

PLANNING NOTICE

An application has been received for a Permit under s.57 of the Land Use Planning Approvals Act 1993:

APPLICANT:	T Canning - PA\24\0105
PROPERTY ADDRESS:	311 Marriott Street WESTBURY (CT:179617/2)
DEVELOPMENT:	Single dwelling, Secondary residence, Residential outbuildings (carport, garage) - setbacks, driveway.

The application can be inspected until **Monday, 12 February 2024**, at www.meander.tas.gov.au or at the Council Office, 26 Lyall Street, Westbury (during normal office hours).

Written representations may be made during this time addressed to the General Manager, PO Box 102, Westbury 7303, or by email to planning@mvc.tas.gov.au. Please include a contact phone number. Please note any representations lodged will be available for public viewing.

If you have any questions about this application please do not hesitate to contact Council's Planning Department on 6393 5320.

Dated at Westbury on 27 January 2024.

Jonathan Harmey

GENERAL MANAGER

APPLICATION FORM

PLANNING PERMIT

Land Use Planning and Approvals Act 1993



- Application form & details **MUST** be completed **IN FULL**.
- Incomplete forms will not be accepted and may delay processing and issue of any Permits.

OFFICE USE ONLY

Property No:	<input type="text"/>	Assessment No:	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>
DA\	<input type="text"/>	PA\	<input type="text"/>	PC\	<input type="text"/>		

- Is your application the result of an illegal building work? ☐ Yes ☒ No
- Have you already received a Planning Review for this proposal? ☐ Yes ☒ No
- Is a new vehicle access or crossover required? ☐ Yes ☒ No

PROPERTY DETAILS:

Address:	<input type="text" value="311 Marriott St"/>	Certificate of Title:	<input type="text" value="179617"/>
Suburb:	<input type="text" value="Westbury"/>	<input type="text" value="7301"/>	Lot No: <input type="text" value="2"/>
Land area:	<input type="text" value="5007"/>	m^2 / ha	
Present use of land/building:	<input type="text" value="vacant"/>	(vacant, residential, rural, industrial, commercial or forestry)	

- Does the application involve Crown Land or Private access via a Crown Access Licence: ☐ Yes ☒ No
- Heritage Listed Property: ☐ Yes ☒ No

DETAILS OF USE OR DEVELOPMENT:

- Indicate by ✓ box
- | | | | |
|---|--|--------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> Building work | <input type="checkbox"/> Change of use | <input type="checkbox"/> Subdivision | <input type="checkbox"/> Demolition |
| <input type="checkbox"/> Forestry | <input type="checkbox"/> Other | | |

Total cost of development (inclusive of GST): Includes total cost of building work, landscaping, road works and infrastructure

Description of work:

Use of building: (main use of proposed building – dwelling, garage, farm building, factory, office, shop)

New floor area: m^2 New building height: m

Materials:	External walls:	<input type="text" value="metal colorbond"/>	Colour:	<input type="text" value="Surfmist"/>
	Roof cladding:	<input type="text" value="metal colorbond"/>	Colour:	<input type="text" value="Surfmist"/>

SEARCH OF TORRENS TITLE

VOLUME 179617	FOLIO 2
EDITION 3	DATE OF ISSUE 19-Sep-2023

SEARCH DATE : 22-Jan-2024

SEARCH TIME : 10.42 AM

DESCRIPTION OF LAND

Town of WESTBURY

Lot 2 on Sealed Plan 179617

Derivation : Part of Lot 143, 5 Acres (Sec. F8) Gtd. to Thomas
Campion

Prior CT 169983/1

SCHEDULE 1N153920 TRANSFER to JESSICA MARY O'GRADY and MATHEW ANTHONY
O'GRADY Registered 19-Sep-2023 at 12.01 PMSCHEDULE 2

Reservations and conditions in the Crown Grant if any

SP179617 EASEMENTS in Schedule of Easements

SP179617 FENCING COVENANT in Schedule of Easements

E361832 MORTGAGE to Australia and New Zealand Banking Group
Limited Registered 19-Sep-2023 at 12.02 PMUNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

<p>OWNER: JULIE GOWER</p> <p>FOLIO REFERENCE: CT. 169983/1</p> <p>GRANTEE: WHOLE OF LOT 143 (5A-0R-0P) GRANTED TO THOMAS CAMPION.</p>		<p>PLAN OF SURVEY</p> <p>BY SURVEYOR: radian S.C. BUCKNELL SURVEYING</p> <p>LOCATION: TOWN OF WESTBURY SECTION F8</p> <p>SCALE 1:750 LENGTHS IN METRES</p>		<p>REGISTERED NUMBER</p> <p>SP179617</p> <p>APPROVED EFFECTIVE FROM 17 SEP 2020</p> <p><i>Renna</i> Recorder of Titles</p>	
<p>MAPSHEET MUNICIPAL Code No 121(4840)</p>	<p>LAST UPI No</p>	<p>LAST PLAN No. P.169983</p>	<p>ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN</p>		

(SP22796)
(C1/130) LO

J. Jordan
GENERAL MANAGER
Council Delegate

10/11/2020
Date

SCHEDULE OF EASEMENTS

Registered Number

NOTE: THE SCHEDULE MUST BE SIGNED BY THE OWNERS & MORTGAGEES OF THE LAND AFFECTED.
SIGNATURES MUST BE ATTESTED.

SP 1796 17

PAGE 1 OF 3 PAGE/S

EASEMENTS AND PROFITS

Each lot on the plan is together with:-

- (1) such rights of drainage over the drainage easements shown on the plan (if any) as may be necessary to drain the stormwater and other surplus water from such lot; and
- (2) any easements or profits a prendre described hereunder.

Each lot on the plan is subject to:-

- (1) such rights of drainage over the drainage easements shown on the plan (if any) as passing through such lot as may be necessary to drain the stormwater and other surplus water from any other lot on the plan; and
- (2) any easements or profits a prendre described hereunder.

The direction of the flow of water through the drainage easements shown on the plan is indicated by arrows.

Lot 1 on the Plan is together with an Electricity Infrastructure Easement (as herein defined) over the area marked "ELECTRICITY INFRASTRUCTURE EASEMENT ~~(PRIVATE)~~ 1.50 WIDE ABCDEFGHJK" shown on the Plan.

Lot 2 on the Plan is subject to an Electricity Infrastructure Easement (as herein defined) (appurtenant to Lots 1, 3 and 4 on the Plan) over the area marked "ELECTRICITY INFRASTRUCTURE EASEMENT ~~(PRIVATE)~~ 1.50 WIDE ABCHJK" shown passing through Lot 2 on the Plan.

Lot 3 on the Plan is subject to an Electricity Infrastructure Easement (as herein defined) (appurtenant to Lots 1 and 4 on the Plan) over the area marked "ELECTRICITY INFRASTRUCTURE EASEMENT ~~(PRIVATE)~~ 1.50 WIDE CDGH" shown on the Plan.

"ELECTRICITY INFRASTRUCTURE EASEMENT ~~(PRIVATE)~~ 1.50 WIDE
Lot 3 on the Plan is together with an Electricity Infrastructure Easement (as herein defined) over the area marked ^
"ABCHJK" shown passing through Lot 2 on the Plan.

Lot 4 on the Plan is subject to an Electricity Infrastructure Easement (as herein defined) (appurtenant to Lot 1 on the Plan) over the area marked "ELECTRICITY INFRASTRUCTURE EASEMENT ~~(PRIVATE)~~ 1.50 WIDE DEFG" shown passing through Lot 4 on the Plan.

Lot 4 on the Plan is together with an Electricity Infrastructure Easement (as herein defined) over the area marked "ELECTRICITY INFRASTRUCTURE EASEMENT ~~(PRIVATE)~~ 1.50 WIDE ABCHJK" shown passing through Lot 2 on the Plan.

Lot 4 on the Plan is together with an Electricity Infrastructure Easement (as herein defined) over the area marked "ELECTRICITY INFRASTRUCTURE EASEMENT ~~(PRIVATE)~~ 1.50 WIDE CDGH" shown passing through Lot 3 on the Plan.

INTERPRETATION

In this schedule of easements "Electricity Infrastructure Easement" means:

Firstly, the full and free right and liberty for the owner of the dominant tenement and their successors at all times hereafter:

- (a) To maintain, lay, erect and install power lines (overhead or underground) together with all necessary poles and other equipment for the transmission or distribution of electricity (hereinafter called "Electricity Infrastructure")


(USE ANNEXURE PAGES FOR CONTINUATION)

SUBDIVIDER: Julie Gower

FOLIO REF: Volume 169983 Folio 1

SOLICITOR

& REFERENCE: Sproal & Associates (BD Sproal)

PLAN SEALED BY: Meander Valley Council

DATE: 10 July 2020

PA/20/0024

REF NO.


J. JordanGENERAL MANAGER
Council Delegate

NOTE: The Council Delegate must sign the Certificate for the purposes of identification.

ANNEXURE TO SCHEDULE OF EASEMENTS PAGE 2 OF 2 PAGES 3	Registered Number SP 1796 17
SUBDIVIDER: Julie Gower FOLIO REFERENCE: Volume 169983 Folio 1	

- of such materials and type as the owner of the dominant tenement may determine above, on or under the land marked "Electricity Infrastructure (Private) 1.50 Wide" on the Plan (hereinafter called "the servient land");
- (b) To enter into and upon the servient land for the purpose of examining, maintaining, repairing, modifying, adding to or replacing the Electricity Infrastructure without doing unnecessary damage to the servient land and making good all damage occasioned thereby;
 - (c) To cause or permit electrical energy to flow or be transmitted through the Electricity Infrastructure;
 - (d) To enter into and upon the servient land for all or any of the above purposes with or without all necessary plant and equipment and machinery and the means of transporting the same and if necessary to cross the remainder of the land in consultation with the registered proprietor thereof for the purpose of access and egress to and from the servient land.

Secondly, the benefit of a covenant for the owner of the dominant land and their successors with the registered proprietors for themselves and their successors in title of the servient land not to erect any buildings or place any structures or objects within the said easement without the prior written consent of the owner of the dominant land to the intent that the burden of this covenant may run with and bind the servient land and every part thereof and that the benefit thereof may be annexed to and run with the dominant land.

FENCING COVENANT

The owner of each lot on the Plan covenants with the Vendor (Julie Gower) that the Vendor shall not be required to fence.

SIGNED by JULIE GOWER being the registered proprietor in the land comprised in the folio of the Register Volume 169983 Folio 1 in the presence of:

(Signature of Witness)



Julie Gower



(Full Name of Witness)

(Address)

BARRY DAVID SPROAL

(Occupation)

71 St John Street,
Launceston Tas 7250
Legal Practitioner

NOTE: Every annexed page must be signed by the parties to the dealing or where the party is a corporate body be signed by the persons who have attested the affixing of the seal of that body to the dealing.

ANNEXURE TO SCHEDULE OF EASEMENTS PAGE <u>3</u> OF <u>3</u> PAGES	Registered Number SP179617
SUBDIVIDER: Julie Gower FOLIO REFERENCE: Volume 169983 Folio 1	

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- (b) To enter into and upon the servient land for the purpose of examining, maintaining, repairing, modifying, adding to or replacing the Electricity Infrastructure without doing unnecessary damage to the servient land and making good all damage occasioned thereby;
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 - (d) To enter into and upon the servient land for all or any of the above purposes with or without all necessary plant and equipment and machinery and the means of transporting the same and if necessary to cross the remainder of the land in consultation with the registered proprietor thereof for the purpose of access and egress to and from the servient land.

Secondly, the benefit of a covenant for the owner of the dominant land and their successors with the registered proprietors for themselves and their successors in title of the servient land not to erect any buildings or place any structures or objects within the said easement without the prior written consent of the owner of the dominant land to the intent that the burden of this covenant may run with and bind the servient land and every part thereof and that the benefit thereof may be annexed to and run with the dominant land.

