

SURVEYING | TOWN PLANNING | PROJECT MANAGEMENT

DEVELOPMENT APPLICATION

USE NOT LISTED – TINY HOME COMMUNITY

44 Stephen Street, Boyanup



Prepared for L & K PRITCHARD April 2025



DOCUMENT CONTROL

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1 INTRODUCTION

This planning report forms the basis for a Development Application – Use Not Listed (Tiny Home Community) at Lot 9 (44) Stephen Street, Boyanup ('the subject land').

An assessment of the proposal against the Shire of Capel Local Planning Strategy, Local Planning Scheme No.8 and other relevant planning legislation has been undertaken in order to prepare this report which includes a description of the proposed works, the subject land, surrounding context, planning framework, fire mitigation and onsite effluent disposal investigations.

This development application proposes the use of the subject site for the establishment of a Tiny Home Community, offering a socially diverse community, providing for all age groups, generating ongoing economic and social opportunities and support for the area and caring for the environment by actively reducing environmental footprint.

The proposed development will offer an alternative accommodation that is a cost-effective and time-efficient solution to address the shortage of permanent housing, whilst creating a shared community for like-minded individuals.

In support of this application a Site and Soil Evaluation Assessment, Bushfire Management Plan, Local Development Plan, Community Management Plan and Water and Wastewater Management Plan have been prepared and further detailed within this report.

In considering this application, the Local Government is to consider the relevant matters included within clauses 27 and 67 of Schedule 2 – Deemed Provisions of the *Planning and Development (Local Planning Scheme) Regulations 2015.* This Development Application and supporting plans and documentation provides the suitable justification and confidence to assess and determine the development as a Use Not Listed – Tiny Home Community.

2 BACKGROUND

2.1 Location

Lot 9 (44) Stephen Street, Boyanup is located within the Shire of Capel and is located approximately 1km northeast of the Boyanup main street refer **Figure 1** – Location Plan below. The property is located on Stephen Street which connects Gray Road to the north to Armstrong Street to the south, with the most direct access back to town via Timperley Road which intersections with Stephen Street approximately 50m south of the subject site.



Figure 1 Location Plan



2.2 Property Details

LOT NUMBER:	DEPOSITED PLAN:	VOLUME/FOLIO:	LOT AREA:	REGISTERED PROPRIETOR:
9	DP222154	2188/891	2.2158ha	PRITCHARD, KATIE COOPER PRITCHARD, LEE MARTIN

The property details for Lot 9 (44) Stephen Street, Boyanup are as follows:

A copy of the Certificate of Title has been attached at **Appendix A** of this report.

2.3 Site Context

The subject site is currently vacant of any structures and vegetation and is occasionally used for the agistment of horses.

The property is located within an area comparable to rural residential/small rural holdings lots with similar sized properties maintaining horses and other livestock. Immediately adjoining the southern boundary of the property is a small group of urban sized blocks of approximately 1000m².

2.4 Preliminary Consultation

Preliminary liaison with Officers from the Infrastructure & Development sector at the Shire of Capel has occurred over the past 12 - 18 months leading up to lodgement of this Application.

A meeting with Officers in December 2023 confirmed their indicative support for a Tiny Home Community proposal within the Shire of Capel, supported by their recent adopted of LPP 6.13. The original site identified, being in Capel, unfortunately was not eventuated, however the landowners were still passionate about proceeding with this project. Further research and discussions with the Shire were able to secure the property in Boyanup (the subject site). Since this time, conversations have occurred relating to the subject site which reaffirmed that Shire Officers considered the proposed Tiny Home Community at this site was consistent with the objectives of the approved East Boyanup Local Structure Plan and that the preparation of a Development Application and supporting Local Development Plan would be the appropriate planning pathway for the development.

In January 2025, due to State Government changes to legislation and the subsequent definition of a Tiny Home, the Shire of Capel revoked LPP 6.13. Following recent discussions with Officers at the Shire as to the best pathway for the proposed development, it has been recommended that the preparation of a Development Application – Use Not Listed (Tiny Home Community) supported by a Local Development Plan will capture the land use planning and site-specific design requirements and provide a long-term management mechanism for the development.

Prior to lodgement of this Application, the draft Local Development Plan and Tiny Home Community Management Plan were provided to the Shire for preliminary review and discussion to identify whether additional areas of information and/or detail would be necessary. Furthermore, the landowners have consulted with some Shire of Capel Councillors and will consult with community members to provide further education regarding the development and respond to any initial queries that may exist.

As a result of these discussions, minor modifications to the site layout and management measures were undertaken to further define and clarify the land use and ongoing management requirements for the proposed development.



3 PROPOSED DEVELOPMENT

3.1 Development Summary

This application proposes the development of a "Use Not Listed - Tiny Home Community", which will include 48 Tiny Home Plots, a Caretakers Residence plot and communal facilities as identified on the Development Site Plan.

Tiny Home Communities consist of a group of people living in small, intentionally minimalistic homes on the same property or a shared area. These communities often encourage shared facilities, a sense of belonging and a more sustainable, connected lifestyle.

There are very few examples of Tiny Home Communities within Australia, and this will be the first one within Western Australia, which is an exciting concept and opportunity for the Shire of Capel. The landowners have spent several years researching the Tiny Home Community concept, appropriate locations and requirements and have themselves been living the tiny home lifestyle for years, relocating to the Shire of Capel in 2024, following the securement of the subject site.

Tiny Home Communities operate similarly to gated communities or strata developments, with residential accommodation, communal spaces, infrastructure and management/caretaker facilities. It is the intention of the proponent to live on-site to continue to embrace and enjoy their minimal-scale lifestyle and through the development of the subject site, be able to share it with like-minded people.

The proposed development plans to create an alternative housing-style of living, consistent with residential development designed for long-term residents. The development will offer long-term lease options for the plots, in which people will then establish their Tiny Homes, connect to the internal infrastructure services as required and contribute to and support the community in accordance with the Community Management Plan.

The proposed development will focus on community living and support aspects through the establishment of onsite community gardens and shared open spaces and will establish and encourage the implementation ecoliving practices through the use of water re-capture (rain tanks), solar power and other means individually to minimise their ecological footprint and promote various sustainable aspects of daily life.

Furthermore, the proposed development is in keeping with the now revoked Shire of Capel Local Planning Policy 6.13 – Tiny Home Development with regards to the proposed plot allocations and sizes and has incorporated several aspects of this Policy as part of this report.

The individual plots have been designed to accommodate a standard Tiny Home, carparking space and personal outdoor area, with a site area of approximately 160m². This is consistent with the requirements of the now revoked LPP 6.13 and compares with similar tiny homes sites across the world.

The 48 plots have been situated in rows either side of the private access way, with the communal open space located centrally and larger infrastructure located towards the rear of the development. Smaller pocket style parks and walk trails have been identified amongst the plots and provides access and linkage to the external perimeter landscaping.

Additional boundary setbacks have been proposed to encompass the development and provide the opportunity for further landscaping to the road and adjoining properties to increase the amenity of the site and contribute to the sustainable, eco-friendly development objectives.

3.2 Tiny Home (on Wheels)

In 2018, as part of a State Administrative Tribunal, it was established that vehicles and buildings are mutually exclusive; and a tiny house cannot be both a building and a caravan simultaneously. If a tiny home is a vehicle fitted for habitation it will be classified as a 'caravan' and if a tiny house is not a vehicle, it is classified as a building and subject to regulation under building and planning legislation.

In keeping with this outcome and further supported by the recent release of Fact Sheet Tiny Homes by the Western Australian Planning Commission (WAPC), the Tiny Homes proposed for the development will be classified as 'Caravans' for the purpose of a Class of Building and therefore not require a Building Permit to be issued,



noting all other structures established on site (sheds, water tanks, pergolas, decking etc) will need to consider whether a Building Permit with the Shire of Capel will be required prior to works commencing.

The Tiny Homes will be required to comply with the Vehicle Standards Bulletin 1 (VSB1), which is a collection of publications prepared by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts providing information on various aspects of road vehicle standards, including design, manufacture and modification.

Whilst both Tiny Homes and Caravans are both types of small, mobile "dwellings" they differ in their primary use and design. Tiny Homes are built with permanent living in mind, featuring more robust construction, better insultation and larger spaces for kitchens, bathrooms and storage in comparison to a Caravan. Examples of the types of Tiny Homes available and likely to be established as part of this development are included within **Figure 2** below.





Figure 2 Internal Images of Tiny Homes



The Tiny Homes may range from approximately $20m^2$ to $50m^2$ in size and be a maximum of 4.3m in height and sit on a wheel-based trailer system. They will be bought to site and then established and connected to the services as required. Each Tiny Home resident will be encouraged to incorporate sustainable aspects into their home design and plot, and to provide complimentary cladding, decking and/or landscaping to the exterior base of the Tiny Home to conceal the wheelbase to further promote the residential style of the proposed development as shown in **Figure 3** below.



Figure 3 External Images and Landscaping of Tiny Homes

3.3 Landscaping and Communal Facilities

The subject site at present is a cleared paddock, with the intention improve the amenity of the property for the future residences and surrounding properties. The development proposes to undertake 'low threat' perimeter landscaping along the edges of the property and within the front setback to Stephen Street, which will ensure the property remains compliant with the Bushfire Management Plan.

The Communal Space will include aspects of hardscaping, a community vegetable garden, nature playground and areas of passive recreation to be enjoyed by the residences. These areas will be managed and maintained through the implementation of the Community Management Plan and lease contracts between residents. Examples of what will be implemented have been included within **Figure 4** below.





Figure 4 Communal Amenities

The central open space and break-out parks will also incorporate 'low threat' vegetation and managed gardens. This will however include the establishment of some larger species to provide shade and enjoyment for the residences. Landscaping of the site will consist of native, drought resistant species varying in height to provide interest and depth to the development, like those included within **Figure 5** below.



Figure 5 Landscaping Style

Included as part of the landscaping of the site, will be aspects of hard landscaping, including seating, footpaths, open pergolas and bollard lighting will be installed throughout the development in conjunction with the private access way and central communal open space. The lighting will be consistent with the examples provided in **Figure 6** below and be dimmed to ensure no impact to external areas occurs.





Figure 6 Hardscape Design

3.4 Access and Servicing

3.4.1 Crossover and Private Access Way

Access to the proposed development will be from Stephen Street through a single crossover location. The crossover location has been carefully located to ensure minimal impact to the established vegetation that is present within the Stephen Street road reserve.

The private access way will be constructed of compacted gravel, which will provide impervious drainage and consistent with the surrounding road network.

The private access way has been provided at a 6m width and is designed to operate as a one-way route. The 6m width will provide sufficient moveability for the establishment of the tiny homes and service vehicles (fire response vehicles, commercial vehicles etc) with the inclusion of an 8.5m inner curve radius, and will be constructed of compacted gravel consistent with Stephen Street and will provide impervious drainage opportunities. The swept path data is identified in **Figure 7** – Swept Paths.

Overflow parking has been provided to accommodate visitors and/or additional vehicles to ensure no roadside parking or ad hoc parking occurs in conjunction with the proposed development.





3.4.2 Water

The subject site is currently connected to the reticulated water infrastructure located along Stephen Street. It is intended that the proposed development will utilise this connection, with additional collection for use within the communal open spaces and fire protection to be provided by the proposed water tank on site.



3.4.3 Onsite Effluent Disposal and Geotechnical Report

A reticulated sewerage system is not available for connection within the east Boyanup area. The proposed development will be serviced through the installation of an onsite effluent disposal system.

A Site and Soil Evaluation (SSE) and Geotechnical Report were undertaken in October 2024 to assess the suitability of this site to retain on-site sewage to service the proposed development in accordance with the Government Sewerage Policy 2019.

Based on the results of the SSE, it is identified that a primary treatment septic system consisting of septic tanks along with a secondary treatment system or similar can be designed and installed to satisfactorily meet the requirements of AS 1547 and the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations and the Government Sewerage Policy 2019.

The SSE has identified a recommended location for the Land Application Area (LAA) which is located along the western boundary of the site.

A full copy of the Site and Soil Evaluation and Geotechnical Reports are attached at **Appendix B** of this report.

3.4.4 Power

The subject site will be connected to the necessary power infrastructure by way of a future application to Western Power.

Whilst the site will provide the opportunity for each Tiny Home to be connected to the reticulated water and power source, it is likely and will be encouraged that owners utilise sustainable options like rainwater tanks and alternate power sources where possible to support the overall eco-friendly aims for the community site.

3.5 Other Matters to be Considered

3.5.1 Waste Management

As detailed in the Community Management Plan (**Appendix E**), bin storage areas are proposed at regular intervals within the proposed development for the communal use of residents. The proposed bin storage areas will be screened through hardscape and traditional landscaping measures to improve the amenity of the area. Bins will be collected in accordance with the Shire of Capel Waste Collection Schedule and will be placed on the verge by 6am every Friday for weekly collection.

Consistent with the low-impact, sustainable intentions of Tiny Homes, individual waste collection per Tiny Home plot is not required. Waste production and collection will be established in a staged approach as the proposed development progresses. Regular monitoring by the Caretakers through the Community Management Plan will occur and should additional facilities be required, then they will be established accordingly.

4 PLANNING FRAMEWORK

4.1 State Planning Policy 3.7 – Planning in Bushfire Prone Areas

The objective of State Planning Policy 3.7 – Planning in Bushfire Prone Areas (SPP 3.7), is to implement effective, risk-based land use planning and development to preserve life and reduce the impact of bushfire on properties and infrastructure.

Figure 8 demonstrates that areas of the subject land are included within a bushfire prone area and is therefore required to undergo additional bushfire investigation, which includes a Bushfire Management Plan. The Bushfire Management Plan (BMP) is further detailed in Section 5.3 below. The BMP can be found at **Appendix C.**





Figure 8 Bushfire Prone Mapping

4.2 Shire of Capel Local Planning Strategy

The Shire of Capel Local Planning Strategy (the Strategy) was endorsed by the Western Australian Planning Commission (WAPC) in July 2023 and aims to set out the long-term planning direction for the Shire over a 15-year timeframe. The Strategy provides the rationale for land use zones and other provisions of the Local Planning Scheme and provides an opportunity for an integrated approach to planning across all areas including consideration of social, environmental and economic aspects.

The subject land is identified as 'Future Urban Land (B1)' within the Strategy. The proposed development is considered consistent with the intentions of 'Future Urban Land' as the development proposes to establish a long-term residential community which is consistent with the intentions of urban development.

4.3 Shire of Capel Local Planning Scheme No.8

4.3.1 Zoning

The subject land is zoned "Urban Development" under the Shire of Capel Local Planning Scheme No.8 (LPS 8) and is also identified within an area subject to 'Additional Site and Development Requirements' being SR 3 within Schedule 5 of LPS 8.

The objectives for land zoned "Urban Development" include:

- To provide an intention of future land use and a basis for more detailed structure planning in accordance with the provisions of this Scheme.
- To provide for a range of residential densities to encourage a variety of residential accommodation.
- To provide for the progressive and planned development of future urban areas for residential purposes and for commercial and other uses normally associated with residential development.
- To provide an intermediate transitional zone prior to or following the lifting of an urban deferred zoning within the Greater Bunbury Region Scheme.

Schedule 5 identifies the additional requirements needed to be undertaken prior to a subdivision application being lodged with the WAPC and development constraints to be taken into consideration as part of future planning for the area.

A subdivision application is not being proposed for this application, and the site is not impacted by any drainage and/ecological corridor or foreshore protection areas therefore additional information to address these matters is not required for this site.



A SSE report has been prepared and included at **Appendix B** of this report which complies with the relevant requirements of SR3 and is further detailed in Section 3.4.3 of this report.

4.3.2 Land Use Permissibility

The proposed land use being "Tiny Home Community" is not a defined use within LPS 8 and will therefore need to be considered as a 'Use Not Listed' in accordance with Section 18(4), which is detailed as below:

- (4) The local government may, in respect of a use that is not specifically referred to in the zoning table and that cannot reasonably be determined as falling within a use class referred to in the zoning table
 - a) Determine that the use is consistent with the objectives of a particular zone and is therefore a use that may be permitted in the zone subject to conditions imposed by the local government; or
 - b) Determine that the use may be consistent with the objectives of a particular zone and advertise under clause 64 of the deemed provisions before considering an application for development approval for the use of the land; or
 - c) Determine that the use is not consistent with the objectives of a particular zone and is therefore not permitted in the zone.
- (6) If the zoning table does not identify any permissible uses for the land in a zone the local government may, in considering an application for development approval for land within the zone, have due regard to any of the following plans that apply to the land
 - a) A structure plan
 - b) A local development plan

To provide further clarification for the proposed development being appropriately considered as a Use Not Listed – Tiny Home Community, defined land uses that can be applied to residential and/or accommodation themed land uses are included within the below **Table 1**. The table also identifies the areas of non-compliance and/or difference in use associated with the proposed Tiny Home Community and its objectives and intentions.

Land Use	Definition	Non-Compliance with Tiny Home
		Community
Caravan Park	Means premises that are a caravan park as defined in the Caravan Parks and Camping Grounds Act 1995 section 5(1)	The proposed development is not consistent with the development requirements and intentions for a Caravan Park, due to the transitional nature of Caravan Parks and their users.
		Caravan Parks are primarily based around short-term accommodation and tourist themes, with proponents visiting for short periods of time only.
		The proposed development aims to create a community of long-term residents who will respect, engage and support their community, through employment, economic and social pathways.
Nature	Means a facility in an area that:	The proposed development is not
Based Park	 a) Is not in close proximity to an area that is built up with structures used for businesses, industry or dwelling-houses at intervals of less than 100m for a distance of 500m or more; and b) Has been predominantly formed by nature; and c) Has limited or controlled artificial light and 	consistent with the intent and purpose of a Nature Based Park as it is located within an urban area and is not formed by nature.
	noise intrusion.	
Park Home	Means a caravan park at which park homes, but not any	The proposed development is not
Park	other caravans or camps, are situated for habitation.	intended to include Park Homes.



