2 lanes sealed
Access Roads	Access Streets (urban)	8	LGA	Limited access traffic. Forms part of local distribution network. Intersections self controlling with minor measures.	<3000	40-50	Grey	2 lanes sealed
	Access Roads (rural)	4	LGA	<b>A.</b> Main function is access. Local distribution network to individual properties. Generally connects to rural distributors and properties. Intersections self controlling with minor measures.	<75	40+	Grey	2 lanes sealed
		4	LGA	<b>B.</b> Main function is access. Local distribution network to individual properties. Intersections self controlling with minor measures.	<75	40+	Grey	2 lanes sealed
		5	LGA	<b>C.</b> Main function is access. Local distribution network to individual properties. Intersections self controlling with minor measures.	<75	40+	Grey	Gravel
		5	LGA	<b>D.</b> Main function is access. Local distribution network to individual properties. Intersections self controlling with minor measures.	<75	40+	Grey	Dirt track
n/a	Laneways (urban)	9	LGA	Provide access to the side or rear of lots, principally for access to garages.	<300	15	Grey	1 lane sealed

**Stakeholders:**

The following stakeholders have been identified in relation to Bridges' infrastructure:

Stakeholder	Expectations
Councillors	Meeting community needs, sound management and allocation of resources, good governance
Employees / Contractors	Safe working environment
Community Residents and Businesses	Value for money, equitable and responsible service, well maintained assets
Bridges & Facility Users	Well maintained assets specific to users' needs
Insurers	Appropriate risk management policies and practices, safe working environments, well-maintained assets
Tourists	Well maintained assets, accessible services, safe facilities
Government (Federal and State)	Systems in place to sustain Bridges infrastructure, accountability, transparency

**Linkage to Other Plans:**

- Strategic Community Plan 'Murray 2025'
- Corporate Plan 2017 - 2021
- Long-Term Financial Plan
- Annual Report
- Risk Management Strategy
- Risk Management Policy
- Asset Management Policy
- Asset Management Improvement Strategy
- Community Infrastructure Plan
- Workforce Plan

### Levels of Service

#### Customer Research and Expectations:

An internal Level of service review has been undertaken, identifying stakeholders service needs and wants to establish more robust service levels.

#### Community Levels of Service:

Community Levels of Service measure how the community receives the asset services and whether the Shire is providing community value. The bi-annual asset management satisfaction survey has been conducted this financial year, and current community levels of service are displayed below.

Key Performance Indicator	Level of Service	Performance Measurement Process	Target Performance	Current Performance
<b>Safety</b>	To manage transport infrastructure to maximise safety for users.	Number of hazards identified and remedied within set timeframes.	100% of hazards actioned within set timeframes.	Timeframes not measured. Crash statistics analysed and safety audits conducted every 2-3 years
<b>Accessibility &amp; Availability</b>	Bridge infrastructure to be provided in accordance with demonstrated community needs and Council policy	Conformance to BrAMP, asset hierarchies and Council policy.	75% of community consider local bridges as in good condition or better.	75.47% of community responses are happy with the condition of bridges
<b>Appearance</b>	Infrastructure in public areas maintained and improved to enhance appearance of townships	Annual community satisfaction survey	High satisfaction rate of customers surveyed.	73.58% of community responses satisfied with the appearance of bridges
		Condition inspections		
<b>Responsiveness</b>	Compliance with target maintenance response times.	Reports from works requests	100% compliance within response targets.	100% compliance within response targets.



**Technical Levels of Service:**

Technical levels of service relate to the technical measures and the outputs the customer receives and are summarised below:

Key Performance Measure	Level of Service	Performance Measurement Process	Current Performance	Performance Target
<b>TECHNICAL LEVELS OF SERVICE</b>				
<b>Quality</b>	Renewal	Assets @ Intervention level	Less than 0% Assets at Intervention level	0 % of Assets
	Capital Renewal Program	Budget	95 % expended in Projects scheduled for delivery in FY 2017/18. Balance held up due to defect liability periods.	Expenditure = budget
	Condition of Bridges and reserves assets known.	Condition Survey	Tri-annual condition assessment program for valuation purposes and engineering condition assessments every five years	Tri-annual condition assessment program for valuation purposes and engineering condition assessments every five years
	To manage transport infrastructure to maximise safety for staff and contractors	To manage transport infrastructure to maximise safety for staff and contractors	0 lost time injuries in the last 12 months	No accidents or injuries sustained due to non-compliance
<b>Upgrade / Expansion</b>	Capital New / Upgrade works program	Time, Quality, Cost & Environmental	All works delivered with due expedition to quality, cost & environmental requirements.	All projects progressing with due consideration for proper planning & external influences.  Infrastructure designed and constructed taking into account local environment (design processes account for assessment of soil types, water movement, storm frequencies and natural environment).
		Budget	95 % expended in Projects scheduled for delivery in FY 2017/18. Balance held up due to defect liability periods.	Expenditure = budget

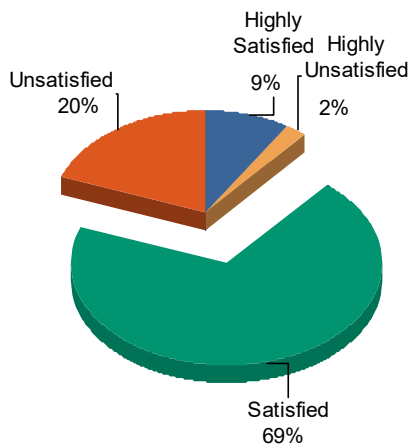
Key Performance Measure	Level of Service	Performance Measurement Process	Current Performance	Performance Target
<b>Operations</b>	Regulatory and Non-regulatory Inspection	Compliance with inspection regimes and maintenance intervention levels specified within O & M Plan.	All inspections completed as scheduled	All inspections completed as scheduled

### Community Consultation

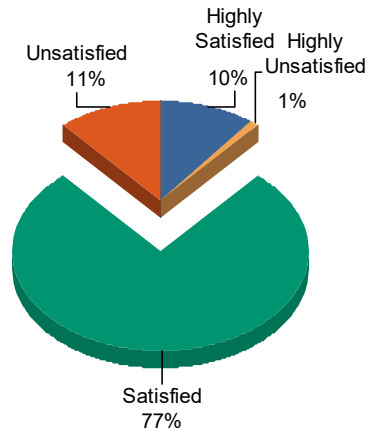
#### Customer Research:

In December 2017 a survey was undertaken to obtain an understanding of the community's level of satisfaction about The Shire's Bridges provision. Details of the survey are summarised below:

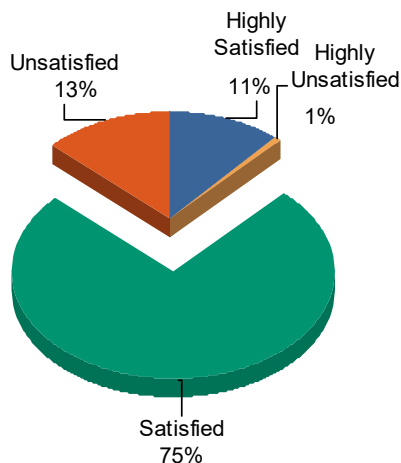
Bridges width and weight suitable for road type and traffic volume



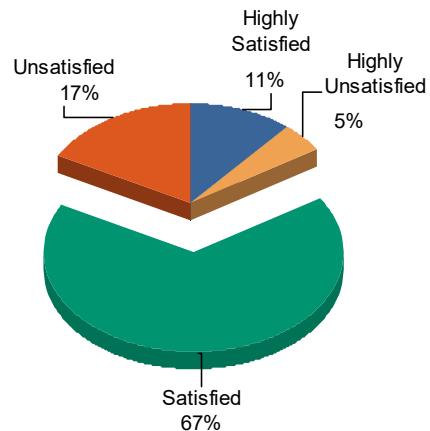
Cleanliness and general maintenance of the bridge network



Condition of the bridge network



Safety of the bridge network



#### Customer Concerns:

Customers are primarily concerned with services and assets such as:

- Increased heavy vehicle traffic over Bridges
- Improvements achieved by future heavy haulage redirection
- Future works (upgrade/renew) design to consider architectural heritage of towns
- Ravenswood bridge is not suitable for pedestrian traffic
- Access to the swing bridge is limited for mobility scooters
- Bridge over Wiligee Creek in North Yunderup quite rough
- Safety barrier provision on the Ravenswood bridge
- Safety barrier provision for the Pinjarra rd Murray river bridge (between rd and pedestrian path)
- General under bridge cleanliness
- East Coolup rd, George St, Williams Rd Curtis Ln, South Yunderup rd, Lakes Rd (over the Serpentine River) bridges need widening
- Improve traffic control signs on narrow bridges, particularly speed signs
- The main bridge north of Pinjarra is a major hazard with an intersection just metres away
- Realignment of South Yunderup bridge
- Murray River bridge at the Ravenswood not fit for purpose due to the tides hindering boat users to reach their destinations
- Potholes/bumps where the bridges connect to roads
- Pinjarra bridge walkway needs major maintenance

**Legislative Requirements:**

Legislative requirements govern the management of Bridges assets under the Shire’s control and include the following:

Legislation	Requirement
Local Government Act 1995	Sets out the role, purpose, responsibilities and powers of local governments.
Disability Discrimination Act 1992	To ensure that persons with disabilities have the same rights as the rest of the community (including access to premises).
Environment Protection Act 1986	Regulations regarding noise, sustainability, landfill, stormwater and groundwater resources.
Occupational Health & Safety Act 1984	Provide a work environment that is safe and as far as practicable without risk to health.
Planning & Development Act 2005	Defines the land use and zoning of waterway facility infrastructure

Future Demand Drivers / Impacts			
Demand Drivers	Present Position	Projection	Impact on Services
New Sub-divisional Activity	No of Subdivisions delivered this year:4	10 New Subdivisions – Short Term (1-5years)	Increase in the lifecycle costs of the Bridges assets group
		13 New Subdivisions – Mid Term (6-10 years)	
Economic Changes	2017 – 1,009 local businesses	Increase in facilities such as retail trade, education and health.	Predicted growth in the region will see increased demand for new infrastructure and greater wear on existing infrastructure as the population expands. This will likely lead to higher costs to The Shire as asset lives will be reduced.
Population Changes / Density	2017 – 17,805	2041 - 80,782	Capital Expenditure due to Growth - the construction of new dwellings in the Shire in the coming 20 years will require new Bridges where these are not already provided. At a projected population density of 2.63 per new dwelling, the number of dwellings in the Shire is forecast to grow from 7,935 in 2016 to 25,232 in 2041. As well as the land required to meet additional demand, Bridges will need to be developed to meet the needs of a growing community. In situations where additional land is not required, e.g. infill subdivision, the existing Bridges network may need to be upgraded to cater for the additional demand

Future Demand Drivers / Impacts			
Demand Drivers	Present Position	Projection	Impact on Services
Changes in Technology	Regular Construction technology (Methodology, Materials, Plant & Equipment) improvements are regularly available	Construction technology improvements will increase positive outcomes (e.g. viability of solar electricity, water saving, etc.)	Reduced asset lifecycle costs (Construction, Operations, Maintenance & Disposal)
		Methods and water storage methods, etc.)	
Legislation	New Assets constructed and maintained according to current legislation	Assets constructed to current legislative requirements	Improvement required to current Asset Management processes and practices
Environmental	Assets are constructed to withstand today's known environmental conditions and to meet today's environmental standards	Greater environmental sustainability requirements placed on the construction industry	Higher costs associated with construction methods that are environmentally sustainable (e.g. dealing with disposal of contaminated soil, etc.)
Tourism Growth	Increase in visitor numbers to the Shire, local events	Increase in events and tourism generally	Increase in the lifecycle costs of the bridges assets group, which will see the Shire establishing asset rationalisation strategies after careful analysis
Climate Change	Climate change represents a key challenge in the future	Possibly trending to increased seasonal extremes	Likely to result in increased operations & maintenance warranting service level reviews

**Subdivisional Activity :**

Based on current outline development plans and subdivision applications, the following additional subdivisions are expected within the short and mid-term financial plan impacting service provision:

**Additional Subdivisions - Short Term financial plan (1 to 5 years)**

Location
Lot B28 Shanns , North Dandalup
Lot 28 Shanns , North Dandalup
Austin Cove / Austin Lakes, South Yunderup - future stages
Murray River Country Estate - Stage 8
Riverland Waters, Ravenswood - future stages
Ravenswood Green Estate
Ravenswood on the Murray
Peel Industrial Development
Lot 619 Ravenswood
North Dandalup Estate

**Additional Subdivisions - Mid Term financial plan (6 to 10 years)**

Location
Lots 1 & 2 Lakes, North Dandalup
Lot 530 Lakes, Stake Hill/Nambeelup
Avoca Retreat, North Dandalup
Paul Street/Furnissdale, Furnissdale
Point Grey Development
Pollard Street / Alderson Street, Pinjarra
Lots 1 & 2 Pinjarra, Pinjarra
Murray River Country Estate - Stage 9
Murray River Country Estate - Stage 10
Greenlands / Forrest Highway, West Pinjarra
Lot 42 Hampton, Pinjarra
Moores, Pinjarra (Industrial) - future stage
Lot 602 Beacham, Pinjarra

## Risk Management

The following risks have been identified about Shire Bridges assets:

Risk Details	Risk Assessment			Treatment Strategy	Responsibility
	Likelihood	Consequence	Risk Rating		
Exposure of key structures to damage as a result of bushfire or flood (financial & reputation risk)	Possible	Major	High (12)	"Keelty Report" - MRWA to undertake frequent examinations to its bridges located in areas prone to bushfire.	Technical Services
Inadequate funding for pedestrian bridge maintenance resulting in deterioration of structure (financial & health risk)	Unlikely	Catastrophic	High (10)	Ensure priority given through budget process. Develop 10 year renewal and maintenance plan for pedestrian bridges.	Technical Services
Inappropriate technical practices employed for bridge maintenance resulting in failure of structure (health & reputation risk)	Rare	Catastrophic	Medium (5)	Utilise MRWA bridge maintenance guidelines for maintenance standards.	Technical Services
Inadequate values used for insurance purposes (financial & reputation risk)	Unlikely	Catastrophic	High (10)	Include annual consultation with TS directorate within insurance renewal procedures.	Corporate Services
Inappropriate construction and maintenance methods expose work personnel to unacceptable risks (reputation & health risk)	Unlikely	Moderate	Medium (6)	Compliance with requirements of OSH legislation. Adoption and documentation of safe systems of work. Staff training.	Technical Services
Traffic or pedestrian bridge fails under its load (reputation & health risk)	Rare	Catastrophic	Medium (5)	Ensure ongoing structural assessment of bridges occurs to determine existing carrying capacities. Implementation of load ratings on traffic bridges where required.	Technical Services
Risk Inspections not undertaken	Rare	Catastrophic	Medium (5)	1) Inspections undertaken by MRWA	Technical Services
Programmed Maintenance works not undertaken	Rare	Catastrophic	Medium (5)	2) Proactive maintenance inspections undertaken as per Bridge Maintenance and Operational Plan	Technical Services

## Forward Works Programming

### Operations & Maintenance Strategy (O&M)

Risk is a key consideration in striking the right balance between minimising the total cost of ownership of the Shire assets and maximising their performance, availability, and reliability.

The O&M Strategy ensures that agreed level of services and statutory and legislative requirements are met, reducing operational risk, reactive maintenance and increasing user groups satisfaction

The O&M Strategy contains:

- Systems and procedures to be used to plan and manage maintenance work
- Types of maintenance to be carried out
- Order of priority for maintenance activities
- Inspection regimes and responsibilities

The maintenance activities, along with factors that govern or influence them, are:

- Reactive (unplanned) maintenance activities. This is governed by the urgency of what is required.
- Planned (scheduled) maintenance activities. These are generally more extensive repairs that are undertaken as part of a program of works to either prevent the breakdown of elements or components of a property or to bring those elements up to an acceptable condition. The extent of this program largely depends on funding allocations.
- Backlog maintenance activities. This refers to an accumulation of uncorrected or deferred deficiencies in an asset. This is governed by available funding and any future plans for a particular asset.

Reactive work accounts for the majority of the annual maintenance budget and encompasses the repair or replacement of asset elements as they wear out or are damaged. By its nature, reactive work must be carried out as the need arises and cannot be scheduled in advance. Work is prioritised as it arises by defined intervention levels and response times. The intervention level defines the condition, state or risk level associated with an asset component, i.e. the point in time at which the asset is considered to be below an acceptable level of service. Response time defines a reasonable time frame within which it can be expected for the Shire to remedy the defect.

Planned maintenance is repair work that is identified and managed through a maintenance management strategy. Planned maintenance activities include inspection, assessing the condition against failure, prioritising, scheduling and actioning the work. Development of a maintenance strategy which defines inspection frequencies, technical work standards, condition for intervention, and target response times



**Renewal / Replacement Strategies:**

Renewal expenditure is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original service potential.

**New and Upgrade:**

New

Best practice asset management involves a comprehensive analysis of the acquisition of new assets. The analysis involves completing a project proposal and business case which addresses issues such as:

- relevance to corporate goals;
- alignment to core business;
- community need;
- anticipated benefits;
- environmental impacts;
- risk identification and treatment;
- total life-cycle costs;
- impact on existing services/infrastructure;
- analysis as to whether service can be delivered without asset acquisition;
- forecasted usage rates;
- value for money

To ensure Bridges assets continue to meet corporate and community needs, all new assets planned for acquisition must undergo this critical 'whole of life' analysis that will consider the impact of longer-term maintenance, as well as operating costs of the asset and its impact to The Shire long-term sustainability

Where decisions are made to proceed with additional assets, future budgets accommodate the additional expenditure.

Upgrade

Upgrade refers to works which improve an existing asset beyond its current capacity. They may result from growth, social or environmental needs. Upgrade/expansion of infrastructure will contribute to the overall infrastructure inventory and will require, as well, a comprehensive whole of life' analysis.

**Asset Disposal Strategies:**

No Bridges assets have been identified for disposal through either an excess in the asset base or a transfer of responsibility of assets.

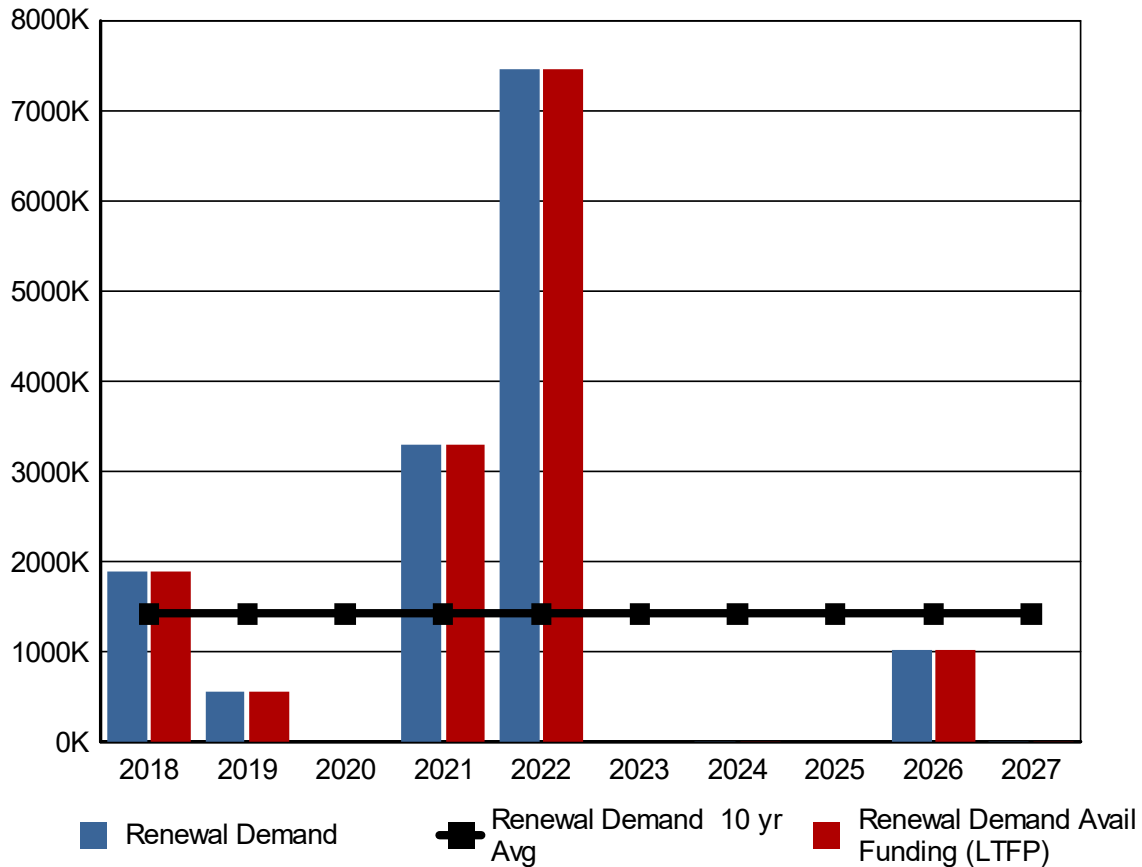
### Financial Summary

#### Bridges

#### Renewal Requirement (Like for Like Replacement):

The projected outlays necessary to provide the like for like renewal for assets covered by this AMP over the 10 year planning period is \$744,311 or \$74,431 on average per year.

Estimated available funding for this period is \$744,311 or \$74,431 on average per year which is 100 % of the cost to provide the service. Projected expenditure to provide like for like renewal in this AMP included in the LTFFP is shown in the graph below.



The proposed funding allocation for building renewal in Year 1 is \$ 1,900,000 and will be funded by the state (1/3) and Federal Government (2/3) through Federal Assistance Grants Scheme (FAGS).

<b>Confidence Level</b>
<b>Data Source and Data Rating Assessment:</b>
<ul style="list-style-type: none"> <li>• Assetic (myData) Corporate Asset Register</li> <li>• MapInfo Professional</li> <li>• Synergysoft</li> </ul>
<p><b>Confidence Grade B</b> – Reliable data based on sound records, procedures, investigations and analysis which is properly documented but has minor shortcomings’ for example the data is old, some documentation is missing, and reliance is placed on unconfirmed reports or some extrapolation.</p>

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/18
Council to utilise their infrastructure Asset Hierarchy as a basis for consistent reporting across the organisation.	Asset Management, Finance	Internal	7/30/18
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/18
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/18
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/19
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/19
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/19

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Council and Executive to consider the annual Capital Works Program and prioritise works based on cost/benefit assessments (including risk) with resource implications reflected into the Long Term Financial Plan.	Asset Management & Technical Services	Internal	6/30/19
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/19
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/19
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/19
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/19
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/19
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/19
Ongoing rolling condition assessment program as per inspection procedure	Asset Management & Technical Services	Internal	11/20/19
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/20
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/20

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
AM roles and responsibilities matrix bi-annual update	Asset Management	Internal	3/28/20
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/20
Ensure Annual Budget is prepared based on 'service levels' as reflected in the Strategic Longer Term Plan and contains indicators and measures to assess performance against achieving Council's strategic objectives.	Asset Management & DCCD	Internal	6/30/20
Develop a communication plan to communicate information on infrastructure service delivery issues and Council's management of these issues to external stakeholders.	Asset Management & Media Coordinator	Internal	6/30/20
Incorporate technical levels of service into service agreements and/or maintenance, operational and capital renewal procedures.	Asset Management	Internal	6/30/20
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/20
Community survey to review existing level of service and determine the level of service the community is willing to accept and pay for	Asset Management & Technical Services	Internal	6/30/20
Undertake a process of defining, quantifying and documenting current community levels of service and technical levels of service and costs of providing the current levels of service.	Asset Management & Technical Services	Internal	6/30/20
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/20

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Asset Management Plan Review	Asset Management & Technical Services	Internal	6/30/20
Review and Update Asset Class Maintenance and Operational Plan	Asset Management & Technical Services	Internal	6/30/20
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/20
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/20
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/20
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/20
Asset Class revaluation	Finance	Internal / External	11/20/20
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/20
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/21
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/21
Review and Update Asset Class Maintenance and Operational Plan	Asset Management & Technical Services	Internal	6/30/21
Asset Management Plan Review	Asset Management & Technical Services	Internal	6/30/21

Asset Improvement Plan			
Task	Responsibility	Resources	Timeline
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/21
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/21
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/21
Community survey to review existing level of service and determine the level of service the community is willing to accept and pay for	Asset Management & Technical Services	Internal	6/30/21
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/21
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/21
Ensure Annual Budget is prepared based on 'service levels' as reflected in the Strategic Longer Term Plan and contains indicators and measures to assess performance against achieving Council's strategic objectives.	Asset Management & DCCD	Internal	6/30/21
Undertake a process of defining, quantifying and documenting current community levels of service and technical levels of service and costs of providing the current levels of service.	Asset Management & Technical Services	Internal	6/30/21

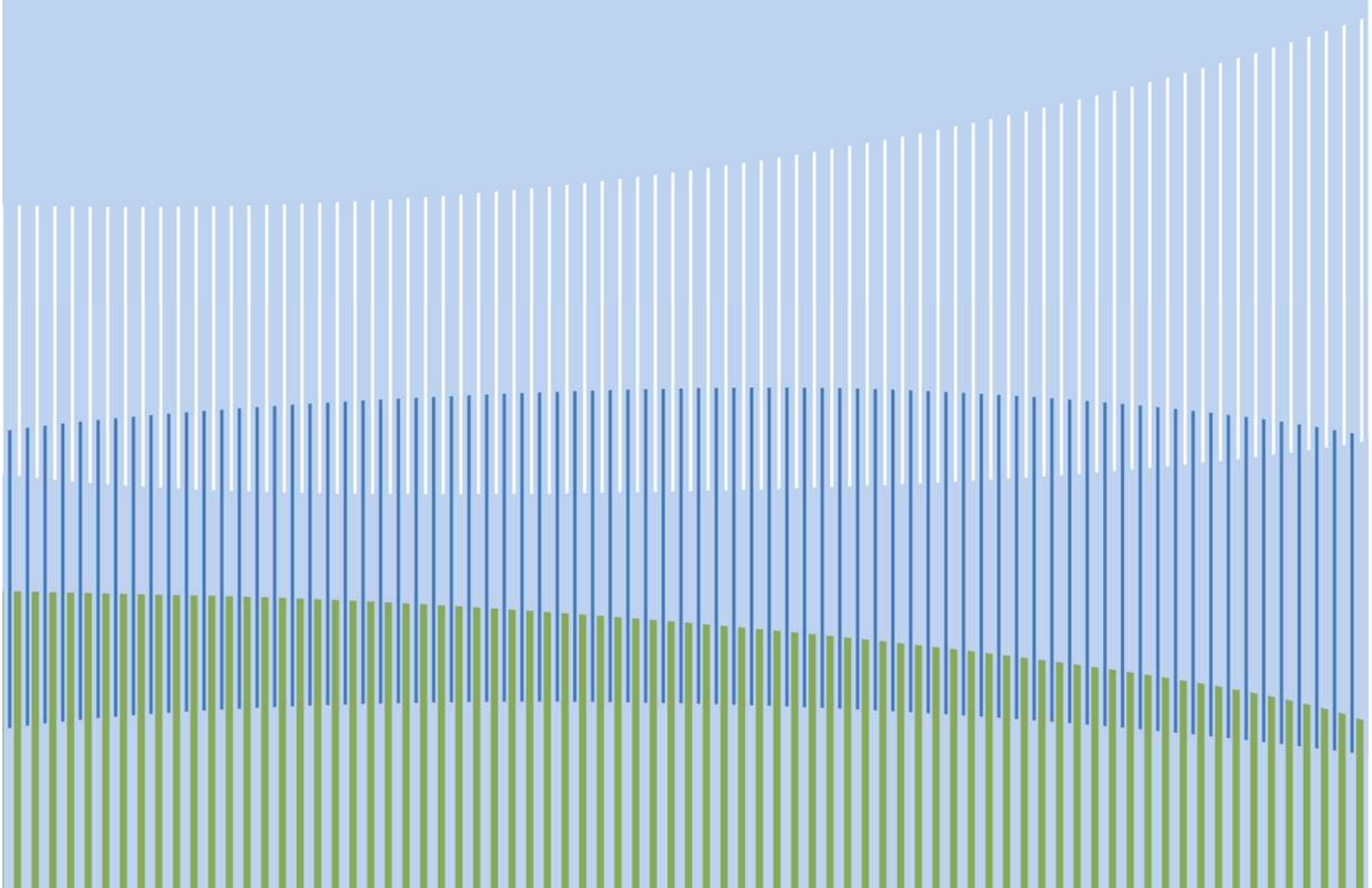
<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/21
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/21
Asset Class revaluation	Finance	Internal / External	11/20/21
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/21





# Appendix D

## Footpaths Asset Management Plan 2017 - 2037



The Shire of Murray (The Shire) is responsible for providing many community services and in doing so must ensure that its infrastructure assets are maintained by well-developed strategic plans and asset management programs. What services are provided, and how they are provided will depend on the agreed level of service.

The Footpaths Asset Management Plan (FAMP) has been developed to document the Shire's asset management processes, to guide the planning, acquisition, operation, maintenance, renewal and disposal of footpaths assets, with an objective to maximise service delivery outcomes with the lowest lifecycle cost.

One of the Shire's core functions is to provide quality fit for purpose assets throughout the municipality by demand requirements, engineering standards and planning objectives. The FAMP has been prepared by Shire of Murray's Strategic Community Plan 'Murray 2025' (SCP) to meet the strategy: "Continue to develop and implement best practice asset management".

The Shire has 98.35 kilometres of pipes within its control. Footpaths is an important component of the Shire's asset portfolio as they facilitate the movement of stormwater mitigating flood impacts on both public and private property in urban areas.

The Shire has gathered a significant amount of Footpaths data as part of the development of this plan. This information, including the condition, value, age, type and location of Footpaths infrastructure, has provided the foundation for this document. As a result of the data collection exercise, Shire now has a very good understanding of the extent and current condition of Footpaths assets.

These infrastructure assets covered in this plan have a replacement value of \$ 9,655,346 as of 30 June 2017.

**What does it Cost?**

The projected outlays necessary to provide the services covered by this Asset Management Plan includes renewal of existing assets over the ten year planning period is \$1,422,061 or \$142,206 on average per year.

Estimated available funding for this period is \$1,066,550 or \$106,655 on average per year, which is 75% of the cost to provide the service. The ten year LTFP period renewal shortfall is \$355,514.

What Does It Cost?	
10 year total renewal cost	\$1,422,061
10 year average cost	\$142,206
10 year total LTFP renewal budget	\$1,066,547
10 year average LTFP renewal budget	\$106,654.7
10 year AM financial indicator	75%
10 year average shortfall	<b>\$355,514</b>

Although there is a financing shortfall over the ten year planning period, the risk of failure in the backlog will be carefully monitored in the coming years, especially on the year one, and will form part of the annual review of the LTFP.

**What we will do**

We plan to provide services for the following:

- Operation, maintenance, renewal and upgrade of Footpaths to meet service levels agreed by Council in annual budgets.
- Asset Renewal at the agreed intervention level within the 10 year planning period.

**Managing the Risks**

There are risks associated with providing the service and not being able to complete all identified activities and projects. We have identified major risks as:

- Deterioration of infrastructure
- Asset loss from disaster (fire, flood etc.)
- Insufficient funding allocated to asset renewal
- Design/construction non-compliant with current legislation or regulations
- Maintenance practice's not environmentally sustainable
- Personal Injury and legal liabilities.

We will endeavour to manage these risks within available funding by:

- Regular condition inspections (3-year rolling basis)
- Business Continuity Plan in place
- Non-compliance works to be given priority
- Ensure maintenance practices are carried out by environmentally sensitive procedures.

This AM Plan is based on Medium level of confidence information.

### ***The Next Steps***

The actions resulting from this asset management plan are:

- Continue to assess and rate the condition of footpaths assets to better inform future revisions of this FAMP
- Annually develop a 10 year Capital Works Program (CWP)
- Maintain assets to a safe condition within available funding constraints
- Consultation with the community to define levels of service options, which can be delivered to the community at various funding levels
- Analyse future demand drivers/impacts
- Revaluation of assets in line with Fair Value

### ***Questions you may have:***

#### ***What is this plan about?***

The FAMP is the means for documenting management, financial and technical practises to ensure that:

- The agreed level of service is provided at the lowest long-term cost
- The proactive management of Assets and services provided by these assets
- Compliance with legislative requirements
- Adequate funding.

#### ***What is an Asset Management Plan?***

Asset management planning is a comprehensive process to ensure delivery of services from infrastructure is provided in a financially sustainable manner.

An asset management plan details information about infrastructure assets, including actions required to provide the agreed level of service in the most cost-effective manner. The plan defines the services to be provided, how the services are provided and what funds are required to provide the services.

#### ***Why is there a funding shortfall?***

The Shire's footpaths assets were largely purchased and constructed by Council, occasionally with external funding support from the state and federal governments, or were gifted by developers as required by planning legislation. Many of these assets are approaching the end of their expected serviceable life, and they require replacement. As a result, service provision through these assets is decreasing, and maintenance costs are increasing. Our present funding levels are not sufficient to continue to provide existing services at current levels in the medium term.

***What options do we have?***

Resolving the funding shortfall involves several steps:

1. Improving asset knowledge so that data accurately records the asset inventory, how assets are performing and when assets are not able to provide the required service levels
2. Improving our efficiency in operating, maintaining, renewing and replacing existing assets to optimise lifecycle costs
3. Identifying and managing risks associated with providing services from infrastructure
4. Making trade-offs between service levels and costs to ensure that the community receives the best return from infrastructure
5. Identifying assets surplus to needs for disposal to make saving in future operations and maintenance costs
6. Consulting with the community to ensure that Footpaths services and costs meet community needs and are affordable,
7. Developing partnership with other bodies, where available to provide services
8. Seeking additional funding from governments and other bodies to better reflect a 'whole of government' funding approach to infrastructure services.

***What happens if we don't manage the shortfall?***

It is likely that we will have to reduce service levels in some areas unless new sources of revenue are found. For Footpaths, the service level reduction may include allowing the condition of very low-risk assets to deteriorate to failure.

***What can we do?***

We can develop options, costs and priorities for future Footpaths services, consult with the community to plan future services to match the community service needs with the ability to pay for services and maximise community benefits against costs.

## Footpaths' Asset Management Plan

**Objective 4 - Well planned, integrated and active places that embrace and respect our rural lifestyle, built and natural environment and heritage**

**Outcome 4.5** - Plan for and build facilities and infrastructure that will meet the needs of a growing community

**Strategy – 4.5.1** - Effectively manage infrastructure through its lifecycle

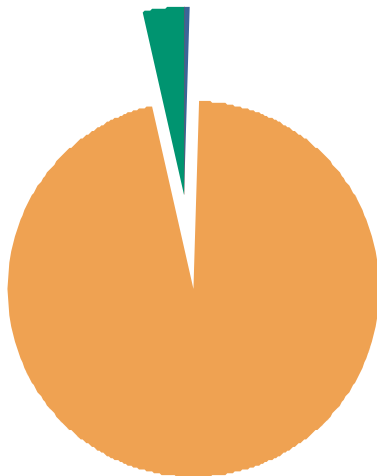
### Asset Inventory

Assets covered by this plan include:

Asset Category	Total Replacement Value (\$)
Boardwalk	\$ 52,000
Footpath	\$ 9,251,151
Share Path	\$ 3,444,658
Steps	\$ 11,425,390
<b>Total</b>	<b>\$ 35,161,250</b>

### Current Replacement Cost:

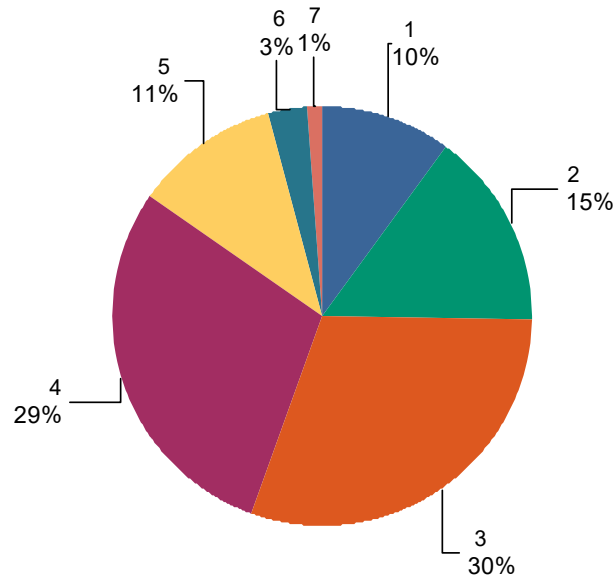
## CRC



Boardwalk	\$52,000	0.5%
Footpath	\$9,251,151	95.8%
Shared Path	\$344,658	3.6%
Steps	\$7,536	0.1%
<b>Total:</b>	<b>\$9,655,346</b>	<b>100.0%</b>

**Footpaths Infrastructure Condition**

**Condition Distribution**



**Condition 8,9 and 10=Nil**

**Simplified Condition Grading Model (1 – 10):**

<b>1</b>	An <b>new</b> asset designed and constructed to current standards.
<b>2</b>	An asset in <b>excellent</b> overall condition, with sound structural integrity, no defects and new appearance. Often moved from a Condition 1 based on the time since construction rather than observed condition decline
<b>3</b>	An asset in <b>very good</b> condition with sound structural integrity, superficial wear and tear and some deterioration to finishes. No serviceability problems.
<b>4</b>	An asset in <b>good</b> overall condition, with some minor wear and tear issues or deterioration to finishes. Serviceability may be impaired very slightly.
<b>5</b>	An asset in <b>fair</b> overall condition. Deterioration in condition would be obvious, with minor defects occurring. There will generally be some aspects of serviceability loss and minor maintenance.
<b>6</b>	An asset in <b>fair to poor</b> overall condition. The condition deterioration would be very obvious. Asset serviceability in general would now be affected and maintenance cost would be rising.
<b>7</b>	An asset in <b>poor</b> overall condition. Deterioration would be quite severe and would be starting to limit the serviceability of the asset. Maintenance cost would be high.

<b>8</b>	An asset in <b>very poor</b> overall condition with serviceability now heavily impacted. Maintenance cost would be very high and the asset would need to be rehabilitated. Minor risk of public injury.
<b>9</b>	An asset in <b>extremely poor</b> condition with severe serviceability problems and needing rehabilitation immediately. User safety and comfort very likely to be affected.
<b>10</b>	An asset that has <b>failed</b> , is no longer serviceable and should not remain in service. There would be an extreme risk in leaving the asset in service.
<b>Assets Excluded from Plan:</b>	
Nil	

**Condition / Renewal Intervention:**

Intervention levels are based on the Western Australian Asset Management Improvement Programme scoring method, and are as follows:

Treatment Name	Hierarchy	Intervention Level
Footpath – Replacement and Step –Replacement	Business Footpath	Condition 6
	Network Footpath	Condition 7
	Residential Footpath	Condition 8
Footpath – Partial Replacement	Business Footpath	Condition 4 and Defect Score 4
	Network Footpath	Condition 5 and Defect Score 5
	Residential Footpath	Condition 6 and Defect Score 5

**Useful Life:**

Asset Type	Life Cycle
Asphalt Footpath	25 Years
Bituminous Seal Footpath	25 Years
Brick Paved Footpath	50 Years
Concrete Footpath	60 Years
Concrete Slabs Footpath	50 Years
Timber Footpath	15 Years
Steps	60 Years
Pram Ramps	50 Years



**Hierarchies**

Hierarchies are used to assign priorities for intervention (e.g. upgrades, renewal, operations & planned maintenance) and reactive maintenance response times to Footpaths assets of different importance. The assets that are ranked higher are considered to be of higher significance as they deliver more critical core services and have high usage rates.

Code	Hierarchy	Function
TCP	Town Centre Footpath	High use around business and community facilities.
CP	Connector Path	Footpath providing direct links to the following facilities: shopping precincts, community facilities, schools, health facilities and other pedestrian traffic generators.
LP	Local Access Path	Low use fully constructed footpaths in residential areas.
AP	Access Path	Formed paths constructed with gravel or limestone.

**Stakeholders:**

The following stakeholders have been identified in relation to Footpaths' infrastructure:

Stakeholder	Expectations
Councillors	Meeting community needs, sound management and allocation of resources, good governance
Employees / Contractors	Shire officers play a major role in managing stormwater footpaths assets to ensure alignment with the agreed level of service and satisfaction of residents and visitors
Community Residents and Businesses	Value for money, equitable and responsible service, well maintained assets
Insurers	Appropriate risk management policies and practices, safe working environments, well-maintained assets
Tourists	Well maintained assets, accessible services, safe facilities
Government (Federal and State)	Systems in place to sustain Footpath infrastructure, accountability, transparency

**Linkage to Other Plans:**

- Strategic Community Plan 'Murray 2025'
- Corporate Plan 2017 - 2021
- Long-Term Financial Plan
- Annual Report
- Risk Management Strategy
- Risk Management Policy
- Asset Management Policy
- Asset Management Improvement Strategy
- Community Infrastructure Plan
- Workforce Plan

### Levels of Service

#### Customer Research and Expectations:

An internal Level of service review has been undertaken, identifying stakeholders service needs and wants to establish more robust service levels.