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.....
Julie Gower

(Signature of Witness)

(Full Name of Witness)

(Address)

(Occupation)

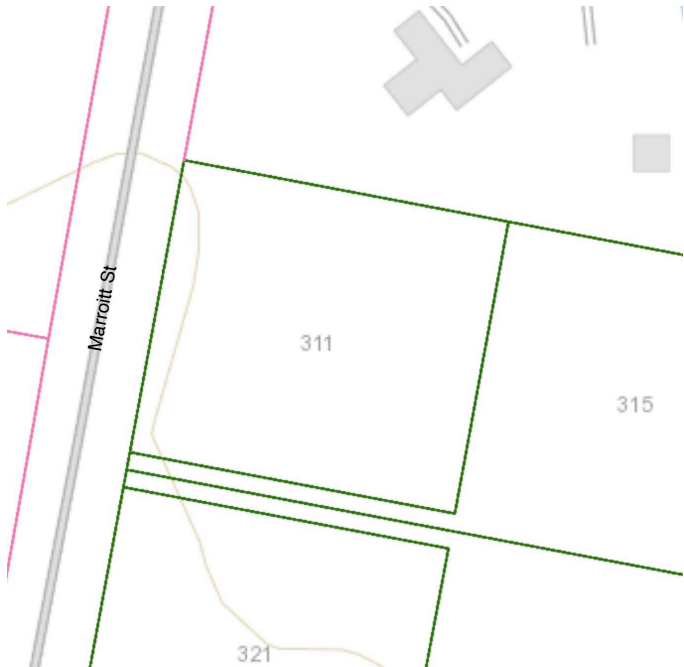
BANK OF QUEENSLAND as mortgagee does hereby consent to this schedule of easements.

EXECUTED BY BANK OF QUEENSLAND LIMITED
ACN 009 656 740 by its attorney GAIL GARTSHORE
SENIOR OFFICER of DXC ENTERPRISE AUSTRALIA
PTY LTD ACN 612 896 527 (formerly known as
ENT. SERVICES AUSTRALIA PTY LTD) under power
of attorney no. PA102879 dated 3 November 2016:

X *Michelle*
Signature of witness Name of witness: Anita Freiberg
(Bank officer)

James
By executing this agreement the attorney states that he/she has received no notice of revocation of the power of attorney.

NOTE: Every annexed page must be signed by the parties to the dealing or where the party is a corporate body be signed by the persons who have attested the affixing of the seal of that body to the dealing.



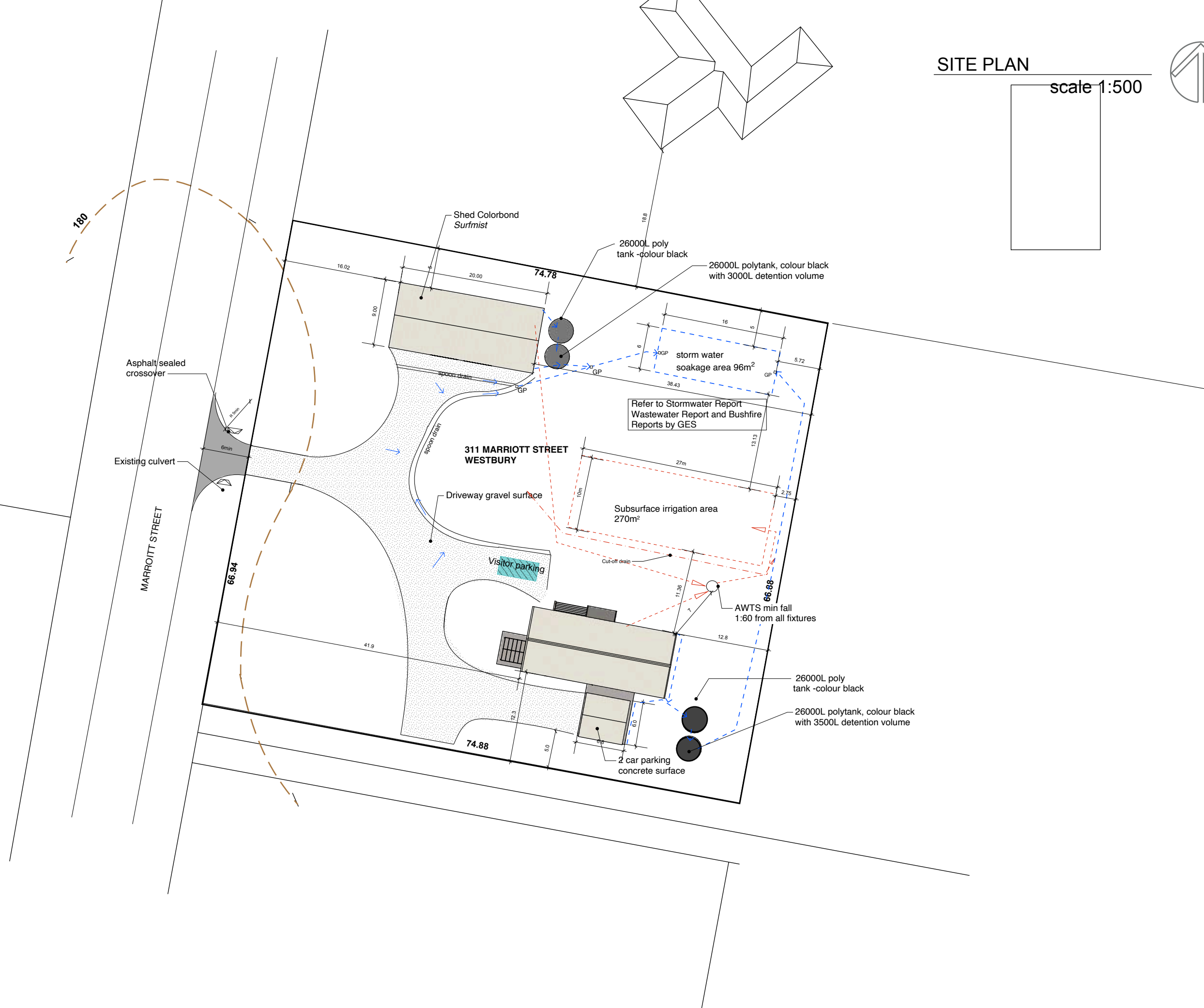
LOCATION PLAN LIST map not to scale

TITLE REFERENCE #	LOT 2 SP 179617
LAND AREA	5007M ²
EXISTING FLOOR AREA	na
PROPOSED FLOOR AREA	168
SHED AND CARPORT	171
SITE COVERAGE	6.7%
SITE CLASSIFICATION	
DESIGN WIND SPEED	N3
SOIL CLASSIFICATION	H2
CLIMATE ZONE	7
BUSHFIRE ATTACK LEVEL	BAL LOW

DEVELOPEMENT APPLICATION

Client: 311 MARRIOTT STREET
WESTBURY

Page #	Page Name
1	Cover Page
2	Site Plan
3	SWMP
4	Elevations North/South
5	Elevations West /East
6	Floor Plan
7	Shed Elevations
8	Shed Plan
9	3D view



SOIL AND WATER
MANAGEMENT PLAN

scale 1:500



DA
3
of
9

Client Mat & Jessica O'Grady
311 Marriott Street Westbury
7303

Torquil Canning/torquil@netsapce.net.au/0478616663

SWMP

ISSUE

DATE

17 Oct 2023	Planning application
18 Dec 2023	Site plan updated
16 Jan 24	Water, stormwater and bushfire reports
22 Jan24	Updated setbacks and heights, windows in shed

1m high sediment fences
use non woven geotextile

Temporary surface drains
(see Drainage Plan for final
drain positions)

Fill location

Cut location

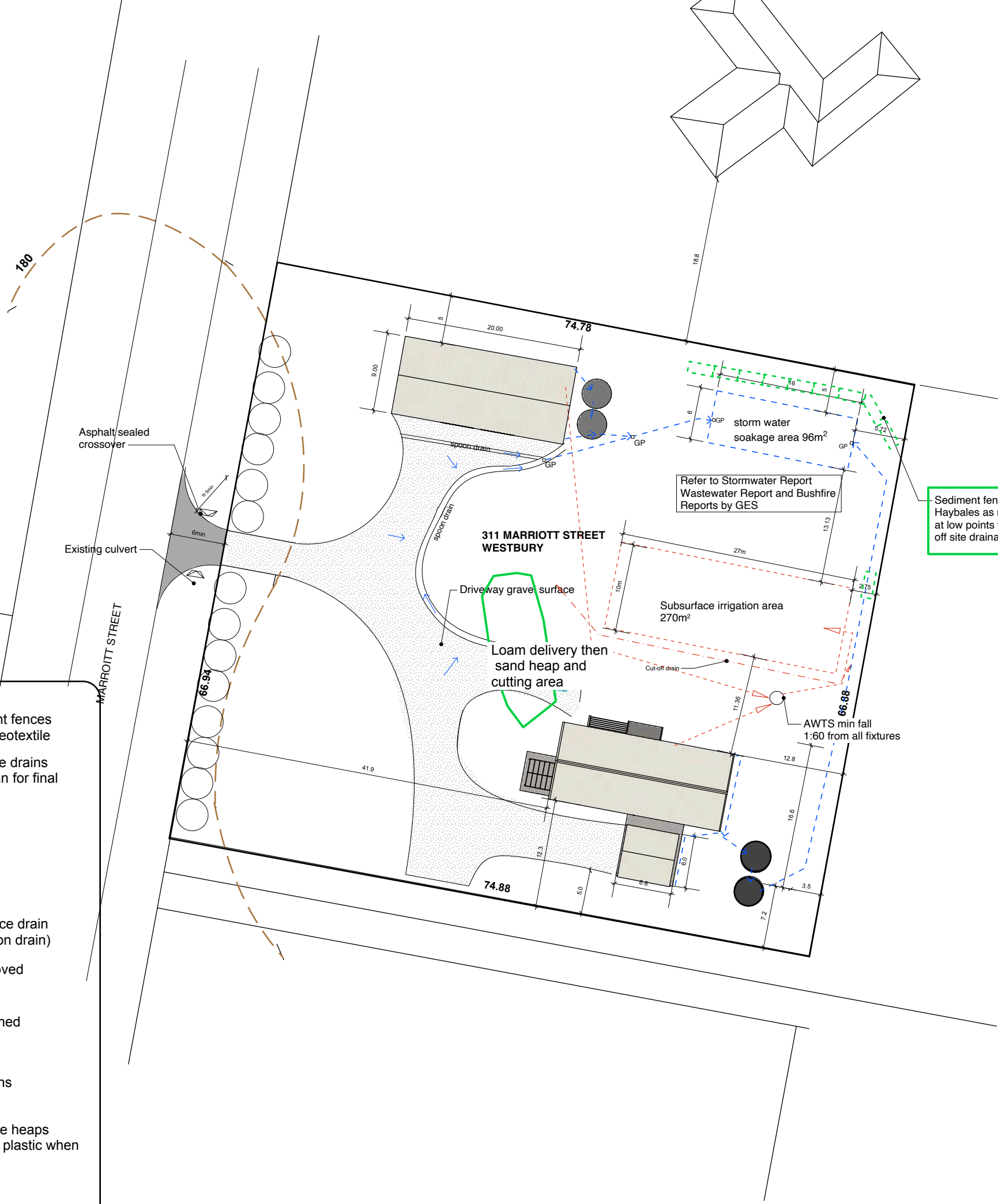
Permanent surface drain
(also site diversion drain)

Trees to be removed

Trees to be retained

Subsurface drains

temporary storage heaps
cover heaps with plastic when
not in use.