		Park Homes are intended for temporary accommodation.
Grouped Dwelling	A dwelling that is one of a group of two or more dwellings on the same lot such that no dwelling is placed wholly or partly vertically above or below another, except where special conditions of landscape or topography dictate otherwise and includes a dwelling in strata titles scheme with common property.	Tiny Homes are not defined as Dwellings and therefore cannot be considered through a Grouped Dwelling development.
Short-Stay Site	Means a site at a caravan park which is to be occupied consecutively by the one person or one group of people, for no longer than 3 consecutive months.	The proposed development is not intended for Short-Stay development and therefore is not consistent with this Land Use.

Table 1 Land Use Comparison

The subject land is subject to an approved Local Structure Plan (as detailed in Section 5.4 below), preliminary liaison with Shire Officers prior to lodging this development application advised that the proposed land use is considered consistent with the objectives of the approved Structure Plan in accordance with clause 27(1) of Schedule 2, Part 4 of the *Planning and Development (Local Planning Schemes) Regulations 2015* and that a Local Development Plan should be prepared in conjunction with the Development Application to provide further detail regarding the development requirements and management measures for the implementation and ongoing management of the proposed Tiny Home Community.

The Local Development Plan is further detailed in Section 5.2 of this report and a copy of the Plan is attached at **Appendix D**.

4.4 East Boyanup Local Structure Plan

The East Boyanup Local Structure Plan (the Structure Plan) was initially endorsed by the WAPC in February 2017. An amendment to the Structure Plan is currently with the WAPC for final consideration. The amendment focuses on the land in the northeast portion of the Structure Plan area (Precincts 7 and 8) and does not include the subject land.

Whilst the proposed development will not be subject to the R-Codes as there are no dwellings proposed, the overall site planning has taken into consideration boundary setbacks, open space allocations and density in accordance with the R20 coding to ensure it is consistent with the approved Structure Plan and provides cohesion with the long-term planning for East Boyanup.

Whilst the proposed development is intended to provide an alternate long-term residential development option for the area, as the Tiny Homes are considered transportable, the Tiny Homes could be decommissioned, services re-located where necessary and converted into standard residential development through a subdivision process in the future if required.

5 OTHER CONSIDERATIONS

5.1 Bushfire Management

The property is partially identified as being within a Bushfire Prone Area. A Bushfire Management Plan (BMP) has been prepared in accordance with SPP 3.7 Planning in Bushfire Prone Areas and Schedule 1 of the Guidelines for Planning in Bushfire Prone Areas V1.4 to support the proposed development.

A full copy of the Bushfire Management Plan is included at **Appendix C** of this report.

5.2 Local Development Plan

A Local Development Plan is a mechanism used to coordinate and assist in achieving better built form outcomes by linking overall site design to future development.



The Local Development Plan included as **Appendix D** facilitates the design and coordination of development within the subject site for the establishment as a Tiny Home Community.

The Local Development Plan also aims to streamline the ability for the establishment of Tiny Homes within the subject site through the inclusion of construction and compliance requirements for the proposed Tiny Homes. The proposed Tiny Homes will need to comply with the requirements of the approved Local Development Plan, Community Management Plan and are registered vehicles under the Vehicle Standards Bulletin 1 (VSB1), to ensure the standard and quality is maintained.

5.3 Tiny Home Community Management Plan

A Community Management Plan has been prepared in conjunction with the Development Application and associated Local Development Plan. The Community Management Plan is intended to serve as a strategic roadmap for effectively managing the community and outlines the goals, objectives and strategies for establishing and maintaining a successful and sustainable inclusive community.

The Community Management Plan has been prepared in accordance with the provisions of the now revoked LPP 6.13 and through referencing and research into the establishment of Tiny Home Communities. Whilst LPP 6.13 is no longer a guiding document within the Shire of Capel, it was created to support the establishment and ongoing management of Tiny Home Communities within the Shire of Capel and identified important requirements and management needs which are considered still relevant and appropriate and have therefore been incorporated into the creation and ongoing management plan for this proposed Tiny Home Community.

A full copy of the Community Management Plan has been included as **Appendix E**.

5.4 Water Use and Wastewater Management

To further support the proposed eco-living and sustainable practice of the proposed Tiny Home Community, the proponents have prepared a Water Use and Wastewater Management Plan, which will be provided to all residents and implemented by the Caretakers.

The Plan identifies ways to responsibly manage resources, minimise pollution, conserve energy and water and protect natural ecosystems, resulting in an individual and overall opportunity to actively reduce their footprint.

A full copy of the Tiny Home Community Water Usage and Wastewater Management Plan is attached at **Appendix F**.

6 CONCLUSION

The proposed development is consistent with the "Urban Development" zone of the Shire of Capel Local Planning Scheme No.8, approved Local Structure Plan and supported by a Local Development Plan and Community Management Plan which provides design requirements and management measures for the establishment and ongoing management and maintenance of the development.

Accordingly, Development Approval is respectfully sought for the proposed development of a "Use Not Listed – Tiny Home Community" at Lot 9 (44) Stephen Street, Boyanup in accordance with clause Section 18(4).



Appendix A Certificate of Title

WESTERN

TITLE NUMBER Volume Folio 891 2188

AUSTRALIA

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

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

BGRobeth

REGISTRAR OF TITLES

LAND DESCRIPTION: LOT 9 ON DEPOSITED PLAN 222154

REGISTERED PROPRIETOR: (FIRST SCHEDULE)

KATIE COOPER PRITCHARD LEE MARTIN PRITCHARD BOTH OF UNIT 1 1182 PITTWATER ROAD NARRABEEN NSW 2101 AS JOINT TENANTS

(T Q242033) REGISTERED 9/12/2024

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

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

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

STATEMENTS:

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

SKETCH OF LAND: PREVIOUS TITLE: PROPERTY STREET ADDRESS: LOCAL GOVERNMENT AUTHORITY: 2188-891 (9/DP222154) 1383-702 44 STEPHEN ST, BOYANUP. SHIRE OF CAPEL





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Appendix B Site and Soil Evaluation



ABS&G



Aussie Building Specialists and Geotech Civil, Structural and Geotechnical Consulting Engineers

Site and Soil Evaluation for Onsite Wastewater Management Report

Site and Soil Evaluation for Onsite Sewage Management Tiny Homes Project 44 Stephen Street, Boyanup Prepared for:Lee and Katie Pritchard Prepared by: Aussie Building Specialists and Geotech Telephone:0416 130 219 Email: engineering@aussiebuildings.com.au Ref No: ABS/SOC/BYP/223/2024 Date: 08-12-2024

Document History

Issue No (version)	Original prepared by	Issued to (description /section revised)	Date	Reviewed by	Field Assessment Date	Approved by	Approval Date
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Rev1	SK	Approval	12.12.2024	SK	22.10.2024	SK	
Rev2	SK	Approval	09-03-2025	SK	22.10.2024	SK	/

STRUCTURAL CIVIL GEOTECHNICAL TRANPORTATION Consulting Engineers





08-12-2024

1. Introduction

1.1 The Consultant

The field investigation and this report have been prepared and overseen by the following experienced professional:

Shah Kakakhel – Civil, Structural, and Geotechnical Consulting Engineer Aussie Building Specialists and Geotech

Shah Kakakhel is a highly experienced Civil, Structural, and Geotechnical Consulting Engineer with over 15 years of professional expertise, currently representing Aussie Building Specialists and Geotech. His career encompasses extensive work in civil engineering, structural consulting, and geotechnical investigations, supporting a wide array of projects ranging from small-scale residential developments to large, mixed-use commercial projects.

Shah's proficiency in the design and consultation of wastewater treatment systems is particularly notable. He has successfully contributed to projects of varying scales, including single residences and complex commercial developments. In addition, Shah has been instrumental in overseeing civil construction processes, conducting site supervision, and carrying out comprehensive testing of construction materials.

Key competencies include:

Earthworks Construction Monitoring: Overseeing residential and commercial earthworks, ensuring compliance with engineering standards and project specifications.

Materials Testing and Inspection: Expertise in the evaluation of soils, aggregates,

concrete, bricks, blocks, rocks, and pavements through rigorous laboratory and field testing protocols.

Site Supervision: Managing on-site activities to maintain quality control, ensure safety, and meet project timelines.

Geotechnical Investigations: Conducting detailed soil and site evaluations to support structural design and project feasibility.

With over 15 years of experience in the industry, Shah brings a wealth of technical knowledge and practical insight to his work. His dedication to delivering high-quality engineering solutions, tailored to the unique requirements of each project, has earned him recognition as a trusted and reliable consultant in civil, structural, and geotechnical engineering.

EXECUTIVE SUMMARY

Aussie Buildings Specialists and Geotech was engaged to undertake a Site-and-Soil Evaluation (SSE) for a proposed development at 44 Stephen Street, Boyanup. The subject lot has a land area of approximately 22,147m².

The SSE will be conducted by Aussie Building Specilaists and Geotech, and the results will help inform the design of an onsite sewage management system to support the development. The proposed development consists of:

49 Tiny Homes

This evaluation aims to assess the soil and site conditions, ensuring the proposed system meets environmental and regulatory standards. The final documentation will include a detailed conceptual design for the sewage management system and will be submitted as part of the application to the Shire of Capel for review and approval. The evaluation will also include recommendations for monitoring, management, and ongoing maintenance of the system. As the site has sufficient space for effluent disposal, the findings will support the installation of a compliant sewage system.

Assessment summary:

Findings of site investigation:

• In accordance with PlanWA online mapping the subject site is located within a sewage sensitive area (refer to Table 2).

• Overall site slope calculated at <10% (refer to Table 2).

• The site is NOT inside a public drinking water source area as per Public drinking water source areas (PDWSA) online mapping (refer to Table 2).

• There are NO Private bores and/or other water sources for potable or irrigation purposes within the property.

• The Preston river is located to the west of the subject site, approximately 360m' and the property and the LAA lies well outside the100 meters buffer from the edge of the river or riparian boundary. This setback distance aligns with the guidelines outlined in Table 2, ensuring that the development maintains ecological integrity and minimises potential environmental impacts.

• The Preston river is located to the west of the subject site, approximately 360m. This distance places the site well outside the typical influence of the Annual Exceedance Probability (AEP) floodplain that is commonly associated with the river. Floodplain mapping indicates that properties located further from the river, such as this one, generally do not fall within the flood-prone areas, which are more concentrated in closer proximity to the watercourse.

The records groundwater for this site at 9.28m depth (11m AHD). Seasonal ground/perched water was NOT recorded at 2.5m depth below ground level during site investigations conducted on 22.10.2024.
Soil permeability has been carried out using Constant Head method in accordance with AS1547. An average daily permeability rate measured at 0.15m/day (refer to Table 4).

• The Department of Primary Industries and Regional Development (DPIRD) indicates a Phosphorus Export Hazard of <3% (high to extreme). Phosphorus Retention Index (PRI) testing was not carried out due to the site location within a sewerage sensitive area (refer to Table 2).

Figure 1Flood Map



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Extent of flooding

Floodplain





Esri, HERE, Garmin, Maxar

2 SITE AND PROPOSED DEVELOPMENT DESCRIPTION

The proposed Tiny Home Community at 44 Stephen Street, Boyanup (Figure 1) spans 2.21 hectares and will consist of 49 tiny homes, designed for sustainable living. A decentralised wastewater treatment system will be implemented to manage the wastewater generated by the community. This system will be tailored to the needs of the development, offering an efficient solution for wastewater disposal while minimising environmental impact.

A comprehensive site-and-soil evaluation has been conducted, ensuring the land's suitability for effluent disposal and confirming compliance with environmental regulations. The evaluation includes a detailed analysis of soil conditions, groundwater levels, and potential environmental risks, ensuring that the land can support an efficient on-site treatment system.

The system will treat effluent on-site using advanced methods, ensuring safe processing and disposal, preserving the surrounding environment, and maintaining water quality. This approach reflects the community's commitment to sustainability, ensuring the development meets regulatory standards while contributing positively to the local ecosystem.

The decentralised system will be designed to meet the specific needs of the tiny home community, providing long-term, efficient, and environmentally conscious wastewater management.

Development Characteristic	Description
Site Address	44 Stephen Street, Boyanup, WA
Owner/Developer	Lee and Katie Pritchard
Postal Address	44 Stephen Street, Boyanup
Contact/Mob	0422 273 724
Local Government	Shire of Capel
Zoning	Urban
Proposal & Lot sizes	Development on 2.21 hectares
Water Supply	Water Corporation (Water Corp)
Anticipated Wastewater Load	Daily hydraulic load of 4,080L/day for the decentralized system
Availability of Sewer	Currently unsewered and unlikely to be serviced by reticulated sewerage in the next 10–20 years due to low density and high cost

3 SITE AND SOIL ASSESSMENT Table 1

3.1 Site Assessment

Aussie Building Specialists conducted a comprehensive site investigation at **44 Stephen Street, Boyanup**, on **22.10.2024**, to assess the suitability of the land for an on-site sewage management system. The assessment combined detailed on-site investigations with a thorough desktop study, which included the review of publicly available geological and topographic data. The site investigation encompassed visual inspections, borehole sampling, percolation testing, and soil identification, while the desktop study examined relevant publications on geology, groundwater conditions, and topography.

The findings of the site and soil assessment indicate that the proposed sewage system is feasible and can be designed to meet the requirements outlined in AS 1547, Health Regulations 1974, and the Government Sewerage Policy 2019. The system will be capable of safely managing effluent and will comply with all relevant environmental standards.

Key Site Features:

The site is located within a sewage-sensitive area, according to PlanWA online mapping. There are no private bores located within the property.

The site is not located within a public drinking water source area, as per PDWSA online mapping.

The Preston river is located to the west of the subject site, approximately 360m, and the land is not affected by the AEP floodplain.

The risk of effluent transport offsite is low, indicating the effectiveness of on-site management.

These findings confirm that the site is suitable for the proposed wastewater treatment system and that environmental concerns, including effluent management and water quality, will be effectively addressed.

Figure 2 Locality Map



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Cadastre Address (LGATE-002) - Large Scale

LGA



Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, SLIP/LANDGATE,

SK

Site characteristics and mitigation measures Table 2

Feature	Description	Level of Constraint	Mitigation Measures
Climate	Mean annual rainfall (all years) – 799mm Station 009990 Boyanup Average annual pan evaporation is 1700mm (derived from BOM Annual Average PAN Evaporation Map). <u>Note: BOM recorded rainfall over 8 weeks prior to</u> <u>site investigations of 374.4mm, approx. 93% of the</u> recorded bistorical mean for the same period		NN
Exposure	Isolated trees are located around perimeter , the site is considered to have high exposure to sun and wind.	Low	NN
Vegetation	No hydrophillic vegetation in the proposed effluent management area or surrounds.	Low	NN
Landform & Drainage	Landform & DrainageNo visible signs of water ponding at time of assessment.		NN
Slope	The lot falls from East to West with a slope of less than 10%.		NN
Fill	Fill No signs of imported fill material observed at time of assessment.		NN
Surface Gravel and Rock Outcrops	No surface gravel or rock outcrops observed.	Low	NN
Erosion Potential	No evidence of sheet or rill erosion; No evidence of landslip and landslip potential is low due to the small slope of site.	Low	NN
Vertical Separation From	Groundwater/Perched water was not encountered in BH1 to BH10 during drilling at depth of up to 2.5m below surface 1007.2024.		
Groundwater	The subject site is located within the Bunbury West subarea of the proclaimed Bunbury Groundwater Area. From available date depth of Ground water is around 9.28m (11m AHD).	Low	Ensure minimum 1.5m separation between maximum groundwater level and discharge point of sewage system for the LAA.
Public Drinking Water Source Areas &The site is located in a sewage sensitive area. The Preston River catchment is situated in the South West of Western Australia, extending through the Blackwood Plateau and the Swan Coastal Plain . The catchment has been impacted by land clearing, especially in the lower reaches near Boyanup, but it remains an important water resource for agriculture, particularly with water supply from Glen Mervyn Dam . This makes it a distinct environmental area, although it shares some hydrological features with nearby coastal plains.		High	Ensure minimum 1.5m separation between maximum groundwater level and discharge

Sewage Sensitive Areas	The site not within a public drinking water source area as per public drinking source areas (PDWSA) online mapping.		point of sewage system for the LAA.
Phosphorus Retention	The Department of Primary Industries and Regional Development (DPIRD) indicates a Phosphorus Export Hazard <3% (high to extreme).	Low	Provide ATU with nutrient and phosphorus removal.
Surface Waters and Separation From Water Resources	The Preston river is located to the west of the subject site, approximately 360m	Low	LAA shall be located a minimum 100m clearance from the edge/riparian
Rainfall Run-on and Seepage	No evidence of stormwater run-on to the proposed LAA observed.	Low	
Flood Potential	The Western boundary of the Lot is not affected by AEP Floodplain Figure 2	Low	
Potential Inundation Areas	The Lot is not affected by the 10% AEP rainfall Event	Low	
Horizontal Setback Distances	All relevant setback distances to the LAA are achievable for proposed lots.	Low	
Available Land Application Area (LAA)	Considering all the constraints and buffers, the site has ample suitable land for a LAA for secondary treated effluent disposal. The proposed effluent management area is as nominated in Figure 3 .	Low NN	

*NN: not needed **LAA: Land Application Area

3.2 Soil Assessment

A Geotechnical Site investigation was conducted across 10 x locations on 22.10.2024. A soil retrieval probe was used to sample the soil by bore holes up to 2.1m in depth. Constant Head permeability testing was carried out as per AS1547:2012. This was sufficient to adequately characterise the soils expected throughout the area of interest. Soil profile description for the boreholes are provided in the appendix. The site geotechnical assessment and percolation test results are consistent with soil permeability Category 4: Clay Loams – Weakly Structured as per AS1547-2012. Table 3 below provides as assessment of the characteristic of boreholes nearest to the proposed LAA. All supporting logs and documentation can be found in the appendix of this report.