#### Community Levels of Service:

Community Levels of Service measure how the community receives the asset services and whether the Shire is providing community value. The bi-annual asset management satisfaction survey has been conducted this financial year, and current community levels of service are displayed below.

Key Performance Measure	Level of Service	Performance Measure Process	Performance Target	Current Performance
<b>Quality</b>	Quality of footpath service	Annual customer satisfaction survey	80% of responses are satisfied with the quality of the footpath network	2017 - 76.74% of respondents satisfied or very satisfied with quality of footpaths
<b>Function</b>	Meets user requirements	External customer service requests for footpath related issues	Less than 40 requests per annum	2017 - 38 requests received
<b>Safety</b>	Safe footpath network	Insurance claims received per annum due to footpath defects	Less than 5 insurance claims per annum accepted due to footpath defects	2017 - 0 claims
<b>Accessibility</b>	Accessible links to business districts and major facilities	Number of requests made for repair or upgrade to footpaths due to accessibility issues.	Less than 5 requests per annum	2017 - 1 request received

**Technical Levels of Service:**  
Technical levels of service relate to the technical measures and the outputs the customer receives and are summarised below:

Key Performance Measure	Level of Service	Performance Measurement Process	Current Performance	Performance Target
<b>TECHNICAL LEVELS OF SERVICE</b>				
<b>Quality</b>	Renewal	Assets @ Intervention level	Less than 5 % Assets at Intervention level	< 5 % of Assets
	Capital Renewal Program	Budget	95 % expended in Projects scheduled for delivery in FY 2017/18. Balance held up due to defect liability periods.	Expenditure = budget
	Condition of Footpaths assets known.	Condition Survey	Annual rolling condition assessment program completed once every 3 years	Annual rolling condition assessment program completed once every 3 years
	Cost Effective planned maintenance program	Percentage of Planned Maintenance undertaken over reactive Maintenance $\frac{PM}{RM} \times 100$	TBD	TBD
<b>Upgrade / Expansion</b>	Capital New / Upgrade works program	Time, Quality, Cost & Environmental	All works delivered with due expedition to quality, cost & environmental requirements.	All projects progressing with due consideration for proper planning & external influences.
		Budget	95 % expended in Projects scheduled for delivery in FY 2017/18. Balance held up due to defect liability periods.	Expenditure = budget

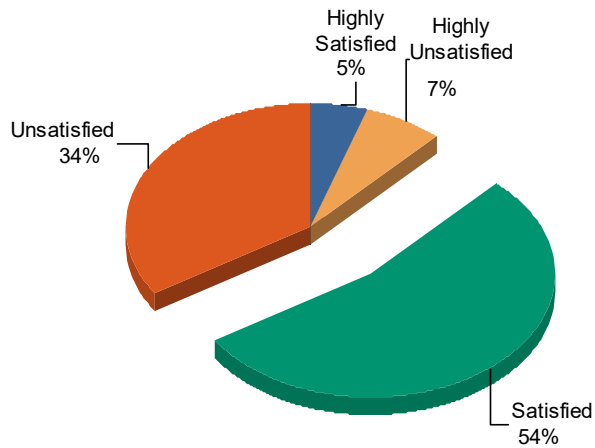
<b>Operations</b>	Regulatory and Non regulatory Inspection and Testing	Inspections and cleaning as per legislative requirements and agreed levels of service	All inspections completed as scheduled	All inspections completed as scheduled
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### Community Consultation

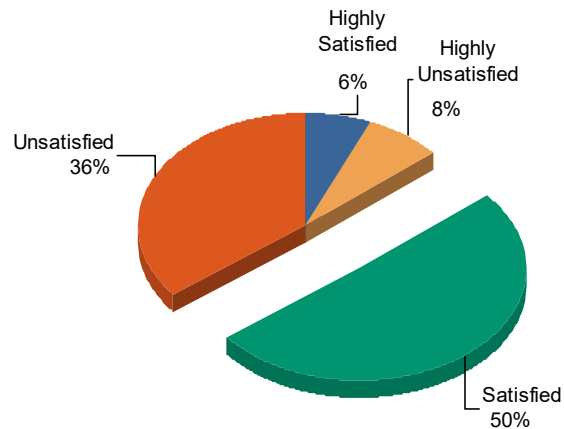
#### Customer Research:

In December 2017 a survey was undertaken to obtain an understanding of the community's level of satisfaction about the Shire's footpath provision. Details of the survey are summarised below:

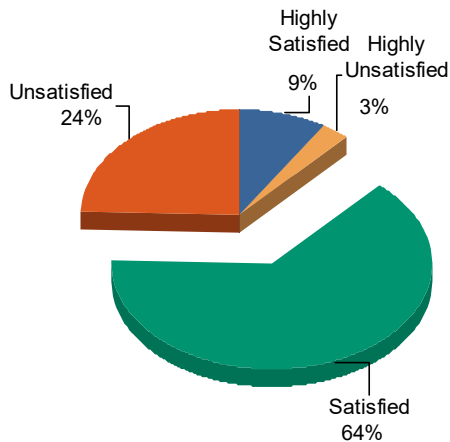
Accessibility of footpath network (i.e. meets the needs of pedestrians from all walks of life and across all abilities, including wheelchairs and motorised mobility devices)



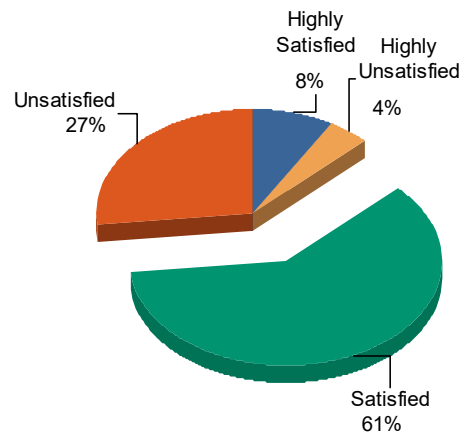
Footpath network suitability for current and future pedestrian demand



Maintenance and general upkeep (i.e. free from overhanging branches and other debris)



Quality of footpath network (i.e. footpaths and ramps are defect free and do not pose any trip hazards)



#### Customer Concerns:

Customers are primarily concerned with services and assets such as:

- Inaccessible pathways for those with wheelchairs or prams.

- Widening of narrow footpaths
- Lack of footpaths in Coolup
- Maintenance improvements in outer suburbs
- Tree pruning on selected footpaths where branches make residents duck down (e.g. Ramble park)
- Additional footpaths in;
  - ▶ Gowman Park
  - ▶ Lymon Rd at the entrance to StakeHill
  - ▶ Continuity of footpaths in Ravenswood as there are too many gaps compromising safe accessibility
  - ▶ Nancarrow way onto Bourke close
  - ▶ Goldseeker loop Ravenswood
  - ▶ All around Riverside Drive
  - ▶ Humphrey & Greenacre
  - ▶ All around Furnissdale
  - ▶ Around Adventure scapes park near the beach area
- Linkage of more paths to complete the Shire's walking and biking network

### Legislative Requirements:

Legislative requirements govern the management of footpaths assets under the Shire's control and include the following:

Legislation	Requirement
Local Government Act 1995	Sets out the role, purpose, responsibilities and powers of local governments.
Environment Protection Act 1986	Regulations relating to storm water and groundwater resources.
Occupational Health & Safety Act 1984	Provide a work environment that is safe and as far as practicable without risk to health.
Planning & Development Act 2005	Defines the land use and zoning in relation to infrastructure
Road Management Act 2004	Sets out the responsibilities in relation to the management of road assets.
Shire of Murray Local Laws	Various requirements and restrictions relating to the use of footpaths
MRWA standards	Australian Standard AS1428.1 – 2003: "Design for access and mobility, Part 1: General Requirements for access - New building works". (This standard is prepared having regard to the Commonwealth Disability Discrimination Act)
Australian Standards and Codes	Austrroads Standard: "Guide to Traffic Engineering Practice, Part 13 - Pedestrians".

Future Demand Drivers / Impacts			
Demand Drivers	Present Position	Projection	Impact on Services
New Sub-divisional Activity	No of Subdivisions delivered this year:4	10 New Subdivisions – Short Term (1-5years)  13 New Subdivisions – Mid Term (6-10 years)	Increase in the lifecycle costs of the footpaths assets group, which will see the Shire implementing the following demand management measures; <ul style="list-style-type: none"> <li>• Upgrade and new works to minimise ongoing maintenance requirements</li> <li>• Assets handover to third parties if it can be demonstrated that they can manage them better</li> <li>• Disposal of assets with no evident demand</li> </ul>
Economic Changes	2017 – 1,009 local businesses	Increase in facilities such as retail trade, education and health.	Predicted growth in the region will see increased demand on footpath network, which will see the Shire implementing the following demand management measures; <ul style="list-style-type: none"> <li>• Development plans for each town with regards footpath network optimisation so the right mix of managing existing assets, upgrade and acquisition can be achieved with the agreed level of service.</li> </ul>
Population Changes / Density	2017 – 17,805	2041 - 80,782	In situations where additional land is not required, e.g. infill subdivision, the existing footpath network may need to be upgraded to cater for the additional demand

Future Demand Drivers / Impacts			
Demand Drivers	Present Position	Projection	Impact on Services
Changes in Technology	Regular Construction technology (Methodology, Materials, Plant & Equipment) improvements are regularly available	Construction technology improvements will increase Positive outcomes (e.g. Trenchless pipe relining, Improved Material Engineering, etc.)	Reduced asset lifecycle costs (Construction, Operations, Maintenance & Disposal)
Legislation	New Assets constructed and maintained according to current legislation	Assets constructed to current legislative requirements	Improvement required to current Asset Management processes and practices
Environmental	Assets are constructed to withstand today's known environmental conditions and to meet today's environmental standards	Greater environmental sustainability requirements placed on the construction industry	Higher costs associated with construction methods that are environmentally sustainable (e.g. dealing with disposal of contaminated soil, etc.)
Tourism Growth	Increase in visitor numbers to the Shire, local events	Increase in events and tourism generally	<p>Increased demand on footpath network, which will see the Shire implementing the following demand management measures;</p> <p>Development plans for each town with regards footpath network optimisation so the right mix of managing existing assets, upgrade and acquisition can be achieved with the agreed level of service.</p> <p>Increased maintenance due to careless littering, which will see the Shire;</p> <ul style="list-style-type: none"> <li>• Implementing education campaigns to create problem awareness among residents</li> <li>• Erecting signs encouraging visitors to keep Murray Pretty</li> <li>• Encourage residents to report littering violations through the development of a mobile app</li> </ul>
Climate Change	Climate change represents a key challenge in the future	Possibly trending to increased seasonal extremes	Likely to result in increased operations & maintenance warranting service level reviews

**Subdivisional Activity :**

Based on current outline development plans and subdivision applications, the following additional subdivisions are expected within the short and mid-term financial plan impacting service provision:

**Additional Subdivisions - Short Term financial plan (1 to 5 years)**

Location
Lot B28 Shanns , North Dandalup
Lot 28 Shanns , North Dandalup
Austin Cove / Austin Lakes, South Yunderup - future stages
Murray River Country Estate - Stage 8
Riverland Waters, Ravenswood - future stages
Ravenswood Green Estate
Ravenswood on the Murray
Peel Industrial Development
Lot 619 Ravenswood
North Dandalup Estate

**Additional Subdivisions - Mid Term financial plan (6 to 10 years)**

Location
Lots 1 & 2 Lakes, North Dandalup
Lot 530 Lakes, Stake Hill/Nambeelup
Avoca Retreat, North Dandalup
Paul Street/Furnissdale, Furnissdale
Point Grey Development
Pollard Street / Alderson Street, Pinjarra
Lots 1 & 2 Pinjarra, Pinjarra
Murray River Country Estate - Stage 9
Murray River Country Estate - Stage 10
Greenlands / Forrest Highway, West Pinjarra
Lot 42 Hampton, Pinjarra
Moore's, Pinjarra (Industrial) - future stage
Lot 602 Beacham, Pinjarra



## Risk Management

The following risks have been identified about Shire Footpaths assets:

Risk Details	Risk Assessment		Risk Rating	Treatment Strategy	Responsibility
	Likelihood	Consequence			
Ongoing deterioration of footpath assets	Possible	Moderate	Moderate (9)	1. Regular condition inspections	Technical Services
				2. Annual allocation of sufficient funding and resources	Technical Services / Executive Management Team / Council
				3. Development and regular update of 10 year Footpath Capital Works Plan	Technical Services
Accident caused by footpath infrastructure	Likely	Minor	Moderate (8)	1. Sufficient insurance coverage	Corporate Services
				2. Submission of appropriate funding requests for footpath inspections and maintenance	Risk Management
Inadequate and / or undefined response times in relation to footpath maintenance	Possible	Minor	Moderate (6)	1. Develop a footpath maintenance plan that details a risk based approach to maintenance	Technical Services
Inadequate lighting particularly to steps, stairways and passageways during hours of darkness	Unlikely	Minor	Low (4)	1. Regular Inspections	Asset Management
				2. Proactive maintenance inspections undertaken as per Footpath Maintenance and Operational Plan	Technical Services
Vegetation which presents a physical hazard to the public e.g.	Likely	Minor	Moderate (8)	1. Proactive maintenance inspections undertaken as per Footpath Maintenance and Operational Plan	Technical Services

Risk Assessment					
Risk Details	Likelihood	Consequence	Risk Rating	Treatment Strategy	Responsibility
overhanging tree, excessive weeds					
Use of shared paths by cyclists and pedestrians may result in conflict and collision.	Possible	Moderate	Moderate (9)	1. Signage on paths indicating right of way.	Technical Services
				2. Pavement markings on path.	
Asset decreases at a greater than acceptable rate due to failure to adequately fund preventative maintenance programs or renewal programs.	Possible	Minor	Moderate (6)	1. Implementation of best practice processes for asset management.	Asset Management
				2. Asset inventory and condition status maintained.	
				3. Whole of life management of assets adopted.	
Trips due to tree roots, subsidence, condition, gaps, service inspection lids obstruction and vehicular damage.	Likely	Minor	Moderate (8)	1. Regular condition inspections	Asset Management
				2. Annual allocation of sufficient funding and resources	Technical Services
				3. Development and regular update of 10 year Footpath Capital Works Program	

## Forward Works Programming

### Operations & Maintenance Strategy (O&M)

Risk is a key consideration in striking the right balance between minimising the total cost of ownership of the Shire assets and maximising their performance, availability, and reliability.

The O&M Strategy ensures that agreed level of services and statutory and legislative requirements are met, reducing operational risk, reactive maintenance and increasing user groups satisfaction

The O&M Strategy contains:

- Systems and procedures to be used to plan and manage maintenance work
- Types of maintenance to be carried out
- Order of priority for maintenance activities
- Inspection regimes and responsibilities

The maintenance activities, along with factors that govern or influence them, are:

- Reactive (unplanned) maintenance activities. This is governed by the urgency of what is required.
- Planned (scheduled) maintenance activities. These are generally more extensive repairs that are undertaken as part of a program of works to either prevent the breakdown of elements or components of a property or to bring those elements up to an acceptable condition. The extent of this program largely depends on funding allocations.
- Backlog maintenance activities. This refers to an accumulation of uncorrected or deferred deficiencies in an asset. This is governed by available funding and any future plans for a particular asset.

Reactive work accounts for the majority of the annual maintenance budget and encompasses the repair or replacement of asset elements as they wear out or are damaged. By its nature, reactive work must be carried out as the need arises and cannot be scheduled in advance. Work is prioritised as it arises by defined intervention levels and response times. The intervention level defines the condition, state or risk level associated with an asset component, i.e. the point in time at which the asset is considered to be below an acceptable level of service. Response time defines a reasonable time frame within which it can be expected for the Shire to remedy the defect.

Planned maintenance is repair work that is identified and managed through a maintenance management strategy. Planned maintenance activities include inspection, assessing the condition against failure, prioritising, scheduling and actioning the work. Development of a maintenance strategy which defines inspection frequencies, technical work standards, condition for intervention, and target response times

### Renewal / Replacement Strategies:

Renewal expenditure is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original service potential.

### **New and Upgrade:**

#### **New**

Best practice asset management involves a comprehensive analysis of the acquisition of new assets. The analysis involves completing a project proposal and business case which addresses issues such as:

- relevance to corporate goals;
- alignment to core business;
- community need;
- anticipated benefits;
- environmental impacts;
- risk identification and treatment;
- total life-cycle costs;
- impact on existing services/infrastructure;
- analysis as to whether service can be delivered without asset acquisition;
- forecasted usage rates;
- value for money

To ensure Footpaths assets continue to meet corporate and community needs, all new assets planned for acquisition must undergo this critical 'whole of life' analysis that will consider the impact of longer-term maintenance, as well as operating costs of the asset and its impact to The Shire long-term sustainability

Where decisions are made to proceed with additional assets, future budgets accommodate the additional expenditure.

#### **Upgrade**

Upgrade refers to works which improve an existing asset beyond its current capacity. They may result from growth, social or environmental needs. Upgrade/expansion of infrastructure will contribute to the overall infrastructure inventory and will require, as well, a comprehensive whole of life' analysis.

### **Asset Disposal Strategies:**

No Footpaths assets have been identified for disposal through either an excess in the asset base or a transfer of responsibility of assets.

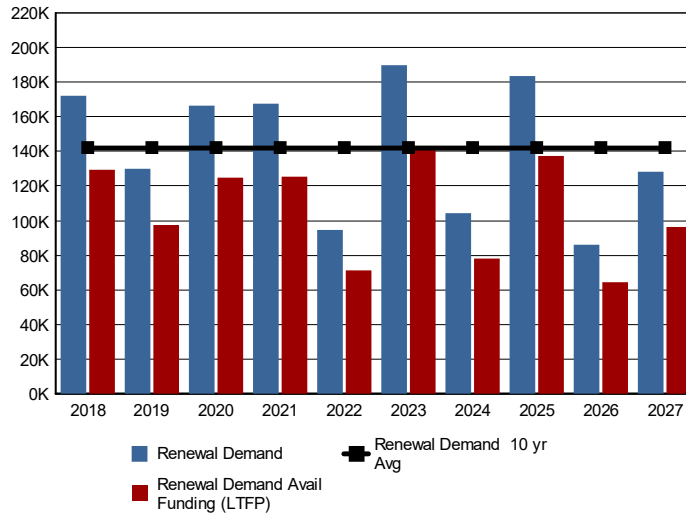
### Financial Summary

#### Footpaths

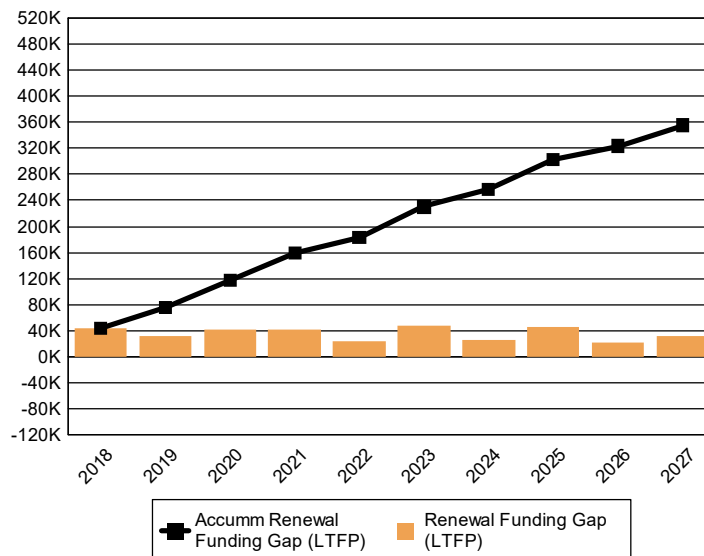
#### Renewal Requirement (Like for Like Replacement):

The projected outlays necessary to provide the services covered by this Asset Management Plan includes renewal of existing assets over the ten year planning period is \$1,422,061 or \$142,206 on average per year.

Estimated available funding for this period is \$1,066,550 or \$106,655 on average per year, which is 75% of the cost to provide the service. Projected expenditure to provide like for like renewal in this AMP included in the LTFP is shown in the graph below.



The total renewal requirement to address the assets at or above the current intervention level in Year 1 is \$172,398. The proposed funding allocation for building renewal in Year 1 is \$129,299 and will be funded from municipal funds. The ten year LTFP period renewal shortfall is \$355,514 and shown in the graph below.



Although there is a financing shortfall over the ten year planning period, the risk of failure in the backlog will be carefully monitored in the coming years, especially on the year one, and will form part of the annual review of the LTFP.

<b>Confidence Level</b>
<p><b>Data Source and Data Rating Assessment:</b></p> <ul style="list-style-type: none"> <li>• Assetic (myData) Corporate Asset Register</li> <li>• MapInfo Professional</li> <li>• Synergysoft</li> </ul> <p><b>Confidence Grade B</b> – Reliable data based on sound records, procedures, investigations and analysis which is properly documented but has minor shortcomings’ for example the data is old, some documentation is missing, and reliance is placed on unconfirmed reports or some extrapolation.</p>

<b>Asset Improvement Plan</b>			
Task	Responsibility	Resources	Timeline
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/18
Council to utilise their infrastructure Asset Hierarchy as a basis for consistent reporting across the organisation.	Asset Management, Finance	Internal	7/30/18
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/18
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/18
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/19
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/19
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/19

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Council and Executive to consider the annual Capital Works Program and prioritise works based on cost/benefit assessments (including risk) with resource implications reflected into the Long Term Financial Plan.	Asset Management & Technical Services	Internal	6/30/19
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/19
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/19
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/19
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/19
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/19
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/19
Ongoing rolling condition assessment program as per inspection procedure	Asset Management & Technical Services	Internal	11/20/19
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/20
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/20

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
AM roles and responsibilities matrix bi-annual update	Asset Management	Internal	3/28/20
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/20
Ensure Annual Budget is prepared based on 'service levels' as reflected in the Strategic Longer Term Plan and contains indicators and measures to assess performance against achieving Council's strategic objectives.	Asset Management & DCCD	Internal	6/30/20
Develop a communication plan to communicate information on infrastructure service delivery issues and Council's management of these issues to external stakeholders.	Asset Management & Media Coordinator	Internal	6/30/20
Incorporate technical levels of service into service agreements and/or maintenance, operational and capital renewal procedures.	Asset Management	Internal	6/30/20
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/20
Community survey to review existing level of service and determine the level of service the community is willing to accept and pay for	Asset Management & Technical Services	Internal	6/30/20
Undertake a process of defining, quantifying and documenting current community levels of service and technical levels of service and costs of providing the current levels of service.	Asset Management & Technical Services	Internal	6/30/20
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/20



<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Asset Management Plan Review	Asset Management & Technical Services	Internal	6/30/20
Review and Update Asset Class Maintenance and Operational Plan	Asset Management & Technical Services	Internal	6/30/20
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/20
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/20
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/20
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/20
Asset Class revaluation	Finance	Internal / External	11/20/20
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/20
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/21
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/21
Review and Update Asset Class Maintenance and Operational Plan	Asset Management & Technical Services	Internal	6/30/21
Asset Management Plan Review	Asset Management & Technical Services	Internal	6/30/21

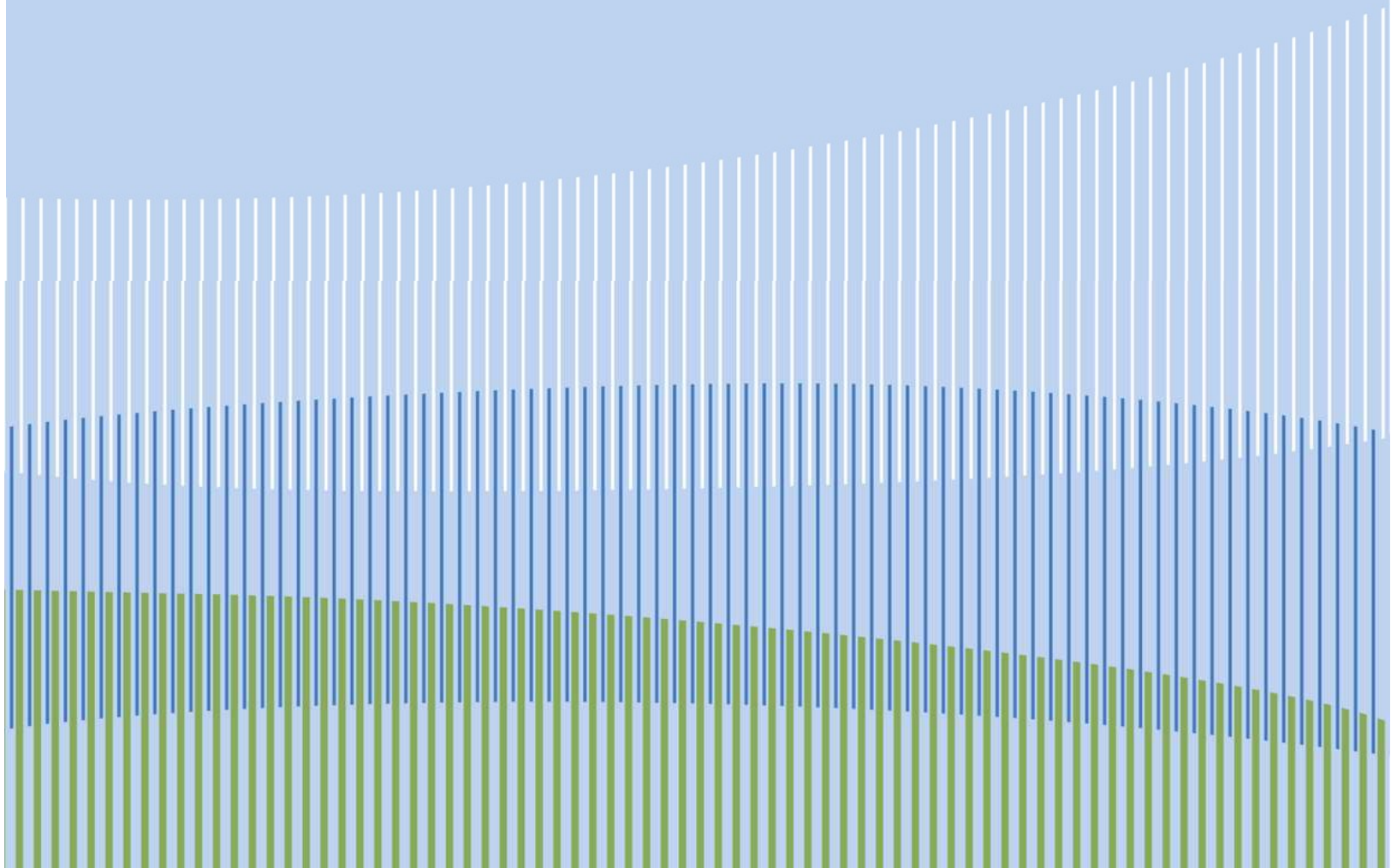
<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/21
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/21
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/21
Community survey to review existing level of service and determine the level of service the community is willing to accept and pay for	Asset Management & Technical Services	Internal	6/30/21
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/21
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/21
Ensure Annual Budget is prepared based on 'service levels' as reflected in the Strategic Longer Term Plan and contains indicators and measures to assess performance against achieving Council's strategic objectives.	Asset Management & DCCD	Internal	6/30/21
Undertake a process of defining, quantifying and documenting current community levels of service and technical levels of service and costs of providing the current levels of service.	Asset Management & Technical Services	Internal	6/30/21

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/21
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/21
Asset Class revaluation	Finance	Internal / External	11/20/21
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/21



# Appendix E

## Drainage Asset Management Plan 2017 - 2037



The Shire of Murray (The Shire) is responsible for providing many community services and in doing so must ensure that its infrastructure assets are maintained by well-developed strategic plans and asset management programs. What services are provided, and how they are provided will depend on the agreed level of service.

The Drainage Asset Management Plan (DAMP) has been developed to document the Shire's asset management processes, to guide the planning, acquisition, operation, maintenance, renewal and disposal of drainage assets, with an objective to maximise service delivery outcomes with the lowest lifecycle cost.

One of the Shire's core functions is to provide quality fit for purpose assets throughout the municipality by demand requirements, engineering standards and planning objectives. The DAMP has been prepared by Shire of Murray's Strategic Community Plan 'Murray 2025' (SCP) to meet the strategy: "Continue to develop and implement best practice asset management".

The Shire has 4,767 Pits and 10,885 kilometres of pipes within its control. Drainage is an important component of the Shire's asset portfolio as they facilitate the movement of stormwater mitigating flood impacts on both public and private property in urban areas.

The Shire has gathered a significant amount of Drainage data as part of the development of this plan. This information, including the condition, value, age, type and location of Drainage infrastructure, has provided the foundation for this document. As a result of the data collection exercise, Shire now has a very good understanding of the extent and current condition of Drainage assets.

These infrastructure assets covered in this plan have a replacement value of \$ 35,161,250 as of 30 June 2017.

**What does it Cost?**

The projected outlays necessary to provide the services covered by this Asset Management Plan includes renewal of existing assets over the ten year planning period is \$441,228 or \$44,123 on average per year.

Estimated available funding for this period is \$330,922 or \$33,092 on average per year, which is 75% of the cost to provide the service. The ten year LTFP period renewal shortfall is \$110,306.

What Does It Cost?	
10 year total renewal cost	\$441,228
10 year average cost	\$44,123
10 year total LTFP renewal budget	\$330,922
10 year average LTFP renewal budget	\$33,092
10 year AM financial indicator	75%
10 year average shortfall	<b>\$110,306</b>

Although there is a financing shortfall over the ten year planning period, the risk of failure in the backlog will be carefully monitored in the coming years, especially on the year one, and will form part of the annual review of the LTFP.

**What we will do**

We plan to provide services for the following:

- Operation, maintenance, renewal and upgrade of Drainage to meet service levels agreed by Council in annual budgets.
- Asset Renewal at the agreed intervention level within the 10 year planning period.

**Managing the Risks**

There are risks associated with providing the service and not being able to complete all identified activities and projects. We have identified major risks as:

- Deterioration of infrastructure
- Asset loss from disaster (fire, flood etc.)
- Insufficient funding allocated to asset renewal
- Design/construction non-compliant with current legislation or regulations
- Maintenance practice's not environmentally sustainable
- Personal Injury and legal liabilities.

We will endeavour to manage these risks within available funding by:

- Regular condition inspections (3-year rolling basis)
- Business Continuity Plan in place
- Non-compliance works to be given priority
- Ensure maintenance practices are carried out by environmentally sensitive procedures.

This AM Plan is based on Medium level of confidence information.

### **The Next Steps**

The actions resulting from this asset management plan are:

- Continue to assess and rate the condition of drainage assets to better inform future revisions of this DAMP
- Annually develop a 10 year Capital Works Program (CWP)
- Maintain assets to a safe condition within available funding constraints
- Consultation with the community to define levels of service options, which can be delivered to the community at various funding levels
- Analyse future demand drivers/impacts
- Revaluation of assets in line with Fair Value

### **Questions you may have:**

#### **What is this plan about?**

The DAMP is the means for documenting management, financial and technical practises to ensure that:

- The agreed level of service is provided at the lowest long-term cost
- The proactive management of Assets and services provided by these assets
- Compliance with legislative requirements
- Adequate funding.

#### **What is an Asset Management Plan?**

Asset management planning is a comprehensive process to ensure delivery of services from infrastructure is provided in a financially sustainable manner.

An asset management plan details information about infrastructure assets, including actions required to provide the agreed level of service in the most cost-effective manner. The plan defines the services to be provided, how the services are provided and what funds are required to provide the services.

#### **Why is there a funding shortfall?**

The Shire's drainage assets were largely purchased and constructed by Council, occasionally with external funding support from the state and federal governments, or were gifted by developers as required by planning legislation. Many of these assets are approaching the end of their expected serviceable life, and they require replacement. As a result, service provision through these assets is decreasing, and maintenance costs are increasing. Our present funding levels are not sufficient to continue to provide existing services at current levels in the medium term.

***What options do we have?***

Resolving the funding shortfall involves several steps:

1. Improving asset knowledge so that data accurately records the asset inventory, how assets are performing and when assets are not able to provide the required service levels
2. Improving our efficiency in operating, maintaining, renewing and replacing existing assets to optimise lifecycle costs
3. Identifying and managing risks associated with providing services from infrastructure
4. Making trade-offs between service levels and costs to ensure that the community receives the best return from infrastructure
5. Identifying assets surplus to needs for disposal to make saving in future operations and maintenance costs
6. Consulting with the community to ensure that Drainage services and costs meet community needs and are affordable,
7. Developing partnership with other bodies, where available to provide services
8. Seeking additional funding from governments and other bodies to better reflect a 'whole of government' funding approach to infrastructure services.

***What happens if we don't manage the shortfall?***

It is likely that we will have to reduce service levels in some areas unless new sources of revenue are found. For Drainage, the service level reduction may include allowing the condition of very low-risk assets to deteriorate to failure.

***What can we do?***

We can develop options, costs and priorities for future Drainage services, consult with the community to plan future services to match the community service needs with the ability to pay for services and maximise community benefits against costs.



## Drainage's Asset Management Plan

**Objective 4 - Well planned, integrated and active places that embrace and respect our rural lifestyle, built and natural environment and heritage**

**Outcome 4.5** - Plan for and build facilities and infrastructure that will meet the needs of a growing community

**Strategy – 4.5.1** - Effectively manage infrastructure through its lifecycle

### Asset Inventory

Assets covered by this plan include:

Asset Category	Total Replacement Value (\$)
Culvert	\$ 11,874
Pipe	\$ 23,723,986
Pit	\$ 11,425,390
<b>Total</b>	<b>\$ 35,161,250</b>

### Current Replacement Cost:

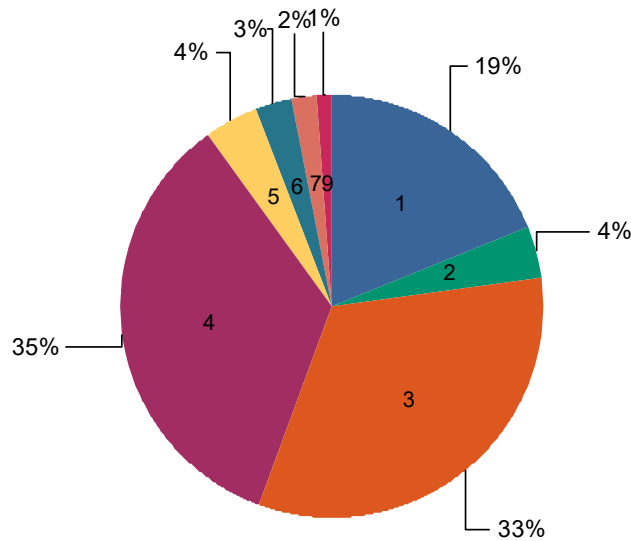
## CRC



Culvert	\$11,874	0.0%
Pipe	\$23,723,986	67.5%
Pit	\$11,425,390	32.5%
Total:	\$35,161,250	100.0%

**Drainage Infrastructure Condition**

**Condition Distribution**



Condition 8 and 10=Nil

**Simplified Condition Grading Model (1 – 10):**

<b>1</b>	A <b>new</b> asset designed and constructed to current standards.
<b>2</b>	An asset in <b>excellent</b> overall condition, with sound structural integrity, no defects and new appearance. Often moved from a Condition 1 based on the time since construction rather than observed condition decline
<b>3</b>	An asset in <b>very good</b> condition with sound structural integrity, superficial wear and tear and some deterioration to finishes. No serviceability problems.
<b>4</b>	An asset in <b>good</b> overall condition, with some minor wear and tear issues or deterioration to finishes. Serviceability may be impaired very slightly.
<b>5</b>	An asset in <b>fair</b> overall condition. Deterioration in condition would be obvious, with minor defects occurring. There will generally be some aspects of serviceability loss and minor maintenance.
<b>6</b>	An asset in <b>fair to poor</b> overall condition. The condition deterioration would be very obvious. Asset serviceability in general would now be affected and maintenance cost would be rising.
<b>7</b>	An asset in <b>poor</b> overall condition. Deterioration would be quite severe and would be starting to limit the serviceability of the asset. Maintenance cost would be high.

<b>8</b>	An asset in <b>very poor</b> overall condition with serviceability now heavily impacted. Maintenance cost would be very high and the asset would need to be rehabilitated. Minor risk of public injury.
<b>9</b>	An asset in <b>extremely poor</b> condition with severe serviceability problems and needing rehabilitation immediately. User safety and comfort very likely to be affected.
<b>10</b>	An asset that has <b>failed</b> , is no longer serviceable and should not remain in service. There would be an extreme risk in leaving the asset in service.
<b>Assets Excluded from Plan:</b>	
Nil	

**Condition / Renewal Intervention:**

Intervention levels are based on the Western Australian Asset Management Improvement Programme scoring method, and are as follows:

Asset Category	Intervention Condition
Pits	8
Pipes	8
Culverts	8

**Useful Life:**

All Assets – 100 years

**Hierarchies**

Hierarchies are used to assign priorities for intervention (e.g. upgrades, renewal, operations & planned maintenance) and reactive maintenance response times to Drainage assets of different importance. The assets that are ranked higher are considered to be of higher significance as they deliver more critical core services and have high usage rates.

The factors that influence the hierarchy for the Shire’s drainage network are:

1. Road hierarchy
2. Town Planning Scheme Zoning

	Town Centre	Residential / Commercial / Industrial	Rural / Special Rural
Regional Distributor	1	1	1
District Distributor	1	1	2
Local Distributor	1	2	2
Access Roads	2	2	2
Laneways	n/a	3	3

**Stakeholders:**

The following stakeholders have been identified in relation to Drainage' infrastructure:

Stakeholder	Expectations
Councillors	Meeting community needs, sound management and allocation of resources, good governance
Employees / Contractors	Shire officers play a major role in managing stormwater drainage assets to ensure alignment with the agreed level of service and satisfaction of residents and visitors
Community Residents and Businesses	Value for money, equitable and responsible service, well maintained assets
Insurers	Appropriate risk management policies and practices, safe working environments, well-maintained assets
Tourists	Well maintained assets, accessible services, safe facilities
Government (Federal and State)	Systems in place to sustain Drainage infrastructure, accountability, transparency

**Linkage to Other Plans:**

- Strategic Community Plan 'Murray 2025'
- Corporate Plan 2017 - 2021
- Long-Term Financial Plan
- Annual Report
- Risk Management Strategy
- Risk Management Policy
- Asset Management Policy
- Asset Management Improvement Strategy
- Community Infrastructure Plan
- Workforce Plan

Levels of Service
<b>Customer Research and Expectations:</b>
An internal Level of service review has been undertaken, identifying stakeholders service needs and wants to establish more robust service levels.
<b>Community Levels of Service:</b>
Community Levels of Service measure how the community receives the asset services and whether the Shire is providing community value. The bi-annual asset management satisfaction survey has been conducted this financial year, and current community levels of service are displayed below.