Sediment fence:
Haybales as required
at low points to prevent
off site drainage

SWMP NOTES

Responsibility: unless otherwise arranged the builder is responsible for enacting the SWMP. All sub contractors, should be made aware of erosion control measures.

Early roof drainage connection is required to prevent erosion around the building site. Install sub surface drains and discharge points prior and have ready for connection.

Open trenches: divert water away from trenches, keep top soil separate from sub soil, back-fill to

Preserve vegetation:
House site: preserve grassed areas where possible.
Bushfire management area: Leave tree stumps in tact on steep sites.

Grated Pits: install after works are complete, otherwise protect with filter socks or sediment fences.

Maintenance
- Check sediment fences regularly and after rain. Redo ties and secure stakes.
- Re pin erosion blankets and reseed where damage occurs.
- Clean out cut-off drains, remove silt from newly installed sumps.
- BFMP area:
seed bare soil immediately. Reseed bare patches following spring. Remove sediment fences once grass sward is established.



NORTH

Roof
Colorbond Surfmist matt
trimdeck

Cladding
Cement sheet *Scyon Axon*
colour *Surfmist*



SOUTH

ELEVATIONS

scale 1:100

DA
4
of
9

Client Mat & Jessica O'Grady
311 Marriott Street Westbury
7303

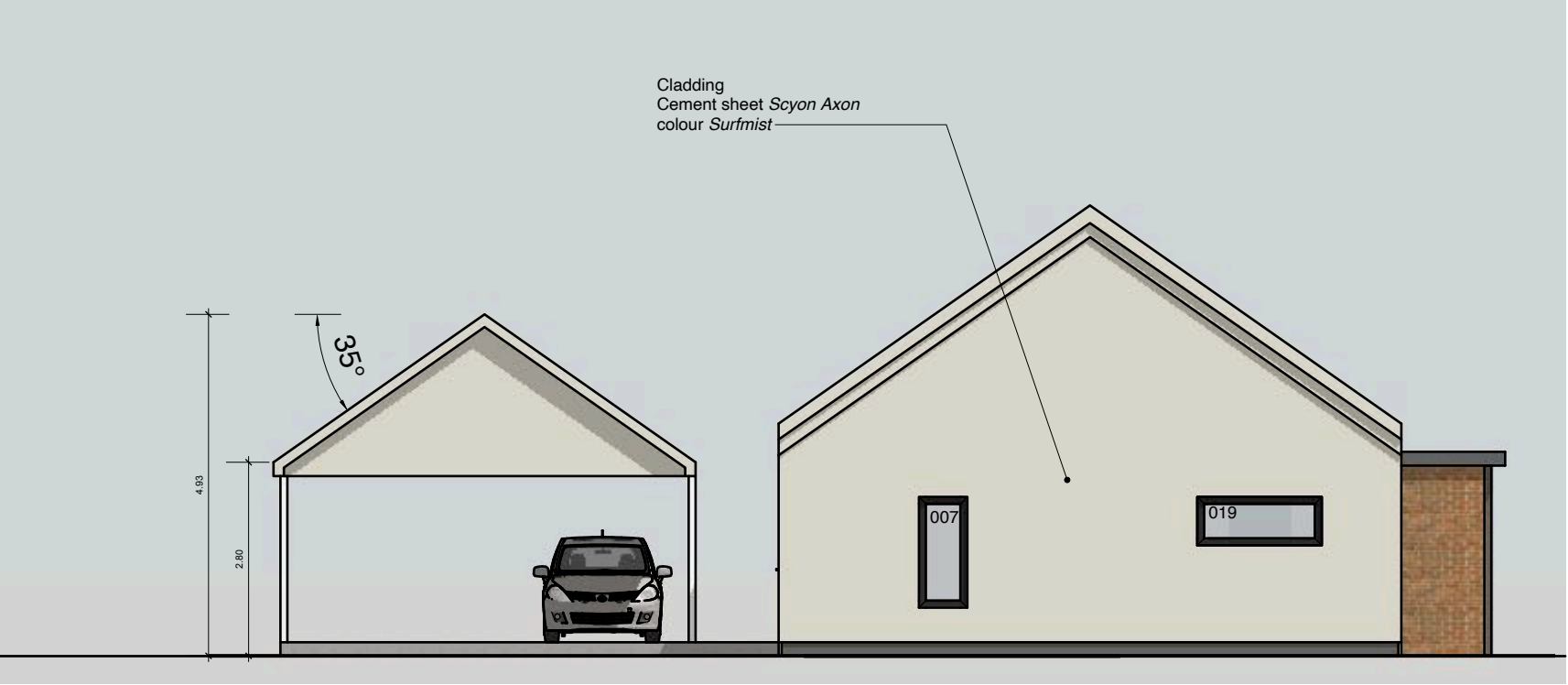
TorquilCanning@netsapce.net.au/0478616663

DATE	ISSUE
17 Oct 2023	Planning application
18 Dec 2023	Site plan updated
16 Jan 24	Wastewater, stormwater and busifire reports
22 Jan24	updated setbacks and heights, windows in shed

Elevations North/South



WEST



EAST

scale 1:100



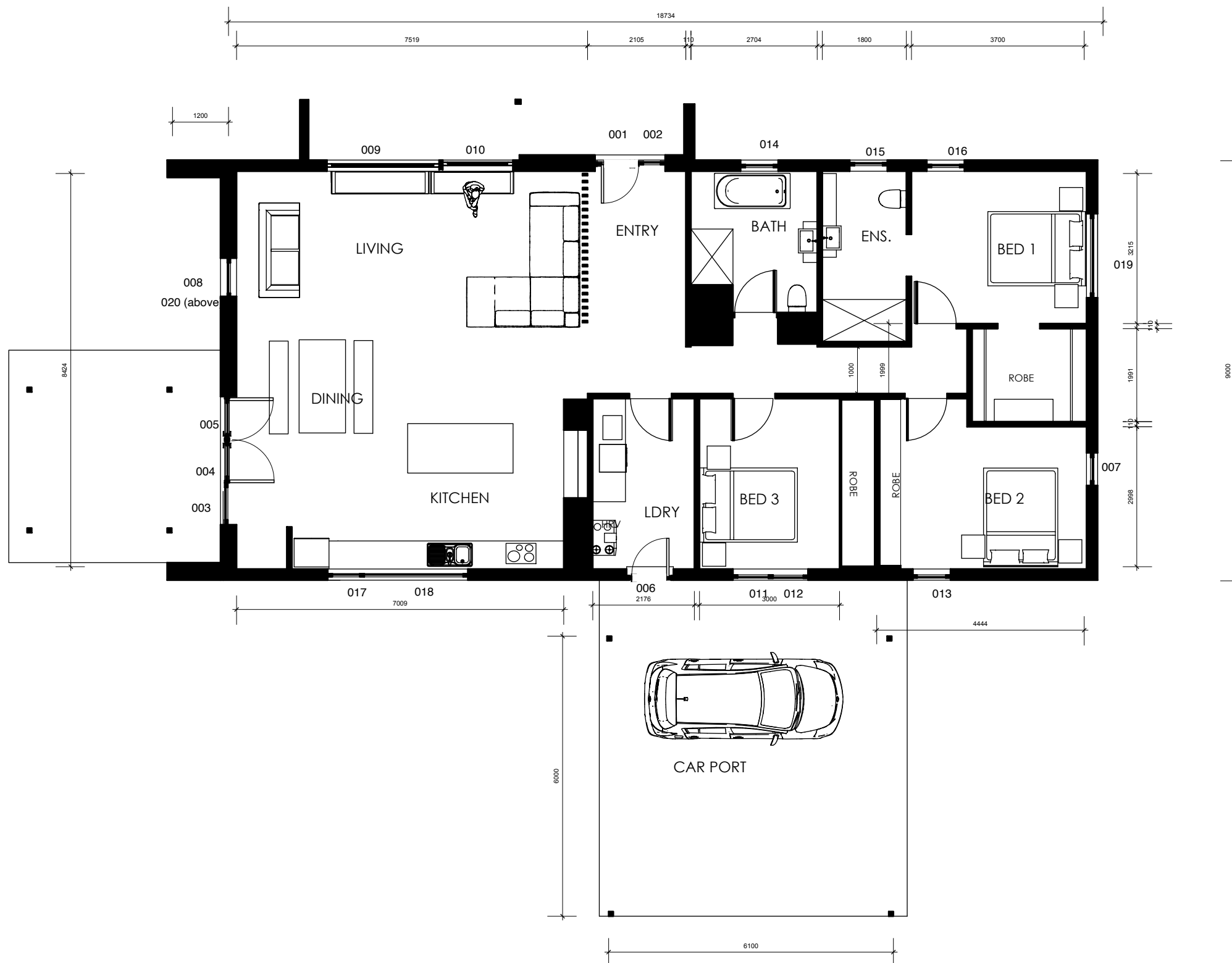
DA
6
of
9

Client Mat & Jessica O'Grady
311 Marriott Street Westbury
7303

Torquill Canning/torquill@netsapce.net.au/0478616663

Floor Plan

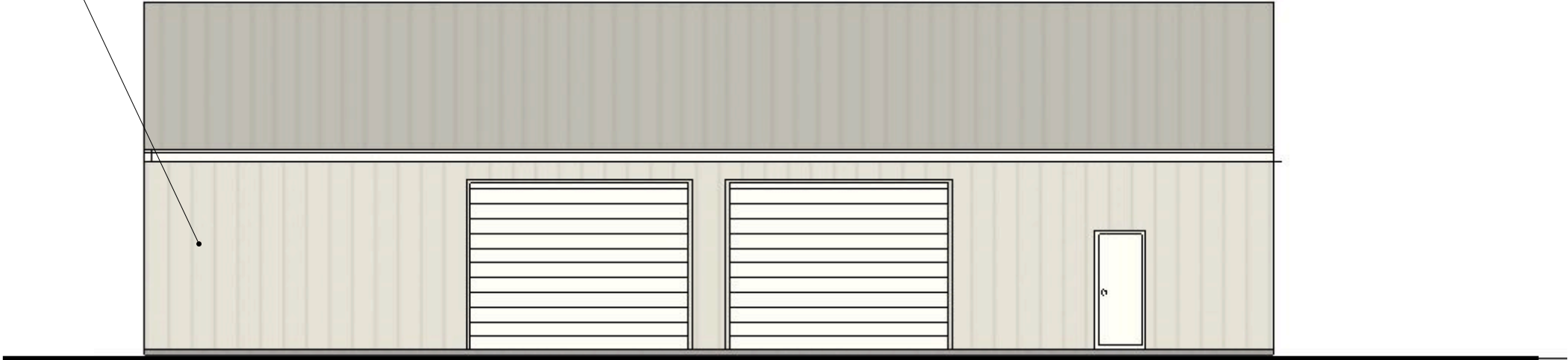
DATE	ISSUE
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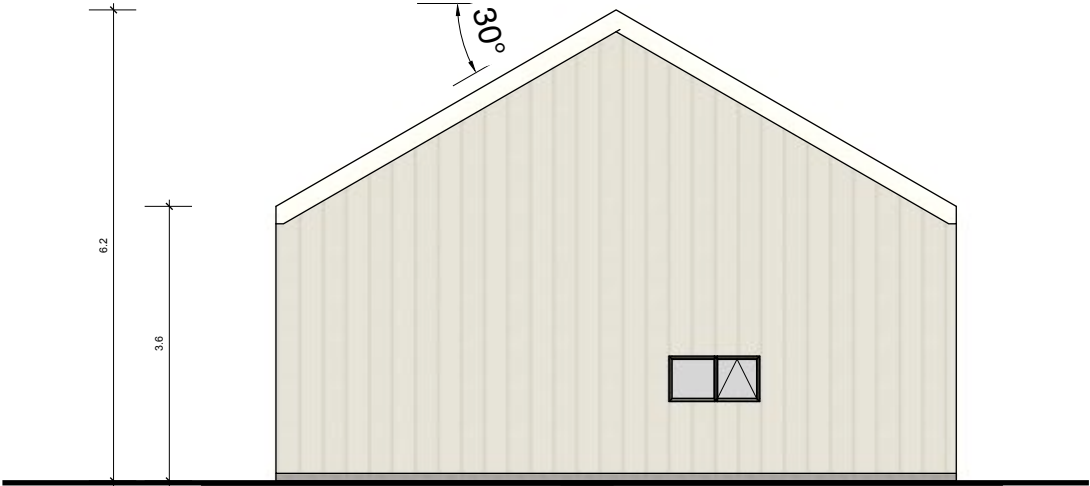
Roof & Cladding
Colorbond Surfmist matt
trimdeck