Table 3: Soil Assessment

Feature	Assessment	Level of Constraint	Mitigation Measures
Profile Depths	0-200mm Topsoil. 200- 2500 mm Sandy CLAY: fine to medium grained, Trace gravel, high plasticity, red/brown (Alluvium)	Moderate	Provide secondary treatment to systems with large daily hydraulic loads.
Depth to Water Table	Groundwater/Perched water was not encountered in BH1 to BH10 during drilling at depth of 2.5m below surface level during site inspection conducted on 22.10.2024. Record records indicate a maximum ground water level of 9.28 m depth (11 m AHD) below existing ground level. The Landgate website indicates the ground surface level at this site is approximately 7 - 18m Australian Height Datum (AHD) falling East to West.	Low	Ensure minimum 1.5m separation between maximum groundwater level and discharge point of sewage system for the LAA.
Particle Size distribution	90% passing 75mm	Low NN	
Soil Colour	Red/Brown	Low	NN
Soil Permeability & Design Loading Rates	Soil Category 4: Clay Loams – Weakly meability & sign Loading es Mean Permeability of 0.15m/day using the constant head method.		Installation of secondary treatment system with drip irrigation type effluent disposal system.

Test Location	Testing Depth	Soil Type	Permeability	
BH8	0 – 0.7m	Sandy CLAY	0.162m/day	
BH9	0 – 0.7m	Sandy CLAY	0.152m/day	
BH10	0 – 0.7m	Sandy CLAY	0.135m/day	

Table 4: Permeability Test Results

OVERALL LAND CAPABILITY OF THE SITE

Based on the results of the site and soil assessment tabled above and provided in the appendices, the proposed onsite sewage system is able to be designed and installed to satisfactorily meet the requirements of AS1547 and the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974 and Government Sewerage Policy 2019.

4. Wastewater Management System

Refer to the DOH website for the list of approved products: <u>http://www.health.wa.gov.au/</u>. The property owner has the responsibility for the final selection of the treatment system and will include the details in the application to install an onsite sewage system for local government approval.

4.1 Treatment System

Provide a secondary treated effluent with nutrient removal and disposal, with a minimum required effluent quality of:

- Biochemical Oxygen Demand (BOD) ≤ 20 mg/L
- Total Suspended Solids (TSS) ≤ 30 mg/L
- Escherichia (E) coli ≤ 10 cfu/100 mL
- Phosphorus concentration $\leq 1 \text{mg/L}$
- Nitrogen concentration ≤ 10 mg/L
- 90% of the samples shall have a BOD5 less than or equal to 20 g/m³ with no sample greater than 30 g/m³.
- 90% of the samples shall have TSS less than or equal to 30 g/m³ with no sample greater than 45 g/m³.

4.2 Land Application System

Description of the effluent disposal system.

Effluent disposal systems shall be approved by the Department of Health for the application.

Sizing the Disposal System

The system is sized according to the calculated daily hydraulic load, the soil classification, and the quality of effluent being disposed.

Data Used for Sizing the Land Application Disposal Area: Estimated Daily Hydraulic Load:

105 residents × 85L/person/day = 8,925L/day Soil Classification: Category 4: Clay Loams – Weakly Structured as per AS1547. Design Irrigation Rate (DIR): 3.5mm for secondary wastewater treatment system. Land Application Area (LAA) Calculation In accordance with Government Sewage Policy 2019 (Table 2):

Secondary treatment for Soil Category 4 – Clay Loams = Conversion Factor: 0.286 LAA Calculation:

= Hydraulic Load × Secondary Treated Conversion Factor

= 8,925 × 0.286

= 2,553m²

Note: Application for the new effluent system is to be sized in accordance with current governing regulations.

The property owner/developer has the responsibility for the final selection of the secondary treatment system and will include the details of it in the Onsite sewage system Approval to Install application form for Local Government approval.

Siting and configuration of the proposed disposal system

The effluent disposal system shall be located in a designated area to enhance evapotranspiration and its amenity and shall:

- Not be used for purposes that compromise the effectiveness of the system or access
- for future maintenance purposes.
- Be used only for effluent application.
- Have boundaries clearly delineated by appropriate vegetation or other type of border.
- Have no run-off or seepage of effluent beyond the designated area.

Buffer distances

Setback buffer distances from effluent land application areas and treatment systems are required to help prevent human contact, maintain public amenity and protect sensitive environments. The relevant buffer distances for this site are:

The disposal system should maintain minimum horizontal setbacks of:

- 100m from high water mark of a reservoir or any bore used for public drinking, reservoir, waterways, significant wetlands and not within a waterway foreshore area or wetland buffer (the separation distance is to be measured from of riparian or wetland vegetation).
- \circ 30m from potable private bore intended for consumption.
- 1.8m downslope from property boundaries (may be dependent on local authority guidelines)
- o 1.2m from driveways and paved surfaces
- o 6.0m from any stormwater drainage systems
- o 1.8m from building footings

• 1.5m vertical separation from the discharge point of the effluent disposal system to the highest groundwater level (due to location of lot in a sewage sensitive area).

• On completion of the proposed disposal area, appropriate landscaping should be undertaken (i.e. planting of shallow rooted grasses / shrubs).

Installation of the disposal system.

Installation of the disposal system must be carried out by a suitably qualified and licensed plumber or drainer experienced with onsite sewage disposal systems. Figure 2 shows the preliminary siting of the proposed wastewater disposal system in line with the required setbacks. This plan may differ based on the final number of occupants per building, dwelling location and any other intended developments on site.

Figure3 : Site Plan – Effluent Disposal System



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- . J LGA
- 10 metre contours (DPIRD-073)
 - 2 metre contours (DPIRD-072)



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5. Stormwater Management

The Land Application areas for the proposed Lots are located on the elevated section of the Lots, therefore Stormwater run-off is not expected to be a concern. It is expected that run-off from the developed site will be managed and maintained within the Lots.

Stormwater works to be designed to the Shire of Capel requirements and approvals, with proposed criteria of 1 in 20-year ARI 5 minute duration event (subject to Shire approval) for proposed the development.

Note: Design of the stormwater drainage done by Engineer as a separate scope of work.

6. Monitoring, Operation and Maintenance

Maintenance is to be carried out in accordance with the manufacturers instructions and to AS/NZS 1547-2012 Section 6, Appendix T & U. The treatment system will only function adequately if appropriately and regularly maintained.

To ensure the treatment system functions adequately, residents must:

- Scrape dishes and remove fats and solids before washing.
- Not dispose solids, sanitary napkins and other hygiene products in the system.
- Not use a food waste disposal unit.
- Use household cleaning products that are suitable for ATU system.
- Keep as much fat and oil out of the system as possible.
- Conserve water (AAA rated fixtures and appliances are recommended).

To maintain adequate performance of the system, residents must ensure:

- Tanks and biosolids settling vessels undergo regular pump-out by licensed waste contractors to remove accumulated sediment.
- No structures and/or paths are constructed over the LAA, vehicles avoid access to the LAA to prevent damage.
- ATUs to undergo maintenance servicing by a provider approved by the Department of Health at minimum three-monthly intervals.
7. Conclusions

As a result of our investigations we conclude that a sustainable onsite sewage management system can be installed to meet the needs of 44 Stephen Street Boyanup. Specifically, we recommend the following:

- The site is in a sewage sensitive area as per PlanWA online mapping.
- Installation of Secondary Treated Effluent system/s with nutrient removal capabilities that discharges treated sewage with phosphorus and nitrogen concentrations of less than 1mg/L and 10mg/L respetively, by a suitable DOH-approved treatment system of volume required for final calculated daily hydraulic load.
- The Perth Groundwater Atlas (Waters & Rivers Commission) records groundwater for this site at 9.28m depth (11m AHD). Seasonal ground/perched water was not recorded at 2.5m depth below ground level during site investigations conducted on 22.07.2024.
- The base of the Land Application Area (LAA) shall maintain a minimum of 1.5m vertical separation to the maximum recorded ground water level of 9.28m AHD.
- The Soil Category for this lot is classified as "Category 4: Clay Loams Weakly Structured as per AS1547-2012".
- Domestic Wastewater to be disposed by drip irrigation type disposal system.
- Positioning of LAA to be minimum 100m from adjacent waterways at all times.
- Operation and management of the treatment and disposal system in accordance with the manufacturers instructions and to AS/NZS 1547, the DOH Approval and the recommendations made in this report.

8. References

Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974 Government of Western Australia (2019). *Government Sewerage Policy.* Standards Australia/Standards New Zealand (2012). AS/NZS 1547:2012 On-site domesticwastewater management.

Code of Practice for the Design, Manufacture, Installation and Operation od Aerobic Treatment Units (ATU's) – Government of Western Australia Department of Health (2001) Standards Australia/Standards New Zealand (2014). AS/NZS 1289:2014 *Methods of testing soils for engineering purposes Definitions and general requirements*. Government of Western Australia, Department of Planning, Lands and Heritage. *PlanWA* <u>https://espatial.dplh.wa.gov.au/PlanWA/Index.html?viewer=PlanWA</u>

Government of Western Australia, Department of Water and Environmental Regulation. *Western Australia floodplain mapping*

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<u>https://dpird.maps.arcgis.com/apps/webappviewer/index.html?id=662e8cbf2def492381fc915</u> <u>aaf3c6a0f</u>

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Government of Western Australia, Department of Water, Peel-Harvey Nutrient Report 2015 – Nambeelup Brook 2017 update <u>https://www.wa.gov.au/system/files/2023-03/Nambeelup-Brook-Peel-Harvey-catchment-nutrient-report-2015-Update-2017.pdf</u>

The recommended minimum setback distances have been based on guidelines specified in accordance with GSP 2019 and AS / NZS 1547:2012.

5 SETBACK DISTANCES OF THE LAND APPLICATION AREA

Feature	Setback distance
Private bore for household/drinking water purposes	30 m
A drainage system that discharges directly into a waterway or wetland without treatment	100 m
Waterway/watercourse (measured from the edge of the wetland vegetation)	100 m
Vertical distance to peak groundwater levels	1.5 m
Property boundary	1.5 m
Buildings/houses	2.0 m
Surface water	25 m
Recreational areas (children's play areas, swimming pools and so on)	5.0 m
In-ground water tank	5.8 m
Retaining wall and Embankments, escarpments, cuttings	3 m or 45° angle from the toe of the wall (whichever is greatest)

Table 3: Relevant setback distances in accordance with GSP 2019 and AS / NZS 1547:2012

APPENDIX 1- Horizontal and vertical setback distances

Site Feature	Setback Distance, m
Horizontal setback distances	
Treatment tanks to buildings, property boundaries, driveways, paths and other tanks	1.2
Tranches, beds and soak wells to boundary, building, tanks and other land application systems	1.8
Tranches, beds and soak wells to trafficable areas	1.2
Any land application system to wells, stream, private bores or underground source of water intended for human consumption	30
Tranches, beds and soak wells to subsoil drainage or open drainage channel (as per <u>Section 5.2.2 of the GSP</u> a separation of 100m is required if there is discharge into a waterway or significant wetland without treatment of the discharge)	6.0
On-site wastewater system to water resources (for more details refer to Section 5.2.2 of the GSP)	100
 On-site wastewater system must not be located within any area subject to inundation and/or flooding in a 10 per cent Annual Exceedance Probability (AEP) rainfall event 	

Soil Category	Texture	Structure	Acceptable Psorp (mg/kg)
1	Gravels and sands ¹	Structureless	50
2a	Sandy loams	Weak	100
2b	Sandy loams	Massive	100
За	Loams	High / moderate	200
3b	Loams	Weak / massive	200
4a	Clay loams	High / moderate	400
4b	Clay loams	Weak	400
4c	Clay loams	Massive	400
5a	Light clays	Strong	500
5b	Light clays	Moderate	500
5c	Light clays	Weak / massive	500
6a	Med-heavy clays	Strong	600
6b	Med-heavy clays	Moderate	600
6c	Med-heavy clays	Weak / massive	600

APPENDIX 2 – Indicative Phosphorus Sorption Uptake Values for each soil type

Source: WaterNSW (2019), Designing and Installing On-Site Wastewater Systems

Note 1: Some gravel and sands in Western Australia, for example Bassendean Sand prevalent on the Swan Coastal Plain, have zero or near zero capacity to adsorb phosphorus.

APPENDIX 3 - Number of months each year when rainfall exceeds pan-evaporation in the southern part of WA.

This information was compiled using rainfall data from the Bureau of Meteorology, and panevaporation data from the Department of Agriculture and Food of WA.



If Sand Import is required then the following Sand Supplier has been tested and can be imported to mix with existing soil for achieving higher permeability.



Ph: 08 9726 2204 PO Box 5068, Bunbury WA 6231 47 Craigie St., Davenport, WA 6230

44 Stephen Street Boyanup

BOREHOLE L	OG SHEET
------------	----------

Civil Struc BOREHOLE No:	TP No8
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Å

SHEET: 1 of 1 (Sampling Depth (TP8 0m-0.7m)

DATE STARTED	22-10-2024 DRILLING

R.L. SURFACE TBA

CONTRACTOR ABSG Completed 22-10-2024	R.L. SURFACE TBA DATUM	
EQUIPMENT Mech Auger	SLOPE 90° BEARING	
HOLE SIZE 300	HOLE LOCATION TP 1 2 3 4 5 6 7 8 9 10	
NOTES No Ground water Encoutered	LOGGED BY SK CHECKED BY SK	

oth	Graphic	Stratum Description	Consistency	Blow	15/150	mm	San	ples	and a	in the second
				5 1	10 15	20	Depth	Туре	MG	3
		Topsoil: CI: CLAY: fine to medium grained, low plasticity, with sand, trace gravel, dark red, (Alluvium)	S-F						Wa	
2									м	
		Terminated at 2.50 m							_	

2. Hole stability: 3. Samples taken: None

4. Co-ordinate system: UTM

44 Stephen Street Boyanup

BOREHOLE LO	G SHEET
--------------------	---------

Aussie Building Specialists Coult Struct BOREHOLE No: TP No9		
SHEET: 1 of 1	(Sampling Depth (TP9 0m-0.7m)	
DATE STARTED 22-10-2024 DRILLING	i	
CONTRACTOR ABSG Comple	ted 22-10-2024 R.L. SURFACE _TBA DATUM	
EQUIPMENT Mech Auger	SLOPE 90° BEA <u>RING</u>	
HOLE SIZE 300	HOLE LOCATION TP 1 2 3 4 5 6 7 8 🕥 10	
NOTES No Ground water En	coutered LOGGED BY <u>SK</u> CHECKED BY <u>SK</u>	

oth Graphic	Stratum Description	Consistency	Blow	DCP 6/150	mmi	San	npies	NT45	Valuer	
10 M	atomen a read attach	100000	5 1	0 15	20	Depth	Туре	No		
	Topsoil: CI: CLAY: fine to medium grained, low plasticity, with sand, trace gravel, dark red, (Alluvium)	S-F								
								M		
2	Terminated at 2,00 m									

Remarks 1. Termination reason: Refusal - interpreted on stiff clay

Å

2. Hole stability: 3. Samples taken: None 4. Co-ordinate system: UTM

44 Stephen Street Boyanup

BOREHOLE LOG SH

Å

ssie Building Specialists BOREHOLE No: TP No10		
SHEET: 1 of 1 (Sa	mpling Depth (TP10 0m-0.7m)	
DATE STARTED 22-10-2024 DRILLING		
CONTRACTOR ABSG Completed 22-10-2024	R.L. SURFACE TBA	DATUM
EQUIPMENT Mech Auger		BEARING
HOLE SIZE 300	_ HOLE LOCATIONTP 1 2 3 4	456789 🛈
No Ground water Encoutered	_ LOGGED BY _SK	CHECKED BY SK

Depth	Graphic	Stratum Description	Consistency	Blows/15	50mm	San	nples	Isture	All for
		Terroll		5 10 1	5 20	Depth	Туре	N	20
1		Topson.				100			
1.7			1						
-		CH: Sandy CLAY: fine to medium grained, high plasticity,							
1		trace gravel, red/brown							
13	0.3.4	(Alluvium)	S						
1				<u>h </u>					
1									
13				711					1
-									1
1									I .
4	1.5.5		Con low						1
13			St - VSt					M	
1-									
1			-						
-	124								
1	1-1-1								1
-									
12									
4	227								
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									1
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13	12-2-								1
1.e	1000								
1		Terminated at 1.90 m							1
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-									1
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-	0								
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-									1
-	2								
1	8								
-									
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3	-			11	4	<u> </u>	-	-	-
mark	S ation man	on: Refusal interpreted on stiff day							
fole st	tability: H	lole stable							
ample	es taken:	None							



TEST REPORT

Compaction Method: Standard AS1289.5.1.1



CLIENT: Lee and Katie Pritchard **PROJECT:** Proposed Tiny Home Community **LOCATION:** 44 Stephen Street Boyanup

PROPOSED USE: Proposed Tiny Home Community

SAMPLE NO: ABSG/LP/KP/FSOC/01 JOB NO: 229-12-37 FIELD DESCRIPTION: Sandy Clay" DATE SAMPLED: 22-Oct-2024 DATE TESTED: 07-Nov-2024 DEPTH TESTED mm: 0.7m-1.5m

Sample Location: BH8 0–0.7 m

Soil Description: Brown Sand with Cla	ау
Retained on 9.5 mm Sieve (%)	0.0
Maximum Dry Density (t/m³)	1.77700
Optimum Moisture Content (%)	14.8
Moisture at Compaction (%)	14.8
Dry Density of Sample (t/m³)	1.603
Achieved Dry Density Ratio (%)	90.2
Achieved Moisture Ratio (%)	100.0
Surcharge Mass (kg)	2.310
Surcharge Pressure (kPa)	2.8
Moisture % After Permeability (%)	20.2

Coefficent of Permeability

1.8x 10-6 m/s

References:

- AS1289.6.7.2 - Australian Standard for Soil Testing

Prepared by:

- Shah Kakakhel
- Structural Civil and Geotechnical Engineer
- MIEAust Reg Number: 4065311
- Director of Engineering
- Aussie Building Specialists and Geotech
- Email: engineering@aussiebuildings.com.au

Notes:

Sample site selected by Shah Sampled by Shah

Approved Signatory:Shah KakakhelDate:20-11-2024Report Number:ABSG/LP/KP/FSOC/01



Report Number:

ABSG/LP/KP/FSOC/02

TEST REPORT



CLIENT: Lee and Katie Pritchard **PROJECT:** Proposed Tiny Home Community **LOCATION:** 44 Stephen Street Boyanup SAMPLE NO: ABSG/LP/KP/FSOC/02 JOB NO: 229-12-37 FIELD DESCRIPTION: Sandy Clay" DATE SAMPLED: 22-Oct-2024 DATE TESTED: 07-Nov-2024 DEPTH TESTED mm: 0.7m-1.5m

PROPOSED USE: Proposed Tiny Home Community

Sample Location: BH9 0–0.7 m				
Soil Description: Brown Sand with Clay		Compaction Method: Standard AS1289 5 1 1		
Retained on 9.5 mm Sieve (%)	0.0			
Maximum Dry Density (t/m³)	1.77700			
Optimum Moisture Content (%)	14.8			
Moisture at Compaction (%)	14.6			
Dry Density of Sample (t/m³)	1.596			
Achieved Dry Density Ratio (%)	89.8			
Achieved Moisture Ratio (%)	98.6			
Surcharge Mass (kg)	2.310			
Surcharge Pressure (kPa)	3.0			
Moisture % After Permeability (%)	20.3			
Coefficent of Permeability		1.759×10 −6 m/s		
References: - AS1289.6.7.2 - Australian Standard for So Prepared by: - Shah Kakakhel - Structural Civil and Geotechnical Engine - MIEAust Reg Number: 4065311 - Director of Engineering - Aussie Building Specialists and Geotech - Email: engineering@aussiebuildings.con	oil Testing er n.au			
Notes: Sample site selected by S Sampled by Shah	Shah			
Approved Signatory: Shah Ka Date: 20-11-2(akakhel)24			



TEST REPORT

Compaction Method: Standard AS1289.5.1.1



CLIENT: Lee and Katie Pritchard **PROJECT:** Proposed Tiny Home Community **LOCATION:** 44 Stephen Street Boyanup

PROPOSED USE: Proposed Tiny Home Community

SAMPLE NO: ABSG/LP/KP/FSOC/03 JOB NO: 229-12-37 FIELD DESCRIPTION: Sandy Clay" DATE SAMPLED: 22-Oct-2024 DATE TESTED: 07-Nov-2024 DEPTH TESTED mm: 0m-0.7m

Sample Location: BH10 0–0.7 m

Soil Description:	Brown Sand with Clay	
Retained on 9.5 mm \$	Sieve (%)	0.0
Maximum Dry Dens	sity (t/m³)	1.77700
Optimum Moisture C	ontent (%)	14.8
Moisture at Compact	tion (%)	14.8
Dry Density of Samp	le (t/m³)	1.611
Achieved Dry Densi	ty Ratio (%)	90.7
Achieved Moisture	Ratio (%)	100.0
Surcharge Mass (kg)		2.310
Surcharge Pressure	(kPa)	2.9
Moisture % After Pern	neability (%)	20.0

Coefficent of Permeability

1.563×10 −6 m/s

References:

- AS1289.6.7.2 - Australian Standard for Soil Testing

Prepared by:

- Shah Kakakhel
- Structural Civil and Geotechnical Engineer
- MIEAust Reg Number: 4065311
- Director of Engineering
- Aussie Building Specialists and Geotech
- Email: engineering@aussiebuildings.com.au

Notes:

Sample site selected by Shah

Sampled by Shah

Approved Signatory:Shah KakakhelDate:20-11-2024Report Number:ABSG/LP/KP/FSOC/03

Simplifying Engineering



44 Stephen Street Boyanup

Report Title:	Site and Soil Evaluation and Geotechnical Investigation of Proposed Development 44 Stephen Street Boyanup				
Doc. Ref:	ABS/SOC/191/2024				
Client:	Lee and Katie Pritchard				
Signatures:	Prepared By:	Authorised By:			
	Click Kakakhel	Shah Kakakhel			
	Shah Kakakhel BE(Civil & Structural), MIEAust Principal Consulting Engineer 4065311	Shah Kakakhel <i>BE</i> (<i>Civil & Structural</i>), <i>MIEAust</i> Principal Consulting Engineer 4065311			

Aussie Building Specialists & Geotech Civil, Structural & Geotechnical Engineers Albany-Bunbury-Perth Telephone: 0416 130 219 Email: engineering@aussiebuildings.com.au

1. PROJECT DETAILS

1.1 Background

Lee and Katie Pritchard engaged Aussie Building Specialists and Geotech Pty Ltd to investigate 44 Stephen Street, Boyanup.

1.2 Introduction

At the request of Lee and Katie Pritchard (hereafter referred to as *The Client*), Aussie Building Specialists and Geotech Pty Ltd (hereafter referred to as *ABS&G*) have conducted a Geotechnical Investigation at 44 Stephen Street, Boyanup (hereafter referred to as *the Site*).

The purpose of the investigation was to provide the following:

- Investigation of the subsurface profile at the proposed Site.
- Analysis of the site investigation and laboratory test results to assess and provide:
 - Earthworks Recommendations, including batters and retaining structures.
 - Parameters and Recommendations for shallow/strip footings for residential buildings, including Bearing Capacity.
 - Permeability report for on-site septic system recommendations during the peak winter season.

1.1 Development Proposal

The site is located in Boyanup, and the client proposes to develop 49 Tiny Homes on the site.



Figure 1 Site Location

1.1 Field Investigation – Scope of Works

The field investigation was carried out on **22nd October 2024**. The fieldwork comprised the following sequence of activities:

- Drilling boreholes to a depth of **2.5 m** using a mechanical auger.
- Retrieving samples of representative materials from the boreholes.

All fieldwork, including logging of the subsurface profile and collection of samples, was undertaken by a Geotechnical Engineer from ABS&G Pty Ltd. The locations of the completed geotechnical investigations within the proposed site area, as well as the subsurface conditions encountered, are summarized in this report, along with explanatory notes.

Fieldwork was conducted in accordance with Australian Standard AS 1726-2017: Australian Standard – Geotechnical Investigations.

The classification of soils in the field is subjective, based on the experience and judgment of the supervising Geotechnical Engineer, and some variations in the soil descriptions from the actual material type may occur.

The soil classification descriptions, fieldwork, and laboratory testing were carried out in general accordance with the following Australian Standards:

• AS 1726 – 2017: Geotechnical Site Investigations.

A description of the investigation method, along with the borehole records and a site plan showing the approximate locations of the boreholes, is provided in this report (see Figure 1).

1.2 Limitations

Reference should be made to the 'General Notes' at the end of this report.

The information provided is site- and project-specific, applicable only to the location investigated, and was prepared solely for the use of our client in accordance with a specific purpose. As such, it does not necessarily address all aspects of ground behavior on the subject site.

The responsibility of ABS&G Pty Ltd is solely to its client. It is not intended for any third party to rely upon this report, and no liability will be accepted for use by any third party. This report is protected by copyright and shall not be reproduced, either in part or in full, without the prior written permission of ABS&G Pty Ltd.

1.3 Laboratory Testing

Laboratory testing was carried out in laboratories on selected samples retrieved from the site investigation program. The testing was directed towards assessing the reactivity of the subsurface material.

The laboratory testing was conducted in general accordance with AS 1289 – Methods of Testing Soils for Engineering Purposes.

2. Desktop Study

2.1 Geological Setting

The **Collie sheet 1:250,000 Environmental Geology Series** prepared by the Geological Survey of Western Australia indicates that the following geological layers underlie the site:

- Fertile Loam
 - Characterized by a balanced mixture of sand, silt, and clay.
 - Typically rich in organic matter and nutrients, making it highly suitable for agricultural and horticultural use.
 - Known for good drainage and moisture retention.
- Granite
 - A hard, coarse-grained igneous rock composed of quartz, feldspar, and mica.
 - Provides a stable foundation for structures and influences the mineral composition of overlying soils.

Gravelly Loam

- A soil type that includes significant gravel content, enhancing drainage capacity.
- Less prone to waterlogging but may have moderate fertility depending on organic content.

2.2 Ground Surface and Groundwater Level

The **Perth Groundwater Atlas** (Waters & Rivers Commission) indicates that the ground surface level at this site is approximately **40m Australian Height Datum (AHD)**.

From available data, the depth of groundwater is around **9.28m (11m AHD**); however, it should be noted that groundwater levels can vary significantly due to seasonal variation, and the recorded maximum levels should only be used as a guide.

No groundwater was encountered during the geotechnical sampling. Given the leach drain location, height above sea level, and sloping terrain, the groundwater table is expected to be significantly lower.

2.3 Seismic Activity

Current Australian Standards **AS5100** and **AS4678** both refer to **AS1170.4-1993** for earthquake actions, notwithstanding the latest revision of AS1170.4 is **2007**.

As required in **AS1170.4-1993**, the following values are recommended:

- Site factor (S) = 1.25
- Acceleration coefficient (**a**) = **0.09**

2.4 Wind Classification

In accordance with **AS 4055-2012: Wind Loads for Housing**, the wind classification for this site falls within the **non-cyclonic "N2" category**.

As the site is not shielded from the front, the classification remains valid.



3. Ground Conditions Encountered

A summary of the typical subsurface conditions encountered within each investigatory locality is provided below. For a full description of the subsurface profiles encountered at each investigatory location, reference can be made to the borehole logs attached.

3.1 Subsurface Strata

The following table summarises the subsurface strata encountered during the investigation:

TP Depth	Depth Range (m)	Soil Description	Groundwater Encountered
1.5 m	0.0 - 0.2	Topsoil: Dark brown loam, slightly moist, with fine organic material, moderate structure	None
	0.2 - 0.8	Sandy Clay: Fine to medium grained, high plasticity with sand, trace gravel, red-brown	
	0.8 - 1.5	Sandy Clay: Fine to medium grained, high plasticity with sand, trace gravel, red-brown	
2.0 m	0.0 - 0.2	Topsoil: Dark brown loam, slightly moist, with fine organic material, moderate structure	None
	0.2 - 1.2	Sandy Clay: Fine to medium grained, high plasticity with sand, red-brown	
	1.2 - 2.0	Sandy Clay: Fine to medium grained, high plasticity with sand, red-brown	
2.5 m	0.0 - 0.2	Topsoil: Dark brown loam, slightly moist, with fine organic material, moderate structure	None
	0.2 - 1.2	Sandy Clay: Fine to medium grained, high plasticity with sand, red-brown	
	1.2 - 2.5	Sandy Clay: Fine to medium grained, high plasticity with sand, red-brown	

Table 3-1: Summary of Subsurface Strata

Note:

- All depths are measured in metres below ground surface level at the time of the investigation.
- Soil sampling for the **permeability test** was conducted from the test pit terminating at **2.5 m**.

3.1 Groundwater

Groundwater inflow was not encountered at any boreholes at the time of investigation, despite the rainy weather, until the termination depth. The site AHD level of **40m above sea level** may indicate that the groundwater table across the area is deeper.

If, however, deeper excavation or an undercroft/basement construction is proposed, groundwater could potentially be encountered during construction. Allowance should be made for localised dewatering if groundwater is encountered during construction.

3.2 Permeability

Typical values of k for various types of soil are shown in the table below. This table illustrates the range of values of permeability for different types of soils.

Table 3-2: Typical Values of Permeability

Soil Type	Permeability (k) Value
Gravel	Greater than 10 ⁻² m/sec
Sand	10 ⁻⁶ m/sec to 10 ⁻² m/sec
Silt	10 ⁻⁹ m/sec to 10 ⁻⁵ m/sec
Clay	10 ⁻¹¹ m/sec to 10 ⁻⁸ m/sec

Notes:

• All permeability values are approximate and may vary depending on soil conditions.

4. Geotechnical Construction Considerations

4.1 Site Classification

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

The foundation design should be undertaken by a Structural Engineer, taking into consideration ground bearing capacity and the acceptable total and differential settlements of the proposed foundation system.

Based on the results of this investigation, the site can be classified as an equivalent **Class "M"**, which represents the soil classification of the site in general.

4.2 Site Drainage

Based on the topography, observed water table depths, soil classification, and distance from seasonal watercourses (non-catchment area), there is no discernible environmental or health impact with the development as proposed using DOH-approved water treatment systems:

- 1. It is not a water catchment area.
- 2. The soil type and groundwater levels are conducive to the use of normal DOH-approved WTUs.
- 3. The proposed siting of reticulation from WTUs is acceptable and creates no discernible health or environmental risk.

For septic systems, the absence of groundwater supports this site for the grey water reticulation system and surface irrigation using the **Ozzikleen WTU** on these blocks. See SSE for detailed information.

4.3 Seismic Site Subsoil Class

Current Australian Standards AS5100 and AS4678 both refer to AS1170.4-1993 for earthquake actions, notwithstanding the latest revision of AS1170.4 is 2007.

As required in AS1170.4-1993, the following values are recommended:

- Site factor (S) = 1.25
- Acceleration coefficient (a) = 0.09

Seismic accelerations to be resisted by a structure are dependent upon the stiffness of the underlying soil/rock. Soft soils have the potential to amplify ground accelerations, requiring structures built upon them to be designed to resist a higher seismic coefficient.

4.4 Earthworks

As the project consists of Tiny Homes on Wheels, earthworks are not required other than stripping off the topsoil. However, where necessary and required, earthworks shall be undertaken in accordance with AS 3798-2007. Strip off a 150mm topsoil and replace it with a 600mm minimum sand pad, placed in layers of no more than 300mm, and compacted to 7 blows per 300mm.

Guidelines on earthworks for commercial and residential developments are to include, but not be limited to, the following:

4.4.1 Earthworks Equipment

It is considered that standard small to medium-sized earthmoving equipment would be appropriate for the proposed development. The majority of the soils on site will be suitable for re-use as structural fill, provided the material is free of organic matter and deleterious material. All earthworks operations should be performed under appropriate earthworks supervision, in general accordance with the requirements of AS 3798, and should be certified as controlled fill by the testing authority.

The ground surface is competent and should not pose significant issues for either excavation or site traffic movements. Suitable precautions to satisfy Health & Safety requirements must be adopted. Construction procedures (i.e., operation of plant, storage of materials, etc.) should also consider all safety aspects of trenching works and other excavations.

4.4.2 Clearing and Topsoil Stripping

All surface vegetation (i.e., grass) should be stripped and removed off-site to a depth of at least 150mm.

4.4.3 Temporary and Permanent Slopes

Although deep excavation is not expected to be required across the majority of the development, there is a potential exception for the leach drains. The temporary batters should be protected in the short term from erosion caused by heavy rain. This will need to be investigated further during the detailed design. Any temporary slopes should be inspected for signs of instability on a regular basis by a geotechnical engineer. The following temporary and permanent excavation batters are considered suitable for non-surcharged (i.e., no surcharge within 4.0m of the crest), dry, cohesionless sand slopes of less than 2.0m in height, in accordance with the Building Code of Australia (BCA) Table 3.1.1.

Table 4.4.4 Temporary a	and Permanent Slopes
-------------------------	----------------------

	Temporary	Permanent
Cut	1V:2H	1V:2.5H
Fill	1V:2H	1V:2.5H

4.4.5 Proof Compaction

The compaction, where required, should be achieved in accordance with the compaction requirements set out below, as per AS 3798:2007.

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

After proof compaction, bring to finished levels as required. Any imported fill should consist of freedraining sand with no more than 5% passing a 75µm sieve and be free of organic matter and other deleterious materials. The fill sand materials should be placed in layers not exceeding 300mm loose thickness and compacted to achieve the criteria stated in Section 4.4.

4.5 Footings

4.5.1 Design Considerations

The clay soils are assessed to be reactive in relation to moisture content variations. A potential characteristic surface movement (ys) of 20mm-40mm can be calculated for all borehole profiles.

4.5.2 Shallow Foundations

It is deemed that all footings would be founded on natural soil through fill and should comply with the scope of AS 2870. Due to footings being installed on clay subsurface with a sand pad on top, the site should be treated as Class M (moderately reactive) in accordance with AS 2870-2011. The site reactivity in terms of surface movement would be 20mm-40mm due to the presence of clay.

For the proposed structures, pad/raft footings may be a feasible option, provided the footings are founded into a natural competent stratum. Due to the unknown loads and footing systems, no specified allowable bearing capacities can be determined at the time of this investigation.

The following parameters are provided for the preliminary sizing of shallow footings for ancillary structures. The bearing capacity of footings in soil needs to be subjected to geotechnical checking, considering footing size, depth, slope (ground surface and/or footing base), and loadings (i.e., bearing capacity is not a soil property but depends on footing size, depth, slope, and loadings). A footing subjected to pull-out forces should undergo further geotechnical assessment, in addition to bearing capacity, overturning, and sliding.

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

- The site preparation procedures specified in Section 4.4 have been conducted.
- The specified level of compaction has been achieved below the base of each footing.
- Loads are vertical and not eccentric.
- Isolated footings (i.e., interaction of foundations has not been considered).
- The foundations are flexible.
- A factor of safety (FoS) of 3.0 against bearing capacity failure.
- Maximum allowable settlement of 20mm.