Key Performance Indicator	Level of Service	Performance Measurement Process	Target Performance	Current Performance
Quality	Provide efficient methods of collection and disposal of stormwater	Customer requests relating to blockages	Less than 5 customer requests per month	2017 - 19 reports of blockages
Function	Ensure stormwater system meets user requirements	Customer requests relating to property flooding	Less than 5 requests per annum attributed to asset and maintenance failure	2017 - 5 reports of property flooding
Safety	Provide stormwater drainage system free from hazards	Reported hazards from customer service requests	No more than 2 requests per year	2017 - 15 reports of hazards

**Technical Levels of Service:**

Technical levels of service relate to the technical measures and the outputs the customer receives and are summarised below:

Key Performance Measure	Level of Service	Performance Measurement Process	Current Performance	Performance Target
<b>TECHNICAL LEVELS OF SERVICE</b>				
<b>Quality</b>	Renewal	Assets @ Intervention level	Less than 5 % Assets at Intervention level	< 5 % of Assets
	Capital Renewal Program	Budget	95 % expended in Projects scheduled for delivery in FY 2017/18. Balance held up due to defect liability periods.	Expenditure = budget
	Condition of Drainage assets known.	Condition Survey	Annual rolling condition assessment program completed once every 3 years	Annual rolling condition assessment program completed once every 3 years
	Cost Effective planned maintenance program	Percentage of Planned Maintenance undertaken over reactive Maintenance $\frac{PM}{RM} \times 100$	TBD	TBD
<b>Upgrade / Expansion</b>	Capital New / Upgrade works program	Time, Quality, Cost & Environmental	All works delivered with due expedition to quality, cost & environmental requirements.	All projects progressing with due consideration for proper planning & external influences.
		Budget	95 % expended in Projects scheduled for delivery in FY 2017/18. Balance held up due to defect liability periods.	Expenditure = budget

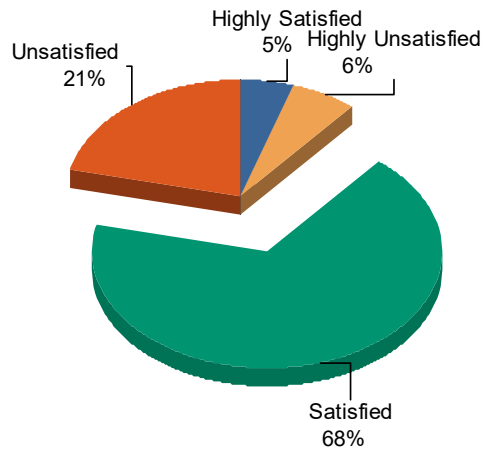
<b>Operations</b>	Regulatory and Non regulatory Inspection and Testing	Inspections and cleaning as per legislative requirements and agreed levels of service	All inspections completed as scheduled	All inspections completed as scheduled
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### Community Consultation

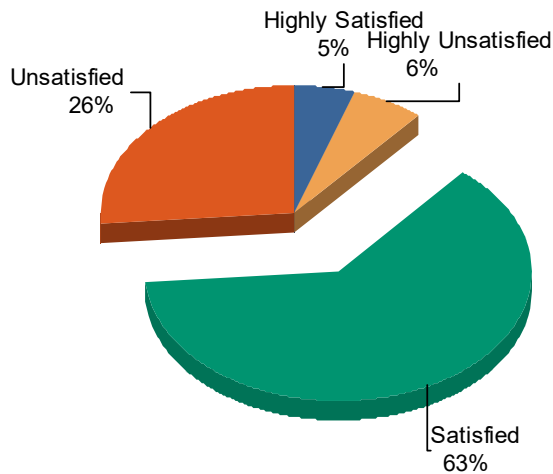
#### Customer Research:

In December 2017 a survey was undertaken to obtain an understanding of the community's level of satisfaction about The Shire's Drainage provision. Details of the survey are summarised below:

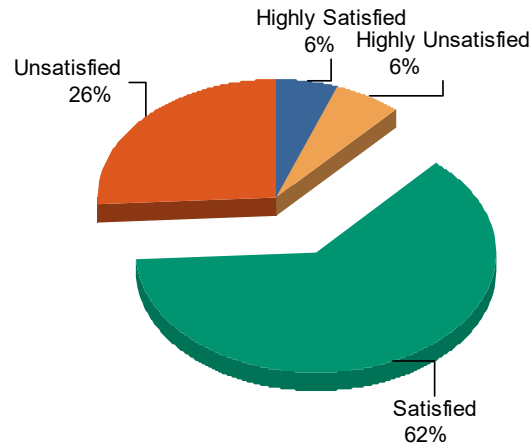
Capacity of drainage network sufficiently prevents inundation of properties



Condition and maintenance of the drainage network sufficiently minimises local blockages



Roads and footpaths free of excess surface water so they do not pose safety hazards



**Customer Concerns:**

Customers are primarily concerned with services and assets such as:

- Better maintenance on several areas experiencing floods  
*Flooded areas after rain in ;*
  1. Ridgeview drive, Pinjarra Williams Road in Meelon
  2. Number of corners within Ravenswood
  3. Jolly Ramble Park
  4. Roundabout Sutton to Country Rd
  5. Pinjarra Rd, near Alcoa Admin Offices
  6. Curtis Rd
  7. Broken/blocked culvert Thompson Road West Pinjarra
  8. Wallace Road, Dwellingup
  9. Wilson Road always blocked
  10. Nancarrow Way, after turning into Nancarrow, just past Lloyd Ave
  11. Opposite shops in Lloyd Ave. the nature strip has eroded causing flooding over the pathway
  12. South Yunderup road between pelicans red and yunderup rd.
  13. Corner Carter Street /Rodoreda Cr.
  14. Holmes Parade
  15. South Yunderup Road between Sandy Cove Tavern and The Canal Shop
  16. Turning point into Peel Caravan Park
  17. Bottom of Marshall Avenue
  18. Fiegert Rd in Barragup
  19. New entrance to the equestrian centre
  20. Solya Cres
  21. West Pinjarra / Nirimba.



**Legislative Requirements:**

Legislative requirements govern the management of drainage assets under the Shire's control and include the following:

Legislation	Requirement
Local Government Act 1995	Sets out the role, purpose, responsibilities and powers of local governments.
Environment Protection Act 1986	Regulations relating to storm water and groundwater resources.
Occupational Health & Safety Act 1984	Provide a work environment that is safe and as far as practicable without risk to health.
Planning & Development Act 2005	Defines the land use and zoning in relation to infrastructure

Future Demand Drivers / Impacts			
Demand Drivers	Present Position	Projection	Impact on Services
New Sub-divisional Activity	No of Subdivisions delivered this year:4	10 New Subdivisions – Short Term (1-5years)	<p>Increase in the lifecycle costs of the Drainage assets group, which will see the Shire implementing the following demand management measures;</p> <ul style="list-style-type: none"> <li>Mitigate drainage blocking by selective resealing of urban road shoulders</li> <li>Upgrade and new works to minimise ongoing maintenance requirements</li> <li>Relining old pipes with poly inserts to prolong life</li> <li>Programmed cleaning of drainage inlets and soak wells</li> <li>Annual programmed cleaning of drainage pipes</li> <li>Annual cleaning of hydrocarbon filters.</li> </ul>
		13 New Subdivisions – Mid Term (6-10 years)	
Economic Changes	2017 – 1,009 local businesses	Increase in facilities such as retail trade, education and health.	<p>Predicted growth in the region will see increased demand on existing drainage infrastructure , which will see the Shire implementing the following demand management measures;</p> <ul style="list-style-type: none"> <li>Ensure new developments and subdivision infills keep stormwater flows to pre-development levels and have a defined 1:100 year high flow path</li> <li>Water Sensitive Urban Design (WSUD) - more overland flow, green swales, local detention basis, less impervious areas on new developments</li> <li>Increased use of stormwater to wetlands</li> <li>Increased re-use of stormwater is localised areas i.e. where it falls is where it is used</li> <li>Improvement and minor upgrades of existing infrastructure.</li> </ul>
Population Changes / Density	2017 – 17,805	2041 - 80,782	In situations where additional land is not required, e.g. infill subdivision, the existing Drainage network may need to be upgraded to cater for the additional demand

Future Demand Drivers / Impacts			
Demand Drivers	Present Position	Projection	Impact on Services
Changes in Technology	Regular Construction technology (Methodology, Materials, Plant & Equipment) improvements are regularly available	Construction technology improvements will increase Positive outcomes (e.g. Trenchless pipe relining, Improved Material Engineering, etc.)	Reduced asset lifecycle costs (Construction, Operations, Maintenance & Disposal)
Legislation	New Assets constructed and maintained according to current legislation	Assets constructed to current legislative requirements	Improvement required to current Asset Management processes and practices
Environmental	Assets are constructed to withstand today's known environmental conditions and to meet today's environmental standards	Greater environmental sustainability requirements placed on the construction industry	Higher costs associated with construction methods that are environmentally sustainable (e.g. dealing with disposal of contaminated soil, etc.)
Tourism Growth	Increase in visitor numbers to the Shire, local events	Increase in events and tourism generally	Increased maintenance due to careless littering, which will see the Shire; <ul style="list-style-type: none"> <li>Implementing education campaigns to create problem awareness among residents</li> <li>Erecting signs advising visitors to do their share to stop flooding due to irresponsible garbage disposal</li> </ul>
Climate Change	Climate change represents a key challenge in the future	Possibly trending to increased seasonal extremes	Likely to result in increased operations & maintenance warranting service level reviews

**Subdivisional Activity :**

Based on current outline development plans and subdivision applications, the following additional subdivisions are expected within the short and mid-term financial plan impacting service provision:

**Additional Subdivisions - Short Term financial plan (1 to 5 years)**

Location
Lot B28 Shanns , North Dandalup
Lot 28 Shanns , North Dandalup
Austin Cove / Austin Lakes, South Yunderup - future stages
Murray River Country Estate - Stage 8
Riverland Waters, Ravenswood - future stages
Ravenswood Green Estate
Ravenswood on the Murray
Peel Industrial Development
Lot 619 Ravenswood
North Dandalup Estate

**Additional Subdivisions - Mid Term financial plan (6 to 10 years)**

Location
Lots 1 & 2 Lakes, North Dandalup
Lot 530 Lakes, Stake Hill/Nambeelup
Avoca Retreat, North Dandalup
Paul Street/Furnissdale, Furnissdale
Point Grey Development
Pollard Street / Alderson Street, Pinjarra
Lots 1 & 2 Pinjarra, Pinjarra
Murray River Country Estate - Stage 9
Murray River Country Estate - Stage 10
Greenlands / Forrest Highway, West Pinjarra
Lot 42 Hampton, Pinjarra
Moore's, Pinjarra (Industrial) - future stage
Lot 602 Beacham, Pinjarra

**Risk Management**

The following risks have been identified about Shire Drainage assets:

Risk Details	Risk Assessment			Treatment Strategy	Responsibility
	Likelihood	Consequence	Risk Rating		
Ongoing deterioration of drainage assets	Likely	Moderate	High (12)	1. Scheduled condition inspections	Technical Services
				2. Annual allocation of sufficient funding and resources	EMT / Council
Accident caused by drainage infrastructure	Unlikely	Moderate	Moderate (6)	1. Sufficient insurance coverage	Corporate Services
				2. Submission of appropriate funding requests for drainage inspections and maintenance	Technical Services
				3. Submit	
Chemical spill or similar infiltrates through drainage system	Unlikely	Moderate	Moderate (6)	1. Prioritise capital and maintenance works based on condition and hierarchy	Technical Services
				2. Maintain and update drainage database to ensure current data exists spatially	Asset Management
Blockages/underperformance of drainage assets	Likely	Moderate	High (12)	1. Inspection and cleaning frequency according to asset hierarchy	Technical Services
Portions of the drainage network may contain asbestos and cause health problems to Shire staff	Rare	Major	Moderate (4)	1. Identify drainage assets constructed before 1976 and communicate this information to relevant Shire staff	Asset Management
Failure to correctly construct drainage infrastructure according to Australian Standards	Unlikely	Major	Moderate (8)	1. Build by Australian Standards,	Technical Services
				2. Quality Assurance Check.	
Failure to correctly maintain drainage infrastructure according to Australia Standards	Unlikely	Major	Moderate (8)	1. Inspection frequency according to asset hierarchy.	Technical Services
Non-compliance with drainage design standards	Unlikely	Moderate	Moderate (6)	1. Design by Australian Standards.	Technical Services
				2. Quality Assurance Check.	

## Forward Works Programming

### Operations & Maintenance Strategy (O&M)

Risk is a key consideration in striking the right balance between minimising the total cost of ownership of the Shire assets and maximising their performance, availability, and reliability.

The O&M Strategy ensures that agreed level of services and statutory and legislative requirements are met, reducing operational risk, reactive maintenance and increasing user groups satisfaction

The O&M Strategy contains:

- Systems and procedures to be used to plan and manage maintenance work
- Types of maintenance to be carried out
- Order of priority for maintenance activities
- Inspection regimes and responsibilities

The maintenance activities, along with factors that govern or influence them, are:

- Reactive (unplanned) maintenance activities. This is governed by the urgency of what is required.
- Planned (scheduled) maintenance activities. These are generally more extensive repairs that are undertaken as part of a program of works to either prevent the breakdown of elements or components of a property or to bring those elements up to an acceptable condition. The extent of this program largely depends on funding allocations.
- Backlog maintenance activities. This refers to an accumulation of uncorrected or deferred deficiencies in an asset. This is governed by available funding and any future plans for a particular asset.

Reactive work accounts for the majority of the annual maintenance budget and encompasses the repair or replacement of asset elements as they wear out or are damaged. By its nature, reactive work must be carried out as the need arises and cannot be scheduled in advance. Work is prioritised as it arises by defined intervention levels and response times. The intervention level defines the condition, state or risk level associated with an asset component, i.e. the point in time at which the asset is considered to be below an acceptable level of service. Response time defines a reasonable time frame within which it can be expected for the Shire to remedy the defect.

Planned maintenance is repair work that is identified and managed through a maintenance management strategy. Planned maintenance activities include inspection, assessing the condition against failure, prioritising, scheduling and actioning the work. Development of a maintenance strategy which defines inspection frequencies, technical work standards, condition for intervention, and target response times

**Renewal / Replacement Strategies:**

Renewal expenditure is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original service potential.

**New and Upgrade:**

New

Best practice asset management involves a comprehensive analysis of the acquisition of new assets. The analysis involves completing a project proposal and business case which addresses issues such as:

- relevance to corporate goals;
- alignment to core business;
- community need;
- anticipated benefits;
- environmental impacts;
- risk identification and treatment;
- total life-cycle costs;
- impact on existing services/infrastructure;
- analysis as to whether service can be delivered without asset acquisition;
- forecasted usage rates;
- value for money

To ensure Drainage assets continue to meet corporate and community needs, all new assets planned for acquisition must undergo this critical 'whole of life' analysis that will consider the impact of longer-term maintenance, as well as operating costs of the asset and its impact to The Shire long-term sustainability

Where decisions are made to proceed with additional assets, future budgets accommodate the additional expenditure.

Upgrade

Upgrade refers to works which improve an existing asset beyond its current capacity. They may result from growth, social or environmental needs. Upgrade/expansion of infrastructure will contribute to the overall infrastructure inventory and will require, as well, a comprehensive whole of life' analysis.

**Asset Disposal Strategies:**

No Drainage assets have been identified for disposal through either an excess in the asset base or a transfer of responsibility of assets.



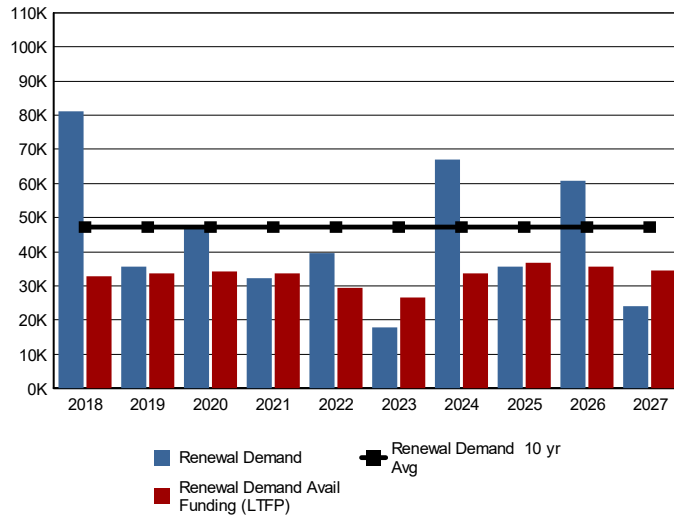
### Financial Summary

#### Drainage

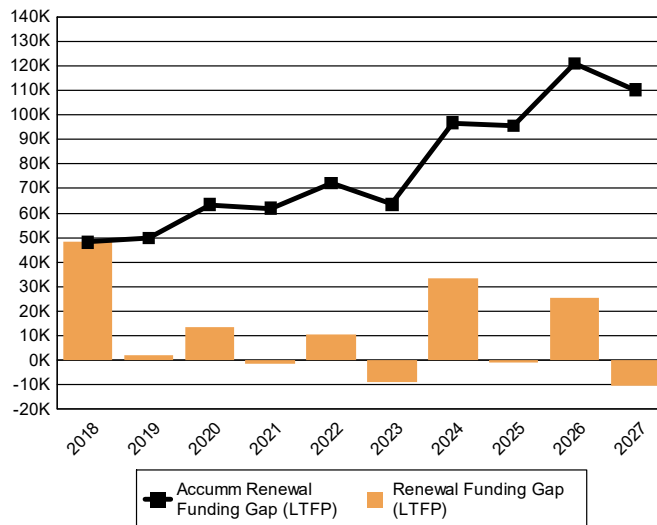
#### Renewal Requirement (Like for Like Replacement):

The projected outlays necessary to provide the services covered by this Asset Management Plan includes renewal of existing assets over the ten year planning period is \$441,228 or \$44,123 on average per year.

Estimated available funding for this period is \$330,922 or \$33,092 on average per year, which is 75% of the cost to provide the service. Projected expenditure to provide like for like renewal in this AMP included in the LTFP is shown in the graph below.



The total renewal requirement to address the assets at or above the current intervention level in Year 1 is \$81,024. The proposed funding allocation for building renewal in Year 1 is \$32,939 and will be funded from municipal funds. The ten year LTFP period renewal shortfall is \$110,306 and shown in the graph below.



Although there is a financing shortfall over the ten year planning period, the risk of failure in the backlog will be carefully monitored in the coming years, especially the one on the year one, and will form part of the annual review of the LTFP.

<b>Confidence Level</b>
<b>Data Source and Data Rating Assessment:</b>
<ul style="list-style-type: none"> <li>• Assetic (myData) Corporate Asset Register</li> <li>• MapInfo Professional</li> <li>• Synergysoft</li> </ul>
<p><b>Confidence Grade B</b> – Reliable data based on sound records, procedures, investigations and analysis which is properly documented but has minor shortcomings’ for example the data is old, some documentation is missing, and reliance is placed on unconfirmed reports or some extrapolation.</p>

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/18
Council to utilise their infrastructure Asset Hierarchy as a basis for consistent reporting across the organisation.	Asset Management, Finance	Internal	7/30/18
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/18
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/18
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/19
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/19
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/19

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Council and Executive to consider the annual Capital Works Program and prioritise works based on cost/benefit assessments (including risk) with resource implications reflected into the Long Term Financial Plan.	Asset Management & Technical Services	Internal	6/30/19
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/19
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/19
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/19
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/19
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/19
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/19
Ongoing rolling condition assessment program as per inspection procedure	Asset Management & Technical Services	Internal	11/20/19
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/20
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/20

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
AM roles and responsibilities matrix bi-annual update	Asset Management	Internal	3/28/20
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/20
Ensure Annual Budget is prepared based on 'service levels' as reflected in the Strategic Longer Term Plan and contains indicators and measures to assess performance against achieving Council's strategic objectives.	Asset Management & DCCD	Internal	6/30/20
Develop a communication plan to communicate information on infrastructure service delivery issues and Council's management of these issues to external stakeholders.	Asset Management & Media Coordinator	Internal	6/30/20
Incorporate technical levels of service into service agreements and/or maintenance, operational and capital renewal procedures.	Asset Management	Internal	6/30/20
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/20
Community survey to review existing level of service and determine the level of service the community is willing to accept and pay for	Asset Management & Technical Services	Internal	6/30/20
Undertake a process of defining, quantifying and documenting current community levels of service and technical levels of service and costs of providing the current levels of service.	Asset Management & Technical Services	Internal	6/30/20
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/20

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Asset Management Plan Review	Asset Management & Technical Services	Internal	6/30/20
Review and Update Asset Class Maintenance and Operational Plan	Asset Management & Technical Services	Internal	6/30/20
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/20
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/20
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/20
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/20
Asset Class revaluation	Finance	Internal / External	11/20/20
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/20
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/21
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/21
Review and Update Asset Class Maintenance and Operational Plan	Asset Management & Technical Services	Internal	6/30/21
Asset Management Plan Review	Asset Management & Technical Services	Internal	6/30/21

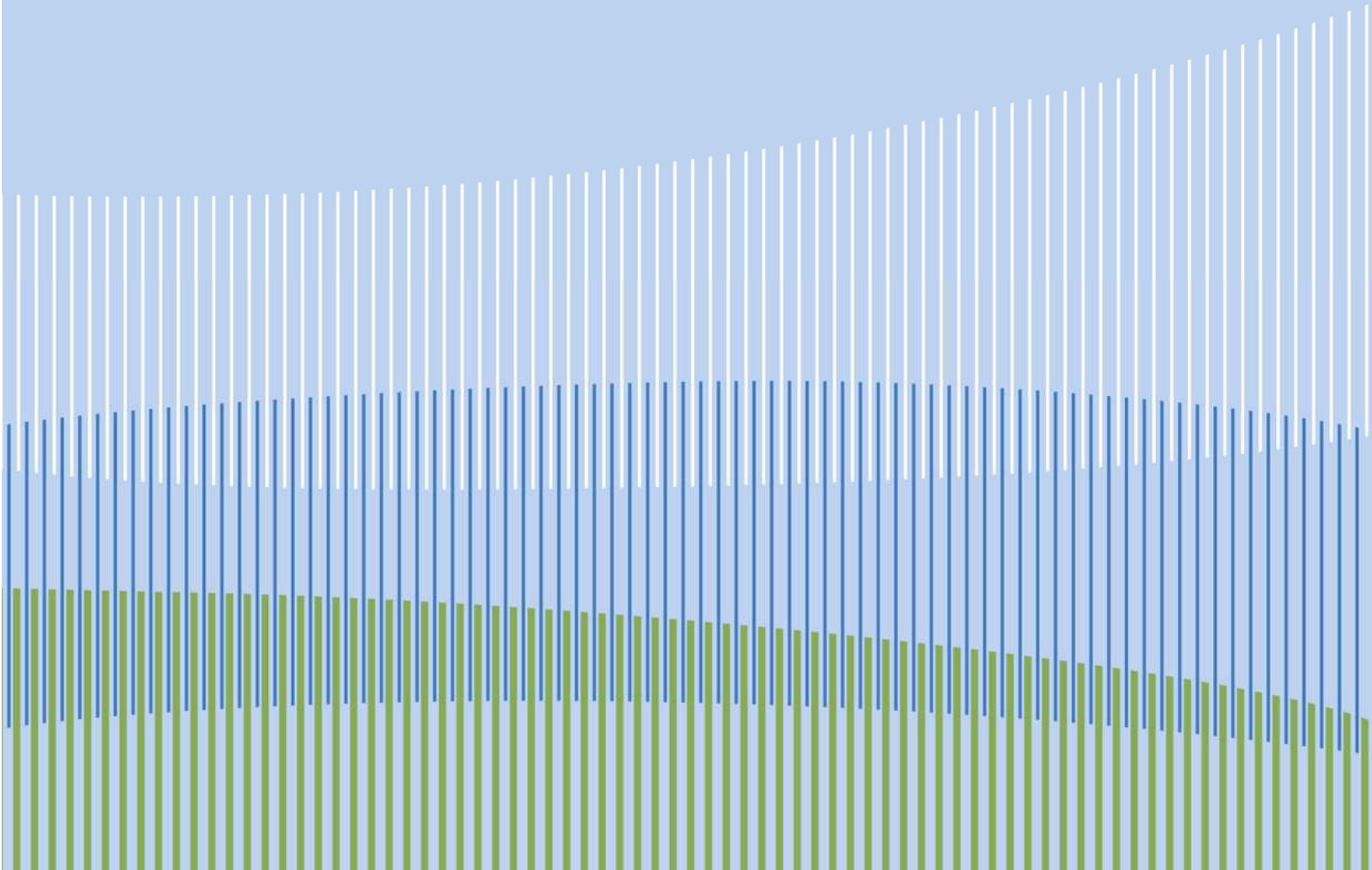
Asset Improvement Plan			
Task	Responsibility	Resources	Timeline
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/21
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/21
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/21
Community survey to review existing level of service and determine the level of service the community is willing to accept and pay for	Asset Management & Technical Services	Internal	6/30/21
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/21
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/21
Ensure Annual Budget is prepared based on 'service levels' as reflected in the Strategic Longer Term Plan and contains indicators and measures to assess performance against achieving Council's strategic objectives.	Asset Management & DCCD	Internal	6/30/21
Undertake a process of defining, quantifying and documenting current community levels of service and technical levels of service and costs of providing the current levels of service.	Asset Management & Technical Services	Internal	6/30/21

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/21
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/21
Asset Class revaluation	Finance	Internal / External	11/20/21
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/21



# Appendix F

## Parks & Reserves Asset Management Plan 2017 - 2037





The Shire of Murray (The Shire) is responsible for providing many community services and in doing so must ensure that its infrastructure assets are maintained by well-developed strategic plans and asset management programs. What services are provided, and how they are provided will depend on the agreed level of service.

The Parks Asset Management Plan (PAMP) has been developed to document the Shire's asset management processes, to guide the planning, acquisition, operation, maintenance, renewal and disposal of park assets, with an objective to maximise service delivery outcomes with the lowest lifecycle cost.

One of the Shire's core functions is to provide quality fit for purpose assets throughout the municipality by demand requirements, engineering standards and planning objectives. The PAMP has been prepared by Shire of Murray's Strategic Community Plan 'Murray 2023' (SCP) to meet the strategy: "Continue to develop and implement best practice asset management".

The Shire has 30 parks and 30 reserves within its control. Parks are an important component of the Shire's asset portfolio as they provide an opportunity for residents and visitors to the community to meet and undertake recreational activities within a safe, convenient and comfortable environment. Recreational facilities are seen by the community as essential infrastructure.

The Shire has gathered a significant amount of parks data as part of the development of this plan. This information, including the condition, value, age, type and location of parks infrastructure, has provided the foundation for this document. As a result of the data collection exercise, Shire now has a very good understanding of the extent and current condition of parks and recreation assets.

The proactively managed park network comprises the following key subgroups:

- Active Reserves
- Barbeques
- BMX Tracks
- Car parks
- Flag Poles
- Flood Lighting
- Football Goals
- Football Scoreboards
- Garden Bed Kerbing
- Gazebos
- Hard Surface Sporting Facilities
- Information Boards
- Lighting
- Memorials
- Park Furniture
- Passive Reserves
- Playgrounds
- Pumps
- Retaining Walls
- Sculptures
- Shelters
- Signage
- Skate Park
- Soccer Goals
- Structures
- Water Fountains
- Water Tanks

Some subgroups are not included in this plan due to the lack of data available and time constraints. These include:

- CBD streetscapes
- Trees
- Irrigation
- Bus Shelters

These infrastructure assets covered in this plan have a replacement value of \$ 17,339,306 as of 30 June 2017.

### **What does it Cost?**

The projected outlays necessary to provide the services covered by this Asset Management Plan includes renewal of existing assets over the ten year planning period is \$ 744,311 or \$ 74,431 on average per year.

Estimated available funding for this period is \$ 744,311 or \$ 74,431 on average per year, which is 100% of the cost to provide the service. Projected expenditure required to provide services in the PAMP compared to planned expenditure currently included in the Long-Term Financial Plan is shown in the graph below:

<b>What Does It Cost?</b>	
10 year total renewal cost	\$ 744,311
10-year average cost	\$ 74,431
10 year total LTFP renewal budget	\$ 744,311
10 year average LTFP renewal budget	\$ 74,431
10 year AM financial indicator	100%
10-year average shortfall	-\$ 0

### **What we will do**

We plan to provide services for the following:

- Operation, maintenance, renewal and upgrade of Parks to meet service levels agreed by Council in annual budgets.
- Asset Renewal at the agreed intervention level within the 10 year planning period.

### **Managing the Risks**

There are risks associated with providing the service and not being able to complete all identified activities and projects. We have identified major risks as:

- Deterioration of infrastructure
- Asset loss from disaster (fire, flood etc.)
- Insufficient funding allocated to asset renewal
- Design/construction non-compliant with current legislation or regulations
- Maintenance practice's not environmentally sustainable
- Personal Injury and legal liabilities.

We will endeavour to manage these risks within available funding by:

- Regular condition inspections (3-year rolling basis)
- Business Continuity Plan in place
- Non-compliance works to be given priority
- Ensure maintenance practices are carried out by environmentally sensitive procedures.

### **Confidence Levels**

This AM Plan is based on Medium level of confidence information.

### **The Next Steps**

The actions resulting from this asset management plan are:

- Continue to assess and rate the condition of park assets to better inform future revisions of this PAMP
- Annually develop a 10 year Capital Works Program (CWP)
- Maintain assets to a safe condition within available funding constraints
- Consultation with the community to define levels of service options, which can be delivered to the community at various funding levels
- Analyse future demand drivers/impacts
- Revaluation of assets in line with Fair Value

### **Questions you may have:**

#### **What is this plan about?**

The PAMP is the means for documenting management, financial and technical practises to ensure that:

- The agreed level of service is provided at the lowest long-term cost
- The proactive management of Assets and services provided by these assets
- Compliance with legislative requirements
- Adequate funding.

#### **What is an Asset Management Plan?**

Asset management planning is a comprehensive process to ensure delivery of services from infrastructure is provided in a financially sustainable manner.

An asset management plan details information about infrastructure assets, including actions required to provide the agreed level of service in the most cost-effective manner. The plan defines the services to be provided, how the services are provided and what funds are required to provide the services.

#### **Why is there a funding shortfall?**

The Shire's park assets were largely purchased and constructed by Council, occasionally with external funding support from the state and federal governments, or were gifted by developers as required by planning legislation. Many of these assets are approaching the end of their expected serviceable life, and they require replacement. As a result, service provision through these assets is decreasing, and maintenance costs are increasing. Our present funding levels are sufficient to continue to provide existing services at current levels in the medium term.

***What options do we have?***

Resolving the funding shortfall involves several steps:

1. Improving asset knowledge so that data accurately records the asset inventory, how assets are performing and when assets are not able to provide the required service levels
2. Improving our efficiency in operating, maintaining, renewing and replacing existing assets to optimise lifecycle costs
3. Identifying and managing risks associated with providing services from infrastructure
4. Making trade-offs between service levels and costs to ensure that the community receives the best return from infrastructure
5. Identifying assets surplus to needs for disposal to make saving in future operations and maintenance costs
6. Consulting with the community to ensure that Park services and costs meet community needs and are affordable,
7. Developing partnership with other bodies, where available to provide services
8. Seeking additional funding from governments and other bodies to better reflect a 'whole of government' funding approach to infrastructure services.

***What happens if we don't manage the shortfall?***

It is likely that we will have to reduce service levels in some areas unless new sources of revenue are found. For Parks, the service level reduction may include allowing the condition of very low-risk assets to deteriorate to failure.

***What can we do?***

We can develop options, costs and priorities for future Park services, consult with the community to plan future services to match the community service needs with the ability to pay for services and maximise community benefits against costs.

## Park's Asset Management Plan

**Objective 4 - Well planned, integrated and active places that embrace and respect our rural lifestyle, built and natural environment and heritage**

**Outcome 4.5 - Plan for and build facilities and infrastructure that will meet the needs of a growing community**

**Strategy – 4.5.1 - Effectively manage infrastructure through its lifecycle**

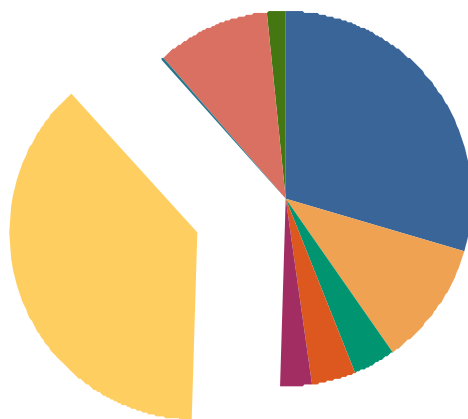
### Asset Inventory

Assets covered by this plan include:

Asset Category	Total Replacement Value (\$)
Car Parks	\$ 4,615,168
Fencing	\$ 1,719,830
Lighting	\$ 529,735
Retaining Walls	\$ 649,268
Open Space Furniture	\$ 407,125
Park Active Areas	\$ 5,920,108
Park Passive Areas	\$ 55,113
Play Equipment	\$ 1,509,695
Signs	\$ 275,670
<b>Total</b>	<b>\$ 15,681,713</b>

#### Current Replacement Cost:

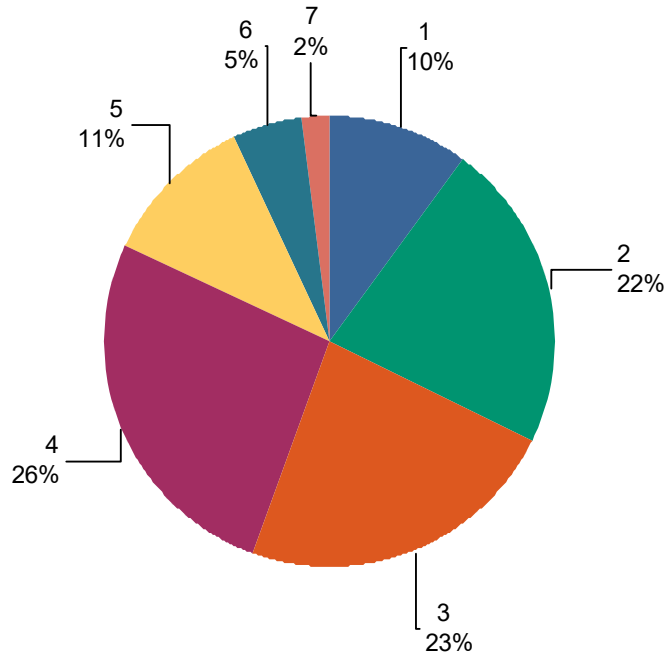
### CRC



Car Parks	\$4,615,168	29.4%
Fencing	\$1,719,830	11.0%
Lighting	\$529,735	3.4%
Retaining Walls	\$649,268	4.1%
Open Space Furniture	\$407,125	2.6%
Park Active Areas	\$5,920,108	37.8%
Park Passive Areas	\$55,113	0.4%
Play Equipment	\$1,509,695	9.6%
Signs	\$275,670	1.8%
<b>Total:</b>	<b>\$15,681,713</b>	<b>100.0%</b>

**Parks Infrastructure Condition**

**Condition Distribution**



**Condition 8,9 and 10=Nil**

**Simplified Condition Grading Model (1 – 10):**

<b>1</b>	An <b>new</b> asset designed and constructed to current standards.
<b>2</b>	An asset in <b>excellent</b> overall condition, with sound structural integrity, no defects and new appearance. Often moved from a Condition 1 based on the time since construction rather than observed condition decline.
<b>3</b>	An asset in <b>very good</b> condition with sound structural integrity, superficial wear and tear and some deterioration to finishes. No serviceability problems.
<b>4</b>	An asset in <b>good</b> overall condition, with some minor wear and tear issues or deterioration to finishes. Serviceability may be impaired very slightly.
<b>5</b>	An asset in <b>fair</b> overall condition. Deterioration in condition would be obvious, with minor defects occurring. There will generally be some aspects of serviceability loss and minor maintenance.
<b>6</b>	An asset in <b>fair to poor</b> overall condition. The condition deterioration would be very obvious. Asset serviceability in general would now be affected and maintenance cost would be rising.

7	An asset in <b>poor</b> overall condition. Deterioration would be quite severe and would be starting to limit the serviceability of the asset. Maintenance cost would be high.
8	An asset in <b>very poor</b> overall condition with serviceability now heavily impacted. Maintenance cost would be very high and the asset would need to be rehabilitated. Minor risk of public injury.
9	An asset in <b>extremely poor</b> condition with severe serviceability problems and needing rehabilitation immediately. User safety and comfort very likely to be affected.
10	An asset that has <b>failed</b> , is no longer serviceable and should not remain in service. There would be an extreme risk in leaving the asset in service.

**Assets Excluded from Plan:**

Bus Shelters, Irrigation, CBD Streetscapes & Trees

**Condition / Renewal Intervention:**

Intervention levels are based on the Western Australian Asset Management Improvement Programme scoring method, and are as follows:

Asset Category	Intervention Condition
Regional Parkland - Cantwell Park Playground - Edenvale - MREC	6
District-Parkland	7
Neighbourhood, Local and Natural Parklands	8

**Useful Life:**

Element	Years/Life
Sealed Car Parks	30
Unsealed Car Parks	20
Park Active Areas	30
Park Passive Areas	30
Play Equipment	20
Lighting	30
Park Furniture	20
Structures	30
Signs	20
Fencing	30

<b>Hierarchy:</b>				
Hierarchies are used to assign priorities for intervention (e.g. upgrades, renewal, operations & planned maintenance) and reactive maintenance response times to parks assets of different importance. The assets that are ranked higher are considered to be of higher significance as they deliver more critical core services and have high usage rates.				
<b>Classification</b>	<b>Approximate size</b>	<b>Estimated Service Group</b>	<b>Approximate service radius</b>	<b>Description of Function</b>
Regional Parkland	1000 metres plus	Local and intershire communities	Intershire	Assets that have, support or are located within an asset that has national or state significance.
District-Parkland	5ha to 15ha	Serves 3 or more neighbourhoods	Intershire	Parks which provide for a diverse range of recreational opportunities in an attractive high maintained landscape setting. Residents from a wide area will visit the parks, most of who will drive or cycle to it. Visitors will stay for several hours at the parks and will use it predominantly on weekends. Facilities may include a large highly developed playground catering for a wide range of ages and abilities, a range of facilities including car parking and public toilets, picnic shelters, barbecues and irrigated garden beds. These parks are major recreation or sports parks that offer a wide variety of opportunities to a broad cross-section of residents. Large in size and well known among residents, these parks are major destinations. May incorporate grassed area for informal/formal games, organised sport and hard surface sporting activities.
Neighbourhood Parkland	1ha to 5ha	Serves 600 dwellings or more	1km from most dwellings	A well-developed park within walking distance from most households. The parks will be predominantly used by residents who live within walking distance. Most visitors will spend up to an hour in the park, although some may stay several hours using picnic facilities. At least one suburban park is located in most town sites. These are mid-sized parks providing a range of facilities and activity space for recreation or sport. They cater for large groups and are appealing to a range of users. They service several communities or suburbs and are a fairly well-known destination for those people living in their catchment. Facilities may include a good quality playground, facilities for teenage play, picnic facilities, shelters and barbecue areas, irrigated garden beds and a good quality grassed area.
Local Parkland	0.4ha to ha	Serves less than 600 dwellings	500m from most dwellings	Parks which provide a basic local playground and areas for relaxation and play. The parks are used by residents who live within a 5 - 10-minute walking distance who spend less than one hour at the park but may use it on a daily basis. Facilities may include a basic playground with shaded areas, tree plantings and kick about spaces. These are smaller parks providing a limited range of recreational opportunities for residents. Designed for local children's play and as resting places. Provide good visual supervision.
Natural Parklands	3000 metres plus	Local community	Varies	Any natural reserve area. Except some pathways, there are generally no facilities in these areas. It includes the following classifications; 1. River Foreshore areas. 2. Rural Nature Reserves. 3. Bridal Trails. 4. Regional Conservation Reserves.



**Stakeholders:**

The following stakeholders have been identified in relation to parks' infrastructure:

Stakeholder	Expectations
Councillors	Meeting community needs, sound management and allocation of resources, good governance
Employees / Contractors	Safe working environment
Community Residents and Businesses	Value for money, equitable and responsible service, well maintained assets
Parks & Facility Users	Well maintained assets specific to users' needs
Insurers	Appropriate risk management policies and practices, safe working environments, well-maintained assets
Tourists	Well maintained assets, accessible services, safe facilities
Government (Federal and State)	Systems in place to sustain parks infrastructure, accountability, transparency

**Linkage to Other Plans:**

- Strategic Community Plan 'Murray 2025'
- Corporate Plan 2017 - 2021
- Long-Term Financial Plan
- Annual Report
- Risk Management Strategy
- Risk Management Policy
- Asset Management Policy
- Asset Management Improvement Strategy
- Community Infrastructure Plan
- Workforce Plan

### Levels of Service

#### Customer Research and Expectations:

An internal Level of service review has been undertaken, identifying stakeholders service needs and wants to establish more robust service levels.

#### Community Levels of Service:

Community Levels of Service measure how the community receives the asset services and whether the Shire is providing community value. The bi-annual asset management satisfaction survey has been conducted this financial year, and current community levels of service are displayed below.