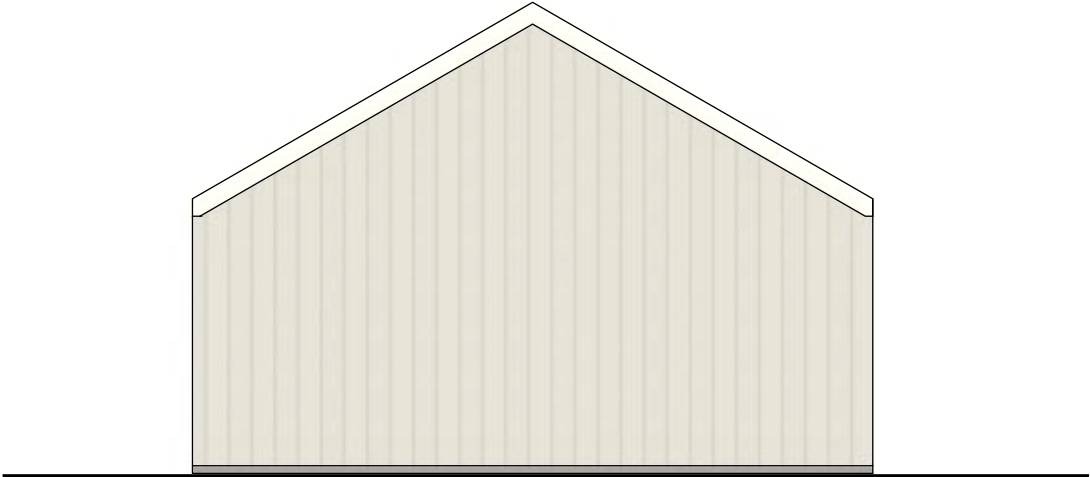
NORTH



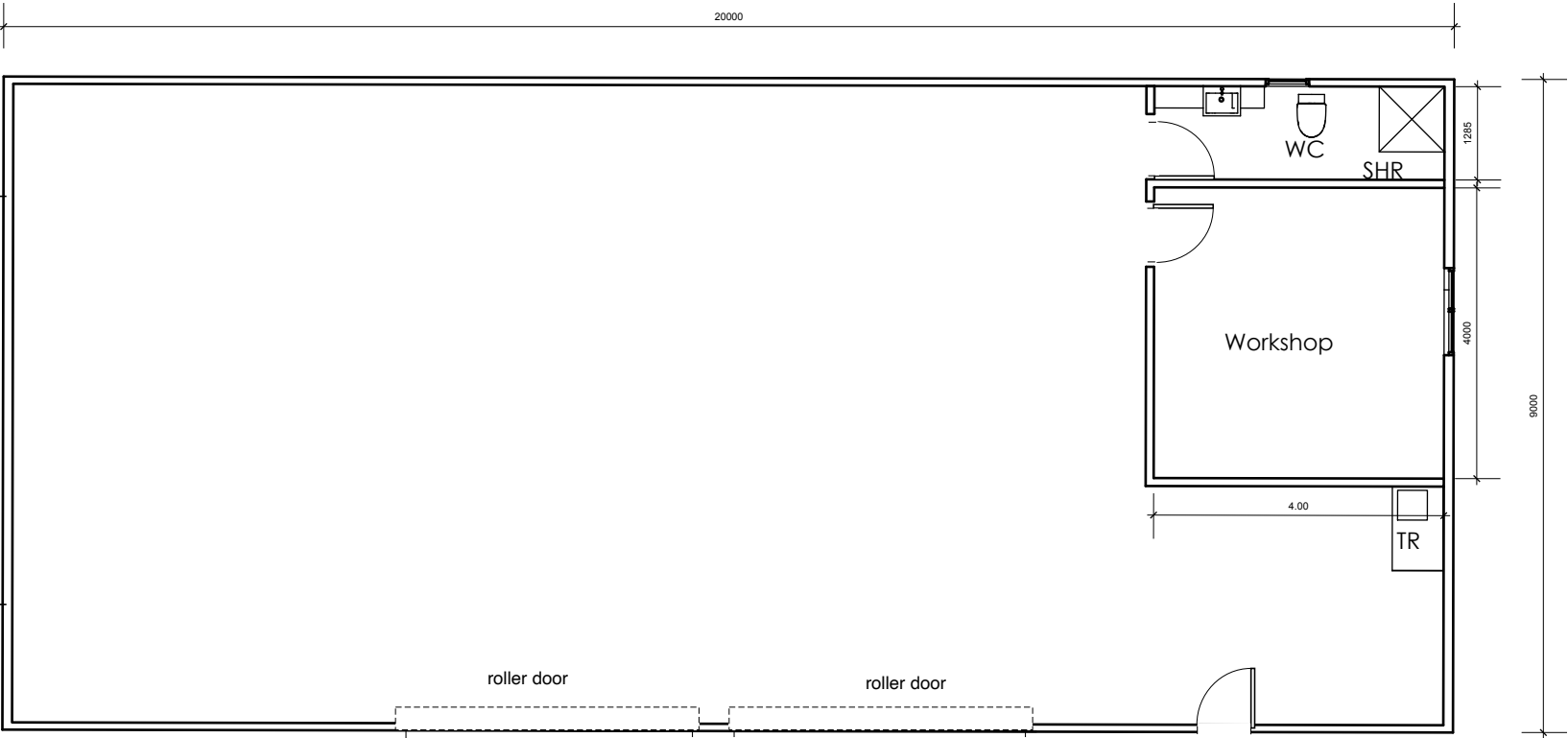
SOUTH



EAST



WEST



FLOOR PLAN
scale 1:100



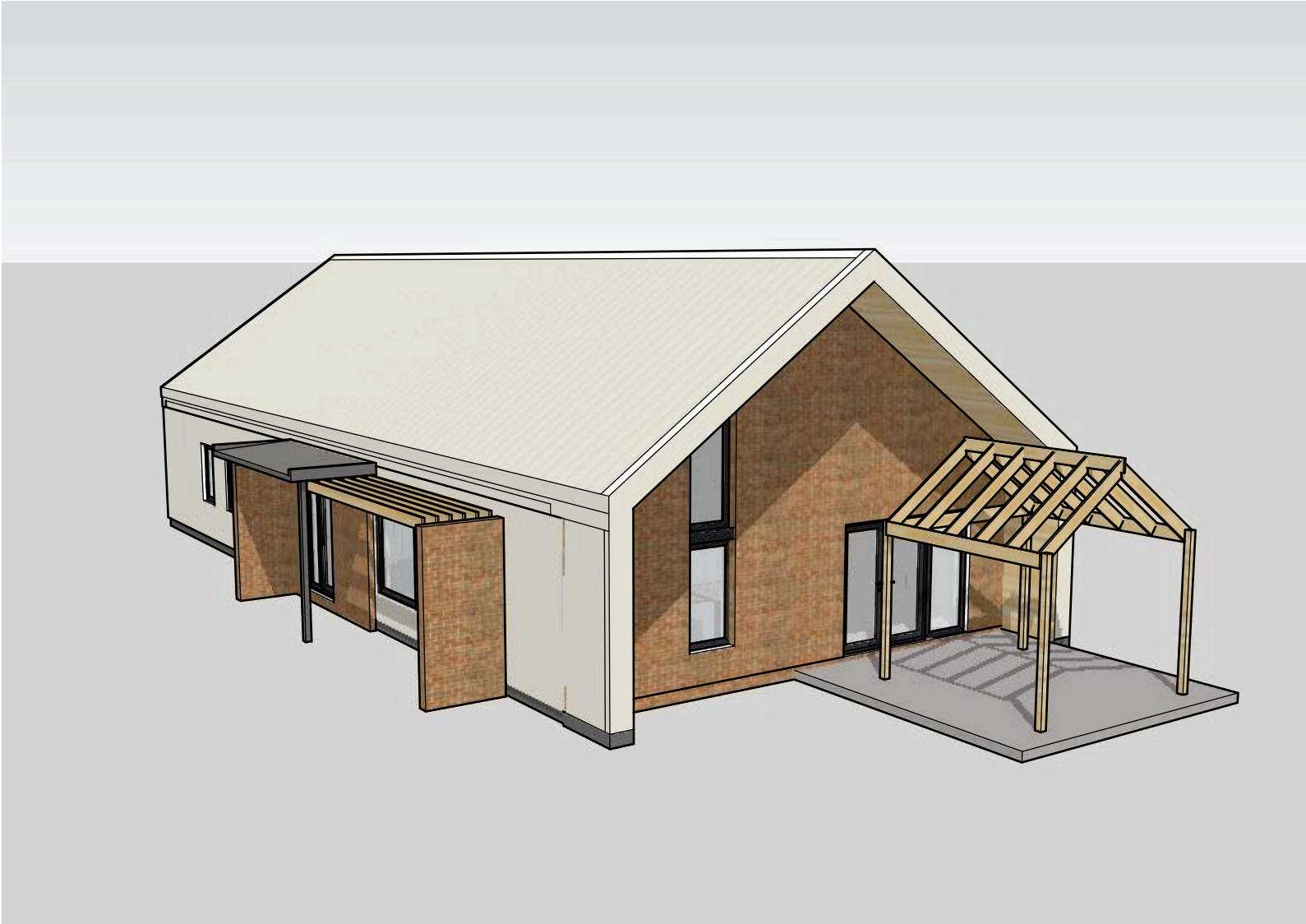
DA
8
of
9

Client Mat & Jessica O'Grady
311 Marriott Street Westbury
7303

Torquil Canning/torquil@netsapce.net.au/0478616663

Shed Plan

DATE	ISSUE
17 Oct 2023	Planning application
18 Dec 2023	Site plan updated
16 Jan 24	Wastewater, stormwater and buskline reports
22 Jan24	updated setbacks and heights, windows in shed



DATE	ISSUE
17 Oct 2023	Planning application
18 Dec 2023	Site plan updated
16 Jan 24	Wastewater, stormwater and buskline reports
22 Jan24	-updated setbacks and heights, windows in shed

3D view

Client Mat & Jessica O'Grady
311 Marriott Street Westbury
7303

TorquilCanning@torquill@netsapce.net.au/0478616663

Brenton Josey

From:
Sent: Monday, 22 January 2024 9:47 AM
To: Planning @ Meander Valley Council
Cc:
Subject: Re: PA\24\0105 - S54 RFI - 311 Marriott St Westbury
Attachments: 311 Marriott St Updated plans 22Jan24.pdf

Hi Brenton,

Attached: updated plans for 311 Marriott Street Westbury.

The use for the room in the shed will be for a workshop. The owner does expect to use the shed for short term living while constructing the dwelling. Both buildings will be under the same fixed price contract so temporary living in the shed should be less than 12 months.

regards Torquil

On 19 Jan 2024, at 4:23 pm, Planning @ Meander Valley Council <planning@mvc.tas.gov.au> wrote:

Hi Torquil,

Acknowledging receipt of the additional information and payment of fees for the application at 311 Marriott Street Westbury. Just a couple of queries regarding the application, please refer to the attached for more detail.