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

Market and all		Allowable Bearing Capacity (kPa)			
	waterial	Strip Footing	Pad Footing		
Fill	Uncontrolled	NR	NR		
Clay	Very Stiff	200	250		
Gravel and Sand	Loose	NR	NR		
	Medium Dense	100	125		
	Dense	200	250		
	Very Dense and DCP Refusal	300	350		
Weathered Rock	Above 'TC' Bit Refusal	500	550		
	 Below 'TC' Bit Refusal 	650	750		

ALLOWABLE BEARING CAPACITIES FOR HIGH LEVEL FOOTINGS

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

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

TEST CERTIFICATE



Client: Aussie Building Specialists and Geotech

Address: 39 Roberts Street

Date: 08/09/2024

Atterberg Limits (1 Point Casagrande Method)

AS 1289.3.1.2, 3.2.1, 3.3.1

Sample Description: CLAY with gravel

Liquid Limit: 38%

Plastic Limit: 16%

Plasticity Index: 22%

History of Sample: Air-Dried

Method of Preparation: Dry-Sieved





TEST REPORT



CLIENT: Lee and Katie Pritchard **PROJECT:** Proposed Tiny Home Community **LOCATION:** 44 Stephen Street Boyanup

PROPOSED USE: Proposed Tiny Home Community

SAMPLE NO: ABSG/LP/KP/FSOC/01 JOB NO: 229-12-37 FIELD DESCRIPTION: Sandy Clay DATE SAMPLED: 22-Oct-2024 DATE TESTED: 07-Nov-2024 DEPTH TESTED mm: 0.7m-1.5m

Sample Location: BH8 0–0.7 m Soil Description: Brown Sand with Clay Retained on 9.5 mm Sieve (%) Maximum Dry Density (t/m³)	Compaction Method: Standard AS1289.5.1.1 0.0 1.77700
Optimum Moisture Content (%)	14.8
Moisture at Compaction (%)	14.8
Dry Density of Sample (t/m ³)	1.603
Achieved Dry Density Ratio (%)	90.2
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Coefficient of Permeability References: - AS1289.6.7.2 - Australian Standard for So Prepared by: - Shah Kakakhel - Structural Civil and Geotechnical Enginee - MIEAust Reg Number: 4065311 - Director of Engineering - Aussie Building Specialists and Geotech - Email: engineering@aussiebuildings.com	1.8x 10-6 m/s MI Testing
Notes: Sample site selected by S	Shah
Sampled by Shah	
Approved Signatory: Shah Ka Date: 20-11-20 Report Number: ABSG/L	kakhel 24 P/KP/FSOC/01

44 Stephen Street Boyanup Geotechnical Report



TEST REPORT



CLIENT: Lee and Katie Pritchard **PROJECT:** Proposed Tiny Home Community **LOCATION:** 44 Stephen Street Boyanup SAMPLE NO: ABSG/LP/KP/FSOC/02 JOB NO: 229-12-37 FIELD DESCRIPTION: Sandy Clay DATE SAMPLED: 22-Oct-2024 DATE TESTED: 07-Nov-2024 DEPTH TESTED mm: 0.7m-1.5m

PROPOSED USE: Proposed Tiny Home Community

Sample Location: BH9 0–0.7 m		Occurrent in Marked
Soil Description: Brown Sand w	ithClay	Compaction Method:
Retained on 9.5 mm Sieve (%)	0.0	Standard AS1209.5.1.1
Maximum Dry Density (t/m ³)	1.77700	
Optimum Moisture Content (%)	14.8	
Moisture at Compaction (%)	14.6	
Dry Density of Sample (t/m ³)	1.596	
Achieved Dry Density Ratio (%)	89.8	
Achieved Moisture Ratio (%)	98.6	
Surcharge Mass (kg)	2.310	
Surcharge Pressure (kPa)	3.0	
Moisture % After Permeability (%)	20.3	
Coefficient of Permeab	ility	1.759×10 −6 m/s
References: - AS1289.6.7.2 - Australian Stand	dard for Soil Testing	
Prepared by: - Shah Kakakhel - Structural Civil and Geotechnic - MIEAust Reg Number: 406531 - Director of Engineering - Aussie Building Specialists and - Email: engineering@aussiebui	al Engineer 1 I Geotech Idings.com.au	
Notes:		
Sample site selection Sampled by Sha	cted by Shah h	
Approved Signatory: Date: Report Number:	Shah Kakakhel 20-11-2024 ABSG/LP/KP/FS0	DC/02



TEST REPORT



CLIENT: Lee and Katie Pritchard **PROJECT:** Proposed Tiny Home Community **LOCATION:** 44 Stephen Street Boyanup

PROPOSED USE: Proposed Tiny Home Community

SAMPLE NO: ABSG/LP/KP/FSOC/03 JOB NO: 229-12-37 FIELD DESCRIPTION: Sandy Clay DATE SAMPLED: 22-Oct-2024 DATE TESTED: 07-Nov-2024 DEPTH TESTED mm: 0m-0.7m

Sample Location: BH10 0–0.7 m	
Soil Description: Brown Sand with Clay	Compaction Method:
Retained on 9.5 mm Sieve (%)	0.0 Standard AS1289.5.1.1
Maximum Dry Density (t/m³)	1.77700
Optimum Moisture Content (%)	14.8
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References: - AS1289.6.7.2 - Australian Standard for S Prepared by: - Shah Kakakhel - Structural Civil and Geotechnical Engine - MIEAust Reg Number: 4065311 - Director of Engineering - Aussie Building Specialists and Geotech - Email: engineering@aussiebuildings.cor	oil Testing er n.au
Notes:	
Sample site selected by Sampled by Shah	Snan
Approved Signatory: Shah Ka Date: 20-11-20 Report Number: ABSG/I	akakhel 024 .P/KP/FSOC/03

DATE	STARTE	D 22-10-2024 DRILLING								
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HO <u>LE</u>	SIZE 3	00	HOLE LOCATION	TP 🛈	2 3 4	5 6 7 8 9	10			
NOTE	S No End	Ground water countered	LOGGED BY SK			CHECKED BY	<u>3K</u>			
Depth	Graphic	Stratum Description		Consistency	DCP Blows/150m	m Samples	evine of			
		Topsoil:				Depth Type	-			
		CH: CLAY: fine to medium grained, high p sand, trace gravel, red/brown (Alluvium)	plasticity, with	s						
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		reminated at 1.30 m								
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NOTES	No G Enco	round water untered	LOGGED BY <u>SK</u>		(CHECKED	HECKED BY SK			
Depth	Graphic	Stratum Description		Consistency	DCP Blows/150m 5 10 15 2	m Sam	ples	Acres		
		Topsoil:			TT.	и шертл	Type	-		
		CH: CLAY: fine to medium grained, high sand, trace gravel, red/brown (Alluvium)	n plasticity, with	S-F						
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2-										
1.1	1	Terminated at 2.50 m					-			

BOF	REHC	cialists DEE No: TP No3 (San	npling Depth (TP3 0	m-0.7m)						
SHE date	EET: start	1 of 1 ED 22-10-2024 DRILLING								
CON	TRACTO	DR ABSG Completed 22-10-2024	R.L. SURFACE	ВА	C	DATUM				
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HO <u>LE</u>	SIZE	300	_ HOLE LOCATION	TP 1	<u>12</u> 345	56789	9 10			
NOTE	S	No Ground water Encountered	LOGGED BY <u>SK</u>		c	HECKED BY	SK			
Depth	Graphic	Stratum Description		Consistency	DCP Blows/150mm 5 10 15 20	Samples Depth Type	Maisture	Water		
1		Topsoil:								
1		CH: Sandy CLAY: fine to medium grained trace gravel, red/brown (Alluvium)	, high plasticity,	S-F						
		Terminated at 1.80 m								
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2. Hole stability: Hole stable
3. Samples taken: None
4. Co-ordinate system: UTM

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NC	TES	No Ground water Encountered	LOGGED BY S	K		CHECKED	BY SI	<		
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1		CH: Sandy CLAY: fine to medium grained, I trace gravel, red/brown (Alluvium)	high plasticity,	S-F			*			

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Remarks 1. Termination reason: Target depth 2. Hole stability:

Terminated at 2.50 m

3. Samples taken: None 4. Co-ordinate system: UTM

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Appendix C Bushfire Management Plan



Bushfire Management Plan

Development Application: Tiny Home Community: 44 Stephen Street, Boyanup

Western Environmental Pty Ltd

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Bushfire Management Plan

Development Application: Tiny Home Community: 44 Stephen Street, Boyanup

Report No: A24.279-RPT-BMP_1_FINAL Issue Date: 28-Apr-2025 Status FINAL

Prepared for: Lee Pritchard 44 Stephen Street Boyanup WA 6237

Prepared by Western Environmental Approvals Pty Ltd Unit 5, 162 Colin Street West Perth WA 6005 westenv.com.au



Internal Review



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Appendix A: Classified vegetation photos
Appendix B: Standards for Asset Protection Zones (WAPC, 2024a)
Appendix C: Vehicular access technical requirements (WAPC, 2024b)



1. Introduction

1.1 Proposal Details

Lee Pritchard is seeking to progress a Development Application (DA) for 44 Stephen Street, Boyanup (hereafter referred to as the subject site, Figure 1). The proposed development will result in an intensification of land use and involves the development of 49 tiny homes at the subject site (Figure 2).

The subject site is within a designated bushfire prone area as per the *Western Australia State Map of Bush Fire Prone Areas* (DFES, 2024; Figure 3), which triggers bushfire planning requirements under *State Planning Policy 3.7 Bushfire* (SPP 3.7; WAPC, 2024a) and reporting to accompany submission of the DA in accordance with the associated *Planning for Bushfire Guidelines* (the Guidelines; WAPC, 2024b).

Western Environmental Approvals Pty Ltd (WEPL) was commissioned to prepare a Bushfire Management Plan (BMP) to support the DA. This BMP has been prepared by Bushfire Consultant Bridie Farrar and Senior Principal Bushfire Consultant Daniel Panickar (FPAA BPAD Level 3 Certified Practitioner No. BPAD37802).

1.1.1 Site context

The subject site is located within Shire of Capel and is zoned Urban Development under the Shire of Capel Local Planning Scheme No. 8. The subject site contains unmanaged, classifiable vegetation in the form of a grassed paddock. The subject site is bound by rural land to the north and west, Stephen Street and rural land to the east and high-density residential lots to the south.

1.2 Purpose and Application of the BMP

This BMP has been prepared in accordance with SPP 3.7 and the Guidelines to support the assessment of the DA for the subject site submitted to Shire of Capel.

In addition, this BMP provides strategies and guidance to reduce the level of bushfire risk exposure for the subject site through implementation of a range of bushfire management measures in accordance with the Guidelines.



2. Environmental Considerations

SPP 3.7 policy objective 5.4 recognises the need to consider bushfire risk management measures alongside environmental, biodiversity and conservation values.

2.1 Native Vegetation - Modification and Clearing

The subject site has been historically cleared and used for agricultural purposes. A review of publicly available datasets shows no mapped native vegetation, environmentally sensitive areas or conservation category wetlands intersect the subject site (Figure 2).

WEPL is not aware of any environmental approvals required for the proposed development to proceed.

2.2 Revegetation/Landscape Plans

No revegetation is proposed within the subject site and landscaping will be maintained in a low-threat state.

The land application area (Figure 2) will be used for effluent disposal. Once underground assets (such as an in-ground septic system, leach drains, or drip irrigation) are constructed, the surface of this area will be turfed and maintained to a low-threat state.



Figure 1: Site Overview

_				
N 0 30	60 90 120 m	PROJECT/REPORT NAME Bushfire Management Plan Lot 9 (44) Stephen Street, Boyanup		Legend Subject Site Buffer 100m
scale 1:2,180	SHEET SIZE A3 COLOUR	CLIENT Lee Pritchard		Buffer 150m
coordinate reference system GDA2020 / MGA zone 50		project number A24.279	version O	
^{Data source} Nearmap (31st October 2024)		drawn by / reviewed by SM/BF	date 17/4/2025	

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NOTES:								
Cadastral boundary (LGATE-002). Base map ESRI Topo. Townsites (LGATE-248).								



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Figure 2: Site Plan

0		-								
1 N	0	30	60	90	120 m	PROJECT/REPORT NAME Bushfire Management Plan Lot 9 (44) Stephen Street, Boyanu	qı	Legend Subject Site Buffer 100m	Common Open Space Landscaping/Screening - low fuel	Native Vegetation Extent (DPIRD- Clearing Regulations - Environme
scale 1:2,134			SHEET SIZE A3 COLOU	JR		client Lee Pritchard		Buffer 150m	Shed/Storage Water Tank	Sensitive Areas (DWER-046) Geomorphic Wetlands, Swan Coastal Pla
COORDINATE REFERENCE	e system VIGA zone 5	0				PROJECT NUMBER A24.279	version O		Care Takers Lot	Conservation
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Figure 3: Bushfire Prone Areas

N 0 30	60 90 120 m	PROJECT/REPORT NAME Bushfire Management Plan Lot 9 (44) Stephen Street, Boyanup		Legend Subject Site Bush Fire Prone Area Planning (OBRM-023)
scale 1:2,180	SHEET SIZE A3 COLOUR	CLIENT Lee Pritchard		Buffer 100m Bushfire Prone Area 2
coordinate reference system GDA2020 / MGA zone 50		PROJECT NUMBER A24.279	VERSION O	Tiny Home Lots
DATA SOURCE Nearmap (31st October 2024)		drawn by / reviewed by SM/BF	date 17/4/2025	
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Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number.											





3. Bushfire Assessment Results

3.1 Bushfire Assessment Inputs

A bushfire assessment has been undertaken for the proposed development in accordance with the Guidelines. Inputs to this assessment are detailed below.

3.1.1 Fire Danger Index

A blanket Fire Danger Index (FDI) 80 is adopted for Western Australia, as outlined in *Australian Standard* AS 3959: 2018 Construction of Buildings in Bushfire Prone Areas (SA, 2018).

3.1.2 Pre-Development Vegetation Classification and Slope under Vegetation

Vegetation and effective slope (i.e. slope under vegetation) within the subject site and surrounding 150 m (the assessment area) were assessed on 23/01/2025 in accordance with the Guidelines and AS 3959: 2018.

The pre-development classified vegetation and effective slope for the site from each of the identified vegetation plots are identified below in Table 1 and Figure 4.

Table 1: Pre-Development Classified Vegetation as per AS 3959: 2018

Plot	Vegetation classification	Effective slope
1	Class G Grassland	All upslopes and flat land (0 degrees)
2	Excluded - clause 2.2.3.2 (e)	-
3	Excluded - clause 2.2.3.2 (f)	-

Photographs relating to each area and vegetation type are included in Appendix A.

3.1.3 Post-Development Assumptions

The subject site is proposed to be cleared for development. Following this clearing and development, it will contain non-vegetated areas as well as vegetation which is managed to a low-threat state, in the form of turfed areas and mulch beds.

The assumed post-development vegetation classifications and effective slopes are presented in Figure 5.



Figure 4: Vegetation Classification (Pre-Development)

0 30	60 90	120 m	PROJECT/REPORT NAME Bushfire Management Plan Lot 9 (44) Stephen Street, Boyanup		Legend Subject Site Buffer 100m	2 metre contours (DPIRD-072) —— 2m Contour	Vegetation Classification Class G - Grassland	
scale 1:2,180	SHEET SIZE A3 COLOUR		CLIENT Lee Pritchard		Buffer 150m	—— 10m Contour	Excluded AS 3959: 2018 2.2.3.2 (e)	
coordinate reference system GDA2020 / MGA zone 50			PROJECT NUMBER A24.279	version O				
DATA SOURCE Nearmap (31st October 2024)			drawn by / reviewed by date SM/BF 17/4/2025					

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No	Description	Drawn	Approved	Date						
Α	Original issue	SM	BF	17/4/2025						
NOTES: Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number.										



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3.2 Bushfire Assessment Outputs

A Bushfire Attack Level (BAL) assessment has been undertaken in accordance with SPP 3.7, the Guidelines, AS 3959: 2018 and the bushfire assessment inputs in Section 3.1.

3.2.1 BAL Assessment

All land located within 100 m of the classified vegetation depicted in Figure 5 is considered bushfire prone and is subject to a BAL assessment in accordance with AS 3959: 2018.

A Method 1 BAL assessment (as outlined in AS 3959: 2018) has been completed for the proposed development and incorporates the following factors:

- Fire Danger Index (FDI) rating.
- Vegetation class.
- Slope under classified vegetation.
- Distance between proposed subdivision area and the classified vegetation.

Based on the identified BAL, construction requirements for relevant buildings/structures can then be assigned. The BAL rating gives an indication of the expected level of bushfire attack (i.e. radiant heat flux, flame contact and ember penetration) that may be received by proposed buildings and subsequently informs the standard of construction required to increase building survivability.

3.2.2 Method 1 BAL Assessment

Table 2 and Figure 5 display the Method 1 BAL assessment (in the form of BAL contours) that has been completed for the proposed development in accordance with AS 3959: 2018 methodology.

Post-development, all tiny homes within the subject site will be subject to BAL ratings of \leq BAL-29.

Table 2: Method	1 BAL Calculation	(BAL Contours)
-----------------	--------------------------	----------------

Plot	Vegetation	Effective classe	Separation distances required (m)							
	classification	Effective slope	BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5			
1	Class G Grassland	All upslopes and flat land (0 degrees)	<6	6 - <8	8 - <12	12 - <17	17 - <50			
2	Excluded - clause 2.2.3.2 (e)	-	No separation distances required - BAL-LOW							
3	Excluded - clause 2.2.3.2 (f)	-	No separation distances required - BAL-LOW							



Based on the site assessment inputs and BAL assessment, all proposed buildings are exposed to BAL ratings ≤BAL-29. A summary of the BAL ratings for these assets within the subject site is provided in Table 3.

Proposed Tiny Home Lot	Plot Most Affecting BAL Rating	Separation Distance	BAL Rating
Caretakers Lot	Plot 1	8.0 m	BAL-29
1	Plot 1	14.4 m	BAL-19
2	Plot 1	24.4 m	BAL-12.5
3	Plot 1	34.4 m	BAL-12.5
4	Plot 1	46.4 m	BAL-12.5
5	-	>50 m	BAL-LOW
6	-	>50 m	BAL-LOW
7	-	>50 m	BAL-LOW
8	-	>50 m	BAL-LOW
9	-	>50 m	BAL-LOW
10	-	>50 m	BAL-LOW
11	Plot 1	43.1 m	BAL-12.5
12	Plot 1	32.1 m	BAL-12.5
13	Plot 1	37.1 m	BAL-12.5
14	Plot 1	48.1 m	BAL-12.5
15	-	>50 m	BAL-LOW
16	-	>50 m	BAL-LOW
17	-	>50 m	BAL-LOW
18	-	>50 m	BAL-LOW
19	-	>50 m	BAL-LOW
20	-	>50 m	BAL-LOW
21	-	>50 m	BAL-LOW
22	Plot 1	40.1 m	BAL-12.5
23	Plot 1	29.4 m	BAL-12.5
24	Plot 1	18.4 m	BAL-12.5
25	Plot 1	18.4 m	BAL-12.5
26	Plot 1	29.4 m	BAL-12.5
27	Plot 1	30.0 m	BAL-12.5
28	Plot 1	30.0 m	BAL-12.5

Table 3: BAL Ratings for Assets Within the Subject Site



Proposed Tiny Home Lot	Plot Most Affecting BAL Rating	Separation Distance	BAL Rating
29	Plot 1	30.0 m	BAL-12.5
30	Plot 1	30.0 m	BAL-12.5
31	Plot 1	30.0 m	BAL-12.5
32	Plot 1	30.0 m	BAL-12.5*
33	Plot 1	30.0 m	BAL-12.5*
34	Plot 1	30.0 m	BAL-12.5*
35	Plot 1	30.0 m	BAL-12.5*
36	Plot 1	37.1 m	BAL-12.5*
37	Plot 1	8.0 m	BAL-29*
38	Plot 1	8.0 m	BAL-29*
39	Plot 1	8.0 m	BAL-29*
40	Plot 1	8.0 m	BAL-29*
41	Plot 1	8.0 m	BAL-29*
42	Plot 1	8.0 m	BAL-29*
43	Plot 1	8.0 m	BAL-29
44	Plot 1	8.0 m	BAL-29
45	Plot 1	8.0 m	BAL-29
46	Plot 1	8.0 m	BAL-29
47	Plot 1	8.0 m	BAL-29
48	Plot 1	8.0 m	BAL-29

*These lots are not proposed to be situated within a bushfire prone area as per Figure 3. Despite this, a BAL assessment has been undertaken to ensure appropriate siting of all proposed tiny homes, in areas subject to BAL ratings of BAL-29 or lower. WEPL understands that tiny homes proposed for the development will be classified as 'Caravans' for the purpose of a Class of Building and therefore do not require a building permit to be issued. As such, WEPL understands that construction of tiny homes in line with AS 3959 is not required.