Key Performance Measure	Level of Service	Performance Measurement Process	Current Performance	Performance Target
<b>COMMUNITY LEVELS OF SERVICE</b>				
Quality	Good condition of Parks Facilities and open spaces	Shire's Bi- Annual AM Survey to measure satisfaction with condition of park facilities (Playgrounds, footpaths, toilets, BBQ areas, etc.)	67.75% Satisfaction	70.00%
	Safety of facilities for all users	Parks and Reserves assets are safe to residents and users.	Zero Injuries attributable to assets' condition.	Zero Injuries attributable to assets' condition.
	Maintenance and general upkeep	Shire's Bi- Annual AM Survey to measure satisfaction with maintenance and general upkeep of park facilities	69.75% Satisfaction	70.00%
Function	Park and Reserves assets meet community needs	Shire's Bi- Annual AM Survey to measure satisfaction with park facilities meeting user's needs.	64.00% Satisfaction	70.00%

Key Performance Measure	Level of Service	Performance Measurement Process	Current Performance	Performance Target
<b>COMMUNITY LEVELS OF SERVICE</b>				
	Park and Reserves assets are accessible to all	Shire's Bi- Annual AM Survey to measure satisfaction with park facilities accessibility.	67.25% Satisfaction	70.00%
	Parks & reserves are within walking distance of your home	Shire's Bi- Annual AM Survey to measure satisfaction with Parks and reserves proximity to users homes	70.75% Satisfaction	70.00%
Capacity & Utilisation	Parks & reserves facilities are adequate in quantity for all users	Shire's Bi- Annual AM Survey to measure satisfaction with quantity adequacy of parks & reserves facilities	66% Satisfaction	70.00%
	Multipurpose parks & reserves are adequate in quantity and permit users to undertake desired activities	Shire's Bi- Annual AM Survey to measure satisfaction with quantity adequacy of multipurpose parks & reserves	68.5% Satisfaction	70.00%
Responsiveness	Response time to customer requests.	Time taken to close parks and reserves related requests.	TBD	TBD

**Technical Levels of Service:**

Technical levels of service relate to the technical measures and the outputs the customer receives and are summarised below:

Key Performance Measure	Level of Service	Performance Measurement Process	Current Performance	Performance Target
<b>TECHNICAL LEVELS OF SERVICE</b>				
<b>Quality</b>	Renewal	Assets @ Intervention level	Less than 5 % Assets at Intervention level	< 5 % of Assets
	Capital Renewal Program	Budget	95 % expended in Projects scheduled for delivery in FY 2017/18. Balance held up due to defect liability periods.	Expenditure = budget
	Condition of parks and reserves assets known.	Condition Survey	Annual rolling condition assessment program completed once every 3 years	Annual rolling condition assessment program completed once every 3 years
	Cost Effective planned maintenance program	Percentage of Planned Maintenance undertaken over reactive Maintenance $\frac{PM}{RM} \times 100$	TBD	TBD
<b>Upgrade / Expansion</b>	Capital New / Upgrade works program	Time, Quality, Cost & Environmental	All works delivered with due expedition to quality, cost & environmental requirements.	All projects progressing with due consideration for proper planning & external influences.
		Budget	95 % expended in Projects scheduled for delivery in FY 2017/18. Balance held up due to defect liability periods.	Expenditure = budget

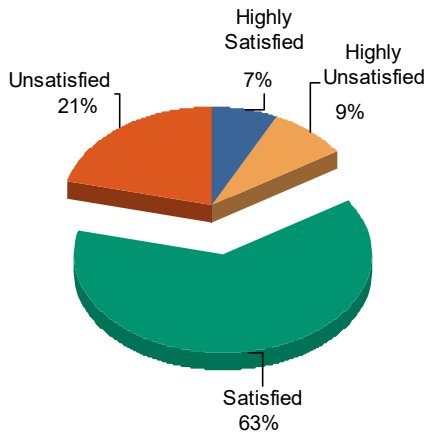
<b>Operations</b>	Regulatory and Non regulatory Inspection and Testing	Safety Inspections to Play Equipment	All inspections completed as scheduled	All inspections completed as scheduled
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### Community Consultation

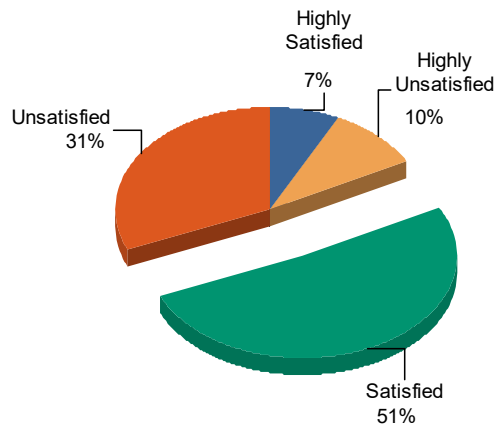
#### Customer Research:

In December 2017 a survey was undertaken to obtain an understanding of the community's level of satisfaction about The Shire's Public Open Space (POS) provision. Details of the survey are summarised below:

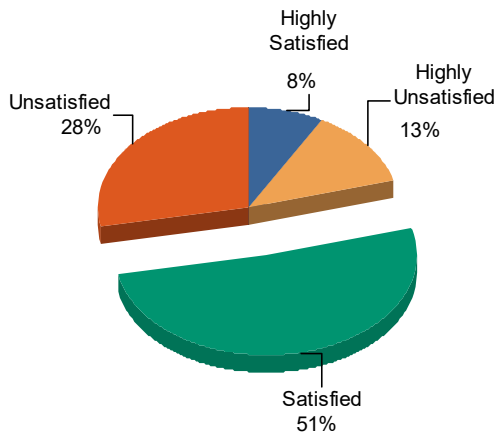
Accessibility of facilities for all users



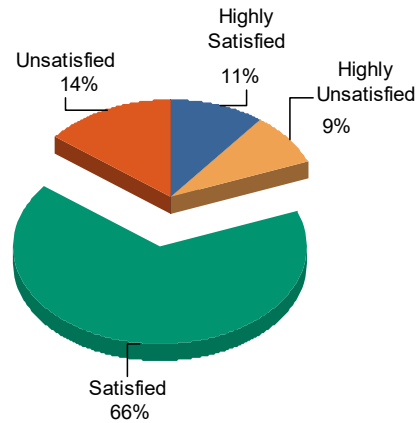
Available facilities meet user's needs



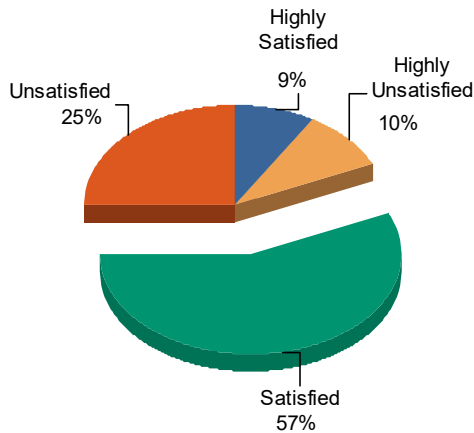
Condition of facilities (playgrounds, footpaths, toilets, BBQ areas, etc.)



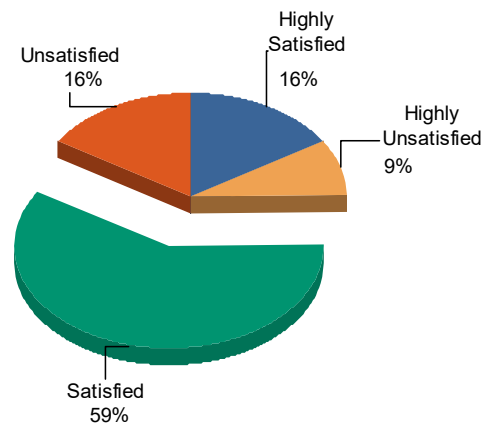
Maintenance and General Upkeep



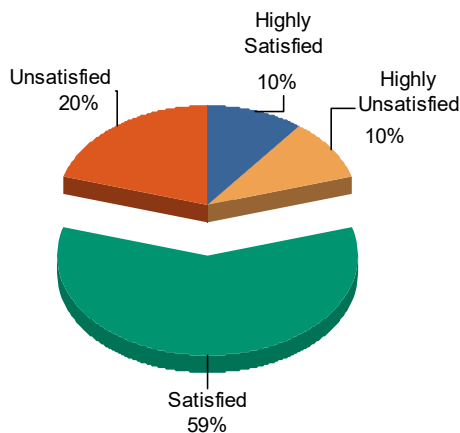
Park and reserve facilities are adequate in quantity for all users



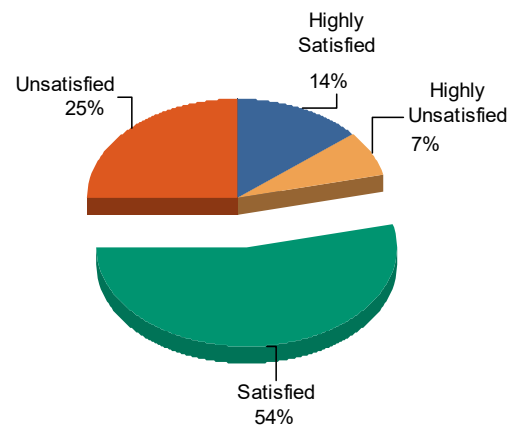
Parks and reserves are within walking distance of your home



Safety of facilities for all users (children, youth, seniors, sporting groups, etc.)



Sufficient number of multipurpose parks and reserves which permit desired activities



### Customer Concerns:

Customers are primarily concerned with services and assets such as:

- Provision of more shade sails on areas with play equipment & toilet facilities over parks
- More parks needed in New estates
- Not enough general purpose recreational areas in Furnissdale.
- Cantwell Park needs to have fencing finished and with a fully enclosed area for safety around the main play area.
- Riverside drive foreshore needs more facilities such as BBQ and sheltered seating
- Lack of play equipment in Stake Hill and Pinjarra Meadows
- Bikeways not meeting quality and quantity expectations
- Reliance on cars to access parks for some residents
- Erosion of Warma Way Park river reserve
- The open space in North Pinjarra should be mowed more regularly to prevent providing hiding space for snakes. There also needs to be a bigger dog exercise area
- Humphrey St Park getting full on bindi prickles on summer periods
- The Barragup and Furnisdale areas looking neglected especially the media/nature strips on Pinjarra Road between Pinjarra and Mandurah. Not very inviting for tourists or residents travelling between the two destinations.
- There is hardly any seating at Pinjarra Park or Ravenswood.
- Ravenswood basketball area needs to be fixed and an Oval

- Jolly Ramble Moondyne Park needs a BBQ and some picnic type tables
- Frank Cross Park should be closed down as it's now a drug car park
- Murray River Country Estate toilets need to be more accessible on weekends and mornings

**Legislative Requirements:**

Legislative requirements govern the management of park assets under the Shire's control and include the following:

Legislation	Requirement
Local Government Act 1995	Sets out the role, purpose, responsibilities and powers of local governments.
Disability Discrimination Act 1992	To ensure that persons with disabilities have the same rights as the rest of the community (including access to premises).
Environment Protection Act 1986	Regulations regarding noise, sustainability, landfill, stormwater and groundwater resources.
Occupational Health & Safety Act 1984	Provide a work environment that is safe and as far as practicable without risk to health.
Planning & Development Act 2005	Defines the land use and zoning of waterway facility infrastructure

Future Demand Drivers / Impacts			
Demand Drivers	Present Position	Projection	Impact on Services
New Sub-divisional Activity	No of Subdivisions delivered this year:4	10 New Subdivisions – Short Term (1-5years)	Increase in the lifecycle costs of the Parks assets group
		13 New Subdivisions – Mid Term (6-10 years)	
Economic Changes	2017 – 1,009 local businesses	Increase in facilities such as retail trade, education and health.	Predicted growth in the region will see increased demand for new infrastructure and greater wear on existing infrastructure as the population expands. This will likely lead to higher costs to The Shire as asset lives will be reduced.
Population Changes / Density	2017 – 17,805	2041 - 80,782	Capital Expenditure due to Growth - the construction of new dwellings in the Shire in the coming 20 years will require new parks where these are not already provided. At a projected population density of 2.63 per new dwelling, the number of dwellings in the Shire is forecast to grow from 7,935 in 2016 to 25,232 in 2041. As well as the land required to meet additional demand, parks will need to be developed to meet the needs of a growing community. In situations where additional land is not required, e.g. infill subdivision, the existing parks network may need to be upgraded to cater for the additional demand
Changes in The Shire's age service groups	Babies and Toddlers ( 0 to 4) 2016 – 990	2041 – 5,414 546.9 %	Babies, Toddlers and Children will be the user groups with the largest increase. There will be, as well, increments on the number of active users groups such as youth and adults and passive user groups such as seniors demanding accessible, connected and multipurpose open spaces supplementing vibrant community hubs.  (Community Hub means clustered multipurpose facilities that satisfy the needs of all age service groups near active, passive open spaces and high-quality public transport)
	Children (5 to 11) 2016 – 1,593	2041 – 6,850 430 %	
	Youth (12 to 24) 2016 – 2,592	2041 – 8,689 335.2 %	
	Adults (25 to 60) 2016 – 7,431	2041 – 28,622 385.2 %	
	Seniors (60 and Over) 2016 – 4,478	2041 – 14,120 315.3 %	



Future Demand Drivers / Impacts			
Demand Drivers	Present Position	Projection	Impact on Services
Changes in Technology	Regular Construction technology (Methodology, Materials, Plant & Equipment) improvements are regularly available	Construction technology improvements will increase positive outcomes (e.g. viability of solar electricity, water saving, etc.)	Reduced asset lifecycle costs (Construction, Operations, Maintenance & Disposal)
		Methods and water storage methods, etc.)	
Legislation	New Assets constructed and maintained according to current legislation	Assets constructed to current legislative requirements	Improvement required to current Asset Management processes and practices
Environmental	Assets are constructed to withstand today's known environmental conditions and to meet today's environmental standards	Greater environmental sustainability requirements placed on the construction industry	Higher costs associated with construction methods that are environmentally sustainable (e.g. dealing with disposal of contaminated soil, using warm asphalt mix on car parks, etc.)
Tourism Growth	Increase in visitor numbers to the Shire, local events	Increase in events and tourism generally	Construction of public car parks with associated signage
Climate Change	Climate change represents a key challenge in the future	Possibly trending to increased seasonal extremes	Likely to result in increased operations & maintenance warranting service level reviews

**Subdivisional Activity :**

Based on current outline development plans and subdivision applications, the following additional subdivisions are expected within the short and mid-term financial plan impacting service provision:

**Additional Subdivisions - Short Term financial plan (1 to 5 years)**

Location
Lot B28 Shanns , North Dandalup
Lot 28 Shanns , North Dandalup
Austin Cove / Austin Lakes, South Yunderup - future stages
Murray River Country Estate - Stage 8
Riverland Waters, Ravenswood - future stages
Ravenswood Green Estate
Ravenswood on the Murray
Peel Industrial Development
Lot 619 Ravenswood
North Dandalup Estate

**Additional Subdivisions - Mid Term financial plan (6 to 10 years)**

Location
Lots 1 & 2 Lakes, North Dandalup
Lot 530 Lakes, Stake Hill/Nambeelup
Avoca Retreat, North Dandalup
Paul Street/Furnissdale, Furnissdale
Point Grey Development
Pollard Street / Alderson Street, Pinjarra
Lots 1 & 2 Pinjarra, Pinjarra
Murray River Country Estate - Stage 9
Murray River Country Estate - Stage 10
Greenlands / Forrest Highway, West Pinjarra
Lot 42 Hampton, Pinjarra
Moores, Pinjarra (Industrial) - future stage
Lot 602 Beacham, Pinjarra

## Risk Management

The following risks have been identified about Shire parks assets:

Risk Details	Risk Assessment			Treatment Strategy	Responsibility
	Likelihood	Consequence	Risk Rating		
<b>Inadequate funding for renewal and maintenance resulting in deterioration of structures and decrease in levels of service</b>	Possible	Major	High (12)	Ensure priority given through budget process. Develop 10 year renewal and maintenance plans for parks assets.	<b>Technical Services</b>
<b>Inappropriate technical practises employed for maintenance and renewal resulting in an increased rate of deterioration of asset</b>	Possible	Minor	Moderate (6)	Document best practice technical standards and monitoring procedure to ensure these standards are maintained and used through employee change.	<b>Technical Services</b>
<b>Inadequate values and incomplete list of assets used for insurance purposes</b>	Unlikely	Moderate	Moderate (6)	Include annual consultation with Technical Services Directorate within insurance renewal procedures.	<b>Corporate Services</b>
<b>Reserves contain hazards that may injure employees or community members</b>	Possible	Minor	Moderate (6)	Formalise and document inspection frequency and findings. Formalise elevation flowchart for risks to ensure high and extreme risks are brought to the attention of senior management.	<b>Technical Services</b>
<b>Vandalism results in unattractive infrastructure</b>	Likely	Insignificant	Moderate (4)	Undertake regular inspections of parks	<b>Technical Services</b>

## Forward Works Programming

### Operations & Maintenance Strategy (O&M)

Risk is a key consideration in striking the right balance between minimising the total cost of ownership of the Shire assets and maximising their performance, availability, and reliability.

The O&M Strategy ensures that agreed level of services and statutory and legislative requirements are met, reducing operational risk, reactive maintenance and increasing user groups satisfaction

The O&M Strategy contains:

- Systems and procedures to be used to plan and manage maintenance work
- Types of maintenance to be carried out
- Order of priority for maintenance activities
- Inspection regimes and responsibilities

The maintenance activities, along with factors that govern or influence them, are:

- Reactive (unplanned) maintenance activities. This is governed by the urgency of what is required.
- Planned (scheduled) maintenance activities. These are generally more extensive repairs that are undertaken as part of a program of works to either prevent the breakdown of elements or components of a property or to bring those elements up to an acceptable condition. The extent of this program largely depends on funding allocations.
- Backlog maintenance activities. This refers to an accumulation of uncorrected or deferred deficiencies in an asset. This is governed by available funding and any future plans for a particular asset.

Reactive work accounts for the majority of the annual maintenance budget and encompasses the repair or replacement of asset elements as they wear out or are damaged. By its nature, reactive work must be carried out as the need arises and cannot be scheduled in advance. Work is prioritised as it arises by defined intervention levels and response times. The intervention level defines the condition, state or risk level associated with an asset component, i.e. the point in time at which the asset is considered to be below an acceptable level of service. Response time defines a reasonable time frame within which it can be expected for the Shire to remedy the defect.

Planned maintenance is repair work that is identified and managed through a maintenance management strategy. Planned maintenance activities include inspection, assessing the condition against failure, prioritising, scheduling and actioning the work. Development of a maintenance strategy which defines inspection frequencies, technical work standards, condition for intervention, and target response times

**Renewal / Replacement Strategies:**

Renewal expenditure is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original service potential. Typical parks renewal works include:

- replacement of existing turf
- resurfacing of hard court areas
- re sheeting unsealed car parks
- replacement of play equipment

### **New and Upgrade:**

#### New

Best practice asset management involves a comprehensive analysis of the acquisition of new assets. The analysis involves completing a project proposal and business case which addresses issues such as:

- relevance to corporate goals;
- alignment to core business;
- community need;
- anticipated benefits;
- environmental impacts;
- risk identification and treatment;
- total life-cycle costs;
- impact on existing services/infrastructure;
- analysis as to whether service can be delivered without asset acquisition;
- forecasted usage rates;
- value for money

To ensure parks assets continue to meet corporate and community needs, all new assets planned for acquisition must undergo this critical 'whole of life' analysis that will consider the impact of longer-term maintenance, as well as operating costs of the asset and its impact to The Shire long-term sustainability

Where decisions are made to proceed with additional assets, future budgets accommodate the additional expenditure.

#### Upgrade

Upgrade refers to works which improve an existing asset beyond its current capacity. They may result from growth, social or environmental needs. Upgrade/expansion of infrastructure will contribute to the overall infrastructure inventory and will require, as well, a comprehensive whole of life' analysis.

### **Asset Disposal Strategies:**

No parks assets have been identified for disposal through either an excess in the asset base or a transfer of responsibility of assets.

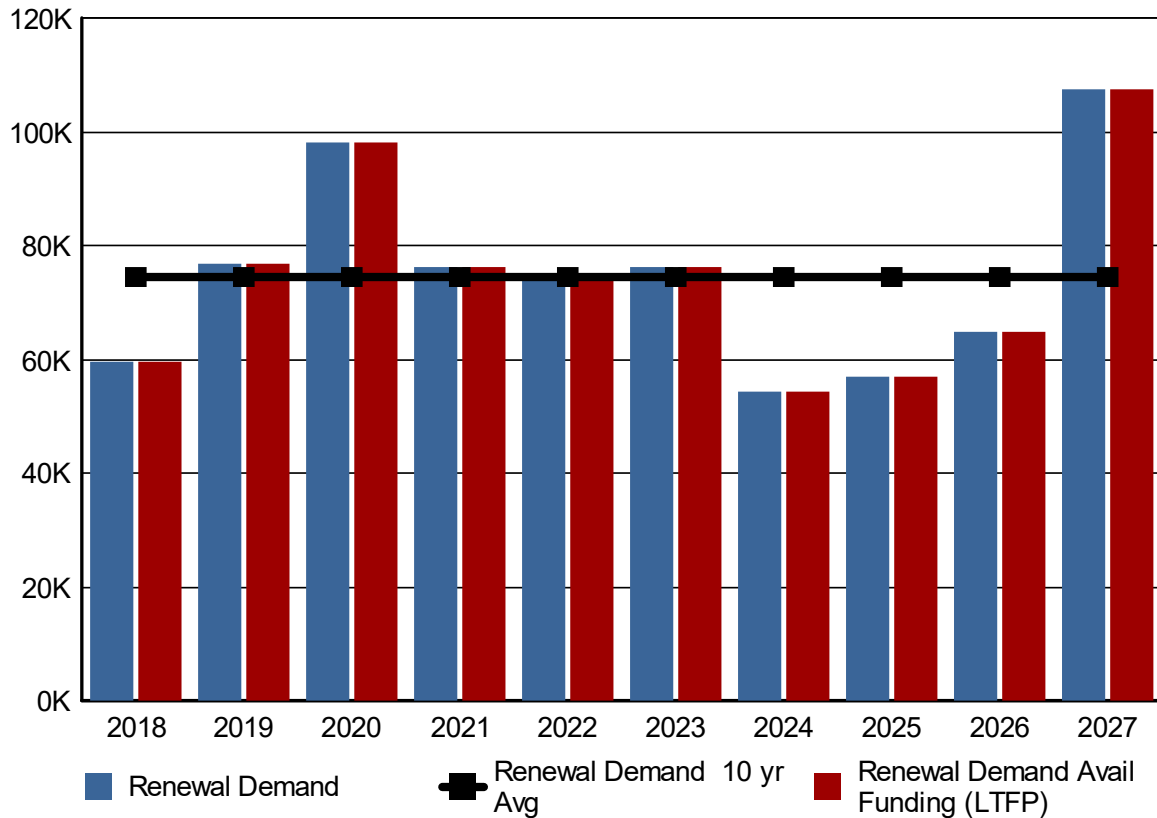
### Financial Summary

#### PARKS

#### Renewal Requirement (Like for Like Replacement):

The projected outlays necessary to provide the like for like renewal for assets covered by this AMP over the 10 year planning period is \$744,311 or \$74,431 on average per year.

Estimated available funding for this period is \$744,311 or \$74,431 on average per year which is 100 % of the cost to provide the service. Projected expenditure to provide like for like renewal in this AMP included in the LTFP is shown in the graph below.



The proposed funding allocation for building renewal in Year 1 is \$ \$59,558 and will be funded from municipal funds.

<b>Confidence Level</b>
<p><b>Data Source and Data Rating Assessment:</b></p> <ul style="list-style-type: none"> <li>• Assetic (myData) Corporate Asset Register</li> <li>• MapInfo Professional</li> <li>• Synergysoft</li> </ul> <p><b>Confidence Grade B</b> – Reliable data based on sound records, procedures, investigations and analysis which is properly documented but has minor shortcomings’ for example the data is old, some documentation is missing, and reliance is placed on unconfirmed reports or some extrapolation.</p>

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/18
Council to utilise their infrastructure Asset Hierarchy as a basis for consistent reporting across the organisation.	Asset Management, Finance	Internal	7/30/18
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/18
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/18
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/19
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/19
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/19



<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Council and Executive to consider the annual Capital Works Program and prioritise works based on cost/benefit assessments (including risk) with resource implications reflected into the Long Term Financial Plan.	Asset Management & Technical Services	Internal	6/30/19
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/19
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/19
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/19
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/19
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/19
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/19
Ongoing rolling condition assessment program as per inspection procedure	Asset Management & Technical Services	Internal	11/20/19
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/20
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/20

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
AM roles and responsibilities matrix bi-annual update	Asset Management	Internal	3/28/20
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/20
Ensure Annual Budget is prepared based on 'service levels' as reflected in the Strategic Longer Term Plan and contains indicators and measures to assess performance against achieving Council's strategic objectives.	Asset Management & DCCD	Internal	6/30/20
Develop a communication plan to communicate information on infrastructure service delivery issues and Council's management of these issues to external stakeholders.	Asset Management & Media Coordinator	Internal	6/30/20
Incorporate technical levels of service into service agreements and/or maintenance, operational and capital renewal procedures.	Asset Management	Internal	6/30/20
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/20
Community survey to review existing level of service and determine the level of service the community is willing to accept and pay for	Asset Management & Technical Services	Internal	6/30/20
Undertake a process of defining, quantifying and documenting current community levels of service and technical levels of service and costs of providing the current levels of service.	Asset Management & Technical Services	Internal	6/30/20
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/20

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Asset Management Plan Review	Asset Management & Technical Services	Internal	6/30/20
Review and Update Asset Class Maintenance and Operational Plan	Asset Management & Technical Services	Internal	6/30/20
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/20
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/20
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/20
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/20
Asset Class revaluation	Finance	Internal / External	11/20/20
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/20
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/21
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/21
Review and Update Asset Class Maintenance and Operational Plan	Asset Management & Technical Services	Internal	6/30/21
Asset Management Plan Review	Asset Management & Technical Services	Internal	6/30/21

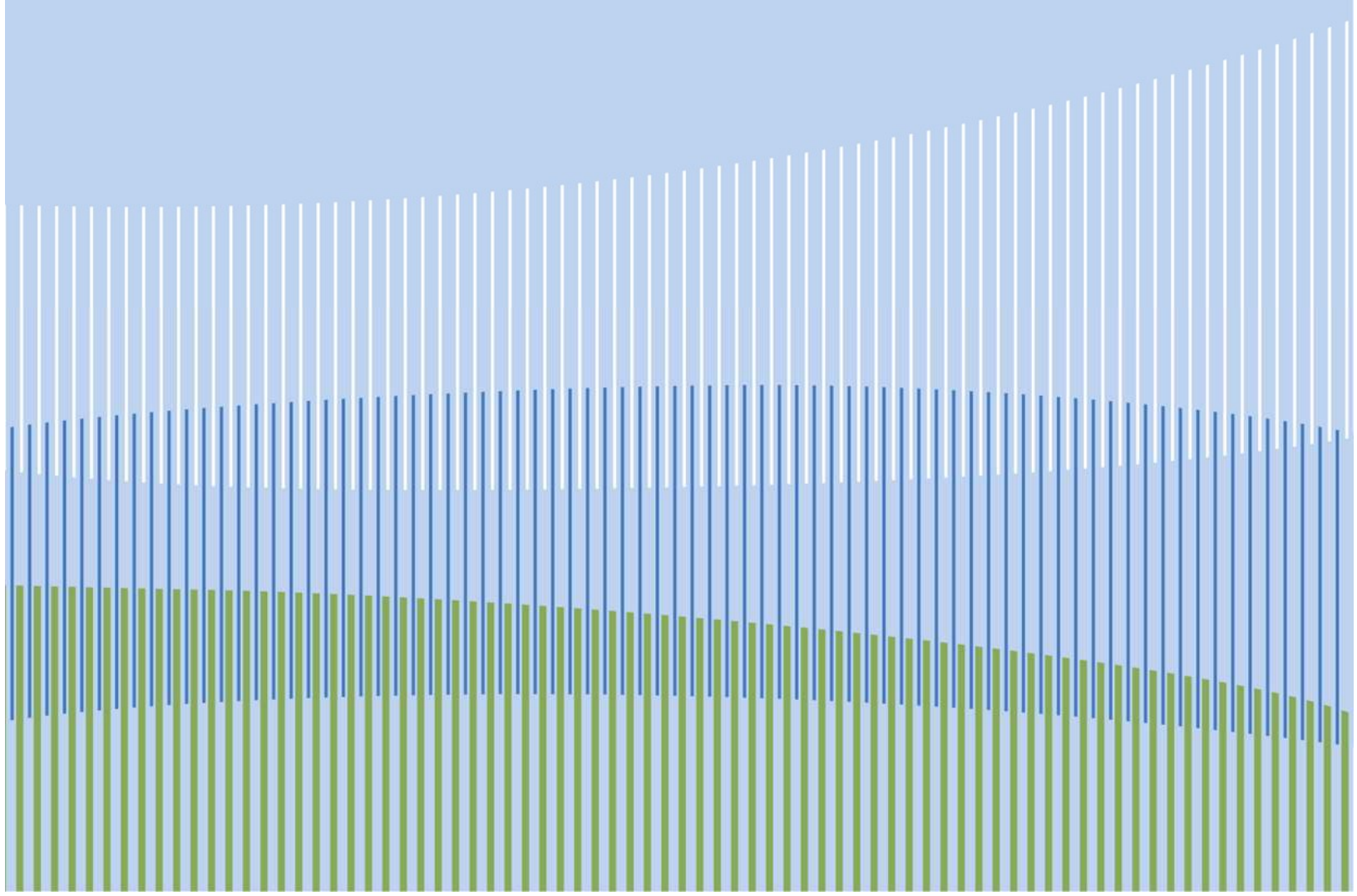
Asset Improvement Plan			
Task	Responsibility	Resources	Timeline
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/21
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/21
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/21
Community survey to review existing level of service and determine the level of service the community is willing to accept and pay for	Asset Management & Technical Services	Internal	6/30/21
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/21
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/21
Ensure Annual Budget is prepared based on 'service levels' as reflected in the Strategic Longer Term Plan and contains indicators and measures to assess performance against achieving Council's strategic objectives.	Asset Management & DCCD	Internal	6/30/21
Undertake a process of defining, quantifying and documenting current community levels of service and technical levels of service and costs of providing the current levels of service.	Asset Management & Technical Services	Internal	6/30/21

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/21
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/21
Asset Class revaluation	Finance	Internal / External	11/20/21
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/21



# Appendix G

## Waterways Facilities Asset Management Plan 2017 - 2037



The Shire of Murray (The Shire) is responsible for providing many community services and in doing so must ensure that its infrastructure assets are maintained by well-developed strategic plans and asset management programs. What services are provided, and how they are provided will depend on the agreed level of service.

The Waterways Asset Management Plan (WAMP) has been developed to document the Shire's asset management processes, to guide the planning, acquisition, operation, maintenance, renewal and disposal of park assets, with an objective to maximise service delivery outcomes with the lowest lifecycle cost.

One of the Shire's core functions is to provide quality fit for purpose assets throughout the municipality by demand requirements, engineering standards and planning objectives. The WAMP has been prepared by Shire of Murray's Strategic Community Plan 'Murray 2023' (SCP) to meet the strategy: "Continue to develop and implement best practice asset management".

The Shire has 93 Waterways within its control. Waterways are an important component of the Shire's asset portfolio as they provide an opportunity for residents and visitors to the community to undertake recreational activities within a safe, convenient and comfortable environment. Recreational facilities are seen by the community as essential infrastructure.

The Shire has gathered a significant amount of Waterways data as part of the development of this plan. This information, including the condition, value, age, type and location of Waterways infrastructure, has provided the foundation for this document. As a result of the data collection exercise, Shire now has a very good understanding of the extent and current condition of Waterways and recreation assets.

The proactively managed park network comprises the following key subgroups:

- Barge
- Boat Ramp
- Canal Wall
- Canoe Launch
- Floating Jetty
- Jetty
- Jetty/Boardwalk
- Pontoon
- Revetment Wall
- River Wall

These infrastructure assets covered in this plan have a replacement value of \$ 4,912,125 as of 30 June 2017.

### ***What does it Cost?***

The projected outlays necessary to provide the services covered by this Asset Management Plan includes renewal of existing assets over the ten year planning period is \$187,692 or \$18,770 on average per year.

Estimated available funding for this period is \$187,692 or \$18,770 on average per year, which is 100% of the cost to provide the service.

What Does It Cost?	
10 year total renewal cost	\$187,692
10 year average cost	\$18,770
10 year total LTFP renewal budget	\$187,692
10 year average LTFP renewal budget	\$18,770
10 year AM financial indicator	100%
10 year average shortfall	\$0

### **What we will do**

We plan to provide services for the following:

- Operation, maintenance, renewal and upgrade of Waterways to meet service levels agreed by Council in annual budgets.
- Asset Renewal at the agreed intervention level within the 10 year planning period.

### **Managing the Risks**

There are risks associated with providing the service and not being able to complete all identified activities and projects. We have identified major risks as:

- Deterioration of infrastructure
- Asset loss from disaster (fire, flood etc.)
- Insufficient funding allocated to asset renewal
- Design/construction non-compliant with current legislation or regulations
- Maintenance practice's not environmentally sustainable
- Personal Injury and legal liabilities.

We will endeavour to manage these risks within available funding by:

- Regular condition inspections
- Business Continuity Plan in place
- Non-compliance works to be given priority
- Ensure maintenance practices are carried out by environmentally sensitive procedures.

### **Confidence Levels**

This AM Plan is based on Medium level of confidence information.

### **The Next Steps**

The actions resulting from this asset management plan are:

- Continue to assess and rate the condition of park assets to better inform future revisions of this WAMP
- Annually develop a 10 year Capital Works Program (CWP)
- Maintain assets to a safe condition within available funding constraints



- Consultation with the community to define levels of service options, which can be delivered to the community at various funding levels
- Analyse future demand drivers/impacts
- Revaluation of assets in line with Fair Value

### ***Questions you may have:***

#### ***What is this plan about?***

The WAMP is the means for documenting management, financial and technical practises to ensure that:

- The agreed level of service is provided at the lowest long-term cost
- The proactive management of Assets and services provided by these assets
- Compliance with legislative requirements
- Adequate funding.

#### ***What is an Asset Management Plan?***

Asset management planning is a comprehensive process to ensure delivery of services from infrastructure is provided in a financially sustainable manner.

An asset management plan details information about infrastructure assets, including actions required to provide the agreed level of service in the most cost-effective manner. The plan defines the services to be provided, how the services are provided and what funds are required to provide the services.

#### ***Why is there a funding shortfall?***

The Shire's park assets were largely purchased and constructed by Council, occasionally with external funding support from the state and federal governments, or were gifted by developers as required by planning legislation. Many of these assets are approaching the end of their expected serviceable life, and they require replacement. As a result, service provision through these assets is decreasing, and maintenance costs are increasing. Our present funding levels are sufficient to continue to provide existing services at current levels in the medium term.

***What options do we have?***

Resolving the funding shortfall involves several steps:

1. Improving asset knowledge so that data accurately records the asset inventory, how assets are performing and when assets are not able to provide the required service levels
2. Improving our efficiency in operating, maintaining, renewing and replacing existing assets to optimise lifecycle costs
3. Identifying and managing risks associated with providing services from infrastructure
4. Making trade-offs between service levels and costs to ensure that the community receives the best return from infrastructure
5. Identifying assets surplus to needs for disposal to make saving in future operations and maintenance costs
6. Consulting with the community to ensure that Park services and costs meet community needs and are affordable,
7. Developing partnership with other bodies, where available to provide services
8. Seeking additional funding from governments and other bodies to better reflect a 'whole of government' funding approach to infrastructure services.

***What happens if we don't manage the shortfall?***

It is likely that we will have to reduce service levels in some areas unless new sources of revenue are found.

***What can we do?***

We can develop options, costs and priorities for future Park services, consult with the community to plan future services to match the community service needs with the ability to pay for services and maximise community benefits against costs.

### Park's Asset Management Plan

**Objective 4 - Well planned, integrated and active places that embrace and respect our rural lifestyle, built and natural environment and heritage**

**Outcome 4.5 - Plan for and build facilities and infrastructure that will meet the needs of a growing community**

**Strategy – 4.5.1 - Effectively manage infrastructure through its lifecycle**

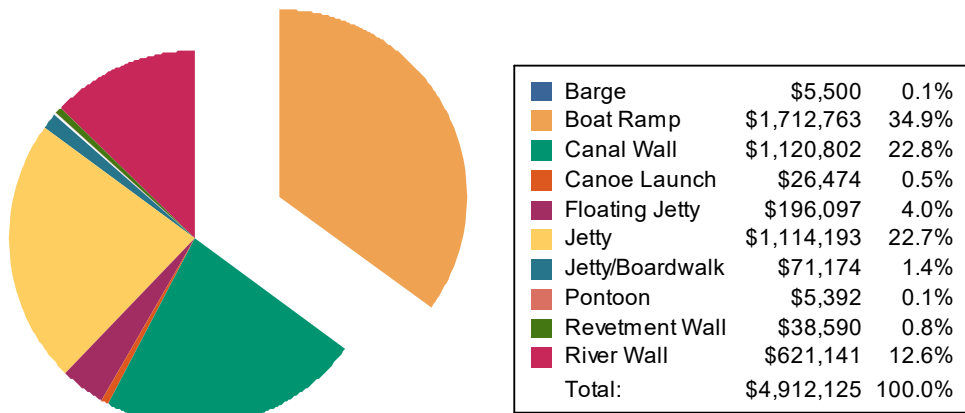
### Asset Inventory

Assets covered by this plan include:

Asset Category	Total Replacement Value (\$)
Barge	\$ 5,500
Boat Ramp	\$ 1,712,763
Canal Wall	\$ 1,120,802
Canoe Launch	\$ 26,474
Floating Jetty	\$ 196,097
Jetty	\$ 1,114,193
Jetty/Boardwalk	\$ 71,174
Pontoon	\$ 5,392
Revetment Wall	\$ 38,590
<b>Total</b>	<b>\$ 4,912,125</b>

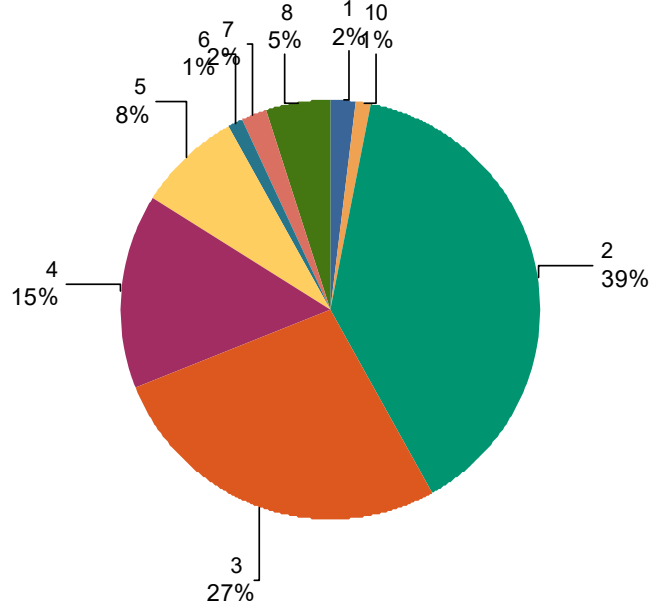
### Current Replacement Cost:

### CRC



**Waterways Infrastructure Condition**

**Condition Distribution**



Condition 9=Nil

**Simplified Condition Grading Model (1 – 10):**

<b>1</b>	An <b>new</b> asset designed and constructed to current standards.
<b>2</b>	An asset in <b>excellent</b> overall condition, with sound structural integrity, no defects and new appearance. Often moved from a Condition 1 based on the time since construction rather than observed condition decline.
<b>3</b>	An asset in <b>very good</b> condition with sound structural integrity, superficial wear and tear and some deterioration to finishes. No serviceability problems.
<b>4</b>	An asset in <b>good</b> overall condition, with some minor wear and tear issues or deterioration to finishes. Serviceability may be impaired very slightly.
<b>5</b>	An asset in <b>fair</b> overall condition. Deterioration in condition would be obvious, with minor defects occurring. There will generally be some aspects of serviceability loss and minor maintenance.
<b>6</b>	An asset in <b>fair to poor</b> overall condition. The condition deterioration would be very obvious. Asset serviceability in general would now be affected and maintenance cost would be rising.
<b>7</b>	An asset in <b>poor</b> overall condition. Deterioration would be quite severe and would be starting to

	limit the serviceability of the asset. Maintenance cost would be high.
8	An asset in <b>very poor</b> overall condition with serviceability now heavily impacted. Maintenance cost would be very high and the asset would need to be rehabilitated. Minor risk of public injury.
9	An asset in <b>extremely poor</b> condition with severe serviceability problems and needing rehabilitation immediately. User safety and comfort very likely to be affected.
10	An asset that has <b>failed</b> , is no longer serviceable and should not remain in service. There would be an extreme risk in leaving the asset in service.
<b>Assets Excluded from Plan:</b>	
Nil	

**Condition / Renewal Intervention:**

Intervention levels are based on the Western Australian Asset Management Improvement Programme scoring method, and are as follows:

Intervention Level	Ranking
<b>Boat Ramps / Jetties / pontoons</b>	
Intervention - Condition 7	Rank A
Intervention - Condition 8	Rank B & C
<b>Canal Walls / River Walls / Canoe Launch</b>	
Intervention - Condition 8	Rank A, B & C

**Useful Life:**

Element	Years/Life
Boat Ramps	60 Years
Floating Jetties	60 Years
Jetty (Timber)	40 Years
Pontoon	10 Years
Canoe Launch	40 Years
Barge	10 Years

**Hierarchy:**

Hierarchies are used to assign priorities for intervention (e.g. upgrades, renewal, operations & planned maintenance) and reactive maintenance response times to Waterways assets of different

importance. The assets that are ranked higher are considered to be of higher significance as they deliver more critical core services and have high usage rates.