Kind regards,
Brenton

Planning @ Meander Valley Council,
<Mail P: 03 6393 5300 | E: planning@mvc.tas.gov.au
Attachment.png>26 Lyall Street Westbury, TAS 7303 | PO Box 102, Westbury Tasmania 7303
www.meander.tas.gov.au

Notice of confidential information

This e-mail is intended only for the use of the addressee. If you are not the addressee, you are requested not to distribute or photocopy this message. If you have received this message in error, please immediately notify the sender and destroy the original message. Views and opinions expressed in this transmission are solely those of the author and do not necessarily represent those of Meander Valley Council.



Proposed Residential Development 311 Marriott Street, Westbury

Bushfire Hazard Report

Applicant: J & M O'Grady



December 2023 J9715v1

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Appendix A – Site Plan	

Attachment 1 - Certificate of Others (form 55)

Disclaimer: The author does not warrant the information contained in this document is free from errors or omissions. The author shall not in any way be liable for any loss, damage or injury suffered by the User consequent upon, or incidental to, the existence of errors in the information

1.0 Purpose

This bushfire hazard report is intended to demonstrate how the proposal complies with the relevant regulatory framework. It will demonstrate compliance with the *Building Regulations 2016*, and the *Directors Determination – Bushfire Hazard Areas, version 1.1, 12th April 2021*. Provide a certificate of others (form 55) as specified by the Director of Building Control.

2.0 Summary

Title reference	179617/2
PID	9234739
Address	311 Marriott Street, Westbury
Applicant	J & M O'Grady
Municipality	Meander
Planning Scheme	Tasmanian Planning Scheme - Meander
Zoning	Low Density Residential
Bushfire Attack Level	BAL-LOW

Development of a new class 1a building at 311 Marriott Street, Westbury, requires demonstrated compliance with *Building Regulations 2016*. The Bushfire attack level has been determined as 'BAL-LOW' for the site, there are no specific requirements for the provision of property access, water supplies for firefighting or for hazard management areas for this proposal.

3.0 Introduction

This bushfire attack level assessment has been completed to form part of supporting documentation for a building permit application for the proposed development. The proposed development site has been identified as potentially being in a bushfire prone area.

4.0 Proposal

It is proposed that a new class 1a building and associated property access is developed at 311 Marriott Street, Westbury (appendix A).

5.0 Bushfire Attack Level (BAL) Assessment

5.1 Methods

The Bushfire attack level has been determined through the application of section 2 of AS3959-2018 'Simplified Procedure'. Vegetation has been classified using a combination of onsite observations and remotely sensed data to be consistent with table 2.3 of AS359-2018. Slope and distances have been determined by infield measurement and/or the use of remotely sensed data (aerial/satellite photography, GIS layers from various sources) analysed with proprietary software systems. Where appropriate vegetation has been classified as low threat.

5.2 Site Description

The proposal is located at 311 Marriott Street, Westbury, in the municipality of Meander and is zoned Low Density Residential under the Tasmanian Planning Scheme – Meander. Access to the lot will be by an existing crossover from Marriott Street, a council-maintained road. The lot is ~0.5 Ha, is rectangular in shape and is located approximately 1.1km south-west of Pensioners Bush (Figure 1).

Adjacent lands are zoned Low Density Residential and carry a mosaic of low threat and grassland vegetation. At a landscape scale the lot occurs within an existing subdivision on the southern extent of the Westbury settled area. The lot is effectively flat with no definitive aspect, it is anticipated that the site is unlikely to be directly impacted by bushfire.

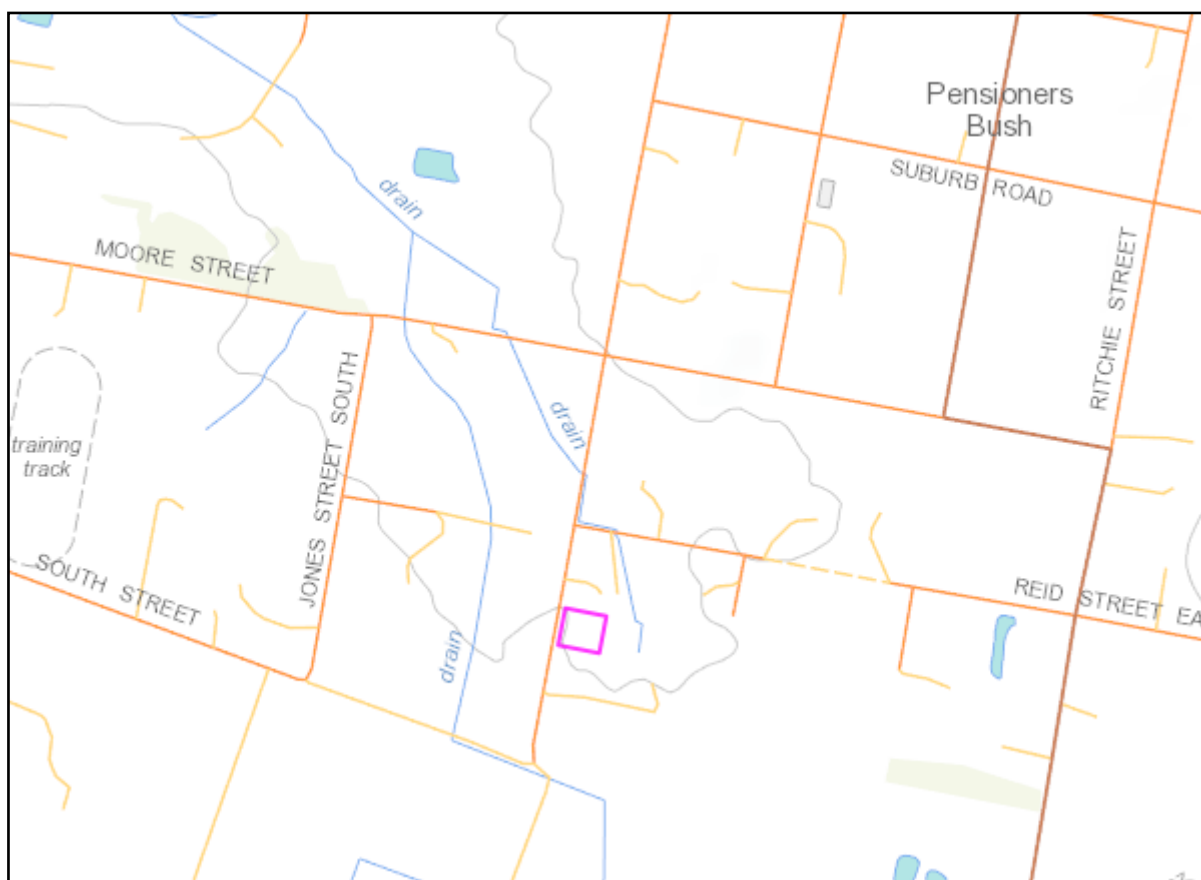


Figure 1. Location of the lot in a topographical context, lot outlined in pink.

Table 1. Bushfire Attack Level (BAL) Assessment

Azimuth	Vegetation Classification	Effective Slope	Distance to Bushfire-prone vegetation	Bushfire Attack Level
North	Exclusion 2.2.3.2 (e, f)^	flat 0°	0 to 100 metres	BAL-LOW
	--	--	--	
	--	--	--	
	--	--	--	
East	Exclusion 2.2.3.2 (e, f)^	flat 0°	0 to 100 metres	BAL-LOW
	--	--	--	
	--	--	--	
	--	--	--	
South	Exclusion 2.2.3.2 (e, f)^	flat 0°	0 to 90 metres	BAL-LOW
	Grassland^	flat 0°	90 to 100 metres	
	--	--	--	
	--	--	--	
West	Exclusion 2.2.3.2 (e, f)^	flat 0°	0 to 56 metres	BAL-LOW
	Grassland^	flat 0°	56 to 100 metres	
	--	--	--	
	--	--	--	

^ Vegetation classification as per AS3959-2018 and Figures 2.4 (A) to 2.4 (H).

* Low threat vegetation as per Bushfire Prone Areas Advisory Note (BHAN) No.1-2014, version 3, 8/11/2017.

^^ Exclusions as per AS3959-2018, section 2.2.3.2, (a) to (f).



Figure 2. Shows the lot in the context of surrounding lands and vegetation.

6.0 Results

The bushfire attack level for the site has been determined as **BAL-LOW**. There is an insufficient increase in the risk from bushfire to the site to warrant specific bushfire protection measures in this circumstance.

7.0 Compliance

The Bushfire Attack Level has been determined as BAL-LOW. AS3959-2018 does not provide construction requirements for buildings assessed in bushfire-prone areas in accordance with section 2 as being BAL-LOW. There are no design or construction requirements relating to; property access, water supplies for firefighting or hazard management areas in this circumstance. In accordance with s3, (1), (i) of the Director's Determination – Bushfire Hazard Areas, a certificate (form 55) is provided that states that a Bushfire Hazard Management Plan is not required in this circumstance.

8.0 Limitations Statement

This Bushfire Hazard Report has been prepared in accordance with the scope of services between Geo-Environmental Solutions Pty. Ltd. (GES) and the applicant named in section 2. To the best of GES's knowledge, the information presented herein represents the Client's requirements at the time of printing of the Report. However, the passage of time, manifestation of latent conditions or impacts of future events may result in findings differing from that described in this Report. In preparing this Report, GES has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations referenced herein. Except as otherwise stated in this Report, GES has not verified the accuracy or completeness of such data, surveys, analyses, designs, plans and other information.

The scope of this study does not allow for the review of every possible bushfire hazard condition and does not provide a guarantee that no loss of property or life will occur as a result of bushfire. As stated in AS3959-2018 "It should be borne in mind that the measures contained in this Standard cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the degree of vegetation management, the unpredictable nature and behaviour of fire, and extreme weather conditions". In addition, no responsibility is taken for any loss which is a result of actions contrary to AS3959-2018 or the Tasmanian Planning Commission Bushfire code.

This report does not purport to provide legal advice. Readers of the report should engage professional legal practitioners for this purpose as required. No responsibility is accepted for use of any part of this report in any other context or for any other purpose by third party.

9.0 References

Directors Determination – Bushfire Hazard Areas, version 1.1, 12th April 2021

Australian Standard 3959-2018 Construction of Buildings in Bushfire-prone Areas. Standards Australia, Sydney.

Building Regulations 2016, (Tas.), div. 6 – Bushfire-prone Areas. (Austl.)