The Tiny Homes will be required to comply with the Vehicle Standards Bulletin 1 (VSB1), which is a collection of publications prepared by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts providing information on various aspects of road vehicle standards, including design, manufacture and modification.



4. Identification of Issues Arising from the BAL Assessment

Post-development, all proposed tiny homes will be subject to BAL ratings of \leq BAL-29.

A reassessment of BAL ratings, through either a BMP addendum or revised BMP will be undertaken if changes to development design or classified vegetation within the assessment area which require a modified bushfire management response occur.



G:\GIS\Project Data\2024\A24.279.qgz



5. Assessment Against the Bushfire Protection Criteria

5.1 Compliance

The proposed development is required to comply with policy measures 7.1 of SPP 3.7 and Bushfire Protection Criteria 6 in the Guidelines.

Table 4 outlines the Acceptable Solutions (AS) that are relevant to the proposal and summarises how the intent of each Bushfire Protection Criteria has been achieved through the application of bushfire risk management measures. No Outcomes-based Solutions (OS) have been proposed for this development. These management measures are depicted in Figure 6 where relevant.

Implementation of this BMP is expected to meet objectives 5.1-5.4 of SPP 3.7.

Table 4: Assessment Against the Bushfire Protection Criteria

Bushfire Protection Criteria 6	AS	PS	N/A					
Element 1: Location A1.1 Development location			\checkmark					
Not Applicable - This Element does not apply to residential developments.								
Element 2: Siting and design A2.1 Siting and design	✓							
Post-development, all proposed tiny home lots will be subject to BAL ratings of ≤BAL-29 (Figure 5 , Figure 6). As discussed in Section 3.2.2, WEPL understands that construction of the tiny homes to the relevant standard in AS 3959 is not required, given their class of building is 'Caravan' and, as such, do not require a building permit. The proposed development is considered to be compliant with A1.1.								
A2.2 Asset Protection Zone (APZ)								
The proposed development has an APZ sufficient for the potential radiant heat flux to not exceed 29 kW/m ² and will be managed in accordance with the requirements of <i>'Standards for Asset Protection Zones'</i> (WAPC, 2024b; Appendix B). The APZ can be contained within the boundaries of the lot.								
A2.3 Clearing of native vegetation			✓					
Not Applicable - No native vegetation is proposed to be cleared to facilitate the	e proposed o	developmen	t.					
Element 3: Vehicular access A3.1 Private driveways	✓							
A loop style driveway is proposed within the subject site with minimum 6 m trafficable surface for the entire lengt The inner curve radius of each of the curves is a minimum of 8.5 m. No turnaround is required given the driveway is a loop. The private driveway specifications will be determined in line with the Vehicular Access Technical Requirements set out in the Guidelines (Appendix C).								

The proposed development is considered to be compliant with A3.1



Bushfire Protection Criteria 6	AS	PS	N/A
Element 4: Water A4.1 Water supply for residential habitable buildings	\checkmark		

Existing reticulated water is present within the area and the subject site will be connected to this water supply. The nearest existing hydrants are located on Timperley Street to the south (**Figure 6**). WEPL assumes the surrounding network of hydrants meet Water Corporation specifications given they are established The proposed development is considered to be compliant with A4.2.

Note: AS - Acceptable solution, OS - Outcomes-based solution, N/A - Not applicable.

5.2 Additional Considerations

Bushfire Protection Criteria 6: Residential Development, does not require access to safer destinations to be considered as part of the BMP. Despite this, WEPL has considered access to suitable destinations given the proposed development is within is a regional area and that multiple habitable structures are proposed to be situated within the subject site. Sufficient access to two suitable destinations from the subject site is available in the event of a bushfire, and these are presented in Figure 6.



	0	37	74	111	148 m	PROJECT/REPORT NAME Bushfire Management Plan			Lege	nd				
Ň						Lot 9 (44) Stephen Street, Boyan	up			Subject Site	\rightarrow	Access / egress route	Bushf	ire Attack Level (BAI
										Buffer 100m	0	Access point		BAL-FZ
			SHEET SIZE			CLIENT				Buffer 150m	V			BAL-40
1.2,300			A3 COLOUR			Lee Pritchard		Tiny Home Lots	Tiny Home Lots	-	Water Hydrant (WCORP-070)		BAL-29	
COORDINATE REFERENCE	E SYSTEM					PROJECT NUMBER	VERSION				•			
GDA2020 / N	/IGA zone 5	0				A24.279	0			Asset Protection Zone (APZ)	Bush F	ire Prone Area Planning (OBRM-023)		BAL-19
DATA SOURCE						DRAWN BY / REVIEWED BY	DATE		++++++	8.5m inner curve radius		Bushfire Prone Area 2		BAL-12.5
Nearmap (31	1st October	2024)				SM/BF	17/4/2025							BAL-LOW
	ata) 2024) 424	270\ 424 270 @6					•							

No	Description	Drawn	Approved	Date
Α	Original issue	SM	BF	17/4/2025
NOTES:				
Cadastral boundary from LANDGATE 2022 Label corresponds to the vegetation associatio number.				TE 2022. association





6. Responsibilities for Implementation and Management of Bushfire Management Measures

Responsibility for implementation of the bushfire risk management measures outlined in Section 5 of this BMP applies to the developer, future owners/builders within the subject site and the local government. Table 5 provides a works program detailing these measures, timing of implementation and responsibility.

Table 5: Proposed Works Program

No.	Bushfire management measure			
Developer responsibilities - Prior to issue of Titles				
1	Ensure that Asset Protection Zones (APZs) are established and maintained as per the design in Figure 6.			
2	Construct private driveways in accordance with the Vehicular Access Technical Requirements in Appendix B of the Guidelines.			
Landowner responsibilities - Ongoing				
3	Maintain APZs to the standard in the Guidelines.			



7. Conclusion

In the professional opinion of the author, the proposed development satisfies the intent, aim and objectives of SPP 3.7 and the Guidelines and is recommended for approval.



8. References

Department of Fire and Emergency Services (DFES). (2024). *Map of Bush Fire Prone Areas*. Retrieved on 06/03/2025 from:

http://www.dfes.wa.gov.au/regulationandcompliance/bushfireproneareas/Pages/default.aspx.

Standards Australia (SA). (2018). Construction of buildings in bushfire-prone areas (AS 3959: 2018).

Western Australian Planning Commission (WAPC). (2024a). *State Planning Policy 3.7 Bushfire*. Government of Western Australia.

Western Australian Planning Commission (WAPC). (2024b). *Planning for Bushfire Guidelines*. Government of Western Australia.



Appendix A: Classified vegetation photos

WEPL Report: Bushfire Management Plan: Development Application: Tiny Home Community: 44 Stephen Street, Boyanup



Class G Grassland

Plot 1

Photo 1

This plot consists of unmanaged grasses and herbs which dominate the understorey. The overstorey consists of few trees with mostly isolated canopies. The overall tree canopy cover is less than 10% throughout this plot.

The slope under this vegetation was assessed to be upslope/flat land.

Class G Grassland

Photo 2

Plot 1

This plot consists of unmanaged grasses and herbs which dominate the understorey. The overstorey consists of few trees with mostly isolated canopies. The overall tree canopy cover is less than 10% throughout this plot.

The slope under this vegetation was assessed to be upslope/flat land.



Photo 3

This plot consists of unmanaged grasses and herbs which dominate the understorey. The overstorey consists of few trees with mostly isolated canopies. The overall tree canopy cover is less than 10% throughout this plot.

The slope under this vegetation was assessed to be upslope/flat land.



Class G Grassland





Class G Grassland

Photo 4

This plot consists of unmanaged grasses and herbs which dominate the understorey. The overstorey consists of few trees with mostly isolated canopies. The overall tree canopy cover is less than 10% throughout this plot.

The slope under this vegetation was assessed to be upslope/flat land.

Plot 1



Class G Grassland

Photo 5

This plot consists of unmanaged grasses and herbs which dominate the understorey. The overstorey consists of few trees with mostly isolated canopies. The overall tree canopy cover is less than 10% throughout this plot.

The slope under this vegetation was assessed to be upslope/flat land.



Excluded - clause 2.2.3.2 (e)



Photo 6

Plot 2

Houses, cleared areas and associated vegetation which is managed to a low-threat state.

Plot 1



Excluded - clause 2.2.3.2 (e)



Excluded - clause 2.2.3.2 (f)



Plot 3

Photo 7

vegetation.

Plot 2

Photo 8 (Vegetation in the background of photo)

This plot consists of vegetation which is maintained to a low-threat state. Pictured are grasses in the form of a mown lawn and trees with no understorey vegetation.

Roads surrounding the subject site which are devoid of



Appendix B: Standards for Asset Protection Zones (WAPC, 2024a)

WEPL Report: Bushfire Management Plan: Development Application: Tiny Home Community: 44 Stephen Street, Boyanup



The following standards have been extracted from the Planning for Bushfire Guidelines (WAPC, 2024b).

Every habitable building is to be surrounded by, and every proposed lot can achieve, an APZ depicted on submitted plans, which meets the following requirements:

- a. Width: the APZ is measured from the development site, and of sufficient size to ensure the radiant heat impact of a bushfire does not exceed 29kW/m² (BAL-29) in all circumstances.
- b. Location: the APZ should be contained solely within the boundaries of the lot, except in instances where:
 - the vegetation on the adjoining lot(s) is, and will continue to be, low threat as per Clause
 2.2.3.2 of AS 3959 or the APZ technical requirements, or an alternative standard on a local planning scheme, on an ongoing basis in perpetuity; or
 - the adjoining land is and will remain in perpetuity, non-vegetated.
- c. Management: the APZ is managed in accordance with the APZ technical requirements (below), or an alternative standard in a gazetted local planning scheme.

Object	Requirement
Fences within the APZ	Should be constructed from non-combustible materials (for example, iron, brick, limestone, metal post and wire, or bushfire-resisting timber referenced in Appendix F of AS 3959).
Fine fuel load (Combustible, dead vegetation matter less than 6 mm in thickness)	 Should be managed and removed on a regular basis to be maintained as a low threat vegetation. Should be maintained at less than two tonnes per hectare (on average). Mulches should be non-combustible such as stone, gravel, shells, rock or crushed mineral earth or wood mulch more than five millimetres in thickness.
Trees* (more than 6 m in height)	 Trunks at maturity should be a minimum distance of six metres from all elevations of the building. Branches at maturity should not touch or overhang a building or powerline. Lower branches and loose bark should be removed to a height of two metres above the ground and/or surface vegetation. Canopy cover within the APZ should be less than 15 per cent of the total APZ area. Tree canopies at maturity should be at least 5 m apart to avoid forming a continuous canopy. Stands of existing mature trees with interlocking canopies may be treated as an individual canopy provided the total canopy cover within the APZ does not exceed 15 per cent and is not connected to the tree canopy outside the APZ.

APZ Technical Requirements



Object	Requirement
	 Tree canopy cover – ranging from 15 to 70 per cent at maturity
Shrub* and scrub* (0.5 m to 6 m in height). Shrub and scrub more than 6 m in height are to be treated as trees.	 Should not be located under trees or within three metres of buildings. Should not be planted in clumps more than five square metres in area. Clumps should be separated from each other and any exposed window or door by at least 10 metres.
Ground cover*(less than 0.5 m in height. Ground cover more than 0.5 m in height is to be treated as shrub)	 Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load' above Can be located within two metres of a structure but three metres from windows or doors if more than 100 mm in height.
Grass	 Grass should be maintained at a height of 100 mm or less, at all times Wherever possible, perennial grasses should be used and well-hydrated with regular application of wetting agents and efficient irrigation.
Defendable space	• Within three metres of each wall or supporting post of a habitable building; the area is kept free from vegetation but can include ground cover, grass and non- combustible mulches as prescribed above.
Liquid petroleum gas cylinders	 Should be located on the side of a building farthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building. The pressure relief valve should point away from the house. No flammable material within six metres from the front of the valve. Must sit on a firm, level and non-combustible base and be secured to a solid structure.

* Plant flammability, landscaping design and maintenance should be considered - refer to explanatory notes in the Guidelines.

ADDITIONAL NOTES

An Asset Protection Zone (APZ) is a low fuel area, maintained around a building to increase the likelihood a building will survive a bushfire, by reducing the potential for direct flame contact, radiant heat exposure and ember attack. The APZ allows emergency services access and provides an area for firefighters and homeowners to defend their property.

An APZ should be contained within the boundaries of the lot on which the building is situated, except in instances where it is demonstrated the vegetation on the adjoining land is, and will continue to be, low threat as per cl. 2.2.3.2 of AS 3959, or the vegetation on the adjoining lot is, and will remain in perpetuity, non-vegetated. However, it should be noted there is no requirement for a neighbouring landowner or land



manager (public or private) to be party to a legal agreement to undertake ongoing management of vegetation as low threat, in perpetuity.



Appendix C: Vehicular access technical requirements (WAPC, 2024b)

WEPL Report: Bushfire Management Plan: Development Application: Tiny Home Community: 44 Stephen Street, Boyanup


Technical requirements	Perimete	r Roads	Public Roa	ads	Emergenc Way3	y Access	Fire Servic Route3	e Access	Battle-Ax Private Driveway	ke and ys1
Map of Bush Fire Prone Areas Designation	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1
Minimum horizontal clearance (m)	12	8	See n	ote 5	10	6	10	6	(5
Minimum vertical clearance (m)					4.	5				
Minimum weight capacity (t)					1	5				
Maximum grade unsealed road2						1	:10 (10% o	r 6 degree	es)	
Maximum grade sealed road2, 4	(a c		6.00	odo F		1	:7 (14.3% c	or 8 degree	es)	
Maximum average grade sealed road	seer	1018 5	See	1018 5		1	:10 (10% o	r 6 degree	es)	
Minimum inner radius of road curves (m)							8	.5		

NOTES

- Driveways and battle-axe legs to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision where not required to comply with the widths in this Appendix or the Guidelines.
- 2. Dips must have no more than a 1 in 8 (12.5% 7.1 degrees) entry and exit angle.
- 3. To have crossfalls between 3 per cent and 6 per cent.
- 4. For sealed roads only the maximum grade of no more than 1 in 5 (20 per cent) (11.3 degrees) for no more than 50 metres is permissible, except for short constrictions to 3.5 metres for no more than 30 metres in length where an obstruction cannot be reasonably avoided or removed.
- 5. As outlined in the Institute of Public Works Engineering Australasia (IPWEA) subdivision guidelines, Liveable Neighbourhoods, Austroads Standards Main Roads standard, supplement, policy or guideline and/or any applicable or relevant local government standard or policy.





Appendix D Local Development Plan



Lot 9 (No. 44) Stephen Street, BOYANUP



Revision | A



ALBANY | BUNBURY | BUSSELTON | FORRESTDALE | PERTH

APPLICATION OF LOCAL DEVELOPMENT PLAN

This Local Development Plan (LDP) applies to the development of Lot 9 (44) Stephen Street, Boyanup

Development and ongoing management of the Tiny Home Community Lot is to be in accordance with the Tiny Home Community Management Plan.

- Vehicle Access and Parking

 1.
 Vehicle access to the development is limited to the single crossover identified on the LDP at the southeastern corner of the property, with internal access to lot to
- following the internal one-way loop system. Parking and open areas within the site facing streets shall be enhanced with tree planting to present a quality street frontage. Vehicle parking is required to be within the individual plots, with additional visitor vehicles to be located within the overflow parking areas. No

- parking along the private access way road will be permitted. Ongoing maintenance of the private access way, parking areas and crossover is to be maintained to ensure safe access and egress for vehicles at all times.

Orientation and Design Elements 5. Tiny Homes are permitted as per the below design specifications, above the wheelbase:

- - Height: 4.3m Width: 3m a) b)
- c) Length: 12.5m Verandas, Pergolas, Patios and similar structures should be constructed in materials to compliment the Tiny Home and may require approval by the Shire of Capel. Predominant finishes and external materials and colour palettes of the Tiny Homes are to consist of earthy tones, non-reflective materials and be complimentary to the compliance of the time of the
- External lighting shall be designed and located to minimise glare onto neighbouring properties and the adjacent street and be generally in accordance with the approved plan to the satisfaction of the Shire.

- Incidental Development 9. Enclosed, non-habitable structures such as storage sheds are only permitted if clad in complimentary finishes to that of the Tiny Home. All clothes drying and storage areas should to be located to the rear of the Tiny
- Homes or screened from the general view.
- The establishment of individual renewable energy sources (e.g. water collection and storage, solar etc) is encouraged to support the Tiny Home plots.

Open Space/Site Coverage 12. A minimum of 50% of the overall site is to be maintained as uncovered open space, but may include landscaping, walk trails, community garden beds and incidental facilities consistent the Community Management Plan.