Key Driver	Score
High use and support	A
Medium use and support	B
Low use and support	C

**Stakeholders:**

The following stakeholders have been identified in relation to Waterways' infrastructure:

Stakeholder	Expectations
Councillors	Meeting community needs, sound management and allocation of resources, good governance
Employees / Contractors	Safe working environment
Community Residents and Businesses	Value for money, equitable and responsible service, well maintained assets
Waterway Users	Well maintained assets specific to users' needs
Insurers	Appropriate risk management policies and practices, safe working environments, well-maintained assets
Tourists	Well maintained assets, accessible services, safe facilities
Government (Federal and State)	Systems in place to sustain Waterways infrastructure, accountability, transparency

**Linkage to Other Plans:**

- Strategic Community Plan 'Murray 2025'
- Corporate Plan 2017 - 2021
- Long-Term Financial Plan
- Annual Report
- Risk Management Strategy
- Risk Management Policy
- Asset Management Policy
- Asset Management Improvement Strategy
- Community Infrastructure Plan
- Workforce Plan

### Levels of Service

#### Customer Research and Expectations:

An internal Level of service review has been undertaken, identifying stakeholders service needs and wants to establish more robust service levels.

#### Community Levels of Service:

Community Levels of Service measure how the community receives the asset services and whether the Shire is providing community value. The bi-annual asset management satisfaction survey has been conducted this financial year, and current community levels of service are displayed below.

#### Community Levels of Service for Jetties

Key Performance Indicator	Level of Service	Performance Measurement Process	Current Performance	Target Performance
Condition	Maintain facilities to user requirements	Monthly inspections throughout peak season	2016 - 0 defects per month reported	< 2 defect reports per month
		2 monthly inspections for non-peak season		
Quality	Ensure effective launching and retrieval facility	Customer feedback	2016 - 0 per annum reported	< 2 adverse comments per month
Function	Ensure facility meets user requirements for boat launching / retrieval	Customer feedback relating to launching / retrievals	2016 - 0 per annum reported	< 2 adverse comments per month
Safety	Provide safe service for users	Injury reports	2016 - 0 per annum reported	0 injury reports per annum
		Customer service requests	2016 - 1 per annum reported	< 10 per annum

**Community Levels of Service for Boat Ramps**

Key Performance Indicator	Level of Service	Performance Measurement Process	Current Performance	Target Performance
<b>Quality</b>	Ensure effective launching and retrieval facility	Customer feedback	2016 - 0 per annum reported	< 2 adverse comments per month
<b>Function</b>	Ensure facility meets user requirements for boat launching / retrieval	Customer feedback relating to launching / retrievals	2016 - 0 per annum reported	< 2 adverse comments per month
<b>Safety</b>	Provide safe service for users	Injury reports	2016 - 0 per annum reported	0 injury reports per annum
		Customer service requests	2016 - 0 per annum reported	< 10 per annum

**Technical Levels of Service:**  
Technical levels of service relate to the technical measures and the outputs the customer receives and are summarised below:

**Technical Levels of Service for Jetties**

Key Performance Indicator	Level of Service	Performance Measurement Process	Target Performance	Current Performance
<b>Condition</b>	All waterway facilities will be in good condition for their purpose.	< Condition 4 for waterway facilities	100% of waterway facilities have a condition audit undertaken as scheduled.	2016 - 100% of waterway facilities scheduled for condition inspection in 2014 completed. 70% < Condition 4.
<b>Function</b>	Facilities are fully operational	Max boat size that can be accommodated at facility	7.5m boat can be accommodated at 100% of facilities	2016 - 90% of facilities can accommodate 7.5m boat
<b>Serviceability</b>	All waterway facilities will be serviced within appropriate timeframes to ensure maximisation of life of assets	Waterway Facilities maintained in accordance with current standards	95% of activities completed within set timeframes	2016 - 100% serviced within timeframes



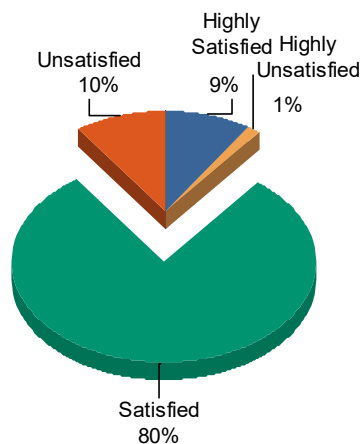
Technical Levels of Service for Boat Ramps				
Key Performance Indicator	Level of Service	Performance Measurement Process	Target Performance	Current Performance
Condition	Maintain facilities to user requirements	Two yearly inspections	< Condition 4 for waterway facilities	2016 - 100% of waterway facilities scheduled for condition inspection in 2016 completed. 70% < Condition 4.
Function	Facilities are fully operational	Max car/boat/trailer size that can be accommodated at facility	15m car/boat/trailer can be accommodated at 100% of facilities	2016 - 90% of facilities can accommodate 15m car/boat/trailer
Safety	To ensure all customers, staff and contractors have personal safety.	Safety audit of facility.	Safety inspections conducted as per Waterway Facilities Maintenance Plan. All defects repaired within approved timeframes.	2016 - 100% of waterway facilities inspected every 12 months.

### Community Consultation

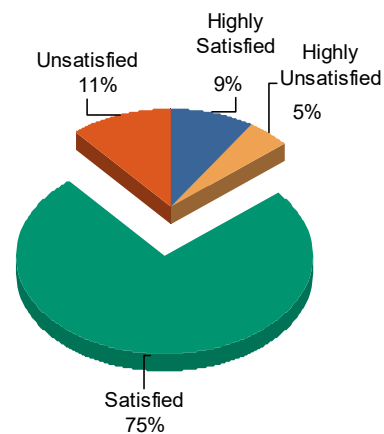
#### Customer Research:

In December 2017 a survey was undertaken to obtain an understanding of the community's level of satisfaction about The Shire's Waterways provision. Details of the survey are summarised below:

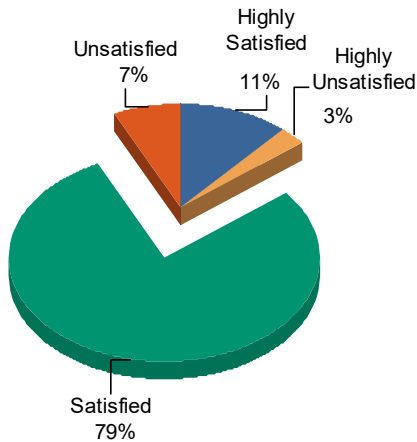
Cleanliness and general maintenance of the waterway facilities



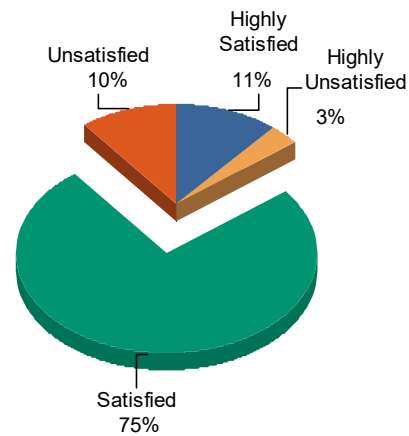
Condition of waterway facilities



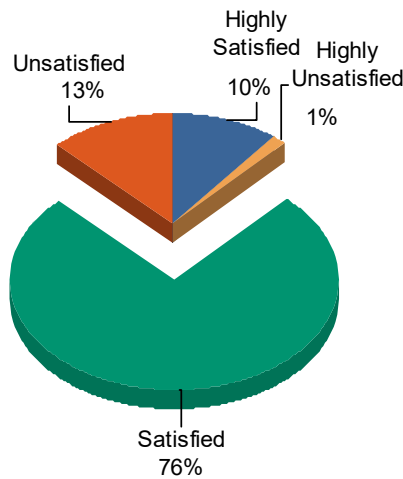
Safety of waterway facilities



Sufficient number of waterway facilities (boat ramps, jetties, pontoons, etc.)



Suitability of waterway facilities (facilities meet all boat size requirements for an easy and safe launch and retrieve)



**Customer Concerns:**

Customers are primarily concerned with services and assets such as:

- Provision of jetties, pontoons, toilets and bird watching facilities in Stake Hill or along the Stake Hill section of the Serpentine River.
- Residents cars parking long term in boat ramp park hinders use for boats
- Needles found at several areas
- Access to swimming areas
- Add toilets in ramp areas
- Furnissdale needs a picnic area, bbq's and toilet facilities
- Furnissdale ramp and jetty in need of repairs
- Safer parking at Ravenswood
- Batavia Quays boat ramp unsatisfactory in low tide. It is also unlit
- More bins and with frequent collections
- More access to Murray River
- More tourism facilities

**Legislative Requirements:**

Legislative requirements govern the management of park assets under the Shire’s control and include the following:

Legislation	Requirement
Local Government Act 1995	Sets out the role, purpose, responsibilities and powers of local governments.
Disability Discrimination Act 1992	To ensure that persons with disabilities have the same rights as the rest of the community (including access to premises).
Environment Protection Act 1986	Regulations regarding noise, sustainability, landfill, stormwater and groundwater resources.
Occupational Health & Safety Act 1984	Provide a work environment that is safe and as far as practicable without risk to health.
Planning & Development Act 2005	Defines the land use and zoning of waterway facility infrastructure

**Future Demand Drivers / Impacts**

Demand Drivers	Present Position	Projection	Impact on Services
Economic Changes	2017 – 1,009 local businesses	Increase in facilities such as retail trade, education and health.	Predicted growth in the region will see increased demand for new infrastructure and greater wear on existing infrastructure as the population expands. This will likely lead to higher costs to The Shire as asset lives will be reduced.
Population Changes / Density	2017 – 17,805	2041 - 80,782	Increase in the lifecycle costs of the Waterways assets group, which will see the Shire establishing asset rationalisation strategies after careful analysis

Future Demand Drivers / Impacts			
Demand Drivers	Present Position	Projection	Impact on Services
Changes in Technology	Regular Construction technology (Methodology, Materials, Plant & Equipment) improvements are regularly available	Construction technology improvements will increase positive outcomes (e.g. viability of solar electricity, water saving, etc.)	Reduced asset lifecycle costs (Construction, Operations, Maintenance & Disposal)
		Methods and water storage methods, etc.)	
Legislation	New Assets constructed and maintained according to current legislation	Assets constructed to current legislative requirements	Improvement required to current Asset Management processes and practices
Environmental	Assets are constructed to withstand today's known environmental conditions and to meet today's environmental standards	Greater environmental sustainability requirements placed on the construction industry	Higher costs associated with construction methods that are environmentally sustainable (e.g. dealing with disposal of contaminated soil, using warm asphalt mix on car Waterways, etc.)
Tourism Growth	Increase in visitor numbers to the Shire, local events	Increase in events and tourism generally	Increase in the lifecycle costs of the Waterways assets group, which will see the Shire establishing asset rationalisation strategies after careful analysis
Climate Change	Climate change represents a key challenge in the future	Possibly trending to increased seasonal extremes	Likely to result in increased operations & maintenance warranting service level reviews

## Risk Management

The following risks have been identified about Shire Waterways assets:

Risk Details	Risk Assessment			Treatment Strategy	Responsibility
	Likelihood	Consequence	Risk Rating		
Ongoing deterioration of waterway facilities assets	Likely	Major	High (16)	1. Regular condition inspections	Technical Services
				2. Annual allocation of sufficient funding and resources	Technical Services / Executive Management Team / Council
				3. Development and regular update of 10 year Waterway Facilities Capital Works Plan	Technical Services
Asset loss from disaster (fire, flood etc.)	Unlikely	Moderate	Moderate (6)	1. Sufficient insurance coverage	Corporate Services
					Risk Management
Waterway facilities in poor condition causes serious injury to staff or community member	Possible	Moderate	Moderate (9)	1. Undertake waterway facilities inspections and maintenance	Technical Services
Inadequate values used for insurance purposes (financial & reputation risk)	Possible	Moderate	Moderate (9)	1. Ensure valuations are based on replacement costs for insurance purposes.	Corporate Services
Waterway facilities non-compliant with new legislation or regulations	Likely	Minor	Moderate (8)	1. Non-compliance works to be given priority	Technical Services
				2. Undertake regular inspection and maintenance regimes	Technical Services
				3. Allocate sufficient funding and resources	Executive Management Team / Council
Seaweed deposited on ramp making the ramp slippery, resulting in vehicles losing traction, and/or people slipping and falling	Rare	Minor	Low (2)	1. Regular condition inspections	Technical Services
				2. Preseason servicing of boat ramp facilities	
Reversing trailers strike pedestrians	Rare	Minor	Low (2)	1. Regular condition inspections to ensure good visibility within car parks	Technical Services

Risk Details	Risk Assessment			Treatment Strategy	Responsibility
	Likelihood	Consequence	Risk Rating		
Access - Damage to reputation due to accessibility needs	Rare	Moderate	Low (3)	1. All new structures constructed to allow access for people of all abilities.	Technical Services
Boat collision into jetty facilities	Likely	Minor	Moderate (8)	Speed limits administered by DoT. Education campaigns conducted randomly by DoT. SoM adheres to DoT regulations.	

## Forward Works Programming

### Operations & Maintenance Strategy (O&M)

Risk is a key consideration in striking the right balance between minimising the total cost of ownership of the Shire assets and maximising their performance, availability, and reliability.

The O&M Strategy ensures that agreed level of services and statutory and legislative requirements are met, reducing operational risk, reactive maintenance and increasing user groups satisfaction

The O&M Strategy contains:

- Systems and procedures to be used to plan and manage maintenance work
- Types of maintenance to be carried out
- Order of priority for maintenance activities
- Inspection regimes and responsibilities

The maintenance activities, along with factors that govern or influence them, are:

- Reactive (unplanned) maintenance activities. This is governed by the urgency of what is required.
- Planned (scheduled) maintenance activities. These are generally more extensive repairs that are undertaken as part of a program of works to either prevent the breakdown of elements or components of a property or to bring those elements up to an acceptable condition. The extent of this program largely depends on funding allocations.
- Backlog maintenance activities. This refers to an accumulation of uncorrected or deferred deficiencies in an asset. This is governed by available funding and any future plans for a particular asset.

Reactive work accounts for the majority of the annual maintenance budget and encompasses the repair or replacement of asset elements as they wear out or are damaged. By its nature, reactive work must be carried out as the need arises and cannot be scheduled in advance. Work is prioritised as it arises by defined intervention levels and response times. The intervention level defines the condition, state or risk level associated with an asset component, i.e. the point in time at which the asset is considered to be below an acceptable level of service. Response time defines a reasonable time frame within which it can be expected for the Shire to remedy the defect.

Planned maintenance is repair work that is identified and managed through a maintenance management strategy. Planned maintenance activities include inspection, assessing the condition against failure, prioritising, scheduling and actioning the work. Development of a maintenance strategy which defines inspection frequencies, technical work standards, condition for intervention, and target response times

**Renewal / Replacement Strategies:**

Renewal expenditure is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original service potential.

**New and Upgrade:**

New

Best practice asset management involves a comprehensive analysis of the acquisition of new assets. The analysis involves completing a project proposal and business case which addresses issues such as:

- relevance to corporate goals;
- alignment to core business;
- community need;
- anticipated benefits;
- environmental impacts;
- risk identification and treatment;
- total life-cycle costs;
- impact on existing services/infrastructure;
- analysis as to whether service can be delivered without asset acquisition;
- forecasted usage rates;
- value for money

To ensure Waterways assets continue to meet corporate and community needs, all new assets planned for acquisition must undergo this critical 'whole of life' analysis that will consider the impact of longer-term maintenance, as well as operating costs of the asset and its impact to The Shire long-term sustainability

Where decisions are made to proceed with additional assets, future budgets accommodate the additional expenditure.

Upgrade

Upgrade refers to works which improve an existing asset beyond its current capacity. They may result from growth, social or environmental needs. Upgrade/expansion of infrastructure will contribute to the overall infrastructure inventory and will require, as well, a comprehensive whole of life' analysis.

**Asset Disposal Strategies:**

No Waterways assets have been identified for disposal through either an excess in the asset base or a transfer of responsibility of assets.



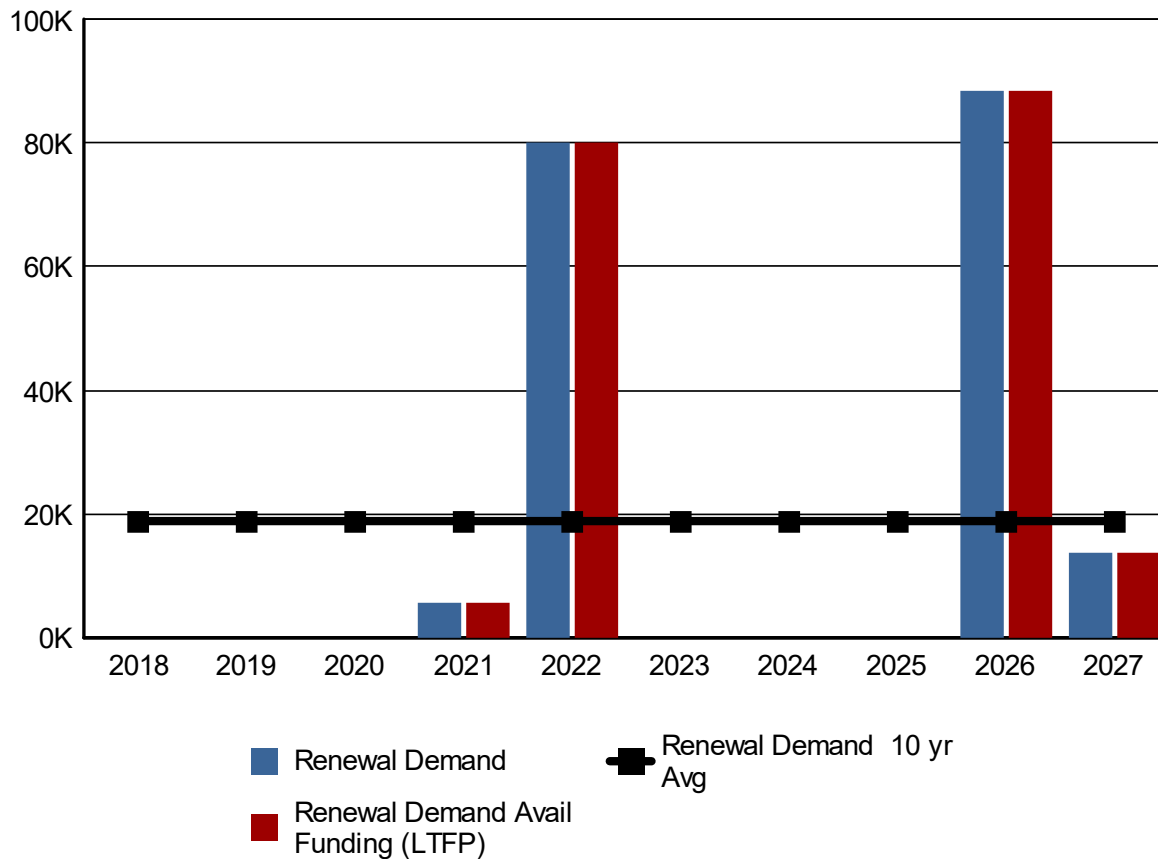
### Financial Summary

#### Waterways

#### Renewal Requirement (Like for Like Replacement):

The projected outlays necessary to provide the like for like renewal for assets covered by this AMP over the 10 year planning period is \$744,311 or \$74,431 on average per year.

Estimated available funding for this period is \$744,311 or \$74,431 on average per year which is 100 % of the cost to provide the service. Projected expenditure to provide like for like renewal in this AMP included in the LTFFP is shown in the graph below.



### Confidence Level

#### Data Source and Data Rating Assessment:

- Assetic (myData) Corporate Asset Register
- MapInfo Professional
- Synergysoft

**Confidence Grade B** – Reliable data based on sound records, procedures, investigations and analysis which is properly documented but has minor shortcomings’ for example the data is old, some documentation is missing, and reliance is placed on unconfirmed reports or some extrapolation.

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/18
Council to utilise their infrastructure Asset Hierarchy as a basis for consistent reporting across the organisation.	Asset Management, Finance	Internal	7/30/18
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/18
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/18
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/19
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/19
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/19
Council and Executive to consider the annual Capital Works Program and prioritise works based on cost/benefit assessments (including risk) with resource implications reflected into the Long Term Financial Plan.	Asset Management & Technical Services	Internal	6/30/19
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/19
Annual collection of evidence based useful life	Asset Management	Internal	6/30/19

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
data for all infrastructure classes			
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/19
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/19
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/19
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/19
Ongoing rolling condition assessment program as per inspection procedure	Asset Management & Technical Services	Internal	11/20/19
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/20
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/20
AM roles and responsibilities matrix bi-annual update	Asset Management	Internal	3/28/20
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/20
Ensure Annual Budget is prepared based on 'service levels' as reflected in the Strategic Longer Term Plan and contains indicators and measures to assess performance against	Asset Management & DCCD	Internal	6/30/20

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
achieving Council's strategic objectives.			
Develop a communication plan to communicate information on infrastructure service delivery issues and Council's management of these issues to external stakeholders.	Asset Management & Media Coordinator	Internal	6/30/20
Incorporate technical levels of service into service agreements and/or maintenance, operational and capital renewal procedures.	Asset Management	Internal	6/30/20
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/20
Community survey to review existing level of service and determine the level of service the community is willing to accept and pay for	Asset Management & Technical Services	Internal	6/30/20
Undertake a process of defining, quantifying and documenting current community levels of service and technical levels of service and costs of providing the current levels of service.	Asset Management & Technical Services	Internal	6/30/20
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/20
Asset Management Plan Review	Asset Management & Technical Services	Internal	6/30/20
Review and Update Asset Class Maintenance and Operational Plan	Asset Management & Technical Services	Internal	6/30/20
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/20

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/20
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/20
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/20
Asset Class revaluation	Finance	Internal / External	11/20/20
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/20
Council to Benchmark its asset management performance improvements against State and National indicators and reports annually on its asset management improvement performance against set targets.	Asset Management	Internal	2/27/21
Develop 10 year building infrastructure models to enable Forward Capital Works programming	Asset Management & Technical Services	Internal	2/28/21
Review and Update Asset Class Maintenance and Operational Plan	Asset Management & Technical Services	Internal	6/30/21
Asset Management Plan Review	Asset Management & Technical Services	Internal	6/30/21
Council has an internal Audit Committee with competency to understand advanced asset management and the internal Audit Committee provides an independent review and annual report on asset management performance across the whole organisation to the Council.	AMWG	Internal	6/30/21
Annual collection of evidence based useful life data for all infrastructure classes	Asset Management	Internal	6/30/21

<b>Asset Improvement Plan</b>			
<b>Task</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timeline</b>
Community levels of service and technical levels of service to be monitored and reported to the Executive Leadership Team and Council.	Asset Management	Internal	6/30/21
Community survey to review existing level of service and determine the level of service the community is willing to accept and pay for	Asset Management & Technical Services	Internal	6/30/21
Ensure planning for New assets and the Upgrade of assets is driven by Council's Strategic Longer Term Plan, Council's Service Plans and Council's Asset Management Plans.	Asset Management	Internal	6/30/21
Ensure Annual Report includes a performance assessment of progress towards achieving the goals and strategic objectives of the Strategic Long Term Plan.	Finance	Internal	6/30/21
Ensure Annual Budget is prepared based on 'service levels' as reflected in the Strategic Longer Term Plan and contains indicators and measures to assess performance against achieving Council's strategic objectives.	Asset Management & DCCD	Internal	6/30/21
Undertake a process of defining, quantifying and documenting current community levels of service and technical levels of service and costs of providing the current levels of service.	Asset Management & Technical Services	Internal	6/30/21
Condition assessment manual review	Asset Management & Technical Services	Internal	7/20/21
Validate infrastructure unit replacement rates to enable accurate predictive modelling analysis	Asset Management & Technical Services	Internal	10/30/21
Asset Class revaluation	Finance	Internal / External	11/20/21
Ongoing rolling condition assessment program as per inspection procedure	Asset Management	Internal	11/20/21

<b>List of Accounts Paid in July 2021 to be Received</b>			
<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
<b>AAC ID Solutions Pty Ltd</b>			<b>\$1,029.76</b>
EFT000195	21/07/2021	MALC wristbands for aquatic entry	\$1,029.76
<b>Airborn Amusements</b>			<b>\$3,000.00</b>
EFT000197	28/07/2021	Pinjarra Festival - Livelighter Zone strongman activity	\$3,000.00
<b>Alinta Electricity</b>			<b>\$17,343.96</b>
EFT000193	14/07/2021	Electricity - Leisure Centre	\$12,611.51
EFT000193	14/07/2021	Electricity - Administration Building	\$2,370.35
EFT000193	14/07/2021	Electricity - George Beacham Pavilion	\$2,362.10
<b>Annabel Wills Architecture Pty Ltd</b>			<b>\$2,200.00</b>
EFT000195	21/07/2021	Edenvale wall drawings	\$1,100.00
EFT000195	21/07/2021	Roger May wall drawings	\$1,100.00
<b>Aus Clean WA</b>			<b>\$2,979.16</b>
EFT000192	07/07/2021	Cleaning MALC - April to June 2021	\$2,979.16
<b>Australasian Performing Right Assoc. Ltd T/as One</b>			<b>\$496.09</b>
EFT000197	28/07/2021	Music Licensing 01/07/21 to 30/09/21	\$496.09
<b>Australia Post</b>			<b>\$565.23</b>
EFT000192	07/07/2021	Postage period ending 30/06/21	\$565.23
<b>Australian Services Union</b>			<b>\$103.60</b>
EFT000192	07/07/2021	Payroll deductions	\$51.80
EFT000195	21/07/2021	Payroll deductions	\$51.80
<b>Australian Taxation Office</b>			<b>\$222,664.25</b>
EFT000192	07/07/2021	PAYG deductions	\$93,352.00
EFT000195	21/07/2021	PAYG deductions	\$129,312.25
<b>Austswim</b>			<b>\$280.00</b>
EFT000197	28/07/2021	Infant and pre-school aquatics	\$280.00
<b>Avalon Roof &amp; Gutter Repairs</b>			<b>\$8,790.00</b>
EFT000195	21/07/2021	Gutter cleaning July 2021 all Shire buildings	\$8,790.00
<b>B&amp;J Catalano Pty Ltd</b>			<b>\$27,182.43</b>
EFT000192	07/07/2021	Supply and deliver gravel for road base	\$27,182.43
<b>Bang the Table</b>			<b>\$17,116.00</b>
EFT000192	07/07/2021	Subscription 2021-2022 (Year 2 of 3)	\$17,116.00
<b>Black, Geoff</b>			<b>\$1,602.75</b>
EFT000197	28/07/2021	Meeting, IT & Communications Allowance	\$1,602.75
<b>Boc Gases Australia Limited</b>			<b>\$42.66</b>
EFT000195	21/07/2021	Industrial air cylinder monthly rental fee	\$42.66
<b>Bolinda Publishing P/L</b>			<b>\$305.76</b>
EFT000193	14/07/2021	Library book stock	\$305.76
<b>Bolt, Cr David</b>			<b>\$4,563.17</b>
EFT000197	28/07/2021	Meeting, IT & Communications Allowance	\$4,563.17
<b>Brenda Lillian Beacham</b>			<b>\$1,602.75</b>
EFT000197	28/07/2021	Meeting, IT & Communications Allowance	\$1,602.75
<b>Brownes Food Operations Pty Ltd</b>			<b>\$418.44</b>
EFT000193	14/07/2021	MALC Kiosk supplies	\$215.65
EFT000193	14/07/2021	MALC staff room supply	\$12.95
EFT000193	14/07/2021	Administration Office milk supply	\$136.00
EFT000193	14/07/2021	Operations Centre milk supply	\$53.84
<b>Bunbury Freight Services</b>			<b>\$261.86</b>
EFT000192	07/07/2021	Freight of chemicals to MALC	\$261.86
<b>Bunnings Building Supplies (Mandurah)</b>			<b>\$234.78</b>
EFT000192	07/07/2021	Building materials for Edenvale	\$234.78
<b>Ampol (Caltex Australia Starcard)</b>			<b>\$3,146.92</b>
EFT000193	14/07/2021	Fuel usage	\$3,146.92
<b>Cannon Hygiene Australia Pty Ltd</b>			<b>\$499.05</b>
EFT000192	07/07/2021	Sanitary bin service 05/07/21 - 04/01/22	\$499.05
<b>Cardilini, Brad</b>			<b>\$1,602.75</b>
EFT000197	28/07/2021	Meeting, IT & Communications Allowance	\$1,602.75
<b>Cemeteries &amp; Crematoria Association of WA</b>			<b>\$125.00</b>
EFT000195	21/07/2021	Annual ordinary membership 2021/2022	\$125.00
<b>Chemwatch</b>			<b>\$1,925.00</b>

<b>List of Accounts Paid in July 2021 to be Received</b>			
<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
EFT000192	07/07/2021	Annual maintenance fee Gold FFX licence July 2021 - June 2022	\$1,925.00
<b>Cleanaway Waste Management</b>			<b>\$159,933.91</b>
EFT000197	28/07/2021	Bulk bin collection June 2021	\$1,098.92
EFT000197	28/07/2021	Waste disposal June 2021	\$19,781.86
EFT000197	28/07/2021	Recycling collection June 2021	\$44,135.66
EFT000197	28/07/2021	Refuse collection June 2021	\$74,973.77
EFT000197	28/07/2021	Transfer Stations June 2021	\$19,943.70
<b>Cleaning Supplies WA</b>			<b>\$209.00</b>
EFT000195	21/07/2021	Hand soap	\$209.00
<b>Coca-Cola Amatil (Aust) Pty Ltd</b>			<b>\$285.11</b>
EFT000193	14/07/2021	MALC Kiosk supplies	\$79.93
EFT000197	28/07/2021	MALC Kiosk supplies	\$205.18
<b>Coles Online</b>			<b>\$268.00</b>
EFT000193	14/07/2021	MALC Kiosk supplies	\$166.21
EFT000197	28/07/2021	MALC Kiosk supplies	\$101.79
<b>Coles Supermarkets Australia</b>			<b>\$1,162.19</b>
EFT000192	07/07/2021	Staff farewell gift	\$200.00
EFT000192	07/07/2021	Catering items	\$31.10
EFT000192	07/07/2021	Stationery for MALC	\$3.20
EFT000192	07/07/2021	Staff farewell gift	\$200.00
EFT000192	07/07/2021	MALC Kiosk catering supplies	\$110.38
EFT000192	07/07/2021	Items for Pinjarra Festival	\$46.00
EFT000192	07/07/2021	General kitchen and catering supplies	\$84.70
EFT000192	07/07/2021	Catering for Chainsaw training	\$11.00
EFT000192	07/07/2021	Catering for Cargo training	\$9.50
EFT000192	07/07/2021	MALC Kiosk supplies	\$75.57
EFT000192	07/07/2021	Catering for Volunteers Event	\$69.95
EFT000192	07/07/2021	Catering for Councillor Briefing	\$133.80
EFT000192	07/07/2021	Items for Youth event	\$44.00
EFT000192	07/07/2021	Blue the Film catering supplies	\$26.50
EFT000192	07/07/2021	Catering for Load Restraint training	\$9.50
EFT000192	07/07/2021	Staff farewell gift	\$106.99
<b>Connect Call Centre Services</b>			<b>\$804.38</b>
EFT000195	21/07/2021	Overcalls June 21	\$804.38
<b>Corsign WA Pty Ltd</b>			<b>\$4,187.70</b>
EFT000197	28/07/2021	Traffic cones and signs	\$3,668.50
EFT000197	28/07/2021	Dogs prohibited within 10m of playground signs	\$145.20
EFT000197	28/07/2021	Warning signs	\$149.60
EFT000197	28/07/2021	Stop and One Way signs Corio Road Transfer Station	\$224.40
<b>Department of Mines, Industry Regulation &amp; Safety</b>			<b>\$14,683.70</b>
EFT000192	07/07/2021	Firewood collection fees June 2021	\$1,029.60
EFT000193	14/07/2021	BSL collection fees June 2021	\$13,654.10
<b>Department of Premier and Cabinet</b>			<b>\$124.80</b>
EFT000197	28/07/2021	Gazettal Notice - UV to GRV D21/6277	\$124.80
<b>Dial Before You Dig WA Ltd</b>			<b>\$110.00</b>
EFT000192	07/07/2021	Quarterly referral fee for April to June 2021	\$110.00
<b>DS Agencies Pty Ltd</b>			<b>\$181.50</b>
EFT000197	28/07/2021	Riser for RV Dump tank	\$181.50
<b>Dunlop Electrics</b>			<b>\$5,013.80</b>
EFT000193	14/07/2021	Replace light fittings and install sensors	\$597.30
EFT000193	14/07/2021	Relocate acid pumps outlets	\$343.20
EFT000193	14/07/2021	Electrical repairs	\$195.80
EFT000193	14/07/2021	Replace floodlight and sensor at Roger May Museum	\$766.70
EFT000195	21/07/2021	Check potential electrical fault at South Yunderup Fire Station	\$104.50
EFT000197	28/07/2021	Supply and install light fittings along Pinjarra Foreshore	\$3,006.30
<b>Estuary Bobcats</b>			<b>\$17,820.00</b>
EFT000192	07/07/2021	Corio Road Transfer Station screening fence	\$11,000.00
EFT000193	14/07/2021	Rock pitching and relocation of donga Corio Road Transfer Station	\$6,820.00



<b>List of Accounts Paid in July 2021 to be Received</b>			
<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
<b>Fitz Gerald Strategies</b>			<b>\$9,500.00</b>
EFT000193	14/07/2021	HR and IR Services 2021-2022	\$9,500.00
<b>Foot Print (WA) Pty Ltd</b>			<b>\$1,163.80</b>
EFT000192	07/07/2021	30 small receipt books	\$624.80
EFT000192	07/07/2021	TRASH Card printing (200 pads per box)	\$539.00
<b>Frontline Fire &amp; Rescue</b>			<b>\$703.36</b>
EFT000197	28/07/2021	Fire fighting equipment	\$703.36
<b>Frontline Technology Services</b>			<b>\$3,536.96</b>
EFT000197	28/07/2021	Managed support services for Skype - July 2021	\$2,033.70
EFT000197	28/07/2021	Annual license for Fastvue Reporter	\$1,503.26
<b>GHD Pty Ltd</b>			<b>\$3,862.10</b>
EFT000192	07/07/2021	Groundwater monitoring Corio Road Transfer Station	\$3,862.10
<b>Gilbert J &amp; A</b>			<b>\$1,980.00</b>
EFT000195	21/07/2021	Repairs to donga Corio Road Transfer Station	\$1,980.00
<b>GISSA</b>			<b>\$2,502.50</b>
EFT000195	21/07/2021	A-Spec annual fees for 2021-2022	\$2,502.50
<b>Graham Brown Auto Wreckers</b>			<b>\$180.00</b>
EFT000193	14/07/2021	Towage of white Toyota	\$180.00
<b>High Standard Systems</b>			<b>\$3,351.78</b>
EFT000192	07/07/2021	Alarm monitoring all Shire buildings 01/07/21 - 30/09/21	\$2,992.20
EFT000193	14/07/2021	Alarm monitoring 01/07/21 - 30/09/21	\$174.58
EFT000195	21/07/2021	Alarm repairs	\$185.00
<b>Hosemasters</b>			<b>\$171.04</b>
EFT000197	28/07/2021	Replacement hydraulic hose	\$171.04
<b>Hot Klobba</b>			<b>\$503.28</b>
EFT000193	14/07/2021	Staff uniforms	\$300.95
EFT000195	21/07/2021	Staff uniforms	\$202.33
<b>I Sweep</b>			<b>\$4,752.00</b>
EFT000197	28/07/2021	Sweeping of Town June 2021	\$4,752.00
<b>Infiniti Group</b>			<b>\$180.11</b>
EFT000193	14/07/2021	MALC Kiosk supplies	\$180.11
<b>Institute Of Public Works Engineering Aus WA</b>			<b>\$75.00</b>
EFT000195	21/07/2021	Institute of Public Works Engineering Forum	\$75.00
<b>Intelife Group</b>			<b>\$8,355.77</b>
EFT000193	14/07/2021	BBQ cleaning and litter collection June 2021	\$1,920.77
EFT000193	14/07/2021	Litter pick Pinjarra Road May 2021	\$3,465.00
EFT000193	14/07/2021	Roadside litter pick up June 2021	\$2,970.00
<b>iSubscribe</b>			<b>\$1,714.93</b>
EFT000192	07/07/2021	Library magazine subscriptions 2021/2022	\$1,714.93
<b>IT Vision</b>			<b>\$16,644.84</b>
EFT000197	28/07/2021	Annual license Synergy 5 user - 01/07/21 - 30/06/22	\$16,644.84
<b>Ivey's Industrial Cleaners</b>			<b>\$206.25</b>
EFT000195	21/07/2021	Cleaning of air filters	\$206.25
<b>Ixom Operations Pty Ltd</b>			<b>\$195.05</b>
EFT000193	14/07/2021	Chlorine gas cylinder rental fee 01/06/21 to 30/06/21	\$195.05
<b>James Bennett Pty Ltd</b>			<b>\$51.07</b>
EFT000193	14/07/2021	Library book stock	\$51.07
<b>JB Hi-Fi Mandurah</b>			<b>\$645.56</b>
EFT000192	07/07/2021	Library DVD stock	\$645.56
<b>Stuart Kirkham</b>			<b>\$1,602.75</b>
EFT000197	28/07/2021	Meeting, IT & Communications Allowance	\$1,602.75
<b>Lake Preston Lime</b>			<b>\$19,105.83</b>
EFT000192	07/07/2021	Supply of limestone	\$3,116.66
EFT000193	14/07/2021	Supply of limestone	\$6,668.81
EFT000197	28/07/2021	Supply of limestone	\$9,320.36
<b>Landgate</b>			<b>\$957.31</b>
EFT000197	28/07/2021	Gross rental valuations 15/05/21 - 11/06/21	\$957.31
<b>Lee Stephen Donald</b>			<b>\$1,602.75</b>
EFT000197	28/07/2021	Meeting, IT & Communications Allowance	\$1,602.75
<b>Les Mills Body Training Systems</b>			<b>\$760.59</b>