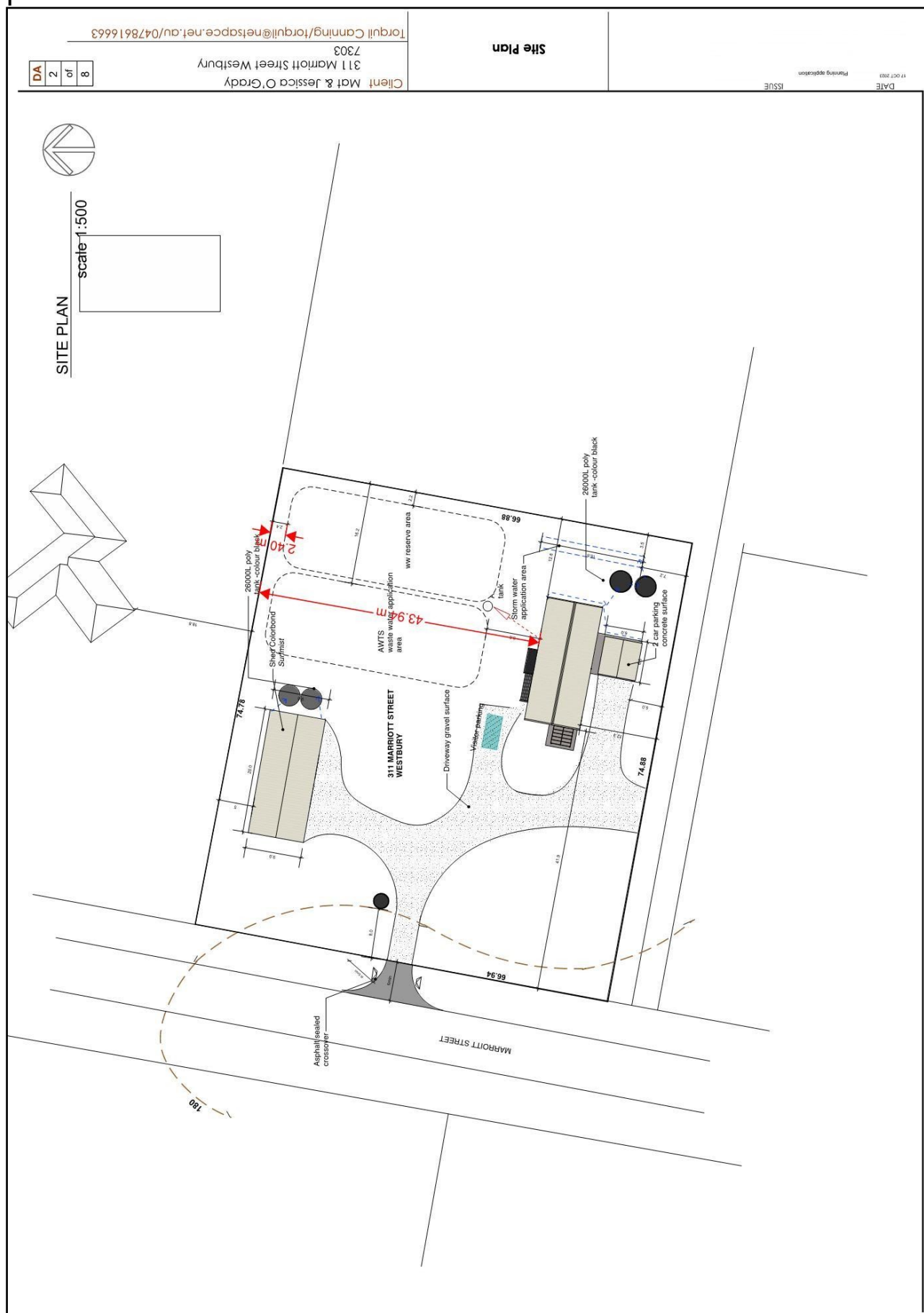
Building Regulations 2014, (Tas.) part 1A – Bushfire-prone Areas. (Austl.)

Tasmanian Planning Scheme - Meander, Tasmanian Planning Commission.

Bushfire-prone Areas Advisory Note No. 01-2014. v3.0. 8th November 2017. *Assessment of vegetation within suburban areas*. Tasmania Fire Service, Hobart.

Bushfire-prone Areas Advisory Note No. 04-2016. V3.0. 29th August 2017. *Chief Officer's Approved Form for a Bushfire Hazard Management Plan*. Tasmania Fire Service, Hobart

Appendix A – Site Plan



CERTIFICATE OF QUALIFIED PERSON – ASSESSABLE ITEM

Section 321

Form **55**

To: Owner /Agent
 Address
 Suburb/postcode

Qualified person details:

Qualified person:
Address: Phone No:
 Fax No:
Licence No: Email address:

Qualifications and Insurance details: (description from Column 3 of the Director's Determination - Certificates by Qualified Persons for Assessable Items)

Speciality area of expertise: (description from Column 4 of the Director's Determination - Certificates by Qualified Persons for Assessable Items)

Details of work:

Address: Lot No:
 Certificate of title No:
The assessable item related to this certificate: (description of the assessable item being certified)
Assessable item includes –

- a material;
- a design
- a form of construction
- a document
- testing of a component, building system or plumbing system
- an inspection, or assessment, performed

Certificate details:

Certificate type: (description from Column 1 of Schedule 1 of the Director's Determination - Certificates by Qualified Persons for Assessable Items n)

This certificate is in relation to the above assessable item, at any stage, as part of - (tick one)

building work, plumbing work or plumbing installation or demolition work: ☒
or

a building, temporary structure or plumbing installation: ☐

In issuing this certificate the following matters are relevant –

Documents:	Bushfire Hazard Report 311 Marriott Street, Westbury. December 2023 J9715v1. and Form 55
Relevant calculations:	Not Applicable.
References:	Directors Determination – Bushfire Hazard Areas, version 1.1, 12 th April 2021. Consumer, Building and Occupational Services, Department of Justice, Tasmania. Building Amendment (Bushfire-Prone Areas) Regulations 2014 Standards Australia 2018, Construction of buildings in bushfire prone areas, Standards Australia, Sydney

Substance of Certificate: (what it is that is being certified)

The Bushfire Attack Level has been determined to be BAL-LOW. There is an insufficient increase in risk to the dwelling and occupants from bushfire to warrant specific bushfire protection measures in this circumstance. There is no requirement for the provision of hazard management areas or water supplies for firefighting and there are no specific design or construction standards for property access for the proposed class 1a development.

I also certify that there is no requirement for a Bushfire Hazard Management Plan in this circumstance.

Scope and/or Limitations

Scope: This report was commissioned to identify the Bushfire Attack Level for the existing property. Limitations: The inspection has been undertaken and report provided on the understanding that;-1. The report only deals with the potential bushfire risk all other statutory assessments are outside the scope of this report. 2. The report only identifies the size, volume and status of vegetation at the time the site inspection was undertaken and cannot be relied upon for any future development. 3. Impacts of future development and vegetation growth have not been considered.

I certify the matters described in this certificate.

Qualified person:	Signed: 	Certificate No: J9715	Date: 07/12/2023
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ONSITE-WASTEWATER ASSESSMENT

311 Marriott Street

Westbury

December 2023

Updated 19/12/2023



GEO-ENVIRONMENTAL

S O L U T I O N S

Disclaimer: The author does not warrant the information contained in this document is free from errors or omissions. The author shall not in any way be liable for any loss, damage or injury suffered by the User consequent upon, or incidental to, the existence of errors in the information.

Investigation Details

Client:	Mat and Jessica O'Grady
Site Address:	311 Marriott Street, Westbury
Date of Inspection:	02/11/2023
Proposed Works:	New house
Investigation Method:	Drill Tech Auger
Inspected by:	AM

Site Details

Certificate of Title (CT):	179617/2
Title Area:	Approx. 5011 m ²
Applicable Planning Overlays:	Bushfire-prone Areas
Slope & Aspect:	1° NE facing slope
Vegetation:	Grass & Weeds
Ground Surface:	Undisturbed

Background Information

Geology Map:	MRT 1:250000
Geological Unit:	Quaternary Sediments
Climate:	Annual rainfall 800mm
Water Connection:	Tank
Sewer Connection:	Unserviced-On-site required
Testing and Classification:	AS2870:2011, AS1726:2017 & AS1547:2012

Investigation

A number of bore holes were completed to identify the distribution and variation of the soil materials at the site, bore hole locations are indicated on the site plan. See soil profile conditions presented below. Tests were conducted across the site to obtain bearing capacities of the material at the time of this investigation.

Soil Profile Summary

BH 1 Depth (m)	BH 2 Depth (m)	USCS	Description
0.00-0.40	0.00-0.35	MH	TOPSOIL: Clayey SILT : dark grey, moist, loose.
0.40-0.70	0.35-0.60	CH	Silty CLAY trace gravel & BH1 sand: high plasticity, grey mottled yellow, moist, very stiff.
0.70-0.90		CL	Gravelly CLAY : low plasticity, yellow mottled red, moist, very stiff.
0.90-1.50		CH	Silty CLAY : high plasticity, grey mottled yellow, moist, very stiff.
1.50-2.00+	0.60-2.00+	CH	Silty CLAY : high plasticity, pale grey mottled red-yellow, moist, very stiff, no refusal.

Site Notes

The soils on site have developed from Quaternary sediments and consist clayey silt topsoil overlying silty to gravely clay subsoils. The soil has a low estimated permeability of approximately 0.12-0.18m/day.

Wastewater Classification & Recommendations

According to AS1547-2012 (on-site waste-water management) the natural soil is classified as **Light Clay (category 5)**. The site is unsuited to the installation of a traditional septic tank and trenches due to low permeability subsoils. Secondary treatment of effluent will be required, and it is proposed to install an Envirocycle package treatment system with treated effluent disposed by subsurface irrigation. A Design Irrigation Rate (DIR) of 3L/m²/day has been assigned for this site.

The proposed three-bedroom dwelling has a calculated maximum wastewater output of 600L/day. This is based on a tank water supply and a maximum occupancy of 5 people (120L/day/person). With secondary treatment this will require an absorption area of at least 270m². This can be accommodated by subsurface irrigation. For all calculations please refer to the Trench summary reports. A cut-off drain will be required and the area excluded from traffic or any future building works. In light of the use of irrigation and secondary treatment the designation of a reserve area can be eliminated. This is justified by the ease at which irrigation systems can be replaced, with old lines and topsoil removed and replaced with new topsoil and irrigation systems within a 48 hour period.

The following setback distances are required to comply with the Building Act 2016:

Upslope or level buildings:	3m
Downslope buildings:	2.25m
Upslope or level boundaries:	1.5m
Downslope boundaries:	2.5m
Downslope surface water:	17m

Compliance with Building Act 2016 Guidelines for On-site Wastewater Management Systems is outlined in the attached table.

During construction GES will need to be notified of any variation to the soil conditions or wastewater loading as outlined in this report.



Dr John Paul Cumming B.Agr.Sc (hons) PhD CPSS GAICD

Director

GES P/L

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Assessment Report

Site assessment for on-site waste water disposal

Assessment for Mat & Jessica O'Grady

Assess. Date

7-Dec-23

Ref. No.

Assessed site(s) 311 Marriott Street, Westbury

Site(s) inspected

3-Nov-23

Local authority Meander Valley

Assessed by John Paul Cumming

This report summarises wastewater volumes, climatic inputs for the site, soil characteristics and system sizing and design issues. Site Capability and Environmental sensitivity issues are reported separately, where 'Alert' columns flag factors with high (A) or very high (AA) limitations which probably require special consideration for system design(s). Blank spaces on this page indicate data have not been entered into TRENCH.

Wastewater Characteristics

Wastewater volume (L/day) used for this assessment = 600 (using the 'No. of bedrooms in a dwelling' method)

Septic tank wastewater volume (L/day) = 200

Sullage volume (L/day) = 400

Total nitrogen (kg/year) generated by wastewater = 1.8

Total phosphorus (kg/year) generated by wastewater = 1.2

Climatic assumptions for site

(Evapotranspiration calculated using the crop factor method)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean rainfall (mm)	51	32	43	58	60	69	81	92	81	61	59	52
Adopted rainfall (R, mm)	51	32	43	58	60	69	81	92	81	61	59	52
Retained rain (Rr, mm)	46	29	39	52	54	62	73	83	73	55	53	47
Max. daily temp. (deg. C)												
Evapotrans (ET, mm)	130	110	91	63	42	29	32	42	63	84	105	126
Evapotrans. less rain (mm)	84	81	52	11	-12	-33	-41	-41	-10	29	52	79
Annual evapotranspiration less retained rain (mm) =											252	

Soil characteristics

Texture = Light Clay

Category = 5

Thick. (m) = 3

Adopted permeability (m/day) = 0.12

Adopted LTAR (L/sq m/day) = 3

Min depth (m) to water = 3

Proposed disposal and treatment methods

Proportion of wastewater to be retained on site: All wastewater will be disposed of on the site

The preferred method of on-site primary treatment: In a package treatment plant

The preferred method of on-site secondary treatment: In-ground

The preferred type of in-ground secondary treatment: None

The preferred type of above-ground secondary treatment: None

Site modifications or specific designs: Not needed

Suggested dimensions for on-site secondary treatment system

Total length (m) = 27

Width (m) = 10

Depth (m) = 0.2

Total disposal area (sq m) required = 270

comprising a Primary Area (sq m) of: 270

and a Secondary (backup) Area (sq m) of:

Sufficient area is available on site

To enter comments, click on the line below 'Comments'. (This yellow-shaded box and the buttons on this page will not be printed.)