Setbacks 13. Setbacks to the property boundary are to maintain a minimum of: a) Front 10m b) Side 6m contemportation a minimum of:

- Rear 10m
- Development setbacks to individual plots are to be a minimum of 2m from the private access way.

Fencing
15. Solid fencing will only be permitted along the property boundary.
16. Fencing along Stephen Street is permitted to a height of 1.8m with any fencing above 1.2m in height to be permeable to permit passive surveillance and enhance the streetscape. Solid pillars that form part of front fences may be considered that the street step sector strengt level here the street street step sector. where they are not more than 1.8m above natural ground level provided the horizontal dimension of the pillars is not greater than 400mm by 400mm and pillars are separated by visually permeable fencing.

Waste 17.

Communal bins are to be used by residents as identified on the LDP and will be collected as part of the Shire's weekly collection schedule from the road verge.

- Landscaping and Communal Areas
 Ongoing management and maintenance of the communal areas and overall Landscaping is to occur in accordance with the Community Management Plan.
 Landscaping is to incorporate low-threat vegetation and be developed and maintained in accordance with the Standards for Asset Protection Zones set out in Schoule 1. Anonadius to the Conductions of the Control Control Plane Areas Schedule 1. Appendix 4 of the Guidelines for Planning in Bushfire Prone Areas (2021) and include native species. Perimeter screening vegetation is to be planted and maintained along the property
- boundaries to enhance the streetscape and perimeter amenity.

 Bushfire Management

 21.
 All development shall be undertaken in accordance with the approved Bushfire Management Plan (10 March 2025).

APPROVAL

This Local Development Plan has been approved by the Shire of Capel under Clause 5.10.5 of the Shire of Capel Local Planning Scheme No.8.

Signature

Date





Appendix E Community Management Plan

Tiny Home Community Management Plan

For

44 Stephen Street, Boyanup, Western Australia, 6237

Lot 9, Plan 222154

Prepared for the Shire of Capel



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1. PREAMBLE

1.1 Introduction

We, Lee and Katie Pritchard, the property owners, are proud to present this Tiny Home Community Management Plan for the proposed development located at 44 Stephen Street, Boyanup, within the Shire of Capel.

This plan outlines our vision for a thoughtfully designed Tiny Home Community that provides a cost-effective and time-efficient response to the growing need for permanent housing. In addition to addressing housing challenges, the development aims to foster a sense of shared community among like-minded residents who value simplicity, sustainability, and connection.

1.2 Key Aspects of the Plan

This Management Plan identifies the standards and strategies for the effective long-term operation and maintenance of communal infrastructure and shared spaces, including:

- Communal Fruit, Vegetable, and Herb Gardens
- Effluent Disposal System
- Fire Pit Areas
- Gates and Fencing
- Landscaped Zones
- Nature Play Area
- Private Access Ways
- Walking Trails and Footpaths
- Rainwater Tanks

In addition, the plan details the designated locations and management strategies for:

- Mail Delivery and Letterboxes
- Bin Storage and Collection
- Communal Lighting
- Individual Storage Sheds
- Noise Control Measures
- Traffic Flow and Parking
- Bushfire Preparedness and Mitigation

1.3 Purpose of the Plan

This Management Plan provides a strategic framework for the sustainable and effective operation of the Tiny Home Community at 44 Stephen Street, Boyanup. It sets out our goals, guiding principles, and implementation strategies aimed at cultivating a vibrant, inclusive, and well-managed community.

The plan will serve as a living document to guide future decision-making, resource management, and community development.

1.4 Vision and Objectives

The proposed development represents a progressive and sustainable approach to housing — an affordable Tiny Home Community that supports social diversity, encourages multi-generational living, and contributes positively to the local economy and environment.

Our vision is to create a connected and resilient community that:

- Provides affordable, high-quality housing solutions
- Supports social interaction and inclusion across all age groups
- Enhances the local area through sustainable practices
- Encourages environmental responsibility by actively reducing the community's ecological footprint

The principles outlined in this Management Plan are central to achieving long-term sustainability and liveability for all residents

2. MANAGEMENT ACTIONS AND STRATEGIES

2.1 Plan Objectives, Strategies, and Implementation

To support the successful implementation and ongoing sustainability of the Tiny Home Community, a series of targeted management measures have been developed. These measures are designed to ensure that the community maintains high standards of safety, cleanliness, functionality, and liveability.

The following strategies and actions will be implemented by the property owners and on-site caretakers, Lee and Katie Pritchard, and serve to realise the vision for the community while addressing its long-term management and maintenance needs.

2.2 Ongoing Management and Maintenance of Communal Facilities

A daily operations schedule will be established to ensure regular cleaning, maintenance, and risk management of all communal facilities. This will create a safe, clean, and welcoming environment for residents, visitors, and contractors.

Routine inspections will be conducted to monitor the condition and functionality of communal infrastructure. These inspections will ensure consistent adherence to safety and hygiene standards.

A designated maintenance fund will be established to cover the costs associated with cleaning, repairs, and general upkeep of communal areas and shared assets.

All maintenance equipment will be serviced and maintained in accordance with the manufacturer's specifications and any relevant safety regulations.

These proactive management practices will ensure that shared spaces remain functional, well-kept, and conducive to community wellbeing.

2.2.1 Communal Fruit, Vegetable and Herb Garden

A communal fruit, vegetable, and herb garden will be developed for the enjoyment and benefit of all community members. This garden will serve as a central feature of the Tiny Home Community, encouraging residents to engage in sustainable living practices and connect through shared food production.

The primary purpose of the garden is to grow a variety of fruits, vegetables, and herbs for personal or shared use among residents.

Management and Community Involvement:

- The overall management and maintenance of the garden will be overseen by the property owners and on-site caretakers.
- Community members will be actively encouraged to contribute to the daily operations of the garden, helping to foster a sense of ownership, responsibility, and collaboration.
- Typical gardening tasks may include, but are not limited to:
 - Watering
 - Weeding
 - Pest management
 - Pruning and trimming
 - Fertilising

Waste and Compost Management:

- A community composting program will be implemented to promote sustainable waste management.
- Residents will be encouraged to collect appropriate food scraps and contribute to a shared communal compost bin, which will be used to enrich the garden soil.
- Vegetation waste generated from the garden will also be added to the compost system, helping to close the loop on organic waste.

Harvesting and Use:

- Produce will be harvested regularly and may be used for personal consumption or shared among residents, depending on individual contributions and seasonal availability.

Garden Infrastructure and Maintenance:

- A designated water supply will be allocated to service the communal garden, with maintenance carried out to ensure continued efficiency and reliability.
- The garden will be located in a position that ensures easy access for all residents and provides adequate sunlight to support healthy plant growth.
- Appropriate budgeting and funding will be allocated to support the ongoing care, maintenance, and development of the garden area.

This communal garden is designed not only to provide fresh, healthy produce but also to serve as a hub for environmental learning, cooperation, and community-building.

2.2.2 Effluent Disposal System

A communal effluent disposal system will be implemented to manage wastewater generated within the Tiny Home Community. This system is designed to ensure safe, efficient, and environmentally responsible treatment of effluent on-site, preserving local water quality and protecting the surrounding ecosystem.

System Overview and Standards:

- The primary function of the system is to treat and dispose of wastewater onsite using advanced, approved treatment methods.
- All operations and maintenance will comply with AS/NZS 1547:2012 Section 6, Appendix T & U, as well as the manufacturer's specifications.
- The system will be maintained to meet all applicable Department of Health requirements and environmental standards.

Maintenance and Servicing:

- Tanks and biosolids settling vessels will be routinely pumped out by a licensed waste contractor to remove accumulated sediment. The frequency of pump-outs will be determined in consultation with the manufacturer.
- Aerobic Treatment Units (ATUs) will be serviced at intervals as specified by the manufacturer, with maintenance carried out by a Department of Health–approved service provider.
- A qualified consultant will be engaged to develop a tailored pumping and maintenance schedule based on system type, usage, and site-specific conditions.

Monitoring and Maintenance Schedule:

Routine inspections will be conducted to identify early signs of system malfunction or stress, including:

- Slow-draining fixtures
- Gurgling sounds in plumbing
- Sewage backup
- Unusual or unpleasant odours
- Surface water pooling or excessive moisture
- Any other irregularities affecting system performance

Budget and Ongoing Management:

- A designated maintenance budget will be established to ensure the ongoing servicing, monitoring, and repair of the effluent disposal system.
- Records of all inspections, servicing, and contractor visits will be maintained to support compliance and inform long-term system planning.

Through careful design, proactive maintenance, and adherence to Department of Health standards, the onsite effluent system will contribute to the health, safety, and sustainability of the community.

2.2.3 Fire Pit Areas

Communal fire pit areas will be established as designated spaces for community members to gather, connect, and enjoy recreational fires in a safe and responsible manner.

Purpose and Use:

- The primary function of the fire pit(s) will be to provide a communal space for socialisation and relaxation.
- Use of fire pit(s) will be prohibited during the Prohibited Burning Period (15 December – 31 March), and on any day where the Fire Danger Rating is High or above, in accordance with local fire regulations and safety guidelines.

Management and Maintenance:

The overall management and safety oversight of fire pit areas will be the responsibility of the property owners and on-site caretakers.

A fire pit maintenance and safety schedule will be implemented, including but not limited to:

- Conducting visual inspections for damage or hazards prior to each use
- Ensuring the fire is fully extinguished after use
- Removing ash and debris following each use
- Periodic deep cleaning of fire pits
- Applying a protective coating as required to prevent rust and extend the lifespan of the fire pit(s)
- Safe storage of firewood in a designated area, away from combustible materials and in compliance with bushfire safety standards

Budgeting and Upkeep:

- Appropriate funding will be allocated for the regular upkeep, cleaning, and long-term maintenance of fire pit areas, ensuring they remain safe, clean, and ready for responsible community use.

These communal spaces will be managed in a way that balances enjoyment with safety, fostering opportunities for community connection while adhering to local fire safety regulations.

2.2.4 Gates and Fencing

The gates and fences surrounding the Tiny Home Community will be maintained, including any existing structures and those required as part of the proposed development. These elements will play a key role in ensuring the safety and security of all community members. Purpose and Function:

- The primary purpose of the gates and fences will be to provide security, define property boundaries, and protect residents from potential external hazards.

Management and Maintenance:

The property owners and on-site caretakers will oversee the overall management and maintenance of all gates and fencing.

Regular checks and maintenance procedures will be carried out to ensure that all gates and fences remain in optimal condition. Specific maintenance tasks will include:

- Regular inspections to ensure gates and fences are in full working order and structurally sound.
- Keeping gates and fences clear of debris that may cause blockages or hinder their function.
- Monitoring for signs of erosion around fence posts or gates.
- Inspecting for leaning or damaged posts that may compromise the integrity of the fencing.
- Checking wire tension to ensure gates and fences remain taut and secure.
- Addressing any other potential issues that may arise (e.g., rust, damage from weather, or wear and tear)

Budgeting and Funding:

- Appropriate funds will be allocated to ensure ongoing upkeep and maintenance, guaranteeing the security and functionality of the gates and fencing for the long term.

This approach will ensure that gates and fences continue to provide a safe, secure, and well-maintained environment for all residents.

2.2.5 Landscaped Zones

Landscaping within the Tiny Home Community will be thoughtfully designed and constructed to enhance the overall aesthetic appeal, support resident wellbeing, and complement the natural environment.

These landscaped areas will serve both practical and recreational purposes, contributing to the visual character of the community while promoting sustainability, privacy, and liveability.

Purpose and Design Intent:

- Landscaping will be created not only for the enjoyment of residents but also to define boundaries, create privacy screens between individual tiny home plots, and buffer neighbouring properties.
- The selection of plants and materials will prioritise the preservation and protection of existing native vegetation and local biodiversity.

- Only non-invasive, low-fuel-risk species will be used to reduce fire hazards and maintain compliance with bushfire safety guidelines.
- Landscaping elements such as walking trails, open green areas, and communal spaces will support outdoor activity and social interaction.

Sustainable and Low-Impact Practices:

- Native and drought-tolerant species will be prioritised to minimise water use and reduce the need for chemical inputs.
- Landscaping may incorporate rainwater harvesting systems and natural composting methods to support sustainable irrigation and soil health.
- Eco-friendly mulching and soil conditioning will help conserve moisture and suppress weed growth.

Management and Maintenance:

The property owners and on-site caretakers will be responsible for the overall management and ongoing maintenance of all landscaped areas.

A structured landscaping maintenance schedule will be implemented, including the following routine tasks:

- Watering based on seasonal needs and plant type
- Weeding to maintain clean and healthy garden beds
- Pest management using environmentally responsible methods
- Pruning and trimming to promote healthy growth and maintain aesthetics
- Mulching to retain soil moisture and suppress weeds
- Fertilising as needed for soil nourishment
- Mowing of grassy areas to maintain a neat appearance

Budgeting and Long-Term Care:

- Appropriate funds will be allocated to cover the ongoing costs of landscaping maintenance, including plant replacement, equipment, and any contracted professional services required to ensure long-term success.

Through the implementation of sustainable practices and thoughtful design, the landscaping within the Tiny Home Community will foster a welcoming, green, and resilient environment that enhances the quality of life for all residents.

2.2.6 Nature Play Area

A nature play area will be developed as a dedicated outdoor space for the youngest members of the Tiny Home Community to explore, play, and grow. Designed with children of all ages and abilities in mind, this area will encourage imaginative, creative, and physical development in a natural and engaging environment. Purpose and Design Objectives:

- The nature play area will provide a safe and stimulating space where children can interact with natural materials and play structures, supporting their social, cognitive, and physical development.
- Features will be designed to promote inclusive play, ensuring that children with diverse needs and abilities can participate fully.
- Natural elements such as logs, rocks, sand, water, and plantings may be incorporated to inspire exploration and creativity.

Management and Maintenance:

The property owners and on-site caretakers will oversee the overall management and maintenance of the nature play area.

A regular maintenance and safety schedule will be implemented to ensure the area remains clean, functional, and safe at all times. This will include, but is not limited to:

- Routine inspections of all play equipment and natural elements for:
 - Cracks
 - Rust
 - Warping
 - Structural breakage or damage
- Removal of debris and rubbish from play surfaces and surrounding areas
- Raking of loose-fill surfacing (e.g., mulch or sand) to ensure even distribution and impact absorption
- Washing and sanitising of outdoor surfaces and equipment as needed

Budget and Ongoing Support:

- Appropriate funding will be allocated for the continued upkeep, repair, and replacement of play structures and landscaping materials within the play area.
- Regular reviews of the space will ensure it continues to meet the evolving needs of the community's children.

This nature play area will serve as an important gathering point for families and contribute to a vibrant, child-friendly environment that reflects the community's values of inclusivity, safety, and connection to nature.

2.2.7 Private Access Ways

A private access network will be constructed as part of the proposed development to provide safe and efficient vehicle and pedestrian access throughout the Tiny Home Community.

Design and Construction:

- The private access way will be installed by a licensed contractor.
- These access ways are intended to minimise environmental impact while providing reliable access for residents, visitors, and service vehicles.

Management and Maintenance:

The property owners and on-site caretakers will be responsible for the ongoing management and maintenance.

A scheduled maintenance program will be implemented to ensure private access ways remain safe, accessible, and well-kept. This will include:

- Smoothing out ruts and uneven surfaces caused by weather or frequent use
- Thorough inspections, particularly following heavy rainfall, to identify and address any issues such as erosion, pooling, or surface degradation

Traffic and Safety Measures:

- A maximum speed limit of 10 km/h will be enforced within the community to promote pedestrian safety, and preserve the road surface.
- Signage may be installed to remind drivers of the speed limit and to maintain awareness of pedestrians and children at play.

Budget and Long-Term Care:

- Appropriate funding will be allocated to cover the ongoing upkeep and maintenance costs associated with the private access network.

This approach will ensure that the private access way remains safe, functional, and in harmony with the rural character of the development while supporting long-term durability.

2.2.8 Walking Trails and Footpaths

Walking trails and footpaths will be developed throughout the Tiny Home Community to promote walkability, encourage outdoor activity, and provide safe, accessible pedestrian routes that connect homes with communal spaces.

Design and Construction:

- All trails and footpaths will be constructed by a licensed contractor to ensure quality, safety, and durability.
- Pathways will be designed to integrate with the natural landscape, encouraging passive recreation and connection to nature.

Management and Maintenance:

The property owners and on-site caretakers will oversee the ongoing maintenance of all walking trails and footpaths.

A regular maintenance schedule will be implemented to ensure:

- Paths remain level, safe, and clear of debris or overgrowth
- Inspections are carried out, especially after adverse weather, to identify erosion, pooling, or other hazards

Budget and Ongoing Care:

- Appropriate funding will be allocated to support the continued upkeep, repairs, and resurfacing of walking trails and footpaths to ensure long-term usability and safety.

These pathways will not only enhance mobility within the community but also contribute to residents' overall well-being by promoting active lifestyles and connection to outdoor spaces.

2.2.9 Rainwater Tanks

Rainwater tanks will be installed throughout the Tiny Home Community as part of a broader commitment to sustainability and resource efficiency. These tanks will collect rainwater for appropriate use, helping to reduce reliance on the reticulated water supply and minimise the community's environmental footprint.

Purpose and Use:

- The primary function of the water tank system is to harvest and store rainwater for use in garden irrigation, landscaping, and other potable applications, where appropriate.
- This approach supports sustainable water management while also reducing demand on the local water infrastructure.

Management and Maintenance:

- Water tanks will be maintained in accordance with the manufacturer's specifications to ensure safe, efficient, and hygienic operation.
- Where necessary, a qualified tradesperson will be engaged to carry out servicing, cleaning, or repairs to ensure compliance with health and safety standards.

Budget and Ongoing Care:

- Appropriate funds will be allocated for the ongoing upkeep, servicing, and potential replacement of parts associated with the water tank system.
- Regular inspections will be carried out to monitor the condition of the tanks, gutters, and filters to prevent contamination or mechanical failure.

The water tank system is a key element in the community's strategy to reduce environmental impact, promote self-sufficiency, and support the long-term resilience of the development.