<b>List of Accounts Paid in July 2021 to be Received</b>			
<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
EFT000197	28/07/2021	Les Mills monthly license fees - July 2021	\$760.59
<b>LGIS Broking</b>			<b>\$2,673.25</b>
EFT000197	28/07/2021	Marine Cargo Insurance - 30/06/21 - 30/06/22	\$693.00
EFT000197	28/07/2021	Marine Hull Commercial Insurance - 30/06/21 - 30/06/22	\$1,980.25
<b>LGIS Risk Management</b>			<b>\$4,643.56</b>
EFT000195	21/07/2021	Regional Risk Coordinator fee 2020-2021	\$4,643.56
<b>LGISWA</b>			<b>\$359,597.24</b>
EFT000192	07/07/2021	LG Workforce Risk Forum	\$418.00
EFT000195	21/07/2021	LGIS Commercial Crime and Cyber Liability 30/06/21 - 30/06/22	\$9,937.22
EFT000195	21/07/2021	LGIS Management Liability Insurance 30/06/21 - 30/06/22	\$19,119.24
EFT000195	21/07/2021	LGIS Personal Accident Insurance 30/06/21 - 30/06/22	\$663.30
EFT000195	21/07/2021	LGIS Travel Insurance 30/06/21 - 30/06/22	\$1,100.00
EFT000197	28/07/2021	LGIS Motor Vehicle Insurance 30/06/21 - 30/06/22	\$64,156.47
EFT000197	28/07/2021	LGIS Liability Insurance 30/06/21 - 30/06/22 Instalment 1	\$92,807.15
EFT000197	28/07/2021	LGIS Property Insurance 30/06/21 - 30/06/22 Instalment 1	\$97,060.05
EFT000197	28/07/2021	LGIS Workcare Insurance 30/06/21 - 30/06/22 Instalment 1	\$74,335.81
<b>LGRCEU</b>			<b>\$164.04</b>
EFT000192	07/07/2021	Payroll deductions	\$82.02
EFT000195	21/07/2021	Payroll deductions	\$82.02
<b>Links Modular Solutions Pty Ltd</b>			<b>\$1,923.35</b>
EFT000192	07/07/2021	Links licence July 2021 - December 2021	\$1,923.35
<b>Acumentis</b>			<b>\$1,375.00</b>
EFT000192	07/07/2021	Prepare market rental valuation - Alfresco Dining	\$1,375.00
<b>Local Government Professionals Australia WA</b>			<b>\$531.00</b>
EFT000193	14/07/2021	Membership 2021/2022	\$531.00
<b>Lucky Charm Pinjarra</b>			<b>\$495.91</b>
EFT000192	07/07/2021	Assorted stationery items	\$42.50
EFT000192	07/07/2021	West Australian - 30/05/21 - 26/06/21	\$55.90
EFT000192	07/07/2021	Archive boxes	\$397.51
<b>M P Rogers &amp; Associates Pty Ltd</b>			<b>\$1,831.34</b>
EFT000193	14/07/2021	Investigate debris and foam accumulation near Bay Road	\$1,831.34
<b>Mandurah Cellarbrations</b>			<b>\$239.96</b>
EFT000192	07/07/2021	Murray Sundowner Awards catering	\$239.96
<b>Mandurah Tree Lopping &amp; Stump Grinding</b>			<b>\$30,800.00</b>
EFT000192	07/07/2021	Pruning of trees on local roads - 5 days in Coolup Area	\$15,400.00
EFT000192	07/07/2021	Tree works for the month of June 2021	\$3,080.00
EFT000192	07/07/2021	Tree works for the month of June 2021	\$9,240.00
EFT000192	07/07/2021	Tree works for the month of June 2021	\$3,080.00
<b>Marketforce Productions</b>			<b>\$1,375.00</b>
EFT000192	07/07/2021	SEEK 5-ad job pack	\$1,375.00
<b>McCall Bros</b>			<b>\$4,423.10</b>
EFT000197	28/07/2021	Manufacture and installation of central handrail	\$4,423.10
<b>McGrath Pest Management</b>			<b>\$440.00</b>
EFT000197	28/07/2021	Rodent baiting	\$440.00
<b>McLarty, Douglas</b>			<b>\$2,342.83</b>
EFT000197	28/07/2021	Meeting, IT & Communications Allowance	\$2,342.83
<b>McLeods</b>			<b>\$2,660.79</b>
EFT000197	28/07/2021	Legal fees - Lot 9510 Sutton Street Pinjarra	\$1,227.52
EFT000197	28/07/2021	Legal fees - Acquisition agreement	\$1,433.27
<b>Murray Engineering</b>			<b>\$8,838.30</b>
EFT000192	07/07/2021	Service for SES Dual Cab truck	\$894.47
EFT000192	07/07/2021	Repair damage on North Dandalup 3.4 Fire Tender	\$3,358.22
EFT000192	07/07/2021	Repairs to North Dandalup 3.4 Fire Tender	\$1,862.55
EFT000192	07/07/2021	Parts for SES Dual Cab truck	\$1,133.00
EFT000192	07/07/2021	Repair water pump leak on Coolup 4.4 Broad Acre	\$1,590.06
<b>Murray House Resource Centre</b>			<b>\$120.00</b>
EFT000193	14/07/2021	SAS Program Flyer - Murray Community Newspaper	\$120.00
<b>Murray River Auto Repairs</b>			<b>\$385.75</b>
EFT000192	07/07/2021	60,000km service 4016MY Holden Colorado	\$385.75

<b>List of Accounts Paid in July 2021 to be Received</b>			
<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
<b>Murray Shire Social Club</b>			<b>\$446.50</b>
EFT000192	07/07/2021	Payroll deductions	\$236.50
EFT000195	21/07/2021	Payroll deductions	\$210.00
<b>National Trust Of Australia (WA)</b>			<b>\$3,888.50</b>
EFT000197	28/07/2021	Pinjarra Court House - June 21 - June 22	\$3,888.50
<b>North Dandalup Volunteer Bushfire Brigade</b>			<b>\$126.74</b>
EFT000192	07/07/2021	Reimbursement of goods for Advanced Bushfire Course	\$126.74
<b>Officeworks</b>			<b>\$559.78</b>
EFT000197	28/07/2021	Assorted stationery items	\$559.78
<b>Our Community Yoga</b>			<b>\$887.00</b>
EFT000193	14/07/2021	45 minute Hydrotherapy Yoga	\$48.00
EFT000195	21/07/2021	4 Yoga classes	\$242.00
EFT000197	28/07/2021	10 Yoga classes	\$597.00
<b>Party Plus Mandurah</b>			<b>\$732.00</b>
EFT000192	07/07/2021	Hire of marquee, tables and chairs - Environment Community Day	\$732.00
<b>Peel Mini Earthmovers</b>			<b>\$8,081.70</b>
EFT000192	07/07/2021	Clean headwalls South Yunderup	\$484.00
EFT000192	07/07/2021	Install sub-soil drain and footing	\$2,370.50
EFT000192	07/07/2021	Woody weed removal excavation, preparation and backfill	\$5,227.20
<b>Pepper, Rachel</b>			<b>\$82.50</b>
EFT000192	07/07/2021	Pinjarra Festival 2021 map amendments	\$82.50
<b>PFD Food Services Pty Ltd</b>			<b>\$162.00</b>
EFT000193	14/07/2021	MALC Kiosk supplies	\$162.00
<b>Phoenix Foundry</b>			<b>\$861.30</b>
EFT000192	07/07/2021	Memorial plaque	\$861.30
<b>Pinjarra Meat Supply</b>			<b>\$276.78</b>
EFT000195	21/07/2021	Catering for end of financial year function and two retirements	\$276.78
<b>Premier Hotel</b>			<b>\$292.99</b>
EFT000195	21/07/2021	Catering for end of financial year function and two retirements	\$292.99
<b>Priority 1 Fire and Safety</b>			<b>\$880.00</b>
EFT000197	28/07/2021	SCBA Refresher	\$880.00
<b>Puma Energy</b>			<b>\$910.72</b>
EFT000192	07/07/2021	Fuel usage	\$910.72
<b>QTM Pty Ltd</b>			<b>\$17,474.30</b>
EFT000193	14/07/2021	Design of Traffic Management Plan	\$1,099.71
EFT000195	21/07/2021	Traffic management for tree works Nanga Road	\$11,393.94
EFT000195	21/07/2021	Traffic control for Murray River Drive	\$1,192.94
EFT000195	21/07/2021	Pinjarra Festival 2021 traffic management	\$3,787.71
<b>Raeco International Pty Ltd</b>			<b>\$412.52</b>
EFT000195	21/07/2021	Library book labels	\$412.52
<b>Retro Roads</b>			<b>\$2,995.04</b>
EFT000195	21/07/2021	Murray River Drive line marking	\$1,591.44
EFT000197	28/07/2021	Rail X marking installation on Lakes Road	\$1,403.60
<b>Risk Management Institution of Australasia Ltd</b>			<b>\$330.00</b>
EFT000195	21/07/2021	12 month membership subscription	\$330.00
<b>Rogers, Cr Angela</b>			<b>\$1,602.75</b>
EFT000197	28/07/2021	Meeting, IT & Communications Allowance	\$1,602.75
<b>Rose, Casey</b>			<b>\$1,602.75</b>
EFT000197	28/07/2021	Meeting, IT & Communications Allowance	\$1,602.75
<b>Scavenger Fire Safety</b>			<b>\$5,433.12</b>
EFT000195	21/07/2021	Volunteer Bushfire Brigade protective clothing and equipment	\$5,433.12
<b>Scitech Discovery Centre</b>			<b>\$420.00</b>
EFT000195	21/07/2021	Library Incursion	\$420.00
<b>Scope Business Imaging</b>			<b>\$1,582.14</b>
EFT000192	07/07/2021	Copier charges June 2021 - Tech Services	\$155.97
EFT000192	07/07/2021	Copier charges June 2021 - Records	\$14.12
EFT000192	07/07/2021	Copier charges June 2021 - Reception	\$56.09

<b>List of Accounts Paid in July 2021 to be Received</b>			
<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
EFT000192	07/07/2021	Copier charges June 2021 - Rangers	\$57.32
EFT000192	07/07/2021	Copier charges June 2021 - Planners	\$109.16
EFT000192	07/07/2021	Copier charges June 2021 - Accounts	\$63.16
EFT000192	07/07/2021	Copier charges June 2021 - Binding Room	\$248.93
EFT000192	07/07/2021	Copier charges June 2021 - Depot	\$34.97
EFT000192	07/07/2021	Copier charges June 2021 - DTVIC	\$100.58
EFT000192	07/07/2021	Copier charges June 2021 - Fax Room	\$439.22
EFT000192	07/07/2021	Copier charges June 2021 - Library	\$75.56
EFT000192	07/07/2021	Copier charges June 2021 - MALC	\$227.06
<b>Shire of Waroona</b>			<b>\$13,432.00</b>
EFT000192	07/07/2021	Buller Road tipping fees	\$336.00
EFT000193	14/07/2021	Corio Road Transfer Station waste	\$11,520.00
EFT000193	14/07/2021	Green waste disposal from Corio Road Transfer Station	\$288.00
EFT000195	21/07/2021	Fines Enforcement Registry	\$1,000.00
EFT000195	21/07/2021	Green waste disposal from Corio Road Transfer Station	\$240.00
EFT000195	21/07/2021	Green waste disposal from Corio Road Transfer Station	\$48.00
<b>Sigma Chemicals</b>			<b>\$175.92</b>
EFT000195	21/07/2021	Power supply for Wave 100	\$175.92
<b>Sign Craft</b>			<b>\$826.10</b>
EFT000195	21/07/2021	Sponsor acknowledgment plaque	\$314.60
EFT000197	28/07/2021	Locality signage	\$511.50
<b>Signs Plus</b>			<b>\$120.00</b>
EFT000195	21/07/2021	Staff name badges	\$120.00
<b>Soft Landing</b>			<b>\$6,160.00</b>
EFT000193	14/07/2021	Collect mattresses for recycling from Corio Road	\$6,160.00
<b>South West Fire Solutions</b>			<b>\$165.00</b>
EFT000192	07/07/2021	Monthly fire detection system testing	\$165.00
<b>Specialised Lifting Service</b>			<b>\$1,354.10</b>
EFT000197	28/07/2021	Service of 2 post hoist and Hiab service and inspection	\$1,354.10
<b>Specialty Timber Flooring WA</b>			<b>\$3,701.50</b>
EFT000197	28/07/2021	Courts 1 and 2 reseal	\$3,701.50
<b>Spyker Business Solutions Pty Ltd</b>			<b>\$5,726.45</b>
EFT000193	14/07/2021	Replacement of faulty camera at administration car park	\$1,784.51
EFT000193	14/07/2021	Milestone one year Care Plus for XProtect 91 device	\$3,941.94
<b>Studio Kraze</b>			<b>\$500.00</b>
EFT000193	14/07/2021	DJ Services - Roller Disco	\$500.00
<b>Subway Pinjarra</b>			<b>\$147.00</b>
EFT000192	07/07/2021	Catering for HVR Engagement session	\$98.00
EFT000195	21/07/2021	Catering for Peel Water Strategy session	\$49.00
<b>Surveying South</b>			<b>\$2,376.00</b>
EFT000192	07/07/2021	Feature and contour survey of proposed street parking at Pinjarra SHS	\$2,376.00
<b>Talis Consultants</b>			<b>\$610.50</b>
EFT000197	28/07/2021	Final inspection Corio Road Transfer Station works	\$610.50
<b>Technology One Ltd</b>			<b>\$22,988.90</b>
EFT000197	28/07/2021	Intramaps subscription 01/07/21 - 30/06/22	\$22,988.90
<b>Telstra Corporation Limited</b>			<b>\$930.17</b>
EFT000193	14/07/2021	Phone usage	\$744.10
EFT000195	21/07/2021	Phone usage	\$186.07
<b>The Locals Trading Pty Ltd</b>			<b>\$96.22</b>
EFT000192	07/07/2021	DTVC Shop stock	\$96.22
<b>Tourism Council Western Australia</b>			<b>\$175.00</b>
EFT000195	21/07/2021	2 Extra Framed Copies of Dwellingup Top Small	\$175.00
<b>Toyota Financial Services</b>			<b>\$388.19</b>
EFT000192	07/07/2021	Lease MY12336 - July 2021	\$388.19
<b>TPG Network Pty Ltd</b>			<b>\$3,217.87</b>
EFT000197	28/07/2021	Ethernet Access 01/06/21 - 30/06/21	\$3,217.87
<b>Tuckey's Hardware</b>			<b>\$1,021.98</b>
EFT000193	14/07/2021	Miscellaneous hardware items for administration	\$42.95
EFT000193	14/07/2021	Painting supplies	\$50.22

<b>List of Accounts Paid in July 2021 to be Received</b>			
<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
EFT000193	14/07/2021	Cement General Purpose 20kg	\$36.40
EFT000193	14/07/2021	Stainless ball valve and camlock	\$69.01
EFT000193	14/07/2021	MALC hardware items	\$77.85
EFT000193	14/07/2021	Adhesive and turpentine	\$52.93
EFT000193	14/07/2021	Trimmer line and pressure sprayer	\$53.05
EFT000193	14/07/2021	Weed killer	\$71.90
EFT000193	14/07/2021	MALC hardware items	\$26.21
EFT000193	14/07/2021	Clothes line and drill bit and screws for MALC	\$106.49
EFT000193	14/07/2021	Distilled water 20L	\$8.70
EFT000193	14/07/2021	Hose and adjustable nozzles	\$93.89
EFT000193	14/07/2021	Assorted hardware items for Parks and Gardens	\$78.37
EFT000193	14/07/2021	Tape measure and sealant	\$38.00
EFT000193	14/07/2021	MALC hardware items	\$27.94
EFT000193	14/07/2021	Cable ties for signs Corio Road Transfer Station	\$36.95
EFT000193	14/07/2021	Secateurs, telescopic lopper	\$93.79
EFT000193	14/07/2021	Sprayer garden industrial	\$57.33
<b>Tyrecycle Pty Ltd</b>			<b>\$4,259.04</b>
EFT000195	21/07/2021	Tyre collection from Corio Road Transfer Station	\$4,259.04
<b>Ulverscroft Large Print Books</b>			<b>\$1,145.34</b>
EFT000192	07/07/2021	Library Large Print book stock	\$1,145.34
<b>Veolia Environmental Services</b>			<b>\$6,064.08</b>
EFT000192	07/07/2021	Drain cleaning and root cutting South Yunderup	\$6,064.08
<b>Vibe Pinjarra</b>			<b>\$3,233.03</b>
EFT000192	07/07/2021	Fuel usage - June 2021	\$3,233.03
<b>WA Library Supplies</b>			<b>\$1,579.80</b>
EFT000195	21/07/2021	Library supplies	\$678.80
EFT000195	21/07/2021	Kids tables and chairs and pin up board	\$901.00
<b>Waterlogic Australia Pty Ltd</b>			<b>\$570.90</b>
EFT000193	14/07/2021	Water Cooler Hire 01/07/21 - 31/07/21	\$570.90
<b>Waters BM &amp; RV</b>			<b>\$3,432.41</b>
EFT000192	07/07/2021	Supply fill sand	\$3,432.41
<b>Westbooks</b>			<b>\$131.46</b>
EFT000192	07/07/2021	Library book stock	\$131.46
<b>Westcoast Power Equipment</b>			<b>\$139.90</b>
EFT000193	14/07/2021	Plant spare parts	\$139.90
<b>Mandurah Psychological Services Pty Ltd</b>			<b>\$214.50</b>
EFT000195	21/07/2021	Counselling sessions with psychologists	\$214.50
<b>Easi Packaging Pty Ltd</b>			<b>\$7,038.40</b>
EFT000192	07/07/2021	Payroll deductions	\$3,519.20
EFT000195	21/07/2021	Payroll deductions	\$3,519.20
<b>Trisley's Hydraulic Services Pty Ltd</b>			<b>\$8,352.30</b>
EFT000192	07/07/2021	Plastic weld three leaking joints	\$935.00
EFT000192	07/07/2021	Service hydro pool foot valves	\$2,145.00
EFT000192	07/07/2021	Supply and install chlorine leak detector	\$4,702.50
EFT000192	07/07/2021	Service leisure pool PAC pump	\$569.80
<b>Telair Pty Ltd</b>			<b>\$1,372.55</b>
EFT000192	07/07/2021	Service charge - June 2021	\$1,372.55
<b>Toll Transport Pty Ltd</b>			<b>\$216.66</b>
EFT000192	07/07/2021	Courier charges	\$10.73
EFT000193	14/07/2021	Courier charges	\$205.93
<b>Crisp Wireless Pty Ltd</b>			<b>\$8,514.00</b>
EFT000192	07/07/2021	Annual digital radio network lease to 30/06/22 North Dandalup	\$8,514.00
<b>Sterling's Office National</b>			<b>\$182.22</b>
EFT000193	14/07/2021	Library assorted stationery	\$182.22
<b>WML Consultants Pty Ltd</b>			<b>\$5,843.75</b>
EFT000197	28/07/2021	Pinjarra Suspension Bridge - Preparation and review	\$5,843.75
<b>Evolved Sound</b>			<b>\$1,668.00</b>
EFT000197	28/07/2021	MALC music and advertising 02/08/21 to 02/08/22	\$1,668.00
<b>Forms Express</b>			<b>\$3,954.50</b>

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<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
EFT000192	07/07/2021	Annual license bill archive and eNotices 01/07/21 - 30/06/22	\$3,954.50
<b>Construction Training Fund</b>			<b>\$2,613.63</b>
EFT000195	21/07/2021	BCITF Collection Fees - June 2021	\$2,613.63
<b>Quicklee Express</b>			<b>\$27.50</b>
EFT000192	07/07/2021	Frontline tech service account fee	\$27.50
<b>Infocouncil Pty Ltd</b>			<b>\$4,411.00</b>
EFT000197	28/07/2021	Council Agenda/Minute Software 01/07/21 - 30/06/22	\$4,411.00
<b>Little Genius Science</b>			<b>\$875.00</b>
EFT000197	28/07/2021	Animation workshop	\$455.00
EFT000197	28/07/2021	Sphero session at Belswan for adults	\$420.00
<b>Techxcelerate</b>			<b>\$400.00</b>
EFT000197	28/07/2021	Make Some "Sound" Workshop	\$400.00
<b>Jomar (WA) Pty Ltd</b>			<b>\$5,225.00</b>
EFT000195	21/07/2021	Abutment spoon drain repairs Lakes Road Bridge	\$5,225.00
<b>Meraki Art Therapy</b>			<b>\$1,000.00</b>
EFT000192	07/07/2021	2021 Planting in the Park - craft workshop	\$1,000.00
<b>Monitored Electronics</b>			<b>\$57.20</b>
EFT000192	07/07/2021	Gym duress alarm monitoring - 01/07/21 - 30/09/21	\$57.20
<b>Woodlands Distributors &amp; Agencies</b>			<b>\$4,232.80</b>
EFT000195	21/07/2021	Bin enclosure for Banksiadale Road Dwellingup	\$4,232.80
<b>Donna Walker</b>			<b>\$135.30</b>
EFT000193	14/07/2021	Reimbursement for expenses relating to BRPC Field Trip	\$135.30
<b>Damien Carter Bricklaying</b>			<b>\$3,000.00</b>
EFT000192	07/07/2021	Brick laying at Roger May Museum	\$3,000.00
<b>AMPAC Debt Recovery Pty Ltd</b>			<b>\$26,681.28</b>
EFT000197	28/07/2021	2020/21 Debt collection and debt recovery	\$26,681.28
<b>Fleet Commercial Gymnasiums Pty Ltd</b>			<b>\$572.00</b>
EFT000197	28/07/2021	Gym mats and training plates	\$572.00
<b>The West Australian</b>			<b>\$653.80</b>
EFT000195	21/07/2021	Advertising - Pinjarra Festival	\$653.80
<b>Donald Cant Watts Corke (WA) Pty Ltd</b>			<b>\$4,488.00</b>
EFT000197	28/07/2021	Construction services and project completion WAFIP	\$4,488.00
<b>Bindoon Transport</b>			<b>\$18.76</b>
EFT000195	21/07/2021	Freight to Operations Centre	\$18.76
<b>MyMedia</b>			<b>\$787.60</b>
EFT000192	07/07/2021	Subscription for June 2021	\$787.60
<b>Holistic Wellness Community</b>			<b>\$220.00</b>
EFT000197	28/07/2021	Guided Meditation- Socially Active Seniors Program	\$220.00
<b>Open Cities Pty Ltd</b>			<b>\$41,250.00</b>
EFT000192	07/07/2021	SaaS subscription, OpenForms subscription and DMS Connector	\$41,250.00
<b>Armsec WA</b>			<b>\$55.00</b>
EFT000197	28/07/2021	Alarm call out 9/7/2021	\$55.00
<b>Australian Communications and Media Authority</b>			<b>\$228.00</b>
EFT000192	07/07/2021	Renewal Mt William and North Dandalup two way radio	\$228.00
<b>Complete Refridge Solutions</b>			<b>\$209.00</b>
EFT000197	28/07/2021	Investigate Air conditioner fault	\$209.00
<b>Essential Aircor Services Pty Ltd</b>			<b>\$4,301.00</b>
EFT000197	28/07/2021	Service Reception air conditioner	\$407.00
EFT000197	28/07/2021	Investigate faulty air conditioner units	\$198.00
EFT000197	28/07/2021	Replace and install air conditioner Old Court House	\$3,696.00
<b>Lockdown Security Solutions</b>			<b>\$100.00</b>
EFT000195	21/07/2021	Repairs to alarm system	\$100.00
<b>InterFire Agencies Pty Ltd</b>			<b>\$1,764.40</b>
EFT000193	14/07/2021	Volunteer Bushfire Brigade protective clothing and equipment	\$1,764.40
<b>Caraholly Orchard</b>			<b>\$220.00</b>
EFT000192	07/07/2021	DTVC Shop stock	\$220.00
<b>WA Tool and Trade Supply</b>			<b>\$196.70</b>
EFT000197	28/07/2021	Workshop consumables	\$196.70

<b>List of Accounts Paid in July 2021 to be Received</b>			
<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
<b>Howard J Kirk</b>			<b>\$300.00</b>
EFT000197	28/07/2021	Herron Point Caretakers Allow - 02/07/21 - 15/07/21	\$300.00
<b>Pisconeri Family Trust</b>			<b>\$42,176.20</b>
EFT000192	07/07/2021	Corio Road Transfer Station Management June 2021	\$32,287.20
EFT000192	07/07/2021	Transport green waste to Waroona 2020-2021	\$6,050.00
EFT000192	07/07/2021	Dwellingup Transfer Station Management 2020-2021	\$3,839.00
<b>Country Womens Association of WA</b>			<b>\$75.82</b>
EFT000193	14/07/2021	Water rates and usage Hall North Yunderup	\$75.82
<b>WA Automotive Pty Ltd</b>			<b>\$45,723.85</b>
EFT000195	21/07/2021	Registration to 31/7/21 4026MY Triton	\$140.55
EFT000195	21/07/2021	New Mitsubishi Triton GLX Dual Cab Utility 4031MY	\$45,107.85
EFT000195	21/07/2021	Vehicle registration to 31/7/22 4026MY Triton	\$475.45
<b>Mandurah Towing Service</b>			<b>\$396.00</b>
EFT000197	28/07/2021	Towing of three vehicles	\$396.00
<b>Agonis Group</b>			<b>\$4,667.69</b>
EFT000197	28/07/2021	Hotham Valley Tourist Railway - Pinjarra to Alumina Junction feasibility study	\$4,667.69
<b>Choose Digital Pty Ltd</b>			<b>\$383.90</b>
EFT000195	21/07/2021	Aftercare Plan - Hosting and support	\$383.90
<b>Cooper &amp; Oxley Group Pty Ltd</b>			<b>\$866,571.75</b>
EFT000193	14/07/2021	Construction of WA Food Innovation Precinct	\$866,571.75
<b>RDF Plumbing</b>			<b>\$1,858.56</b>
EFT000193	14/07/2021	Drainage works	\$260.00
EFT000195	21/07/2021	Repair to tap Murray River Square	\$60.00
EFT000195	21/07/2021	Unblock drain to Court 1 Accessible Toilet	\$210.00
EFT000195	21/07/2021	Service and repair Dwellingup RV Sullage Point	\$252.00
EFT000195	21/07/2021	Install vent to grease trap	\$494.21
EFT000197	28/07/2021	Replace faulty cistern	\$397.65
EFT000197	28/07/2021	Install riser to RV Dump Point access	\$184.70
<b>EvolvePlus Pty Ltd</b>			<b>\$539.00</b>
EFT000195	21/07/2021	People counter Pinjarra Visitor Information point	\$539.00
<b>Lo-go Appointments</b>			<b>\$7,680.59</b>
EFT000192	07/07/2021	Temporary labour hire	\$3,408.71
EFT000195	21/07/2021	Temporary labour hire	\$2,135.94
EFT000197	28/07/2021	Temporary labour hire	\$2,135.94
<b>Sitevisuals</b>			<b>\$6,208.82</b>
EFT000192	07/07/2021	WAFIP Time lapse camera, subscription and insurance	\$5,299.80
EFT000197	28/07/2021	WAFIP Time lapse camera, subscription and insurance	\$909.02
<b>Haymes Paint</b>			<b>\$65.56</b>
EFT000192	07/07/2021	White paint for Edenvale	\$65.56
<b>National Property Valuers</b>			<b>\$3,300.00</b>
EFT000192	07/07/2021	Property valuation - Lot 737 Greenlands Road	\$3,300.00
<b>Ken Graydon</b>			<b>\$155.00</b>
EFT000192	07/07/2021	Refund for cancelled event booking	\$155.00
<b>LP Visuals</b>			<b>\$5,500.00</b>
EFT000197	28/07/2021	Video shoot for Advocacy Campaign	\$5,500.00
<b>Waroona Septics</b>			<b>\$1,661.00</b>
EFT000197	28/07/2021	Pump out bulk tank at Dwellingup RV Point	\$1,133.00
EFT000197	28/07/2021	Empty grease trap at Multipurpose Community Facility	\$528.00
<b>Nance Bloomfield</b>			<b>\$360.00</b>
EFT000193	14/07/2021	Refund for cancellation of Hall booking	\$360.00
<b>Adrian &amp; Lisa Horley</b>			<b>\$373.21</b>
EFT000195	21/07/2021	Refund overpayment rates A7041	\$373.21
<b>Kerry &amp; Brian Martin</b>			<b>\$792.00</b>
EFT000195	21/07/2021	Refund overpayment rates A6388	\$792.00
<b>Vicki &amp; Kenneth Crane</b>			<b>\$784.15</b>
EFT000195	21/07/2021	Refund overpayment rates A4801	\$784.15
<b>Colin &amp; Linda Smith</b>			<b>\$792.00</b>
EFT000195	21/07/2021	Refund overpayment rates A7729	\$792.00
<b>Kingman Visual</b>			<b>\$107.11</b>

<b>List of Accounts Paid in July 2021 to be Received</b>			
<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
EFT000195	21/07/2021	Refund overpayment BCITF fees - BP2021398	\$107.11
<b>JCorp Pty Ltd</b>			<b>\$611.23</b>
EFT000195	21/07/2021	Refund overpayment Planning application - P163/2021	\$611.23
<b>Leonie Buegge</b>			<b>\$792.00</b>
EFT000195	21/07/2021	Refund overpayment rates A6681	\$792.00
<b>Carol &amp; Barry Moir</b>			<b>\$613.50</b>
EFT000195	21/07/2021	Refund overpayment rates A1429	\$613.50
<b>Joanne Szekeres</b>			<b>\$147.00</b>
EFT000195	21/07/2021	Refund overpayment Planning application - P150/2021	\$147.00
<b>Shirley &amp; Roger Boyd</b>			<b>\$792.00</b>
EFT000195	21/07/2021	Refund overpayment rates A10372	\$792.00
<b>Elfriede &amp; Raymond Dunster</b>			<b>\$613.50</b>
EFT000195	21/07/2021	Refund overpayment rates A5081	\$613.50
<b>Igniting Change</b>			<b>\$116.00</b>
EFT000195	21/07/2021	Books for Seniors Death Café event	\$116.00
<b>James Webb</b>			<b>\$150.00</b>
EFT000195	21/07/2021	Refund overpayment registration fees - Zampa	\$150.00
<b>Robert Walsh</b>			<b>\$792.00</b>
EFT000195	21/07/2021	Refund overpayment rates A3010	\$792.00
<b>Barry &amp; Diane Pickering</b>			<b>\$613.50</b>
EFT000195	21/07/2021	Refund overpayment rates A5662	\$613.50
<b>Peter &amp; Angela Jacka</b>			<b>\$121.00</b>
EFT000195	21/07/2021	Refund overpayment rates A7746	\$121.00
<b>Jonathan Cannon</b>			<b>\$27.50</b>
EFT000195	21/07/2021	Refund of key bond for Pinjarra Tennis Club	\$27.50
<b>Sandra &amp; Douglas Sime</b>			<b>\$792.00</b>
EFT000195	21/07/2021	Refund overpayment rates A10709	\$792.00
<b>Faye &amp; Brian Crookes</b>			<b>\$792.00</b>
EFT000195	21/07/2021	Refund overpayment rates A4353	\$792.00
<b>Andrija Kustura</b>			<b>\$792.00</b>
EFT000195	21/07/2021	Refund overpayment rates A10818	\$792.00
<b>Jennifer Stewart</b>			<b>\$121.00</b>
EFT000195	21/07/2021	Refund overpayment rates A2398	\$121.00
<b>Penelope Busby</b>			<b>\$758.99</b>
EFT000195	21/07/2021	Refund overpayment rates A9912	\$758.99
<b>Jennifer Stevens</b>			<b>\$613.50</b>
EFT000195	21/07/2021	Refund overpayment rates A5268	\$613.50
<b>Raymond &amp; Coralie Spark</b>			<b>\$645.78</b>
EFT000195	21/07/2021	Refund overpayment rates A698	\$645.78
<b>Janet &amp; William Gill</b>			<b>\$784.15</b>
EFT000195	21/07/2021	Refund overpayment rates A10662	\$784.15
<b>Dianne &amp; Colin Glasson</b>			<b>\$792.00</b>
EFT000197	28/07/2021	Refund overpayment rates A7734	\$792.00
<b>Janice Cox</b>			<b>\$613.50</b>
EFT000195	21/07/2021	Refund overpayment rates A5082	\$613.50
<b>Graham &amp; Janette Bishop</b>			<b>\$792.00</b>
EFT000195	21/07/2021	Refund overpayment rates A8253	\$792.00
<b>Cyril Richter</b>			<b>\$613.50</b>
EFT000195	21/07/2021	Refund overpayment rates A3380	\$613.50
<b>Hazel Battye</b>			<b>\$784.15</b>
EFT000195	21/07/2021	Refund overpayment rates A7009	\$784.15
<b>Margaret Henderson &amp; Michael Sibley</b>			<b>\$792.00</b>
EFT000195	21/07/2021	Refund overpayment rates A7434	\$792.00
<b>David &amp; Kerry Cooke</b>			<b>\$792.00</b>
EFT000195	21/07/2021	Refund overpayment rates A2651	\$792.00
<b>Brian Harvey c/- Kevin McMenemy</b>			<b>\$658.36</b>
EFT000195	21/07/2021	Refund overpayment rates A775	\$658.36
<b>Pamela &amp; Nicholas Herrick</b>			<b>\$792.00</b>
EFT000195	21/07/2021	Refund overpayment rates A3410	\$792.00
<b>John &amp; Elaine Lynch</b>			<b>\$792.00</b>



<b>List of Accounts Paid in July 2021 to be Received</b>			
<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
EFT000195	21/07/2021	Refund overpayment rates A4297	\$792.00
<b>AIT Specialists Pty Ltd</b>			<b>\$5,282.20</b>
EFT000195	21/07/2021	Professional services to review records and determination for Fuel Tax Credits	\$5,282.20
<b>Ronald &amp; Jane Peden</b>			<b>\$121.00</b>
EFT000197	28/07/2021	Refund overpayment rates A10379	\$121.00
<b>Graeme Sherlock</b>			<b>\$758.99</b>
EFT000197	28/07/2021	Refund overpayment rates A9373	\$758.99
<b>Eve Herbert-Sadler</b>			<b>\$792.00</b>
EFT000197	28/07/2021	Refund overpayment rates A7449	\$792.00
<b>Betty &amp; John Bajkowski</b>			<b>\$121.00</b>
EFT000197	28/07/2021	Refund overpayment rates A7698	\$121.00
<b>Susan &amp; Paul Hales</b>			<b>\$121.00</b>
EFT000197	28/07/2021	Refund overpayment rates A7441	\$121.00
<b>Cheryle &amp; Frank Jones</b>			<b>\$792.00</b>
EFT000197	28/07/2021	Refund overpayment rates A9056	\$792.00
<b>Janet &amp; Paul Stallwood</b>			<b>\$792.00</b>
EFT000197	28/07/2021	Refund overpayment rates A6303	\$792.00
<b>Albert Russell</b>			<b>\$792.00</b>
EFT000197	28/07/2021	Refund overpayment rates A3571	\$792.00
<b>Michael &amp; Susan O'Donnell</b>			<b>\$792.00</b>
EFT000197	28/07/2021	Refund overpayment rates A3287	\$792.00
<b>Lorraine &amp; Terry O'Meara</b>			<b>\$792.00</b>
EFT000197	28/07/2021	Refund overpayment rates A2126	\$792.00
<b>Pinjarra Developments WA Pty Ltd</b>			<b>\$30,836.00</b>
EFT000197	28/07/2021	Refund Defects Liability Bond for Lot 107 Pinjarra Road, Pinjarra	\$30,836.00
<b>Anne &amp; Robert MacDonald</b>			<b>\$613.50</b>
EFT000197	28/07/2021	Refund overpayment rates A5296	\$613.50
<b>Maree Reid &amp; Gordon Newton</b>			<b>\$792.00</b>
EFT000197	28/07/2021	Refund overpayment rates A6402	\$792.00
<b>David &amp; Susan Austin</b>			<b>\$792.00</b>
EFT000197	28/07/2021	Refund overpayment rates A6630	\$792.00
<b>Robert Bartlett</b>			<b>\$795.92</b>
EFT000197	28/07/2021	Refund overpayment rates A4464	\$795.92
<b>Mervyn McQuade</b>			<b>\$792.00</b>
EFT000197	28/07/2021	Refund overpayment rates A6459	\$792.00
<b>Raymond &amp; Wendy Rice</b>			<b>\$792.00</b>
EFT000197	28/07/2021	Refund overpayment rates A4125	\$792.00
<b>Peter &amp; Ruth Hedrick</b>			<b>\$792.00</b>
EFT000197	28/07/2021	Refund overpayment rates A4311	\$792.00
<b>Barbara Curtis</b>			<b>\$627.78</b>
EFT000197	28/07/2021	Refund overpayment rates A5729	\$627.78
			<b>EFT Total</b>
			<b>\$2,366,392.11</b>
<b>Shire of Murray</b>			<b>\$5,215.75</b>
101316	07/07/2021	Payroll deductions	\$2,361.80
101316	07/07/2021	Firewood Commission - June 2021	\$114.40
101320	14/07/2021	BSL Commission June 2021	\$320.00
101325	21/07/2021	Payroll deductions	\$2,361.80
101325	21/07/2021	BCITF Commission - June 2021	\$57.75
<b>Western Power</b>			<b>\$9,538.37</b>
101321	14/07/2021	Western Power costs to supply and install interface	\$9,538.37
<b>Synergy</b>			<b>\$39,939.93</b>
101317	07/07/2021	Electricity - Ravenswood Toilets	\$290.15
101317	07/07/2021	Electricity - Streetlights	\$32,722.59
101317	07/07/2021	Electricity - CCTV Town Square	\$116.42
101317	07/07/2021	Electricity - DHVIC	\$754.04
101322	14/07/2021	Electricity - Rodereda Cres	\$120.45
101322	14/07/2021	Electricity - Riverland Ramble	\$1,841.58
101322	14/07/2021	Electricity - Riverland Ramble	\$443.81

<b>List of Accounts Paid in July 2021 to be Received</b>			
<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
101322	14/07/2021	Electricity - Fire tank	\$111.08
101322	14/07/2021	Electricity - Fire tank	\$110.78
101322	14/07/2021	Electricity - Scouts Shed & Toilets	\$197.86
101322	14/07/2021	Electricity - Murray Lakes Toilets	\$147.24
101322	14/07/2021	Electricity - Pelican Point Toilets	\$324.14
101322	14/07/2021	Electricity - Murray Bend Toilets	\$112.68
101322	14/07/2021	Electricity - Centenary Park	\$117.61
101322	14/07/2021	Electricity - Lucie Hunter Park	\$113.60
101322	14/07/2021	Electricity - Kingfisher Park Toilets	\$128.98
101322	14/07/2021	Electricity - Boat Ramp Toilets	\$126.56
101322	14/07/2021	Electricity - West Murray Fire Brigade	\$1,025.82
101322	14/07/2021	Electricity - Gowman Way Playground	\$120.21
101322	14/07/2021	Electricity - Sandy Cove Playground	\$116.66
101322	14/07/2021	Electricity - South Yunderup Oval	\$299.06
101330	28/07/2021	Electricity - Coolup Fire Station	\$360.87
101330	28/07/2021	Electricity - Don Spark Reserve	\$111.66
101330	28/07/2021	Electricity - Tennis Courts	\$126.08
<b>Water Corporation</b>			<b>\$8,897.29</b>
101318	07/07/2021	Water: North Pinjarra Hall	\$205.07
101318	07/07/2021	Water: Cemetery	\$282.17
101318	07/07/2021	Water: Hotham Valley Railway	\$338.43
101318	07/07/2021	Water: Birmingham Way Playground	\$5.32
101323	14/07/2021	Water: Tennis Courts / Clubhouse	\$31.94
101323	14/07/2021	Water: George Beacham Pavilion	\$1,154.61
101323	14/07/2021	Rates: Roe Avenue Rental House	\$45.69
101323	14/07/2021	Water: SES Building	\$13.31
101323	14/07/2021	Water: Depot Building Meter	\$181.65
101323	14/07/2021	Water: Coopers Mill Toilets	\$423.26
101323	14/07/2021	Water: Culeenup Road Boat Ramp Toilets	\$438.35
101323	14/07/2021	Water: Kingfisher Park	\$168.75
101323	14/07/2021	Water: Pelican Point Toilets	\$1,167.74
101323	14/07/2021	Water: South Yunderup Fire Station	\$72.92
101323	14/07/2021	Water: Centenary Park	\$29.28
101323	14/07/2021	Rates: Murray Lake Toilets	\$48.96
101323	14/07/2021	Water: Yunderup Oval Toilets/Clubrooms	\$1,338.04
101323	14/07/2021	Water: West Murray Hall	\$21.30
101323	14/07/2021	Water: Boat Ramp Toilets	\$100.03
101323	14/07/2021	Water: York St Toilets	\$153.52
101323	14/07/2021	Water: Old Courthouse	\$300.17
101323	14/07/2021	Water usage - Riverside Drive Toilets	\$23.96
101323	14/07/2021	Water: Canoe Club	\$31.94
101323	14/07/2021	Water: Ravenswood Toilets	\$53.24
101323	14/07/2021	Water: Murray Bend Toilets	\$172.15
101323	14/07/2021	Water usage - LGA Standpipe	\$162.38
101326	21/07/2021	Water: DHVIC	\$431.24
101326	21/07/2021	Water: Dwellingup Hall	\$37.27
101326	21/07/2021	Water: Dwellingup Oval Toilets	\$316.78
101326	21/07/2021	Water: Dwellingup Fire Station	\$66.55
101326	21/07/2021	Water: Library (leak)	\$119.45
101326	21/07/2021	Water: North Dandalup Hall	\$67.18
101331	28/07/2021	Water: Leisure Centre - Waste	\$565.12
101331	28/07/2021	Water: Waste - Civic Centre	\$329.52
<b>Department of Transport</b>			<b>\$22,660.10</b>
101327	21/07/2021	Special Series Plate - 4072MY	\$200.00
101327	21/07/2021	12 month rego renewal expiry 31 July 2022	\$22,460.10
<b>Optus</b>			<b>\$2,751.91</b>
101324	14/07/2021	Phone usage - 06 June 21 - 05 July 21	\$2,751.91
<b>City of Mandurah</b>			<b>\$160.00</b>
101332	28/07/2021	Barista Training - 6th July 2021	\$160.00
<b>Department of Transport Payment Centre</b>			<b>\$385.95</b>

<b>List of Accounts Paid in July 2021 to be Received</b>			
<b>Payment No</b>	<b>Posting Date</b>	<b>Description</b>	<b>Amount</b>
101319	07/07/2021	Registration to 31/7/22 4063MY Zero Turn Mower	\$81.40
101319	07/07/2021	Registration to 31/7/22 4065MY Zero Turn Mower	\$81.40
101328	21/07/2021	6 month registration 31/07/21 - 31/01/22	\$223.15
<b>Linda Harrison</b>			<b>\$792.00</b>
101329	21/07/2021	Refund overpayment rates A8357	\$792.00
<b>Please Pay Cash - Admin</b>			<b>\$226.18</b>
065513	07/07/2021	<b>Petty Cash - detail in attachment</b>	\$190.78
065513	07/07/2021	<b>Petty Cash - detail in attachment</b>	\$35.40
		<b>Cheque Total</b>	<b>\$90,567.48</b>
<b>Commonwealth Bank Direct Debit</b>	06/07/2021	<b>Corporate Credit Cards - detail in attachment</b>	\$20,086.62
		<b>Credit Card Total</b>	<b>\$20,086.62</b>
		<b>Payment Total</b>	<b>\$2,477,046.21</b>

This schedule of accounts paid for the Municipal Fund totalling **\$2,477,046.21** which was submitted to each member of the Council on **26 August 2021** have been duly certified as to the receipt of goods and the rendition of services and as to prices, computations and costings.