Comments

Using the DIR of 3mm/day, an irrigation area of 270m² is required to accommodate the expected wastewater flow from the proposed 3 bedroom dwelling.

GES P/L

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Site Capability Report

Site assessment for on-site waste water disposal

Assessment for Mat & Jessica O'Grady

Assess. Date

7-Dec-23

Ref. No.

Assessed site(s) 311 Marriott Street, Westbury

Site(s) inspected

3-Nov-23

Local authority Meander Valley

Assessed by John Paul Cumming

This report summarises data relating to the physical capability of the assessed site(s) to accept wastewater. Environmental sensitivity and system design issues are reported separately. The 'Alert' column flags factors with high (A) or very high (AA) site limitations which probably require special consideration in site acceptability or for system design(s). Blank spaces indicate data have not been entered into TRENCH.

Alert	Factor	Units	Value	Confid level	Limitation		Remarks
					Trench	Amended	
	Expected design area	sq m	1,000	V. high	Moderate		
	Density of disposal systems	/sq km	15	Mod.	Moderate		
	Slope angle	degrees	1	High	Very low		
	Slope form	Straight simple		High	Low		
	Surface drainage	Imperfect		High	Moderate		
	Flood potential	Site floods 1 in 50-75 yrs		High	Moderate		
	Heavy rain events	Infrequent		High	Moderate		
	Aspect (Southern hemi.)	Faces NE or NW		V. high	Low		
	Frequency of strong winds	Common		High	Low		
	Wastewater volume	L/day	600	High	Moderate		
	SAR of septic tank effluent		1.7	High	Low		
	SAR of sullage		2.6	High	Moderate		
	Soil thickness	m	3.0	V. high	Very low		
	Depth to bedrock	m	3.0	V. high	Very low		
	Surface rock outcrop	%	0	V. high	Very low		
	Cobbles in soil	%	0	V. high	Very low		
	Soil pH		5.5	High	Low		
	Soil bulk density	gm/cub. cm	1.4	High	Very low		
	Soil dispersion	Emerson No.	7	V. high	Very low		
	Adopted permeability	m/day	0.12	Mod.	Very low	Moderate	
A	Long Term Accept. Rate	L/day/sq m	3	High	High		

To enter comments, click on the line below 'Comments' . (This yellow-shaded box and the buttons on this page will not be printed.)

Comments

The site has the capability to accept onsite wastewater.

GES P/L

Land suitability and system sizing for on-site wastewater management

Trench 3.0 (Australian Institute of Environmental Health)

Environmental Sensitivity Report

Site assessment for on-site waste water disposal

Assessment for Mat & Jessica O'Grady

Assess. Date

7-Dec-23

Ref. No.

Assessed site(s) 311 Marriott Street, Westbury

Site(s) inspected

3-Nov-23

Local authority Meander Valley

Assessed by John Paul Cumming

This report summarises data relating to the environmental sensitivity of the assessed site(s) in relation to applied wastewater. Physical capability and system design issues are reported separately. The 'Alert' column flags factors with high (A) or very high (AA) limitations which probably require special consideration in site acceptability or for system design(s). Blank spaces indicate data have not been entered into TRENCH.

Alert	Factor	Units	Value	Confid level	Limitation		Remarks
					Trench	Amended	
	Cation exchange capacity	mmol/100g	100	High	Low		
	Phos. adsorp. capacity	kg/cub m	0.7	High	Moderate		
	Annual rainfall excess	mm	-252	High	Very low		
	Min. depth to water table	m	3	High	Very low		
	Annual nutrient load	kg	3.1	High	Very low		
	G'water environ. value	Agric non-sensit		V. high	Low		
	Min. separation dist. required	m	3	High	Very low		
	Risk to adjacent bores	Very low		V. high	Very low		
	Surf. water env. value	Agric non-sensit		V. high	Low		
A	Dist. to nearest surface water	m	60	V. high	High		
AA	Dist. to nearest other feature	m	2.5	V. high	Very high		
	Risk of slope instability	Low		V. high	Low		
	Distance to landslip	m	1000	V. high	Very low		

To enter comments, click on the line below 'Comments'. (This yellow-shaded box and the buttons on this page will not be printed.)

Comments

The soil on site has a light clay texture and a good CEC, Therefore the soil system has a good capacity to cope with the applied nutrient load from the system. The land application area complies with all setback required by the building act 2016.

Demonstration of wastewater system compliance to *Building Act 2016 Guidelines for On-site Wastewater*

Acceptable Solutions	Performance Criteria	Compliance
<p>A1</p> <p>Horizontal separation distance from a building to a land application area must comply with one of the following:</p> <ul style="list-style-type: none"> a) be no less than 6m; or b) be no less than: <ul style="list-style-type: none"> (i) 3m from an upslope building or level building; (ii) If primary treated effluent to be no less than 4m plus 1m for every degree of average gradient from a downslope building; (iii) If secondary treated effluent and subsurface application, no less than 2m plus 0.25m for every degree of average gradient from a downslope building. 	<p>P1</p> <ul style="list-style-type: none"> a) The land application area is located so that <ul style="list-style-type: none"> (i) the risk of wastewater reducing the bearing capacity of a building's foundations is acceptably low.; and (ii) is setback a sufficient distance from a downslope excavation around or under a building to prevent inadequately treated wastewater seeping out of that excavation 	<p>Complies with A1 (b) (i) Land application area will be located with a minimum separation distance of 3m from an upslope or level building.</p> <p>Complies with A1 (b) (iii) Land application area will be located with a minimum separation distance of 2.25m from a downslope building.</p>
<p>A2</p> <p>Horizontal separation distance from downslope surface water to a land application area must comply with (a) or (b)</p> <ul style="list-style-type: none"> (a) be no less than 100m; or (b) be no less than the following: <ul style="list-style-type: none"> (i) if primary treated effluent 15m plus 7m for every degree of average gradient to downslope surface water; or (ii) if secondary treated effluent and subsurface application, 15m plus 2m for every degree of average gradient to down slope surface water. 	<p>P2</p> <p>Horizontal separation distance from downslope surface water to a land application area must comply with all of the following:</p> <ul style="list-style-type: none"> a) Setbacks must be consistent with AS/NZS 1547 Appendix R; b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable. 	<p>A2 (b) (ii) Land application area will be located a minimum of 17m from downslope surface water</p>

<p>A3</p> <p>Horizontal separation distance from a property boundary to a land application area must comply with either of the following:</p> <p>(a) be no less than 40m from a property boundary; or</p> <p>(b) be no less than:</p> <ul style="list-style-type: none"> (i) 1.5m from an upslope or level property boundary; and (ii) If primary treated effluent 2m for every degree of average gradient from a downslope property boundary; or (iii) If secondary treated effluent and subsurface application, 1.5m plus 1m for every degree of average gradient from a downslope property boundary. 	<p>P3</p> <p>Horizontal separation distance from a property boundary to a land application area must comply with all of the following:</p> <p>(a) Setback must be consistent with AS/NZS 1547 Appendix R; and</p> <p>(b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.</p>	<p>Complies with A3 (b) (i) Land application area will be located with a minimum separation distance of 1.5m from an upslope or level property boundary</p> <p>Complies with A3 (b) (iii) Land application area will be located with a minimum separation distance of 2.5m from a downslope property boundary.</p>
<p>A4</p> <p>Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must be no less than 50m and not be within the zone of influence of the bore whether up or down gradient.</p>	<p>P4</p> <p>Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must comply with all of the following:</p> <p>(a) Setback must be consistent with AS/NZS 1547 Appendix R; and</p> <p>(b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 demonstrates that the risk is acceptable</p>	<p>Complies with A4 No bore or well identified within 50m</p>

<p>A5</p> <p>Vertical separation distance between groundwater and a land application area must be no less than:</p> <p>(a) 1.5m if primary treated effluent; or</p> <p>(b) 0.6m if secondary treated effluent</p>	<p>P5</p> <p>Vertical separation distance between groundwater and a land application area must comply with the following:</p> <p>(a) Setback must be consistent with AS/NZS 1547 Appendix R; and</p> <p>(b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 that demonstrates that the risk is acceptable</p>	<p>Complies with A5 (b)</p> <p>No groundwater encountered</p>
<p>A6</p> <p>Vertical separation distance between a limiting layer and a land application area must be no less than:</p> <p>(a) 1.5m if primary treated effluent; or</p> <p>(b) 0.5m if secondary treated effluent</p>	<p>P6</p> <p>Vertical setback must be consistent with AS/NZS1547 Appendix R.</p>	<p>Complies with A5 (b)</p>
<p>A7</p> <p>nil</p>	<p>P7</p> <p>A wastewater treatment unit must be located a sufficient distance from buildings or neighbouring properties so that emissions (odour, noise or aerosols) from the unit do not create an environmental nuisance to the residents of those properties</p>	<p>Complies</p>

AS1547:2012 – Loading Certificate – AWTS Design

This loading certificate sets out the design criteria and the limitations associated with use of the system.

Site Address: 311 Marriott Street, Westbury

System Capacity: 5 persons @ 120L/person/day

Summary of Design Criteria

DIR: 3mm/day.

Irrigaion area: 270m²

Reserve area location /use: Not assigned. Irrigation lines and topsoil will need to be replaced within a 48 hour period

Water saving features fitted: Standard fixtures

Allowable variation from design flows: 1 event @ 200% daily loading per quarter

Typical loading change consequences: Expected to be minimal due to use of AWTS and large land area

Overloading consequences: Continued overloading may cause hydraulic failure of the irrigation area and require upgrading/extension of the area. Risk considered acceptable due to monitoring through quarterly maintenance reports.

Underloading consequences: Lower than expected flows will have minimal consequences on system operation unless the house has long periods of non occupation. Under such circumstances additional maintenance of the system may be required. Long term under loading of the system may also result in vegetation die off in the irrigation area and additional watering may be required. Risk considered acceptable due to monitoring through quarterly maintenance reports.

Lack of maintenance / monitoring consequences: Issues of underloading/overloading and condition of the irrigation area require monitoring and maintenance, if not completed system failure may result in unacceptable health and environmental risks. Monitoring and regulation by the permit authority required to ensure compliance.

Other considerations: Owners/occupiers must be made aware of the operational requirements and limitations of the system by the installer/maintenance contractor.

CERTIFICATE OF THE RESPONSIBLE DESIGNER

Section 94
Section 106
Section 129
Section 155

To: Owner name
 Address
 Suburb/postcode

Form **35**

Designer details:

Name: Category:
Business name: Phone No:
Business address:
 Fax No:
Licence No: Email address:

Details of the proposed work:

Owner/Applicant Designer's project reference No.
Address: Lot No:

Type of work: Building work ☐ Plumbing work ☒ (X all applicable)

Description of work:

(new building / alteration / addition / repair / removal / re-erection / water / sewerage / stormwater / on-site wastewater management system / backflow prevention / other)

Description of the Design Work (Scope, limitations or exclusions): (X all applicable certificates)

Certificate Type:	Certificate	Responsible Practitioner
	<input type="checkbox"/> Building design	Architect or Building Designer
	<input type="checkbox"/> Structural design	Engineer or Civil Designer
	<input type="checkbox"/> Fire Safety design	Fire Engineer
	<input type="checkbox"/> Civil design	Civil Engineer or Civil Designer
	<input checked="" type="checkbox"/> Hydraulic design	Building Services Designer
	<input type="checkbox"/> Fire service design	Building Services Designer
	<input type="checkbox"/> Electrical design	Building Services Designer
	<input type="checkbox"/> Mechanical design	Building Service Designer
	<input type="checkbox"/> Plumbing design	Plumber-Certifier; Architect, Building Designer or Engineer
	<input type="checkbox"/> Other (specify)	

Deemed-to-Satisfy: ☒ Performance Solution: ☐ (X the appropriate box)

Other details:

AWTS with subsurface irrigation

Design documents provided:

The following documents are provided with this Certificate –

Document description:

Drawing numbers:	Prepared by: Geo-Environmental Solutions	Date: Dec-23
Schedules:	Prepared by:	Date:
Specifications:	Prepared by: Geo-Environmental Solutions	Date: Dec-23
Computations:	Prepared by:	Date:
Performance solution proposals:	Prepared by:	Date:
Test reports:	Prepared by: Geo-Environmental Solutions	Date: Dec-23

Standards, codes or guidelines relied on in design process:

AS1547:2012 On-site domestic wastewater management.