2.3 Location of Services

Essential services and communal amenities within the Tiny Home Community have been strategically located to ensure optimal accessibility, functionality, and convenience for all community members. Each service location has been carefully considered to promote safety, comfort, and sustainability, while maintaining alignment with relevant environmental best practices, and the overall community design objectives.

2.3.1 Mail Delivery and Letterboxes

Australia Post does not currently provide a mail delivery service to the premises at 44 Stephen Street, Boyanup.

As a result, all community members will be required to personally collect their mail from the Boyanup Post Office, or alternatively, arrange for a private Post Office Box through Australia Post.

No individual or communal letterbox infrastructure is proposed on-site at this time. Should service availability or community needs change in the future, this arrangement may be reviewed accordingly.

2.3.2 Bin Storage and Collection

General Waste, Food Organics and Garden Organics (FOGO), and Recyclables bins, supplied by the Shire of Capel, will be strategically placed at regular intervals throughout the Tiny Home Community. This will ensure convenient and accessible waste disposal for all community members.

Collection Schedule and Placement Guidelines:

- As per the Shire of Capel Waste Collection Schedule 2024/25, bins will be placed on the verge by 6:00 AM every Friday for weekly collection.
- Bins will be kept clear of fences, trees, and vehicles by a minimum distance of 1 metre.
- A spacing of 0.5 metres will be maintained between each bin to allow for efficient collection.
- Bins will be returned to their designated storage locations within 24 hours of being emptied.

Additional Waste Services:

Community members may also access the Capel Waste Transfer Station, which offers free and paid recycling and disposal services for materials not included in the standard weekly bin collection, such as e-waste, large household items, and green waste in bulk.

This approach to waste management supports the community's values of cleanliness, environmental responsibility, and shared accountability, while aligning with local shire requirements.

2.3.3 Communal Lighting

Lighting will be installed along designated pathways, walking tracks, and within communal areas where necessary to support visibility, safety, and ease of access after dark.

Lighting Design and Purpose:

- Lighting will be positioned to adequately illuminate key areas while maintaining the natural character and ambience of the community.
- All lighting will be selected and installed to ensure energy efficiency, using solar or low-consumption LED systems where feasible.

Light Spill Management:

- Lighting will be appropriately dimmed and directed to minimise light spill and prevent impact on neighbouring properties or surrounding natural areas.
- Shielded fixtures will be used where necessary to ensure focused illumination, reducing upward or outward glare and supporting dark-sky principles.

Maintenance:

- Lighting will be maintained in accordance with the manufacturer's specifications, with regular inspections carried out to ensure fixtures are in good working order and to promptly address any outages or faults.

This approach ensures that communal areas remain safe and accessible after dark, while preserving the privacy, tranquillity, and environmental integrity of the broader site.

2.3.4 Individual Storage Sheds

Provisions will be made for the installation of individual storage sheds on residential plots, should they be requested by community members.

Installation and Responsibility:

- Individual storage sheds will be placed within the tenant's designated plot and installed at the tenant's expense.
- Community members will be responsible for the ongoing care and maintenance of their sheds, in line with the manufacturer's specifications.

Design Consistency:

- To ensure visual cohesion and maintain the overall aesthetic of the community, all sheds must be of the same or similar style, size, and material finish.
- Shed selection and placement may require approval from the property owners/on-site caretakers to ensure consistency with the development's design guidelines.

This approach provides flexibility for personal storage needs while preserving the uniform, well-maintained appearance of the Tiny Home Community.

2.4 Noise, Traffic and Bushfire Management

The Tiny Home Community has been thoughtfully designed with a strong emphasis on minimising environmental impact while promoting a safe, peaceful, and well-managed living environment for all residents and visitors.

Through carefully planned strategies relating to noise control, traffic and parking management, and bushfire preparedness, the community aims to foster a setting that is both sustainable and resilient.

These combined efforts ensure the community remains well-ordered, environmentally conscious, and aligned with regulatory requirements and best practice planning, while also meeting the diverse needs of its residents.

2.4.1 Noise Management

Community noise will be managed in compliance with the Environmental (Noise) Regulations Act 1997 and in accordance with the guidelines set forth in the Shire of Capel's Residential Noise Information Sheet.

To ensure a peaceful environment for all residents, the following noise-related activities will be regulated:

Specified Equipment Use:

- Lawnmowers, power tools, and other recreational or hobby equipment will be restricted to a maximum of 2 hours per day per household.

Musical Instruments:

- Musical instruments may be played for a maximum of 1 hour per day within the home.

Operating Hours:

- Specified equipment and musical instruments may only be used within the following hours:
 - Monday to Saturday: 7:00 AM to 7:00 PM
 - Sundays and Public Holidays: 9:00 AM to 7:00 PM

Noise Minimisation:

- Efforts will be made to ensure that noise levels are kept at a minimum to avoid any unreasonable disturbance to the health, welfare, convenience, comfort, or amenity of both community members and neighbouring properties.

Social Gatherings:

- Noise associated with social gatherings will be managed in accordance with the Shire of Capel's Residential Noise Information Sheet, ensuring that noise does not exceed acceptable limits, particularly in the evenings.

This approach aims to preserve a harmonious living environment where noise is controlled and community members can enjoy their homes without causing disturbance to others.

2.4.2 Traffic Flow and Parking

To ensure safe and efficient traffic flow within the Tiny Home Community, the following traffic and parking management strategies will be implemented:

Parking Provision:

- A single parking space will be allocated for each Tiny Home plot.
- Visitor parking has been designated as shown in the Development Site Plan and is strictly reserved for temporary visitors only. Community members are encouraged to park in their designated spaces.

Access and Usage Restrictions:

- Private access ways will be restricted to community members and temporary visitors/tradespeople only.
- Onsite tradespeople will be required to sign in and out via a register before entering or exiting the Tiny Home Community to ensure security and accountability.

Speed Limits and Pedestrian Safety:

- A strict speed limit of 10 km/h will apply to all vehicles to enhance safety and minimise noise within the community.
- Walking trails and footpaths, as detailed in the Development Site Plan, will assist with pedestrian movement, providing safe routes for community members to navigate the site on foot.

Traffic Flow:

- The property owners and on-site caretakers will continuously monitor and manage traffic circulation to minimise hazards and ensure safe access and circulation for both vehicles and pedestrians.

This management strategy will promote safety, accessibility, and convenience for all residents and visitors while maintaining a smooth and organised traffic flow within the community.

2.4.3 Bushfire Management

For comprehensive bushfire management, please refer to the Bushfire Management Plan (BMP) and Bushfire Attack Level (BAL) Assessment provided by Western Environmental.

These documents outline the specific measures and actions required to minimise bushfire risk and ensure the safety of all community members, based on the unique characteristics of the site.

The BMP and BAL Assessment will be adhered to and regularly reviewed to ensure that all fire safety protocols are maintained in accordance with current regulations and best practices.

3. SUMMARY

As the property owners, we are confident that the Tiny Home Community has been thoughtfully designed to provide long-term value and to positively contribute to the local economy and community of Boyanup and the surrounding Shire of Capel.

We are dedicated to fostering a safe, secure, and inclusive environment for all community members and visitors. Our commitment to continuous improvement ensures that the Tiny Home Community Management Plan remains adaptable, aligned with evolving government legislation, and consistent with both policy and community expectations.

The strategies outlined in this plan will serve as the foundation for the community's sustainability, supporting its growth and vitality into the future and ensuring its continued success



Appendix F Water Use and Wastewater Management Plan

Development Application Tiny Home Community – 44 Stephen St, Boyanup

Tiny Home Water and Wastewater Management Plan

Proposal for Reduced Wastewater Loading Rate and Secondary Treatment without Nutrient Removal

For

44 Stephen Street, Boyanup, Western Australia, 6237

Lot 9, Plan 222154

Prepared for the Shire of Capel, Department of Health and Department of Water and Environmental Regulation



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1. PREAMBLE

1.1 Introduction

The proposed Tiny Home Community Development at 44 Stephen Street, Boyanup, within the Shire of Capel, represents a forward-thinking and sustainable living model that balances environmental protection, economic opportunity, and social well-being. The development promotes responsible resource use, minimises pollution, conserves energy and water, protects surrounding ecosystems, and provides residents with the opportunity to actively reduce their environmental footprint.

Water usage and wastewater management are fundamental to this sustainable vision. These practices not only reduce environmental impact but also support a resilient, low-impact community model aligned with broader sustainability goals.

This Water Usage and Wastewater Management Plan outlines targeted strategies to reduce water consumption and wastewater generation across the development. These measures are designed to ensure the long-term sustainability and viability of the community.

According to the Site and Soil Evaluation (SSE), the proposed development supports a reduced wastewater design flow based on actual occupancy levels, with a maximum of 105 residents across the site. In support of this, Section 2 outlines water conservation measures that will be implemented at the dwelling level, while Section 3 provides evidence demonstrating that Tiny Homes typically generate lower wastewater volumes due to their smaller scale and higher water efficiency. Based on these factors and the measures detailed throughout this Plan, we are requesting Shire approval for a reduced wastewater loading rate of 85 litres per person per day.

Additionally, we are requesting approval for the use of a secondary treatment system without nutrient removal (refer to Section 6), based on the site's favourable soil characteristics, low risk of groundwater interaction, and minimal likelihood of surface runoff, ensuring safe and sustainable effluent management.

1.2 Key Objectives

This plan has been developed to:

- Provide evidence of reduced water consumption associated with Tiny Home living
- Demonstrate the feasibility of reduced hydraulic loading rates
- Minimise wastewater volumes through efficiency and behavioural design
- Align with National Standards (e.g. WELS and AS 6400:2016)
- Reinforce the development's commitment to environmental best practice
- Support the use of sustainable wastewater treatment options aligned with site conditions, including secondary treatment without nutrient removal

Practical strategies will be applied to daily water use, such as showering, washing, and cleaning, to significantly reduce demand on both water supply and wastewater systems.

2. WATER USAGE STRATEGIES

Reducing water consumption within the proposed Tiny Home Community will:

- Support long-term water availability
- Protect local ecosystems and groundwater
- Reduce energy demands associated with heating water
- Lower wastewater treatment volumes and costs
- Contribute to global efforts to manage water scarcity

All plumbing fixtures and appliances will comply with the Water Efficiency Labelling and Standards¹ (WELS) scheme and meet or exceed the performance requirements outlined in AS 6400:2016².

2.1 Showers

Conventional showers use between 15–25 litres per minute. In contrast, a WELS 5-star rated showerhead can use as little as 4.5 litres per minute³, significantly reducing both water and energy consumption.

Requirements:

All Tiny Homes must be fitted with a WELS 4-star rated (or higher) water-efficient showerhead.

2.2 Taps

Standard taps can consume up to 18 litres of water per minute. Low-flow taps or aerators mix air with water to reduce usage to as low as 2 litres per minute⁴ while maintaining pressure.

Requirements:

All Tiny Homes must be fitted with a WELS 4-5 star rated bathroom tap(s) and WELS 3-4 star rated kitchen tap.⁵

2.3 Toilets

Older single-flush toilets use 9–11 litres per flush⁶. Modern dual-flush or low-flush toilets reduce this significantly, using 3 litres for a half flush and 6 litres for a full flush.

Requirements:

All Tiny Homes must be fitted with a dual-flush or low-flush toilet with a minimum WELS 4-star rating.

¹ <u>https://www.waterrating.gov.au/</u>

² https://www.waterrating.gov.au/about/standards

³ <u>https://www.yourhome.gov.au/water/reducing-water-use</u>

⁴ <u>https://www.energy.gov.au/households/water-efficiency</u>
⁵ <u>https://www.yourhome.gov.au/water/reducing-water-use</u>

<u>https://www.yournome.gov.au/water/reducing-water-use</u>
<u>bttps://www.gwmwater.org.au/conserving-water/saving-water/</u>

⁶ https://www.gwmwater.org.au/conserving-water/saving-water/how-much-water-you-use

2.4 Washing Machines

Washing machines can be one of the largest sources of domestic water usage. A front-loading machine with a WELS 5-star rating can use 55 litres or less per 8kg load, compared to up to 112 litres used by older top loaders.⁷

Requirements:

If installed, all Tiny Homes that include a washing machine must be fitted with a front-loading WELS 5-star rated (or higher) machine.

2.5 Dishwashers

Modern dishwashers vary in efficiency. A WELS 4.5-star rated single-drawer dishwasher typically uses just 6.9 litres per cycle⁸, compared to over 17 litres⁹ for some full-size models.

Requirements:

If installed, all Tiny Homes that include a dishwasher must be fitted with a single-drawer WELS 4.5-star rated (or higher) machine.

⁷ <u>https://www.choice.com.au/home-and-living/laundry-and-cleaning/washing-machines/articles/best-washing-machine-for-saving-water</u> 8

https://www.fisherpaykel.com/au/dishwashing/contemporary-dishwashers/series-7-contemporary-single-dishdrawer-dishwasher-dd60scx9-82316.html

⁹ <u>https://www.energy.gov.au/households/water-efficiency</u>

3. SUPPORTING EVIDENCE

3.1 Tiny Tranquility - Oregon, USA

Due to the currently limited availability of data on wastewater performance specific to Tiny Homes in the Australian context, reference has been made to Tiny Tranquility, a purpose-built Tiny Home community located in Oregon, USA, which offers relevant insights into water use and wastewater generation patterns in a comparable setting.

- Established in 2017
- 46 permanent Tiny Homes
- On-site wastewater system (no access to reticulated sewer)
- All homes include standard plumbing fixtures (not water-saving)
- On-site laundry facilities

In consultation with the community's owner, Josh Palmer, we reviewed the 2024 Annual Discharge Monitoring Report (DMR), prepared by Oregon Water Services Inc. This report provides relevant performance data from Tiny Tranquility. Full supporting documentation can be found in Appendix A.

Key findings from the reporting period include:

- Maximum daily average flow (December 2024): 1,094 gallons (4,141.24 litres)
- Occupancy: 1.5 persons per Tiny Home (total 69 persons)
- Daily water usage per person/per day (December 2024): 60.02 litres

For the calendar year 2024:

- Annual average daily flow: 825 gallons per day (3,122.96 litres)
- Average water usage per person/per day (annual): 45.26 litres

This independent data validates the feasibility of achieving significantly lower per-person water usage in a Tiny Home Community setting, even without efficiency fixtures. The strategies outlined in this plan are expected to outperform these figures by design.

Should a reference from the owner of Tiny Tranquility, Josh Palmer, be required, please contact him via email: <u>tinytranquilitypark@gmail.com</u>

Appendix A

Annual Discharge Monitoring Report (DMR) 2024 – Tiny Tranquility, Oregon, USA

Note: All measurements are reported in US liquid gallons. To convert to litres, multiply the volume by 3.785. For example: 1,000 gallons \approx 3,785 litres.

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4. REDUCED WASTEWATER CAPACITY

As outlined in Section 1.1, we are requesting approval for a reduced wastewater capacity based on the following parameters:

- 85 litres per person per day
- Maximum occupancy: 105 people
- Total of 49 Tiny Home plots

This request is supported by the evidence provided in Section 2: Water Usage Strategies, which highlights significant reductions in water consumption through the use of water-efficient fixtures and appliances, including taps, showerheads, toilets, and whitegoods compliant with the National Water Efficiency Labelling and Standards (WELS) scheme, as well as other water-saving technologies.

Further justification is provided in Section 3: Supporting Evidence, which demonstrates that Tiny Homes inherently use less water than traditional residential dwellings, due to their smaller footprint and more efficient design.

5. REQUEST FOR SECONDARY TREATMENT WITHOUT NUTRIENT REMOVAL

We are formally requesting approval for the use of a secondary wastewater treatment system without nutrient removal for the proposed Tiny Home Community at 44 Stephen Street, Boyanup.

This request is based on the following considerations:

5.1 Site Suitability

A Site and Soil Evaluation (SSE) has been conducted for the development, indicating favourable site and soil conditions for effective wastewater dispersal. While it is acknowledged that on sewerage sensitive sites, nutrient retention for Aerobic Treatment Unit (ATU) systems is generally required, we are requesting a variation to this requirement based on the following factors:

- The site contains loam soils, which exhibit high nutrient retention capacity, significantly reducing the risk of nutrient leaching or environmental degradation.
- The risk of effluent reaching groundwater is low, due to the depth to groundwater and the soil profile, which provides sufficient natural filtration and treatment of effluent.
- The topography and site layout indicate minimal risk of surface runoff, especially when effluent is dispersed appropriately through designated land application areas.
- The proposed secondary treatment systems, in combination with responsible land application design and monitoring, are sufficient to protect the surrounding environment without the need for additional nutrient removal processes.

5.2 Occupant Density and Scale

The development consists of 49 Tiny Home lots with a maximum occupancy of 105 residents. Given the limited scale and low wastewater output per household (85 litres per person per day), secondary treatment systems are considered appropriate and proportionate to the scale of the community.

5.3 Sustainable and Cost-Effective

Avoiding the additional cost and complexity of nutrient removal supports a more affordable and accessible approach that is consistent with the sustainability objectives of the development. This also aligns with the broader goal of encouraging small-footprint, environmentally responsible living.

We propose the implementation of an approved secondary treatment unit that meets Department of Health standards for onsite wastewater management, coupled with regular servicing, monitoring, and community education on water use and system care.

This approach ensures that wastewater is treated responsibly while maintaining alignment with environmental, health, and planning regulations.

6. SUMMARY

The proposed Tiny Home Community Development at 44 Stephen Street, Boyanup, within the Shire of Capel, is centered on the efficient and responsible use of water resources to ensure long-term availability, protect the environment, and support ecosystem health, without compromising the ability of future generations to access clean and safe water.

As property owners, we are fully committed to implementing and maintaining responsible water usage and wastewater management practices for all community members. This includes adopting practical strategies to minimise water consumption and reduce wastewater generation, while ensuring compliance with relevant government legislation, policy, and community expectations.

We are also committed to ongoing evaluation and continuous improvement to ensure that the Tiny Home Water Usage and Wastewater Management Plan remains relevant and effective over time.

The directions and strategies outlined in this Plan will underpin the long-term sustainability of the development and support the resilience, health, and success of the community into the future.