Total creditor accounts outstanding as at 31 July 2021 is **\$202,942.03**.

The accompanying attachment forms part of this report, which details the expenses paid by Cash and Corporate Credit Card for the month of **July 2021**.

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CHIEF EXECUTIVE OFFICER

<b>Attachment of List of Accounts Paid in July to be Received</b>				
<b>Cheque</b>	<b>Date</b>	<b>Name</b>	<b>Description</b>	<b>Amount</b>
<b>65513</b>	<b>7/07/2021</b>	<b>Please Pay Cash - Admin</b>		<b>\$226.18</b>
		Australia Post	USB and Registered Post	\$15.39
		Matchbox	Water jug for events	\$29.95
		Australia Post	Customer postage	\$6.85
		Secure Parking Pty Ltd	Workshop parking	\$12.30
		Department of Transport	Vehicle plate changeover	\$28.60
		Tuckey's Hardware	Paint	\$12.90
		Coles Pinjarra	Easter eggs	\$12.50
		Book Gifts Direct	Science book for events	\$16.00
		Tuckey's Hardware	Coveralls	\$17.98
		Coles Pinjarra	Milk	\$2.58
		Officeworks	Stationery	\$8.28
		Coles Pinjarra	Catering supplies	\$5.50
		Kmart	Water jugs	\$14.00
		Tuckey's Hardware	Paint	\$7.95
		Kmart	Bubbles for Library story time	\$5.50
		The Reject Shop	Sweets for Library story time	\$11.50
		Spotlight	Rainbow swirly pops for Library story time	\$6.40
		Big W	Eye patch for Library story time	\$12.00
<b>Direct Debit</b>	<b>6/07/2021</b>	<b>Card Account Numbers</b>	<b>Corporate Credit Card Usage</b>	<b>\$20,086.62</b>
		<b>5550 .... 6207</b>		<b>\$550.73</b>
		Country Rugs	Runner rug for DTVC	\$450.00
		EvolvePlus	Annual subscription Counters 21/22 DTVC	\$100.73
		<b>5550 .... 7294</b>		<b>\$90.40</b>
		Hummingbird Café	Meeting meal expenses	\$10.00
		Transperth	Return train tickets to Perth for meeting	\$22.60
		Hummingbird Café	Meeting meal expenses	\$36.80
		Hummingbird Café	Meeting meal expenses	\$21.00
		<b>5550 .... 6131</b>		<b>\$1,054.82</b>
		Shutterstock	Monthly image licence	\$35.00
		The Lucky Charm	Farewell card for staff member	\$11.59
		Pinjarra Roadhouse	Ice for event	\$4.50
		Shutterstock	Stock footage clip monthly subscription	\$139.00
		The Reject Shop	Diaries for MALC	\$112.00
		Officeworks	Replacement laminator for MALC	\$129.03
		David Jones	Farewell gift	\$100.00
		Links Modular Solutions	Monthly software licence	\$414.35
		Officeworks	Assorted stationery for MALC	\$109.35
		<b>5550 .... 4071</b>		<b>\$100.82</b>

	Mandurah Library	Book hire	\$25.00
	Ezycharge Australia	Chargebar monthly rental	\$15.67
	Lovers of Lollies	Catering for Library event	\$18.00
	The Reject Shop	Catering for Library event	\$42.15
	<b>5550 .... 2963</b>		<b>\$177.90</b>
	Department of Transport	Changeover of licence plate	\$17.30
	Mandurah Plastics	Snake stencil	\$132.00
	Department of Transport	Changeover of licence plate	\$28.60
	<b>5550 .... 7504</b>		<b>\$1,780.55</b>
	BP Baldivis	Fuel 4011MY	\$38.57
	Coles Pinjarra	MALC Kiosk supplies	\$2.00
	JB Hifi	Waterproof iPad case	\$141.67
	ASI JD MacDonald	Baby change table	\$758.40
	CHFI Education Pty Ltd	Nutrition Course	\$318.19
	Mail Chimp	Newsletter subscription service	\$41.77
	Safety and Mobility	Drop down hand rail	\$460.00
	Bunnings Group	Drill transfer pump	\$19.95
	<b>5550 .... 6290</b>		<b>\$25.95</b>
	The Lucky Charm	A3 lamination pouches	\$25.95
	<b>5550 .... 9933</b>		<b>\$858.01</b>
	Dhillon & Daughters	Lunch for volunteers at Pinjarra Festival	\$83.70
	Parks & Leisure Australia	Attendance at WA Deconstructed Conference	\$231.00
	Economic Development Australia	Annual membership	\$440.00
	Squarespace	Campaigns Core monthly subscription	\$19.00
	Squarespace	Monthly subscription D100	\$16.80
	Soundtrack Your Brand	Monthly music streaming service at DTVC	\$35.99
	Waypoints Café	Meeting meal expenses	\$9.00
	Mailchimp	Monthly subscription	\$22.52
	<b>5550 .... 7662</b>		<b>\$533.63</b>
	Internode Pty Ltd	Internet for DTVC and MALC 21/22	\$241.12
	Avtech Software Inc	Room alert subscription 21/22	\$134.00
	Jaycar Mandurah	Replacement battery for MALC	\$34.95
	ClickSend	Ranger incoming SMS line recharge	\$40.00
	Zettanet	Monthly subscription - voice backup	\$83.56
	<b>5550 .... 2652</b>		<b>\$2,738.51</b>
	Rede Bricks Australia	1500 x recycled red bricks	\$2,738.51
	<b>5550 .... 6715</b>		<b>\$1,733.79</b>

	United Petroleum	Fuel 4003MY	\$81.06
	Planning Institute of Australia	Annual membership	\$638.00
	Planning Institute of Australia	Annual membership	\$638.00
	Waroona Roadhouse	Fuel 4003MY	\$95.50
	BP Bull Creek	Fuel 4003MY	\$96.33
	St John Ambulance	First Aid course for staff member	\$89.00
	Waroona Roadhouse	Fuel 4003MY	\$95.90
	<b>5550 .... 8740</b>		<b>\$270.00</b>
	DWER	Clearing permit	\$50.00
	Sonic Health Plus	Medical assessment	\$220.00
	<b>5550 .... 4063</b>		<b>\$3,719.00</b>
	Pinjarra Bakery	Catering for Fire course	\$381.00
	Pinjarra Bakery	Catering for Leaders course	\$344.00
	Pinjarra Auto Group	Replacement battery for SES	\$243.00
	Tyrepower Pinjarra	Replacement tyres for Fire Truck	\$2,751.00
	<b>5550 .... 2020</b>		<b>\$3,771.22</b>
	Australian Local Government Assoc	National General Assembly Canberra - Press Club Lunch	\$80.00
	Lasseter's Alice Springs	Alice Springs Trails Conference - Meal expenses	\$30.00
	Delaware North	Alice Springs Trails Conference - Meal expenses	\$9.90
	EG Group	Alice Springs Trails Conference - Fuel for hire car	\$28.14
	Crowne Plaza Alice Springs	Alice Springs Trails Conference - Accommodation	\$735.35
	Perth Airport	Alice Springs Trails Conference - Airport parking	\$112.12
	Hertz Australia	Alice Springs Trails Conference - Car hire	\$411.62
	Dwellingup Hotel	Dwellingup Compact meeting catering	\$72.00
	Muffin Break Pinjarra	Meeting meal expenses	\$23.90
	City of Perth Parking	Parking for meeting	\$12.22
	News Limited	The Australian digital subscription	\$32.00
	City of Perth Parking	Parking for meeting	\$15.75
	Pica Bar & Café	Meeting meal expenses	\$48.00
	Dome Pinjarra	Meeting meal expenses	\$12.90
	Novotel Canberra	National General Assembly Canberra - Accommodation	\$1,102.14
	65 Northbourne Canberra	National General Assembly Canberra - Meal expenses	\$100.00
	Bleachers Sports Bar	National General Assembly Canberra - Meal expenses	\$50.04
	Superloop Broadband	CEO Broadband subscription	\$89.95
	Bleachers Sports Bar	National General Assembly Canberra - Meal expenses	\$50.55
	Caltex Canberra Airport	National General Assembly Canberra - Fuel for hire car	\$36.37
	Novotel Canberra	National General Assembly Canberra - Meal expenses	\$121.56

		Perth Airport	National General Assembly Canberra - Airport parking	\$111.96
		Dome Pinjarra	Meeting meal expenses	\$27.90
		Budget Rent a Car	National General Assembly Canberra - Car hire	\$456.85
		<b>5550 .... 3250</b>		<b>\$1,762.35</b>
		Boubar Investments	Meeting meal expenses	\$12.20
		City of Perth Parking	Parking for meeting	\$25.24
		Jarra Infusion	Meeting meal expenses	\$48.95
		The Partisan	Meeting meal expenses	\$35.28
		Pica Bar & Café	Meeting meal expenses	\$48.00
		Institute of Directors	Annual membership 2021/2022	\$452.18
		ICMS Australasia	Economic Development Conference attendance 13-15 October 2021	\$1,100.00
		Thuan & Hong Holdings	Meeting meal expenses	\$8.50
		Rose and Crown Hotel	Meeting meal expenses	\$32.00
		<b>5550 .... 6316</b>		<b>\$918.94</b>
		Createsend	Monthly subscription	\$53.90
		Facebook Ads	Advertising various events	\$500.00
		Facebook Ads	Advertising various events	\$365.04

**MONTHLY FINANCIAL REPORT**  
**(Containing the Statement of Financial Activity)**  
**FOR THE PERIOD ENDED 31 JULY 2021**



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## STATEMENT OF FINANCIAL ACTIVITY

BY NATURE OR TYPE

## FOR THE PERIOD ENDED 31 JULY 2021

	Draft Annual Budget	YTD Budget (a)	YTD Actual (b)	Var. \$ (b)-(a)	Var. % (b)-(a)/(b)
<b>Operating Revenues</b>	\$	\$	\$	\$	%
Specified area rates	189,274	0	0	0	
Operating grants, subsidies and contributions	8,583,763	210,000	211,280	1,280	0.61%
Non-operating grants, subsidies and contributions	24,358,439	150,000	150,000	0	0.00%
Fees and charges	9,338,345	130,000	128,913	(1,087)	(0.84%)
Interest earnings	355,660	3,000	3,510	510	14.53%
Other revenue	251,834	35,000	36,876	1,876	5.09%
Profit on asset disposals	136,586	0	0	0	0.00%
	<b>43,213,901</b>	<b>528,000</b>	<b>530,579</b>	<b>2,579</b>	
<b>Operating Expense</b>					
Employee costs	(13,080,216)	(1,010,000)	(1,012,960)	(2,960)	(0.29%)
Materials and contracts	(16,077,824)	(230,000)	(224,822)	5,178	2.30%
Utility charges	(911,466)	(5,000)	(2,995)	2,005	66.95%
Depreciation on non-current assets	(6,482,590)	0	0	0	0.00%
Interest expenses	(126,079)	(1,000)	(446)	554	124.00%
Insurance expenses	(495,582)	(330,000)	(328,957)	1,043	0.32%
Other expenditure	(4,081,500)	(45,000)	(44,456)	544	1.22%
Loss on asset disposals	(100,850)	0	0	0	0.00%
	<b>(41,356,107)</b>	<b>(1,621,000)</b>	<b>(1,614,636)</b>	<b>6,364</b>	
<b>Non-cash amounts excluded from operating activities</b>					
Add back Depreciation	6,482,590	0	0	0	0.00%
Adjust (Profit)/Loss on Asset Disposal	(35,736)	0	0	0	0.00%
Movement between current & non-current	225,960	11,597	11,597	0	0.00%
<b>Net Operating (Excluding Rates)</b>	<b>8,530,608</b>	<b>(1,081,403)</b>	<b>(1,072,460)</b>	<b>8,943</b>	
<b>Capital Revenues</b>					
Proceeds from Disposal of Assets	654,994	25,000	25,000	0	0.00%
Proceeds from Loan Borrowings	300,000	0	0	0	0.00%
Repayment of Self Supporting Loan	44,698	11,862	11,862	0	0.00%
Transfer from Reserves	6,654,173	0	0	0	0.00%
	<b>7,653,865</b>	<b>36,862</b>	<b>36,862</b>	<b>0</b>	
<b>Capital Expenses</b>					
Land and Buildings	(23,154,130)	(10,000)	(13,476)	(3,476)	(25.80%)
Furniture and Equipment	(276,688)	(4,000)	(4,419)	(419)	(9.48%)
Plant and Equipment	(1,356,850)	(43,000)	(41,007)	1,993	4.86%
Infrastructure Assets - Roads	(3,769,171)	(75,000)	(65,318)	9,682	14.82%
Infrastructure Assets - Other	(4,380,575)	(5,000)	(6,486)	(1,486)	(22.91%)
Repayment of Debentures	(483,493)	(11,862)	(11,862)	0	0.00%
Repayment of Leases	(83,982)	(10,000)	(2,026)	0	(393.70%)
Transfer to Reserves	(5,630,108)	0	0	0	0.00%
	<b>(39,134,997)</b>	<b>(158,862)</b>	<b>(144,593)</b>	<b>6,294</b>	
<b>Net Capital</b>	<b>(31,481,132)</b>	<b>(122,000)</b>	<b>(107,732)</b>	<b>6,294</b>	
<b>Total Net Operating + Capital</b>	<b>(22,950,524)</b>	<b>(1,203,403)</b>	<b>(1,180,192)</b>	<b>15,237</b>	
Add: Net Current Assets July 1 B/Fwd	6,651,930	6,651,930	6,651,930	0	
Less: Net Current Assets Year to Date	1,415,193	5,448,527	5,471,738	23,212	
<b>Amount Raised From General Rates</b>	<b>(17,713,787)</b>	<b>0</b>	<b>0</b>	<b>(7,974)</b>	

## KEY INFORMATION

This statement is to be read in conjunction with the accompanying Financial Statements and Notes.

**MONTHLY FINANCIAL REPORT****FOR THE PERIOD ENDED 31 JULY 2021****MONTHLY SUMMARY  
INFORMATION****PREPARATION TIMING AND REVIEW**

Date prepared: All known transactions up to 13 August 2021

Prepared by: Finance Coordinator

Reviewed by: Director Corporate Services

The budget figures reported are draft only and are subject to change.

**BASIS OF PREPARATION****REPORT PURPOSE**

This report is prepared to meet the requirements of Local Government (Financial Management) Regulations 1996, Regulation 34. Note: The Statements and accompanying notes are prepared based on all transactions recorded at the time of preparation and may vary due to transactions being processed for the reporting period after the date of preparation.

**BASIS OF ACCOUNTING**

This statement comprises a special purpose financial report which has been prepared in accordance with Australian Accounting Standards (as they apply to local governments and not-for-profit entities), Australian Accounting Interpretations, other authoritative pronouncements of the Australian Accounting Standards Board, the Local Government Act 1995 and accompanying regulations. Material accounting policies which have been adopted in the preparation of this statement are presented below and have been consistently applied unless stated otherwise. Except for cash flow and rate setting information, the report has also been prepared on the accrual basis and is based on historical costs, modified, where applicable, by the measurement at fair value of selected non-current assets, financial assets and liabilities.

**THE LOCAL GOVERNMENT REPORTING ENTITY**

All Funds through which the Council controls resources to carry on its functions have been included in this statement. In the process of reporting on the local government as a single unit, all transactions and balances between those funds (for example, loans and transfers between Funds) have been eliminated. All monies held in the Trust Fund are excluded from the statement.

**SIGNIFICANT ACCOUNTING POLICIES****GOODS AND SERVICES TAX**

Revenues, expenses and assets are recognised net of the amount of GST, except where the amount of GST incurred is

not recoverable from the Australian Taxation Office (ATO). Receivables and payables are stated inclusive of GST

receivable or payable. The net amount of GST recoverable from, or payable to, the ATO is included with receivables or payables in the statement of financial position. Cash flows are presented on a gross basis. The GST components of cash flows arising from investing or financing activities which are recoverable from, or payable to, the ATO are presented as operating cash flows.

**CRITICAL ACCOUNTING ESTIMATES**

The preparation of a financial report in conformity with Australian Accounting Standards requires management to make judgements, estimates and assumptions that effect the application of policies and reported amounts of assets and liabilities, income and expenses. The estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under the circumstances; the results of which form the basis of making the judgements about carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates.

**ROUNDING OFF FIGURES**

All figures shown in this statement are rounded to the nearest dollar.

**NOTES TO THE STATEMENT OF FINANCIAL ACTIVITY  
FOR THE PERIOD ENDED 31 JULY 2021**

**NET CURRENT ASSETS**

**SIGNIFICANT ACCOUNTING POLICIES**

**CURRENT AND NON-CURRENT CLASSIFICATION**

In the determination of whether an asset or liability is current or non-current, consideration is given to the time when each asset or liability is expected to be settled. The asset or liability is classified as current if it is expected to be settled within the next 12 months, being the Council's operational cycle. In the case of liabilities where Council does not have the unconditional right to defer settlement beyond 12 months, such as vested long service leave, the liability is classified as current even if not expected to be settled within the next 12 months. Inventories held for trading are classified as current even if not expected to be realised in the next 12 months except for land held for resale where it is held as non current based on Council's intentions to release for sale.

**EMPLOYEE BENEFITS**

The provisions for employee benefits relates to amounts expected to be paid for long service leave, annual leave, wages and salaries and are calculated as follows:

(i) Wages, Salaries, Annual Leave and Long Service Leave (*Short-term Benefits*)

The provision for employees' benefits to wages, salaries, annual leave and long service leave expected to be settled within 12 months represents the amount the Shire has a present obligation to pay resulting from employees services provided to balance date. The provision has been calculated at nominal amounts based on remuneration rates the Shire expects to pay and includes related on-costs.

(ii) *Annual Leave and Long Service Leave (Long-term Benefits)*

The liability for long service leave is recognised in the provision for employee benefits and measured as the present value of expected future payments to be made in respect of services provided by employees up to the reporting date using the project unit credit method. Consideration is given to expected future wage and salary levels, experience of employee departures and periods of service. Expected future payments are discounted using market yields at the reporting date on national government bonds with terms to maturity and currency that match as closely as possible, the estimated future cash outflows. Where the Shire does not have the unconditional right to defer settlement beyond 12 months, the liability is recognised as a current liability.

**PROVISIONS**

Provisions are recognised when: The council has a present legal or constructive obligation as a result of past events; it is more likely than not that an outflow of resources will be required to settle the obligation; and the amount has been reliably estimated. Provisions are not recognised for future operating losses. Where there are a number of similar obligations, the likelihood that an outflow will be required in settlement is determined by considering the class of obligations as a whole. A provision is recognised even if the likelihood of an outflow with respect to any individual item included in the same class of obligations may be small.

**INVENTORIES**

Inventories are measured at the lower of cost and net realisable value. Net realisable value is the estimated selling price in the ordinary course of business less the estimated costs of completion and the estimated costs necessary to make the sale.

## NET CURRENT FUNDING POSITION

	2021-22		
	This Period	Last Period	Same Period Last Year
	\$	\$	\$
<b>Current Assets</b>			
Cash Unrestricted	14,838,579	18,498,794	11,335,130
Cash Restricted	11,731,691	8,859,313	8,213,848
Receivables - Rates and Rubbish	2,329,089	2,573,177	2,178,747
Receivables - Other	1,742,163	2,052,999	1,695,044
Inventories	25,772	25,281	25,338
	<b>30,667,295</b>	<b>32,009,564</b>	<b>23,448,108</b>
<b>Less: Current Liabilities</b>			
Payables	(11,636,565)	(8,298,920)	(1,882,675)
Provisions	(2,424,302)	(2,307,069)	(2,366,226)
	<b>(14,060,867)</b>	<b>(10,605,989)</b>	<b>(4,248,901)</b>
Less: Cash Restricted	(11,731,691)	(8,859,313)	(8,213,848)
Add: Cash Restricted - Matching Liability	597,002	597,002	597,002
<b>Net Current Funding Position</b>	<b>5,471,738</b>	<b>13,141,264</b>	<b>11,582,360</b>

## KEY INFORMATION

Year YTD Actual

Surplus(Deficit)

**\$5.47 M**

Last Period Actual

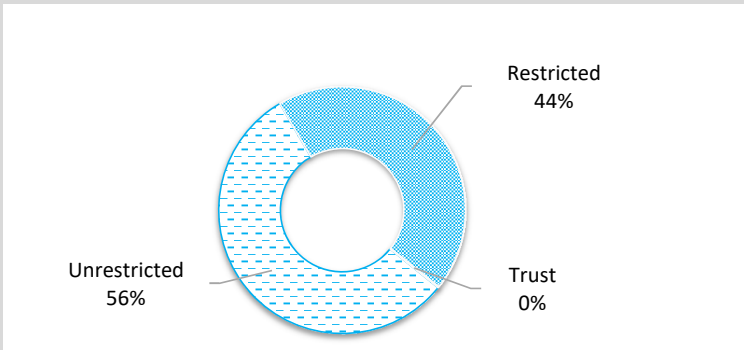
Surplus(Deficit)

**\$13.14 M**

	Municipal	Reserves	Total Cash	Trust	Institution	Interest Rate	Maturity Date
	\$	\$	\$	\$			
<b>Cash Deposits</b>							
Operating Accounts	7,232,713	3,231,691	10,464,404	48,720	Commbank		On Call
Operating Account	95,176		95,176		Bendigo		On Call
Cash on Hand	5,940		5,940				On Call
<b>Term Deposits</b>							
Municipal	2,504,751		2,504,751		Commbank	0.30%	11/08/2021
Municipal	2,000,000		2,000,000		NAB	0.27%	27/10/2021
Municipal	1,000,000		1,000,000		Bendigo	0.15%	29/09/2021
Municipal	2,000,000		2,000,000		Commbank	0.31%	1/09/2021
Reserve		8,500,000	8,500,000		Commbank	0.32%	27/10/2021
<b>Total</b>	<b>14,838,579</b>	<b>11,731,691</b>	<b>26,570,270</b>	<b>48,720</b>			

**KEY INFORMATION**

Cash and cash equivalents include cash on hand, cash at bank, deposits available on demand with banks and other short term highly liquid investments highly liquid investments with original maturities of three months or less that are readily convertible to known amounts of cash and which are subject to an insignificant risk of changes in value and bank overdrafts. Bank overdrafts are reported as short term borrowings in current liabilities in the statement of net current assets.

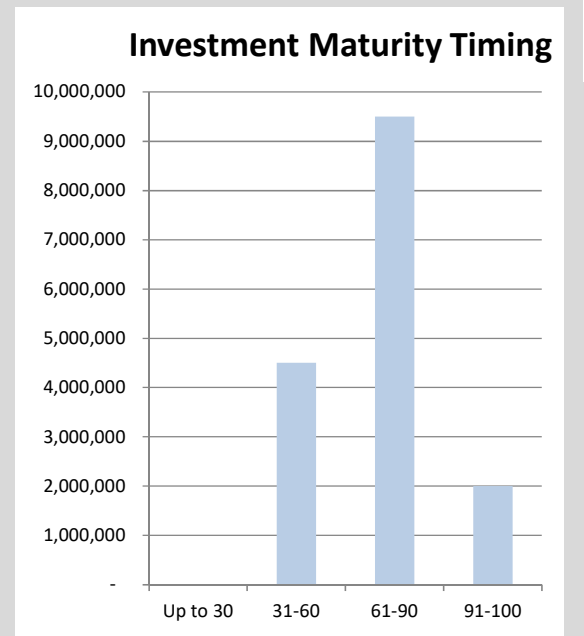
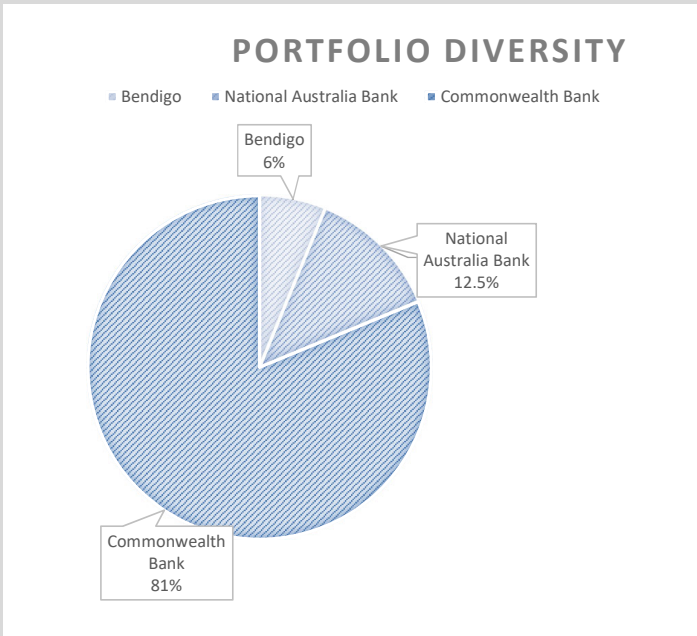


Total Cash	Unrestricted
<b>\$26.57 M</b>	<b>\$14.84 M</b>

NOTES TO THE STATEMENT OF FINANCIAL ACTIVITY  
FOR THE PERIOD ENDED 31 JULY 2021

Deposit Date	Institution	Term (Days)	Invested Interest rates	Expected Interest	Amount Invested (Days)					Interest Budget v Actual			
					Up to 30	31-60	61-90	91-100	Total	Annual Budget	Year to Date Actual	Variance \$	
<b>General Municipal</b>													
8/07/2021	Commbank	34	0.30%	700		2,504,751			2,504,751				
28/07/2021	NAB	91	0.27%	1,346				2,000,000	2,000,000				
28/07/2021	Bendigo	63	0.15%	259			1,000,000		1,000,000				
29/07/2021	Commbank	34	0.31%	578		2,000,000			2,000,000				
				-					-				
				-					-				
				-					-				
				<b>Subtotal</b>	<b>2,883</b>								
						-	<b>4,504,751</b>	<b>1,000,000</b>	<b>2,000,000</b>	<b>7,504,751</b>	39,372	3,510	35,862
<b>Restricted</b>													
29/07/2021	Commbank	90	0.32%	6,707			8,500,000		8,500,000				
				-					-				
				<b>Subtotal</b>	<b>6,707</b>		<b>8,500,000</b>	<b>-</b>	<b>8,500,000</b>		33,048	-	33,048
						-	<b>4,504,751</b>	<b>9,500,000</b>	<b>2,000,000</b>	<b>16,004,751</b>	<b>72,420</b>	<b>3,510</b>	<b>68,910</b>
				<b>Total Funds Invested</b>	<b>9,590</b>								

Deposit Date	Term (Days)	Invested Interest rates	Amount Invested	Percentage of Portfolio
<b>Bendigo Bank</b>				
28/07/2021	63	0.15%	1,000,000	
			<b>Subtotal</b>	<b>6.2%</b>
<b>National Australia Bank</b>				
28/07/2021	91	0.27%	2,000,000	
			<b>Subtotal</b>	<b>12.5%</b>
<b>Commonwealth Bank</b>				
8/07/2021	34	0.30%	2,504,751	
29/07/2021	34	0.31%	2,000,000	
29/07/2021	90	0.31%	8,500,000	
			-	
			<b>Subtotal</b>	<b>81.3%</b>
			<b>Total Funds Invested</b>	<b>100.0%</b>
			<b>16,004,751</b>	



	Current	30 Days	60 Days	90+ Days	Total
	\$	\$	\$	\$	\$
Receivables - General	476,117	27,693	1,044	8,684	513,538
Percentage	93%	5%	0%	2%	

**Accounts Above \$5,000 Over 30 Days**

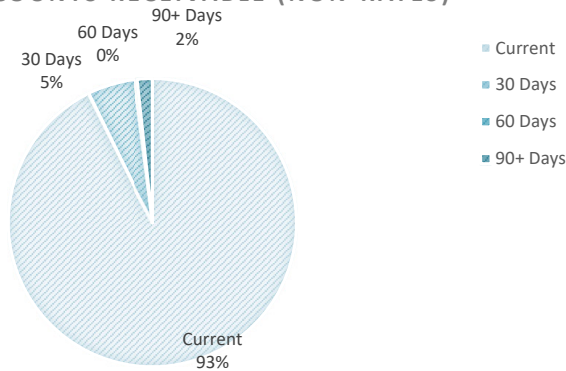
Nil

**KEY INFORMATION**

Trade and other receivables include amounts due from ratepayers for unpaid rates and service charges and other amounts due from third parties for goods sold and services performed in the ordinary course of business. Receivables expected to be collected within 12 months of the end of the reporting period are classified as current assets. All other receivables are classified as non-current. Collectability of trade and other receivables are reviewed on an ongoing basis.

Debts that are known to be uncollectible are written off when identified. An allowance for doubtful debts is raised when there is objective evidence that they will not be collectible.

**NOTE 4 - ACCOUNTS RECEIVABLE (NON-RATES)**



**Debtors Due**

**\$513,538**

**Over 30 Days**

**7%**

**Over 90 Days**

**2%**



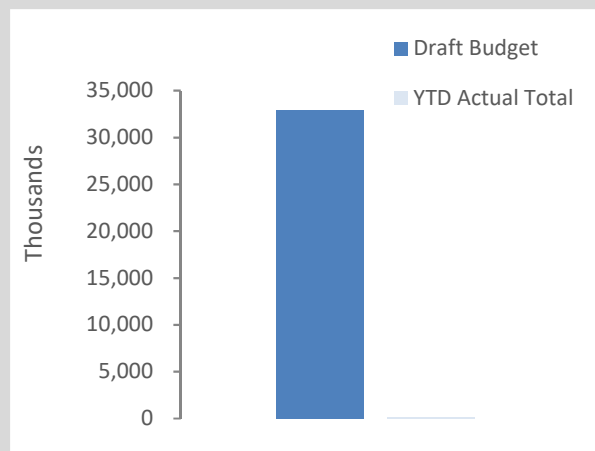
**NOTES TO THE STATEMENT OF FINANCIAL ACTIVITY  
FOR THE PERIOD ENDED 31 JULY 2021**

**INVESTING ACTIVITIES  
CAPITAL ACQUISITIONS**

	Draft Budget	YTD Actual Total	YTD Budget Variance
	\$	\$	\$
Land and Buildings	23,154,130	13,476	1,524
Plant & Equipment	1,356,850	41,007	1,993
Furniture & Equipment	276,688	4,419	(419)
Roads	3,496,550	65,318	9,682
Other Infrastructure	4,653,196	6,486	(1,486)
<b>Capital Expenditure Totals</b>	<b>32,937,414</b>	<b>130,706</b>	<b>11,294</b>

**SIGNIFICANT ACCOUNTING POLICIES**

All assets are initially recognised at cost. Cost is determined as the fair value of the assets given as consideration plus costs incidental to the acquisition. For assets acquired at no cost or for nominal consideration, cost is determined as fair value at the date of acquisition. The cost of non-current assets constructed by the local government includes the cost of all materials used in the construction, direct labour on the project and an appropriate proportion of variable and fixed overhead. Certain asset classes may be revalued on a regular basis such that the carrying values are not materially different from fair value. Assets carried at fair value are to be revalued with sufficient regularity to ensure the carrying amount does not differ materially from that determined using fair value at reporting date.



Acquisitions	Annual Budget	YTD Actual	% Spent
	<b>\$32.94 M</b>	<b>\$.13 M</b>	<b>0%</b>

% of Completion

Level of completion indicator, please see table at the end of this note for further detail.

Project Number	JOB	Draft Budget	Amended Budget	YTD Budget	YTD Actual	Variance Under(Over)
		\$	\$	\$	\$	\$
<b>Capital Expenditure</b>						
<b>Land and Buildings</b>						
	BU0010 Coolup Tennis Club	0	0	0	157	(157)
	BU0016 Court House	19,995	19,995	5,000	3,360	1,640
	BU0022 Edenvale Homestead	0	0	0	75	(75)
	BU0028 Edenvale Roger May Machinery Museum	0	0	0	3,697	(3,697)
	BU0030 George Beacham Pavilion	7,226	7,226	0	0	0
	BU0037 Lovegrove Street Club Rooms	10,000	10,000	0	0	0
	BU0042 Murray Aquatic and Leisure Centre	292,609	292,609	0	0	0
	BU0054 North Yunderup Launch Facility Toilets	0	0	0	543	(543)
	BU0060 Pinjarra Heritage Rail Station	17,310	17,310	0	0	0
	BU0080 McLarty Event Space Club Rooms	33,236	33,236	0	0	0
	CP3002 Ravenswood Community Centre	900,000	900,000	0	0	0
	CP3004 Sir Ross McLarty Changerooms & Oval	2,140,757	2,140,757	0	0	0
	CP3005 South Yunderup Oval Pavilion	1,657,000	1,657,000	0	0	0
	CP4000 CWA Hall North Yunderup	200,000	200,000	0	0	0
	CP4001 Herron Point Toilets	150,000	150,000	0	0	0
	ED0103 Dwellingup National Adventure & Trails Centre	102,909	102,909	0	0	0
	ED0105 WA Food Innovation Precinct	16,382,639	16,382,639	10,000	5,644	4,356
	ED0115 The Exchange - COVID-19 Recovery Project	981,507	981,507	0	0	0
	HE0101 Exchange Hotel	80,722	80,722	0	0	0
	HE1000 Edenvale Building Conservation Works	76,249	76,249	0	0	0
	HE1200 Edenvale Basement Conservation Works	85,000	85,000	0	0	0
	OC0001 Operation Centre	16,971	16,971	0	0	0
		<b>23,154,130</b>	<b>23,154,130</b>	<b>10,000</b>	<b>13,476</b>	<b>1,524</b>
<b>Plant and Equipment</b>						
	PV2002 Tow Behind Slasher	19,500	19,500	0	0	0
	PV2003 Tow Behind Road Broom	87,000	87,000	0	0	0
	PV4000 Miscellaneous Plant	6,875	6,875	0	0	0
	PV4003 4003MY Utility - Director P&S	37,450	37,450	0	0	0
	PV4005 4005MY Utility - Mgr Building	40,660	40,660	0	0	0
	PV4006 4006MY Light Vehicle - Civil Design	24,610	24,610	0	0	0
	PV4007 4007MY Light Vehicle - Mgr Engineering	29,960	29,960	0	0	0
	PV4010 4010MY Light Vehicle - Parks & Waterways	24,610	24,610	0	0	0
	PV4018 4018MY Light Vehicle - Mgr Environmental Health	29,960	29,960	0	0	0
	PV4028 4028MY Utility - Ranger	64,200	64,200	0	0	0
	PV4029 4029MY Utility - Ranger	64,200	64,200	0	0	0
	PV4031 4031MY Utility - Chief Bushfire Control Officer	43,000	43,000	43,000	41,007	1,993
	PV4033 4033MY Light Vehicle - Mgr Tourism & Customer Svc	37,450	37,450	0	0	0
	PV4034 4034MY Utility - Development Engineer	39,330	39,330	0	0	0
	PV4038 4038MY Tipper tray (Mowing)	124,500	124,500	0	0	0
	PV4044 4044MY Light Vehicle - Mgr Place & Econ Dev	23,805	23,805	0	0	0
	PV4062 4062MY Zero Turn Mower	25,000	25,000	0	0	0
	PV4064 4064MY Zero Turn Mower	25,000	25,000	0	0	0
	PV4071 4071MY Tractor Mowing	84,500	84,500	0	0	0
	PV4072 MY11026 Small Loader	147,000	147,000	0	0	0
	PV4073 4073MY Tractor	65,500	65,500	0	0	0
	PV4088 4088MY Trailer - Tipper	109,800	109,800	0	0	0
	PV4089 4089MY Trailer - Tipper	120,000	120,000	0	0	0
	PV4092 MY15047 Heavy Duty Plant Trailer	14,940	14,940	0	0	0
	PV4100 Coordinator Emergency Services	68,000	68,000	0	0	0
		<b>1,356,850</b>	<b>1,356,850</b>	<b>43,000</b>	<b>41,007</b>	<b>1,993</b>
<b>Furniture and Equipment</b>						
	BU0042 Murray Aquatic and Leisure Centre	70,800	70,800	0	0	0
	CP1000 Corporate Business System - Open Office	122,206	122,206	0	0	0
	CP1001 Infocouncil Agenda Software	14,292	14,292	4,000	4,010	(10)
	CP3008 MALC Boiler Units	69,390	69,390	0	0	0
	ED0103 Dwellingup National Adventure & Trails Centre	0	0	0	409	(409)
		<b>276,688</b>	<b>276,688</b>	<b>4,000</b>	<b>4,419</b>	<b>(419)</b>
<b>Infrastructure - Roads</b>						
<b>Municipal Funded</b>						
	IK0001 Kerbing Renewal	41,348	41,348	0	0	0
	RD0304 Murray Street (Coolup)	10,000	10,000	0	0	0
	RD9001 Bus Routes	15,000	15,000	0	0	0
	RD9002 Reseals - Intersections	50,000	50,000	0	0	0
	RD9003 Reseals - Rural	230,000	230,000	0	0	0
	RD9004 Reseals - Urban/Industrial	120,000	120,000	0	0	0
	RD9005 Resheeting	310,333	310,333	0	0	0
	RD9006 Traffic Management	42,757	42,757	0	0	0
<b>Regional Road Group</b>						
	RD0003 Burnside Road	110,889	110,889	0	0	0
	RD0009 Lakes Road	375,000	375,000	0	1,276	(1,276)
	RD0012 Hopeland Road	137,647	137,647	0	0	0
	RD0013 Paterson Road	15,000	15,000	0	0	0
	RD0533 Del Park Road	125,000	125,000	0	0	0
<b>State Blackspot</b>						
	RD0009 Lakes Road	20,000	20,000	0	0	0
	RD0019 Readheads Road	164,550	164,550	0	0	0
	RD0020 Carrabungup Road	357,280	357,280	0	0	0
	RD0060 Nanga Road	40,140	40,140	0	0	0
	RD0214 Corio Road	15,000	15,000	0	0	0
	RD0348 Allambi Way	15,000	15,000	0	0	0

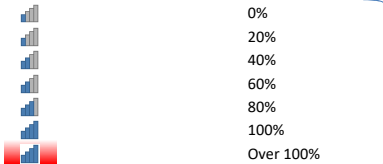
% of Completion

Level of completion indicator, please see table at the end of this note for further detail.

Project Number	JOB	Draft Budget	Amended Budget	YTD Budget	YTD Actual	Variance Under(Over)		
<b>Infrastructure - Roads (cont'd)</b>								
<b>Roads to Recovery</b>								
	RD0017	Coolup Road South	RR0017	100,000	100,000	0	0	0
	RD0230	Moore Street	RR0230	315,000	315,000	0	0	0
	RD0331	George Beacham Way	RR0331	85,000	85,000	0	0	0
	RD9005	Resheeting	RR9005	51,606	51,606	0	0	0
<b>Other Funded</b>								
	RD0130	Gull Road	RO0130	750,000	750,000	75,000	64,042	10,958
				<b>3,496,550</b>	<b>3,496,550</b>	<b>75,000</b>	<b>65,318</b>	<b>9,682</b>
<b>Infrastructure - Other</b>								
	IP0001	Concrete Paths	IP0001	209,724	209,724	0	0	0
	IP9010	Regional Path Network	IP9010	200,000	200,000	0	0	0
	ID0001	Drainage Renewal	ID0001	57,267	57,267	0	0	0
	ID0027	James Street Drainage	ID0027	28,045	28,045	0	0	0
	IB3358	Nicholson Road Traffic Bridge #3358	IB3358	140,029	140,029	0	0	0
	IB9001	Regional Road Bridge Program	IB9001	179,196	179,196	0	0	0
	CM1000	Cemetery Upgrades	CM1000	20,150	20,150	0	0	0
	CP2000	Murray River Foreshore Project	CP2000	340,339	340,339	0	286	(286)
	CP2005	North Dandalup Public Open Space	CP2005	500,000	500,000	0	0	0
	CP3004	Sir Ross McLarty Changerooms & Oval	CP3004	150,000	150,000	0	0	0
	CP3006	Sir Ross McLarty Cricket Wicket	CP3006	40,949	40,949	0	0	0
	CP3010	Sandy Cove Park Upgrade	CP3010	241,590	241,590	0	0	0
	CP3011	Ravenswood Canoe Launch Facility	CP3011	79,000	79,000	0	0	0
	ED0103	Dwellingup National Adventure & Trails Centre	ED0103	81,500	81,500	0	0	0
	HE2000	Edenvale Landscape Works	HE2000	21,848	21,848	0	0	0
	HE2200	Edenvale Signage & Wayfinding	HE2200	40,000	40,000	0	0	0
	HE4001	Heritage Steam Train	HE4001	100,000	100,000	0	0	0
	IC9225	James Street Pedestrian Bridge	IC9225	513,359	513,359	0	0	0
	PG0016	North Pinjarra Oval	PG0016	15,000	15,000	0	0	0
	PG0020	Pinjarra Foreshore	PG0020	195,000	195,000	0	0	0
	PG3002	York Road Public Open Space	PG3002	45,000	45,000	0	0	0
	PG9002	Minor Parks Development	PG9002	48,591	48,591	0	0	0
	PG9003	Annual Parks Renewal	PG9003	176,820	176,820	0	0	0
	TO0500	Visitor Signage & Wayfinding	TO0500	15,000	15,000	0	0	0
	TR5000	Lot 1261 Willowdale Road Gravel Pit	TR5000	272,621	272,621	0	0	0
	WM3003	Corio Transfer Station Tip Face	WM3003	289,931	289,931	5,000	6,200	(1,200)
	WW1001	Wharf Cove Boating Facility	WW1001	545,460	545,460	0	0	0
	WW9000	Waterways Annual Renewal	WW9000	106,777	106,777	0	0	0
				<b>4,653,196</b>	<b>4,653,196</b>	<b>5,000</b>	<b>6,486</b>	<b>(1,486)</b>
		<b>Grand Total</b>		<b>32,937,414</b>	<b>32,937,414</b>	<b>137,000</b>	<b>130,706</b>	<b>11,294</b>

Capital Expenditure Total

Level of Completion Indicators



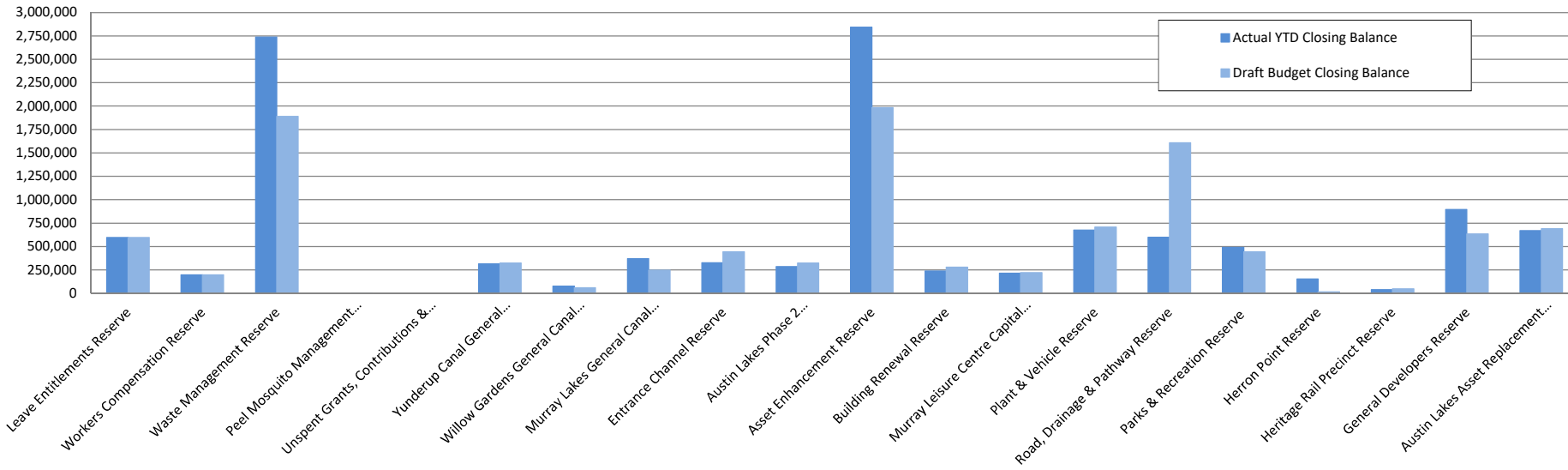
Percentage YTD Actual to Draft Budget  
Expenditure over budget highlighted in red.

Variance is calculated on:  
Draft Budget vs YTD Actual

Cash Backed Reserves

Reserve	Draft Budget Opening Balance	Actual Opening Balance	Draft Budget Transfers In (+)	Actual Transfers In (+)	Draft Budget Transfers Out (-)	Actual Transfers Out (-)	Draft Budget Closing Balance	Actual YTD Closing Balance
Leave Entitlements Reserve	\$ 597,002	\$ 597,002	\$ 0	\$ 0	\$ 0	\$ 0	\$ 597,002	\$ 597,002
Workers Compensation Reserve	198,003	198,003	0	0	0	0	198,003	198,003
Waste Management Reserve	2,736,768	2,736,768	3,243,625	(4,091,554)	1,888,839	2,736,768	2,736,768	
Peel Mosquito Management Reserve	0	0	4,500	0	0	4,500	0	
Unspent Grants, Contributions & Loans Reserve	0	0	0	0	0	0	0	
Yunderup Canal General Maintenance Reserve	313,614	313,614	52,001	(41,416)	324,199	313,614		
Willow Gardens General Canal Maintenance Reserve	78,232	78,232	6,495	(24,346)	60,381	78,232		
Murray Lakes General Canal Maintenance Reserve	370,197	370,197	32,439	(155,953)	246,683	370,197		
Entrance Channel Reserve	326,264	326,264	117,954	0	444,218	326,264		
Austin Lakes Phase 2 Maintenance Reserve	285,151	285,151	39,362	0	324,513	285,151		
Asset Enhancement Reserve	2,842,899	2,842,899	840,000	(1,700,312)	1,982,587	2,842,899		
Building Renewal Reserve	239,411	239,411	41,417	(10,000)	280,828	239,411		
Murray Leisure Centre Capital Reserve	215,876	215,876	73,758	(69,390)	220,244	215,876		
Plant & Vehicle Reserve	676,823	676,823	31,361	0	708,184	676,823		
Road, Drainage & Pathway Reserve	599,918	599,918	1,037,932	(30,940)	1,606,910	599,918		
Parks & Recreation Reserve	491,948	491,948	0	(49,191)	442,757	491,948		
Herron Point Reserve	154,284	154,284	43,494	(182,529)	15,249	154,284		
Heritage Rail Precinct Reserve	39,794	39,794	44,270	(36,500)	47,564	39,794		
General Developers Reserve	896,697	896,697	0	(262,042)	634,655	896,697		
Austin Lakes Asset Replacement Reserve	668,810	668,810	21,500	0	690,310	668,810		
<b>Total</b>	<b>11,731,691</b>	<b>11,731,691</b>	<b>5,630,108</b>	<b>0</b>	<b>(6,654,173)</b>	<b>0</b>	<b>10,717,626</b>	<b>11,731,691</b>

Note 8 - Year To Date Reserve Balance to End of Year Estimate



# North Dandalup Reserve Masterplan

August 2021



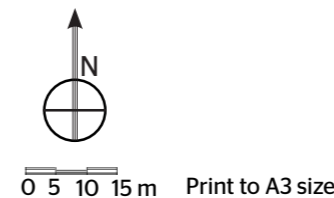
### LEGEND

- 1 Hall existing, with minor upgrades including to kitchen, footpath and sensor lighting
- 2 Oval
- 3 Irrigated to extent possible with available water - Primary green space shown
- 4 Fire Station
- 5 Toilets existing, for replacement with new
- 6 Water tank existing, with recent mural & pump
- 7 Barbecue existing / New drink fountain/ dog bowl
- 8 Play space new, in sandpit and/or play grade mulch, under shade of existing trees
- 9 Shelter with lights / picnic furniture & seats
- 10 Information shelter, existing with updated signage
- 11 Trees existing and new trees and shrubs
- 12 Courts existing/ Future Multi-Court
- 13 Path, gravel / Walking Trail around oval and connecting to facilities
- 14 Caravan/ RV Facilities, new RV waste disposal
- 15 Cricket practice wickets / nets
- 16 Park Entry sign
- 17 Roadside drainage swale, with pedestrian access bridges and planting
- 18 Communications tower, existing

### LEGEND - ACCESS & PARKING

- D Driveway - Access driveway in/out
- P1 Parking - Asphalt carpark
- P2 Parking - Gravel car parking area
- P2-RV Parking - Gravel parking area including space for caravans/ RVs / pop up coffee van
- P2-Re Parking - including space for retail such as food and beverage pop ups
- P-O Parking - Overflow / sports oval parking
- Sv Service Vehicle access

Plan drawn over 2020 aerial photograph  
Images either indicative example of proposed item or of existing, as captioned



Shelter example



Barbecue facilities



Park Entry sign Perth example



Water tank existing



RV facilities Dwellingup example

View from south entry

Play space example

Multicourt example

Existing information shelter

View of Oval from Information Shelter



Outstanding Council Resolutions

Open Resolutions/Items

Name	Owner	Start Date	Status	Complete %	Recommendation/Council Decision	Progress Comment	Last Updated
OCM 22 July 2021 Item 11.11 Pinjarra Cricket Club Premises Working Group - Final Report	Marlene Renton	2021-07-22	In Progress	40	That Council: 1. accept the final report and recommendations of the Pinjarra Cricket Club Premises Working Group, acknowledge the group's objectives have been met and consequently dissolve the Pinjarra Cricket Club Premises Working Group; 2. supports the Pinjarra Cricket Club's use of the Lovegrove Street Hall (old Pinjarra Tennis Club Pavilion) by way of a periodic hire agreement, with hire fees being set in accordance with the adopted Schedule of Fees and Charges for the premises, with; a) the Pinjarra Cricket Club being the exclusive hirer of the building for 5 years, noting that the Murray District Sea Scouts have an existing seasonal booking until 31 December 2021, that will be accommodated; and 3. supports a contribution of up to \$10,000 from the Building Renewal Reserve towards minor upgrades and refurbishments to the Lovegrove Street Hall.	Relocation is underway and quotes for works to the Lovegrove Hall have been received. Tenancy agreement being developed. Murray District Sea Scouts have been advised that their hire until 31 December 2021 is still in place	Leanne McGuirk Aug 11, 2021 04:31 PM
OCM 22 July 2021 Item 11.10 SRM Sports Precinct Master Plan - Draft for Public Comment	Marlene Renton	2021-07-22	In Progress	50	That Council endorse advertising of the Draft Sir Ross McLarty Sports Precinct Master Plan and Report for public comment in August 2021.	Master Plan is out for public comment and closes Friday 13 August 2021	Leanne McGuirk Aug 11, 2021 04:31 PM
OCM 22 July 2021 Item 11.5 Alfresco Dining Licence Proposal - Dwellingup Hotel - Portion of Marinup St, Dwellingup	Robert Marlborough	2021-07-22	In Progress	70	That Council: 1. supports an Alfresco Dining Licence being entered into with The Dwellingup Community Association Inc or the licensee of the Dwellingup Hotel (Rossgem Pty Ltd) or for an area of about 140m2 in Marinup Street, Dwellingup for a period of 5 years, with the annual licence fee commencing at \$1,050 per annum, plus GST, paid in advance, with the licence fee increasing by 3% or CPI, whichever is greater, on each anniversary of the licence; 2. accepts the market rental valuation for the area to which the Alfresco Dining Licence is to apply, as provided by Acumentis dated 29 June 2021, being \$1,050 per annum, plus GST, paid in advance; and 3. approves for the Chief Executive Officer to – (a) publish a local public notice in accordance with Section 3.58 of the Local Government Act 1995 inviting written submissions on the lease proposal, to be received for at least 14 days; and (b) subject to no submissions being received by the closing date negotiate, endorse and enter into the licence with, as outlined; and 4. if adverse submissions are received, a further report is to be prepared and presented to Council to review the submissions and determine a position on the licence proposal.		Robert Marlborough Aug 5, 2021 06:38 AM

OCM 22 July 2021 Item 11.4 Batavia Quays Residents Petition - Fire Hazard Concerns - Unmade Rd Reserve - Rivergum Esp, Sth Yunderup	Robert Marlborough	2021-07-22	In Progress	50	That Council: 1. receive and note the petition facilitated by Mr Tom van Leeuwen of behalf of residents of Batavia Quays, South Yunderup; 2. supports the clearing of understory and overhanging vegetation (not exceeding 4 metres in width) to facilitate an effective firebreak immediately adjacent to the footpath on Reserve 48899 to reduce potential bushfire risk; and 3. supports individual engagement with all landowners adjoining Reserve 48899 to review bushfire preparedness activities and compliance with the Shire of Murray Firebreak Notice to further promote community safety.		Robert Marlborough Aug 5, 2021 06:41 AM
OCM 22 July 2021 Item 11.3 Acquisition of Lot 1 (45) Culeenup Rd, North Yunderup	Robert Marlborough	2021-07-22	In Progress	50	That Council: 1. approves the purchase of Lot 1 (45) Culeenup Road, North Yunderup in fee simple from the Country Women's Association of Western Australia Inc for the amount of \$195,000 (Exc. GST), with funding for the purchase and for settlement costs of \$1,000 being allocated from the Asset Enhancement Reserve, with the Chief Executive Officer being authorised to undertake and finalise the acquisition process; and 2. supports the extension of the current management agreement between the Shire of Murray and the North Yunderup Community Association for Lot 1 (45) Culeenup Road, North Yunderup for a further two years at the expiry of the current option term (31 December 2022) if enacted, subject to any additional terms and conditions, as determined by the Chief Executive Officer. CARRIED UNANIMOUSLY		Robert Marlborough Aug 5, 2021 06:44 AM
OCM 22 July 2021 Item 11.2 In-Principle Support: Lease Duration - WAFIP	Robert Marlborough, Christopher Vas	2021-07-22	In Progress		That Council supports the Chief Executive Officer providing written in-principle confirmation to the proposed lessees of the Western Australian Food Innovation Precinct (WAFIP) — Murdoch University, GrowHub (Fund Singapore), Department of Primary Industries and Regional Development (DPIRD) and Spinifex Brewery Co. that the lease term for the proposed lessees, as detailed will be for an initial term of five years (2022 – 2027) with the option for a further fire year extension (until 2032) on terms to be negotiated, pending formal lease agreements being progressed pursuant to section 3.58 (3) of the Local Government Act 1995.	9 August 2021: A draft lease for the WAFIP entities has been drawn up by Squire Patton Boggs. The Shire is reviewing this document internally. Once updated and finalised, the lease document will be provided to the proposed anchor tenants for their review and for negotiations to commence.	Christopher Vas Aug 9, 2021 11:24 AM
OCM 22 July 2021 Item 11.1 Tender 21/10 Provision of Cleaning Services for Shire owned buildings	Dale Burton	2021-07-22	Not Started		That Council: 1. endorses the tender selection criteria for Tender T21/10 as provided in the body of this report for the Provision of Cleaning Services for Shire owned buildings; and 2. approves the Chief Executive Officer to publicly invite Tender T21/10, State wide for the Provision of Cleaning Services for Shire owned buildings in accordance with the provisions of the Local Government Act.		Cheryl Shenton Aug 3, 2021 10:36 AM

OCM 22 July 2021 Item 10.3.1 Provision of Contract Ranger, Emergency Mgmt & Admin Services - Resource Sharing	Robert Marlborough	2021-07-22	In Progress	90	That both Councils: 1. supports the Chief Executive Officer endorsing a formal Contract arrangement between the Shire of Murray and Shire of Waroona for the provision of Ranger, Emergency Management and Administration Services for the period 1 July 2021 to 30 June 2024 (Initial Term) with the financials aspects being based on full cost recovery for the services provided; and 2. subject to the satisfactory operation of the Contract during the Initial Term, and a full review of operating costs being completed in June 2024, approves for a further contract term being endorsed by the Chief Executive Officer for the provision of Ranger, Emergency Management and Administration Services to the Shire of Waroona for the period 1 July 2024 to 30 June 2027.		Robert Marlborough Aug 5, 2021 06:46 AM
OCM 22 July 2021 Item 10.1.2 Firebreak Notice	Robert Marlborough	2021-07-22	In Progress	60	That Council: 1. notes that the Shire of Murray Firebreak Notice adopted at the Ordinary Council Meeting on 25 June 2020 (OCM20/100) and published in the Government Gazette on 4 September 2020 remains in effect without amendment; and 2. supports the publication of the current firebreak notice, as necessary in accordance with the provisions of the Bush Fires Act 1954, before 30 September 2021.		Robert Marlborough Aug 5, 2021 06:48 AM
OCM 22 July 2021 Item 10.1.1 Election of Officers for the 2021/2022 Fire Season	Robert Marlborough	2021-07-22	In Progress	50	That Council: 1. supports the appointment of the following persons by delegated authority for the 2021/2022 Fire Season; and Chief Bush Fire Control Mr. Robert (Bluey) Wilson Officer: Deputy Chief Bush Fire Mr. Gavin Stevens, CESC Shire of Murray Control Officer: Fire Control Officers: Mr. Douglas McLarty – Coolup VBFB Mr. Peter Thurkle – North Dandalup VBFB Mr. James (Jim) Camplin – South Yunderup/Ravenswood VBFB Mr. Robert Wilson – West Murray VBFB Mr. Kevin Jones – Pinjarra VFRS Fire Control Officers: Mr. Chris Sattler – Coolup VBFB (Permit Issuing Only) Mr. Stuart Kirkham – Coolup VBFB Ms. Lorraine Webster – North Dandalup VBFB Ms. Christine Thompson JP – West Murray VBFB Mr. Brian Bird – West Murray VBFB Fire Weather Officer: Mr. James (Jim) Camplin – South Yunderup/Ravenswood VBFB Deputy Fire Weather Officer: Mr Gavin Stevens, CESC Shire of Murray Shire Training Coordinator/s: Mr. James (Jim) Camplin – South Yunderup/Ravenswood VBFB Mr. Gavin Stevens, CESC Shire of Murray 2. recommend that the Chief Executive Officer appoints a Fire Control Officer and Permit Issuing Officer/s for the 2021/2022 Fire Season from the Dwellingup Volunteer Bush Fire Brigade membership or otherwise, when suitably qualified Officers are nominated or identified.		Robert Marlborough Aug 5, 2021 07:02 AM
OCM 24 June 2021 Item 15.1 Dwellingup Futures Road Map 2021-2036 Reports - Release for Public Comment	Brett Flugge, Dean Unsworth	2021-06-24	In Progress		That Council: 1. grants delegated authority to the Chief Executive Officer to release the Dwellingup Futures Road Map reports for public comment for a 28 day period, with an open public forum being arranged in Dwellingup to present the report findings, in conjunction with using other community consultation methods and news media channels; and 2. awaits a further report on submissions received following the public advertising phase to consider the Road Map reports for final endorsement prior to forwarding onto the Minister for Regional Development.	Road Map reports endorsed for public release at TAC/SWG meeting held on July 28, 2021. Public advertising commenced on August 11 with a community forum held on August 11 and follow up drop in session August 18. A report on submissions to be presented to Council in late October.	Rod Peake Aug 15, 2021 08:16 PM



OCM 24 June 2021 Item 11.8 Pinjarra Cricket Club Holding Over Lease	Marlene Renton	2021-06-24	In Progress	75	That Council: 1. notes that the Pinjarra Cricket Club Holding Over Lease (LD928) at George Beacham Pavilion expires on 30 June 2021; and a. confirms the lease is not to be extended with the premises being vacated by 30 July 2021; and b. requests the Pinjarra Cricket Club Premises Working Group finds a solution that will enable the club to operate successfully until a permanent home is established; and 2. supports the development of detailed concepts and costings, to be funded from Project AD0002 C101, for a new shared facility for cricket and hockey in preparation for funding applications.	The Pinjarra Cricket Club have vacated George Beacham Pavilion and are relocating to the Lovegrove Street Hall for up to 5 years as per Council resolution at July 2021 OCM. Council is contributing up to \$10,000 towards minor refurbishments. CCS Strategic has been engaged to complete detailed concepts and costings for a new facility to be shared between cricket and hockey, and to complete a CSRFF application for 30 September 2021. This is on track	Leanne McGuirk Aug 11, 2021 04:31 PM
OCM 24 June 2021 Item 11.2 Shire of Murray Extractive Industries Local Law 2021	Robert Marlborough	2021-06-24	In Progress	50	That Council 1. supports the making of the proposed Shire of Murray Extractive Industries Local Law 2021 (local law) in accordance with section 3.12 of the Local Government Act 1995, as detailed at Appendix 2; 2. supports the proposed local law being advertised in accordance with section 1.8 of the Local Government Act 1995 and for copies of the proposed local law being made available to the public, with a submission period being open for a minimum period of 6 weeks; and 3. be provided with a further report on the proposed local law after the close of submissions to formally make the local law, by Absolute Majority in accordance with the provisions of the Local Government Act 1995.		Robert Marlborough Aug 5, 2021 06:53 AM
OCM 24 June 2021 Item 11.1 Proposed Amendment to Peel Business Park Design Guidelines Local Planning Policy	Rod Peake	2021-06-24	In Progress		That Council: 1. pursuant to the requirements of the Deemed Provisions set out in Schedule 2, Part 2, Clause 5 of the Planning and Development (Local Planning Schemes) Regulations, resolves to proceed with the proposed amendments to the Peel Business Park Lot 600 Design Guidelines Local Planning Policy as set out in Appendix 1 together with a further amendment as set out in the detail section of this report regarding roof pitches, subject to the detailed wording of the amendments being to the satisfaction of the Director Planning and Sustainability; and 2. publishes notice of the amended policy in a newspaper circulating within the Shire in accordance with the requirements of the Deemed Provisions.	Amendments to policy document under preparation by Consultant.	Rod Peake Aug 15, 2021 08:16 PM
OCM 27 May 2021 Item 11.10 Pinjarra Entry Statement - Historic Steam Train Locomotive	Dean Unsworth	2021-05-27	In Progress	100	That Council allocates \$30,000 from the Rail Heritage Reserve and \$70,000 from the Asset Enhancement Reserve to purchase, refurbish, transport and then permanently place an historic PMR 735 Steam Train Locomotive as an iconic entry statement into Pinjarra.	Have commenced negotiations with owner.	Cheryl Shenton Jul 1, 2021 12:10 PM

OCM 22 April 2021 - Item 11.6 Beau Sovereign Traffic Bridge Closure	Marty Harrop	2021-04-28	In Progress	50	<p>That Council:</p> <ol style="list-style-type: none"> <li>1. closes Bridge No. 5301 on Beau Sovereign Court over the North Dandalup River to vehicles and remove the structure from the Shire's traffic bridge asset register;</li> <li>2. authorises staff to advise Main Roads Western Australia that Bridge No. 5301 is no longer a traffic bridge and is to be removed from Main Roads Integrated Road Information System (IRIS);</li> <li>3. supports staff to investigate the modification of the traffic bridge to a pedestrian and equine standard; and</li> <li>4. authorises staff to manage the bridge structure transformation via the Shire regional bridge program funds.</li> </ol>	<p>The traffic bridge has been barricaded and Main Roads have also been advised that the traffic bridge is closed. The assessment of the bridge for conversion to pedestrian will be undertaken in early spring.</p>	<p>Marty Harrop Jun 14, 2021 03:45 PM</p>
OCM 25 February 2021 - 11.8 Housing and Accommodation Feasibility & Investment Report and Investment Prospectus	Leanne McGuirk	2021-02-25	In Progress	80	<p>That Council endorse:</p> <ol style="list-style-type: none"> <li>1. the findings of the 'Housing and Accommodation: Feasibility and Investment Report' prepared by Syme Marmion and Co;</li> <li>2. the investment prospectus prepared by Syme Marmion and Co. for the purposes of attracting short stay accommodation investment in Dwellingup;</li> <li>3. the CEO working with relevant landowners, agencies and key stakeholders to identify a preferred development site and to develop and implement a strategy that will facilitate investment and development of a high quality, short stay accommodation offering within the Dwellingup townsite; and</li> <li>4. a further review, particularly around Pinjarra's opportunities be undertaken, and a report be provided to Council for consideration within twelve months.</li> </ol>	<p>Investigations and discussions underway with landowners of potential sites under investigations</p>	<p>Leanne McGuirk Aug 11, 2021 04:31 PM</p>
OCM 17 December 2020 - 11.3 Murray Aquatic and Leisure Centre (MALC) Pool Heating	Ben Jordan	2020-12-17	In Progress	90	<p>That Council: endorses the addition of two 350 kW boilers and associated works at the Murray Aquatic and Leisure Centre and increases the current funding allocation from the MALC Capital Reserve for the works from \$130,000 to \$203,000</p>	<p>Boiler unit installation and ancillary works completed in the main. The system is operational, however commissioning works are still underway bringing the hydrotherapy pool into line with the new boilers. There has been an issue with enough water pressure to service the new Hydrotherapy pool heat pump. A solution has been determined, now waiting for installation of works for the system to be fully operational.</p>	<p>Ben Jordan Aug 5, 2021 09:05 AM</p>

<p>OCM 17 December 2020 - 11.2 Installation of Additional Solar Photovoltaic Renewable Energy System at the Shire Administration Building</p>	<p>Tom Lerner</p>	<p>2020-12-17</p>	<p>In Progress</p>	<p>50</p>	<p>That Council: 1. proceeds with the installation of an additional 26kW solar photovoltaic cell system on the Shire Administration building; 2. authorises the Chief Executive Officer and Shire President to execute the associated lease documentation; and 3. notes that details on a revolving green energy fund to finance renewable energy and energy efficiency projects will be presented to it in early 2021 as one of the action pledges under the Cities Power Partnership program and as part of this consider including the savings realised from the additional photovoltaic system into the green revolving energy fund to then be used as seed funding to finance additional renewable energy and energy efficiency projects.</p>	<p>Arrangements with contractor underway for installation in August 2021.</p>	<p>Rod Peake Aug 15, 2021 08:16 PM</p>
<p>OCM 24 September 2020 - 11.13 Proposed Extractive Industry – Lot 1261 Willowdale Road</p>	<p>Alan Smith</p>	<p>2020-09-24</p>	<p>In Progress</p>	<p>85</p>	<p>That Council: 1. authorises the Chief Executive Officer to negotiate and endorse a long term lease agreement with Alcoa for the purpose of gravel extraction for Public Purposes; 2. establishes an Infrastructure Account of \$300,000 from the Asset Enhancement Reserve to develop and manage the extractive Industry site at Lot 1261 Willowdale Road for future infrastructure provision; and 3. develops a Business Plan for the proposed Extractive Industry at Lot 1261 Willowdale Road.</p>	<p>A further meeting has been held with Alcoa due to their internal staff changes to help progress the lease. A briefing document has been issued to Alcoa to inform the Executive at Alcoa to help progress with the lease options.</p>	<p>Alan Smith Aug 13, 2021 04:17 PM</p>
<p>OCM 24 September 2020 - 11.4.1 Matter Arising - Application for Rating Exemption – Access Housing Australia Ltd</p>	<p>Tracie Unsworth</p>	<p>2020-09-24</p>	<p>In Progress</p>		<p>That Council: 1. continues to lobby through WALGA to remove any ambiguity in the Act that grants exemptions to charitable organisations such as Access Housing and thereby removing the impost to the general rate payer; and 2 officers investigate an appropriate mechanism through rate payer notices in the future to identify the cost subsidy borne by the rate payer.</p>	<p>Process to be included as part of the 21/22 financial year rating process and referenced in the Rating Strategy document.</p>	<p>Tracie Unsworth Jul 5, 2021 09:51 AM</p>
<p>OCM 25 June 2020 - Item 16.1 Confidential Report – Business Plan Outcome and Sale of Lots 301 to 305 Dewar Road and Lots 306 to 310 Beau Sovereign Court, North Dandalup (Formerly Lot 102 Lakes Road)</p>	<p>Robert Marlborough</p>	<p>2020-06-25</p>	<p>In Progress</p>	<p>90</p>	<p>That Council: endorses the Officers Recommendation included in the report for Item 16.1 provided under confidential cover.</p>	<p>Sales completed for Lots 307 and 308 Beau Sovereign Court and Lots 301 and 304 Dewar Road. Offers received and accepted for – Lot 310 Dewar Road; Lot 306 Beau Sovereign Court (Finance extension approved 8 February); and Lot 303 Dewar Road. These offers are all subject to finance approval. A cash offer to purchase Lot 309 Beau Sovereign Court has been received, and this is not subject to any conditions. Settlement is scheduled for 45 days after 10 February 2021. Nil offers received so far for Lot 302 or Lot 305. Land titles received 4 September 2020. Agent appointed to Auction the lots to be sold. Auction date set as 10 October 2020. Statutory advertising arranged. Settlement Agent appointed to deal with land actions resulting from the auction. Auction held 10 October 2020. All lots passed in. As of 29 October 2020 two offers and acceptances received for Lot 303 Dewar Road and Lot 308 Beau Sovereign Court. Marketing for remaining lots ongoing.</p>	<p>Robert Marlborough Aug 5, 2021 07:00 AM</p>

<p>OCM 25 June 2020 - Item 11.6 Amendment No. 316 to Town Planning Scheme No. 4 - Proposed Equestrian Zone, Lots 462 and 502 South Western Highway, Blythwood</p>	<p>Rod Peake</p>	<p>2020-06-25</p>	<p>In Progress</p>	<p>50</p>	<p>That Council:</p> <ol style="list-style-type: none"> <li>1. pursuant to Section 75 of the Planning and Development Act 2005 resolves to prepare Amendment No 316 to the Shire of Murray Town Planning Scheme No. 4 to rezone portion of Lot 462 and Lot 502 South Western Highway, Blythwood, from Rural and Private Recreation to Special Use – Equestrian, with a range of suitable conditions that limit the use of the site to equestrian related activities and provide for the orderly progressive development of the land, including the need for a structure plan to guide development.</li> <li>2. pursuant to Regulation 35(2) of the Planning and Development (Local Planning Schemes) Regulations 2015 specifies that the Amendment is a standard amendment as it is considered not to comfortably fall within either the complex or basic amendment categories and will not result in any significant environmental, social, economic or governance impacts on land within the Scheme area;</li> <li>3. authorises the Shire President and Chief Executive Officer to sign and seal the scheme amendment documents prepared to the satisfaction of the Director Planning and Sustainability;</li> <li>4. authorises the amendment to be forwarded to the Environmental Protection Authority for consideration of the need for environmental assessment in accordance with section 81 of the Planning and Development Act; and</li> <li>5. following compliance with sections 81 and 82 of the Act, proceeds to advertise the amendment for a period of at least 42 days.</li> </ol>	<p>Scheme Amendment Documents prepared. Meeting held on 26 July to discuss options. Equine commercial not considered practical option. Further meeting with landowner planned for 16 August to discuss options. Masterplan changed to be investigated.</p>	<p>Rod Peake Aug 15, 2021 08:18 PM</p>
<p>OCM 22 June 2017 – Item 16.1 Dwellingup Community Compact Draft Position Statement – Bauxite Mining in and Around Dwellingup - CONFIDENTIAL</p>	<p>Dean Unsworth</p>	<p>2018-07-01</p>	<p>In Progress</p>	<p>75</p>	<p>That Council:</p> <ol style="list-style-type: none"> <li>1. supports the recommendations of the Chief Executive Officer as presented in the table of 12 actions recommended by the Dwellingup Community Compact;</li> <li>2. delegates to the Shire President and Chief Executive Officer to negotiate further with the Dwellingup Community Compact and Alcoa regarding the proposed Dwellingup Discovery Forest, but that Council fully supports this concept in principle; and</li> <li>3. requests a further report following further negotiations with stakeholders and following the future public meeting with the community.</li> </ol>	<p>Workshops have continued and a final Dwellingup Futures joint workshop will be held on 16 June 2021 prior to a public meeting and calls for submissions in July.</p>	<p>Dean Unsworth Jun 14, 2021 10:09 AM</p>
<p>OCM 23 August 2018 - Item 11.6 Land Encroachments &amp; Other Structures – Closure of Unmade Road – Ballee Island, South Yunderup</p>	<p>Robert Marlborough</p>	<p>2018-08-23</p>	<p>In Progress</p>	<p>66</p>	<p>That Council:</p> <ol style="list-style-type: none"> <li>1. approves for the Chief Executive Officer to formally progress with the Minister for Lands, through the Department of Planning, Lands and Heritage the closure of the unmade road reserve and the creation of a new Crown Reserve for the purposes of “foreshore” on Ballee Island, South Yunderup, with the following outcomes to be achieved:             <ol style="list-style-type: none"> <li>(a) the Crown Reserve land is to be managed by the Shire under a management order;</li> <li>(b) the new Crown Reserve boundaries are to be established in such a way to ensure 3 metre setbacks are provided to accommodate the patio</li> </ol> </li> </ol>	<p>Funding approved in 20/21 budget to undertake formal survey work to progress outcomes on the land encroachments</p>	<p>Robert Marlborough Jun 14, 2021 04:16 PM</p>

					<p>encroachment from Lot 87 Ballee Island and the existing dwelling encroachment from Lot 83 Ballee Island;</p> <p>(c) a 5 metre wide easement being established within the new Crown Reserve to provide ongoing protection to existing Water Corporation infrastructure;</p> <p>(d) define the areas proposed in point 2;</p> <p>2. pending the closure of the unmade road reserve and the creation of the new Crown Reserve actively encourage the Department of Planning, Lands and Heritage to facilitate suitable formal lease arrangements and the appropriate Peel Region Scheme consents, for an initial period of 10 years;</p> <p>(a) with the owner of Lot 82 Ballee Island for existing cottage (dwelling) adjacent to this property;</p> <p>(b) with the owner of Lot 83 for Gazebo and other structure adjacent to this property;</p> <p>3. after receiving confirmation from the Department of Planning, Lands and Heritage that points 1 and 2 are supported and being actioned a further report be prepared for Council to consider the full cost breakdown of survey and other associated costs; and</p> <p>4. authorises the Chief Executive Officer to continue engaging with the landowners of Lots 82, 83 and 87 Ballee Island to determine equitable contributions towards the cost of the survey works.</p>		
OCM 22 November 2018 – Item 11.9 Pinjarra Massacre Memorial Project	Leanne McGuirk	2018-11-22	Deferred	30	<p>That Council supports:</p> <p>1. the Pinjarra Massacre Memorial Project in principle, including the development of a concept plan;</p> <p>2. allocation of in kind workforce resources to assist in the development of a concept plan;</p> <p>3. further consideration of the provision of financial and/or in kind support, following the completion of a concept plan; and</p> <p>4. investigation into the opportunities of a Joint Management Agreement over Crown Reserve 31032.</p>	<p>This project is lead by the Department of Planning, Lands &amp; Heritage, with the Shire being one of a number of stakeholders. The project was placed on hold by DPLH in early 2020. The Department and local Elders have been advised that the Shire remains committed to supporting and enabling progression of the project and look forward to working with all key stakeholders when the project is re-established</p>	Leanne McGuirk Aug 11, 2021 04:32 PM
OCM 27 June 2019 – Item 11.24 Lower Murray River – Foreshore Stabilisation Guidelines	Alan Smith	2019-06-27	In Progress	85	<p>That Council:</p> <p>1. supports the introduction of Foreshore Stabilisation Guidelines for the Lower Murray River;</p> <p>2. continues to engage with Community Associations to inform and add value to the introduction of the Foreshore Stabilisation Guidelines for the Lower Murray River;</p> <p>3. seeks approval from the Department of Water and Environmental Regulation (DWER) and Department of Planning Lands and Heritage (DPLH) for any required environmental and structural works within the Foreshore Stabilisation Guidelines for the Lower Murray River riverbanks that abut areas under the management of the Shire of Murray; and</p> <p>4. once approvals have been obtained from DWER and DPLH for environmental and structural works on the Riverbanks, an engagement strategy be initiated to enable ongoing liaison directly with the community within proximity of the Lower Murray River.</p>	<p>The design of the riverbank retaining wall has been completed and issued to both the Department of Water and Environmental Regulation (DWER) and the Department of Planning, Lands and Heritage (DPLH) for comment prior to finalising the handover of the Riverbank management. Funding applications have been completed to source funding to undertake remediation works at three different areas on the Islands and in South Yunderup.</p> <p>Further communication and an overview of the project has been issued to DPLH to enable a decision on delegation of management.</p>	Alan Smith Jul 26, 2021 12:43 PM

## Delegated Decisions of Development Approvals for July 2021

Application Number Display	Reason For Permit	Site Address Full Address	Decision Type	Decision	Lodged Date Date	Decision Date Date
616-248-1	Proposed Jetty	33 Banksia Terrace, South Yunderup WA 6208	Delegate	Issued	9/07/2021	16/07/2021
P080/2021	Ancillary dwelling	140 Riverland Drive, Stake Hill WA 6181	Delegate	Issued	18/06/2021	13/07/2021
P107/2021	Keeping of Horses	Lot, 1004 O'Reilly Place, North Dandalup WA 6207	Delegate	Issued	5/07/2021	6/07/2021
P112/2021	Variation to Building Envelope	60 Tranquil Retreat, Barragup WA 6209	Delegate	Issued	20/05/2021	14/07/2021
P114/2021	Ancillary accommodation	576 Lakes Road, Barragup WA 6209	Delegate	Issued	9/07/2021	30/07/2021
P115/2021	Signage	528 Pinjarra Road, Furnissdale WA 6209	Delegate	Issued	9/07/2021	29/07/2021
P116/2021	Commercial Workshop	Lot/Lot 32 Dollyup Street, Stake Hill WA 6181	Delegate	Issued	25/05/2021	23/07/2021
P132/2021	Dwelling	2 Toovey Road, South Yunderup WA 6208	Delegate	Issued	9/06/2021	23/07/2021
P134/2021	Outbuilding	30 Jolly Rambler Boulevard, Ravenswood WA 6208	Delegate	Issued	4/06/2021	14/07/2021
P144/2021	Outbuilding	3 Midsummer Circle, Pinjarra WA 6208	Delegate	Issued	18/06/2021	16/07/2021
P145/2021	Patio	Lot 3001 Dixon Avenue, Pinjarra WA 6208	Delegate	Issued	16/06/2021	2/07/2021
P148/2021	Keeping of Horses, stable & shed	Lot/1010 Franklin Drive, North Dandalup WA 6207	Delegate	Issued	18/06/2021	7/07/2021
P149/2021	Outbuilding	80 Ibis Retreat, Stake Hill WA 6181	Delegate	Issued	18/06/2021	19/07/2021
P152/2021	Freestanding garage, portico and patio	45 Rodoreda Crescent, Ravenswood WA 6208	Delegate	Issued	30/06/2021	20/07/2021
P154/2021	Patio	29 Tanderra Place, South Yunderup WA 6208	Delegate	Issued	21/07/2021	22/07/2021
P158/2021	Replacement Canal Retaining Wall	43 Tanderra Place, South Yunderup WA 6208	Delegate	Issued	25/06/2021	1/07/2021
P159/2021	Canal Retaining Wall	37 Allambi Way, South Yunderup WA 6208	Delegate	Issued	25/06/2021	1/07/2021
P160/2021	Canal Retaining Wall	35 Allambi Way, South Yunderup WA 6208	Delegate	Issued	25/06/2021	1/07/2021
P164/2021	Variation to Building Envelope and oversized shed	Lot/5 Privado Circuit, West Pinjarra WA 6208	Delegate	Issued	29/06/2021	5/07/2021
P165/2021	Single Dwelling	15 Weewar Circuit, South Yunderup WA 6208	Delegate	Issued	30/06/2021	14/07/2021
P166/2021	Retaining wall	26 Woolah Place, South Yunderup WA 6208	Delegate	Issued	29/06/2021	22/07/2021
P167/2021	Variation to Building Envelope & water tank	Lot 806 Reading Place, Birchmont WA 6214	Delegate	Issued	30/06/2021	5/07/2021
P177/2021	Variation to building Envelope	Lot/121 Bolliong Grove, North Dandalup WA 6207	Delegate	Issued	13/07/2021	14/07/2021
P179/2021	Outbuilding	Lot 11 Bolliong Grove, North Dandalup WA 6207	Delegate	Issued	15/07/2021	22/07/2021
P184/2021	Variation to Building Envelope - Outbuilding and water tank	17 O'Reilly Place, North Dandalup WA 6207	Delegate	Issued	20/07/2021	27/07/2021

## Delegated Refusals of Development Applications for July 2021

Application Number Display	Reason For Permit	Site Address Full Address	Decision Type	Decision	Lodged Date Date	Decision Date Date
P068/2021	Pet Home Care	21 Passive Place, Barragup WA 6209	Delegate	Application Withdrawn	28/07/2021	28/07/2021
P150/2021	Carport	6 Cornish Way, Pinjarra WA 6208	Delegate	Application Withdrawn	23/06/2021	23/07/2021
P163/2021	Single dwelling	19 Kaler Road, South Yunderup WA 6208	Delegate	Application Withdrawn	30/06/2021	20/07/2021