AS3500 (Parts 0-5)-2013 Plumbing and drainage set.

Any other relevant documentation:

Onsite Wastewater Assessment - 311 Marriott Street Westbury - Dec-23

Onsite Wastewater Assessment - 311 Marriott Street Westbury - Dec-23

Attribution as designer:

I John-Paul Cumming, am responsible for the design of that part of the work as described in this certificate;

The documentation relating to the design includes sufficient information for the assessment of the work in accordance with the *Building Act 2016* and sufficient detail for the builder or plumber to carry out the work in accordance with the documents and the Act;

This certificate confirms compliance and is evidence of suitability of this design with the requirements of the National Construction Code.

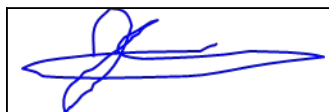
Name: (print)

Signed

Date

Designer:

John-Paul Cumming



19/12/2023

Licence No:

CC774A

Assessment of Certifiable Works: (TasWater)

Note: single residential dwellings and outbuildings on a lot with an existing sewer connection are not considered to increase demand and are not certifiable.

If you cannot check ALL of these boxes, LEAVE THIS SECTION BLANK.

TasWater must then be contacted to determine if the proposed works are Certifiable Works.

I confirm that the proposed works are not Certifiable Works, in accordance with the Guidelines for TasWater CCW Assessments, by virtue that all of the following are satisfied:

- ☒ The works will not increase the demand for water supplied by TasWater
- ☒ The works will not increase or decrease the amount of sewage or toxins that is to be removed by, or discharged into, TasWater's sewerage infrastructure
- ☒ The works will not require a new connection, or a modification to an existing connection, to be made to TasWater's infrastructure
- ☒ The works will not damage or interfere with TasWater's works
- ☒ The works will not adversely affect TasWater's operations
- ☒ The work are not within 2m of TasWater's infrastructure and are outside any TasWater easement
- ☒ I have checked the LISTMap to confirm the location of TasWater infrastructure
- ☒ If the property is connected to TasWater's water system, a water meter is in place, or has been applied for to TasWater.

Certification:

I John-Paul Cumming..... being responsible for the proposed work, am satisfied that the works described above are not Certifiable Works, as defined within the *Water and Sewerage Industry Act 2008*, that I have answered the above questions with all due diligence and have read and understood the Guidelines for TasWater CCW Assessments.

Note: the Guidelines for TasWater Certification of Certifiable Works Assessments are available at: www.taswater.com.au


	<i>Name: (print)</i>	<i>Signed</i>	<i>Date</i>
Designer:	John-Paul Cumming		19/12/2023

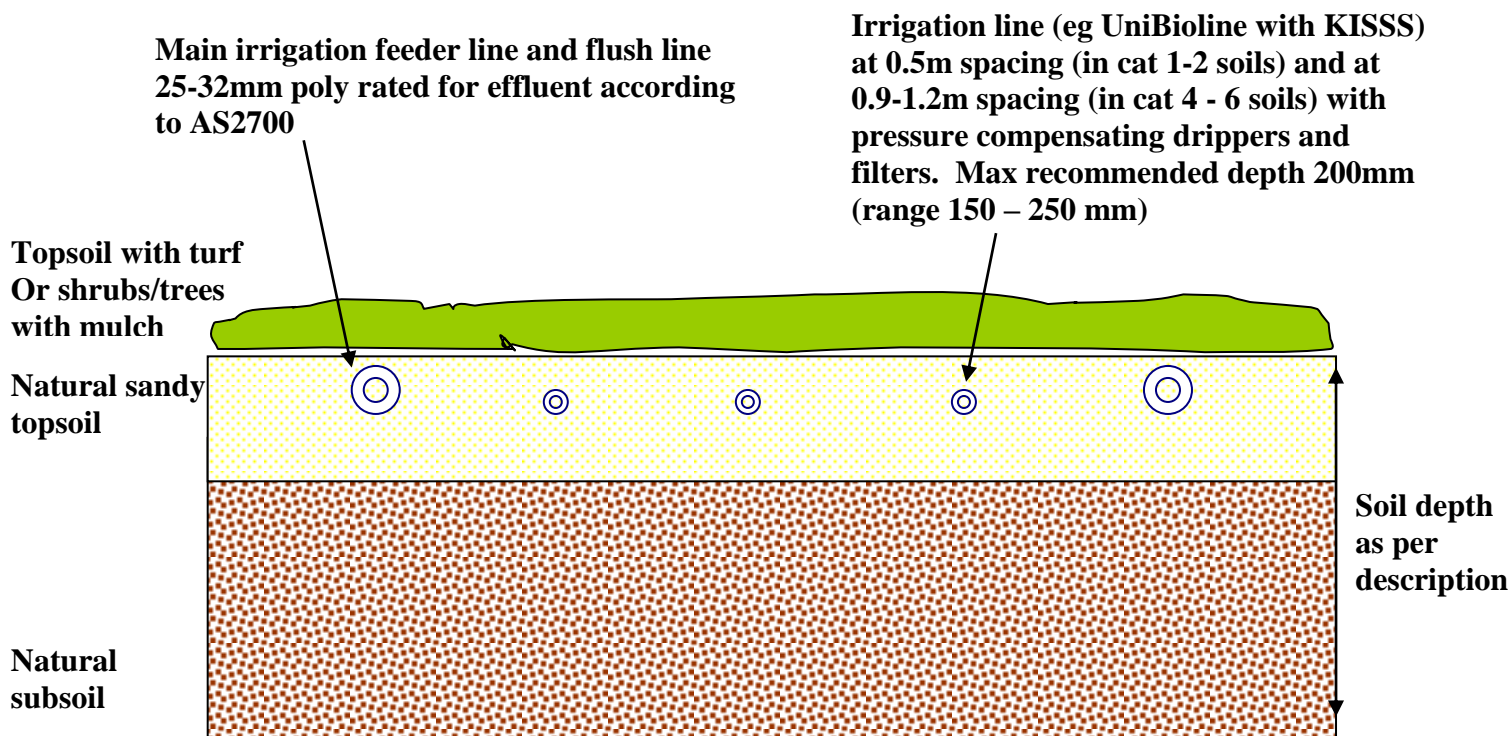


Figure 1 – AWTS

Subsurface irrigation design

To be used in conjunction with site evaluation report for construction of subsurface irrigation areas for use with aerated wastewater treatment systems (AWTS). **On dispersive soils gypsum should be added to tilled natural soil at 1Kg/5m².** The irrigation outlet line from the system or holding tank should utilize a 25-32mm main line out stepped down to a 11-16mm lateral drip irrigation lines in each irrigation row. If the final design is for shrubs/trees then a mounded row design is best employed with a nominal mound height of approximately 200mm.

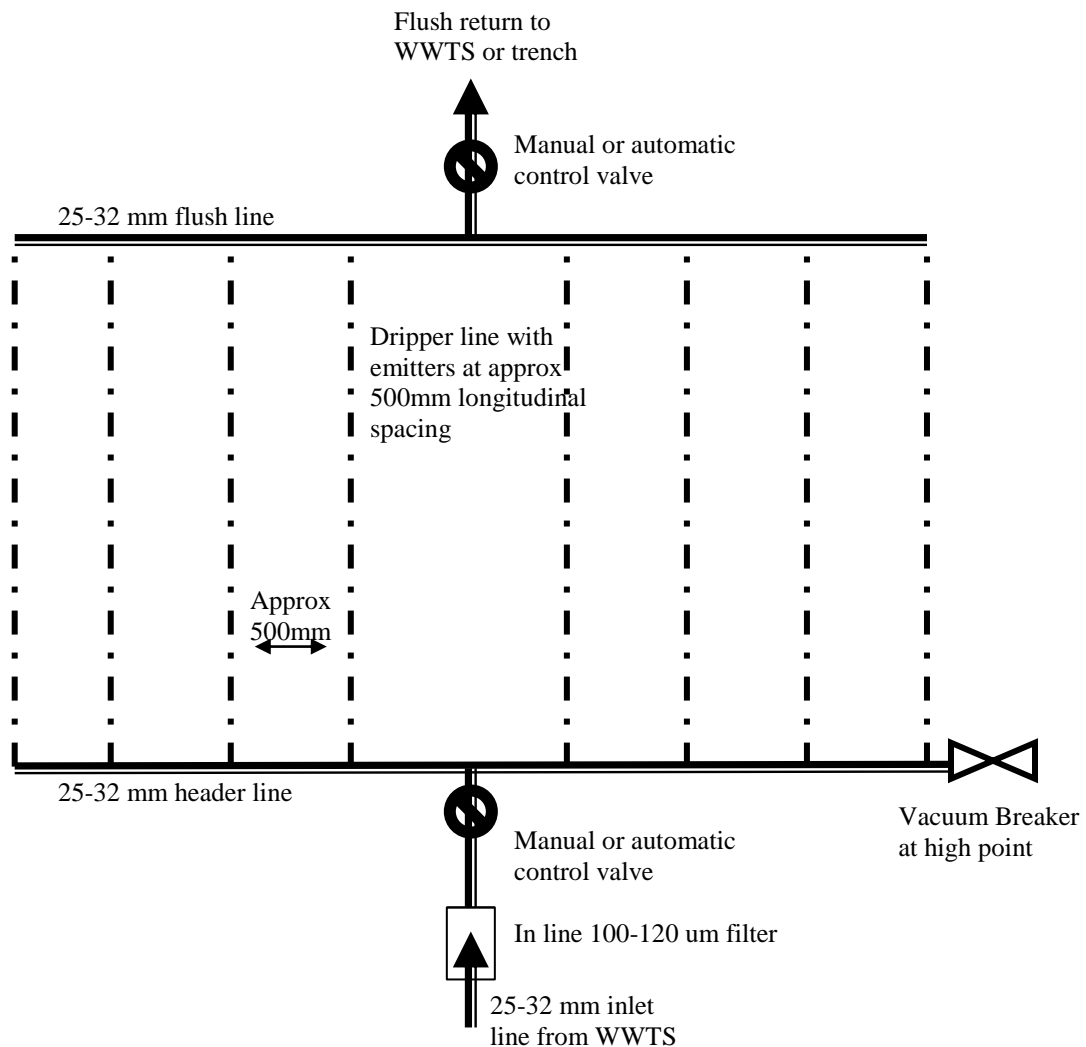
Irrigation Area Cross Section



Note – the topsoil/turf depths are minimum, with a maximum recommended depth of irrigation line below surface of 200mm (range 150-250mm).

- The existing surface of the site should be tilled to a depth of 200mm with a conventional plough, discs or spring tines to break down the turf matt and any large soil clods
- Turf, or grass seed or plants/mulch should be applied to the area as soon as practical after the laying of dripper line and commissioning of the system

Irrigation Area Plan View



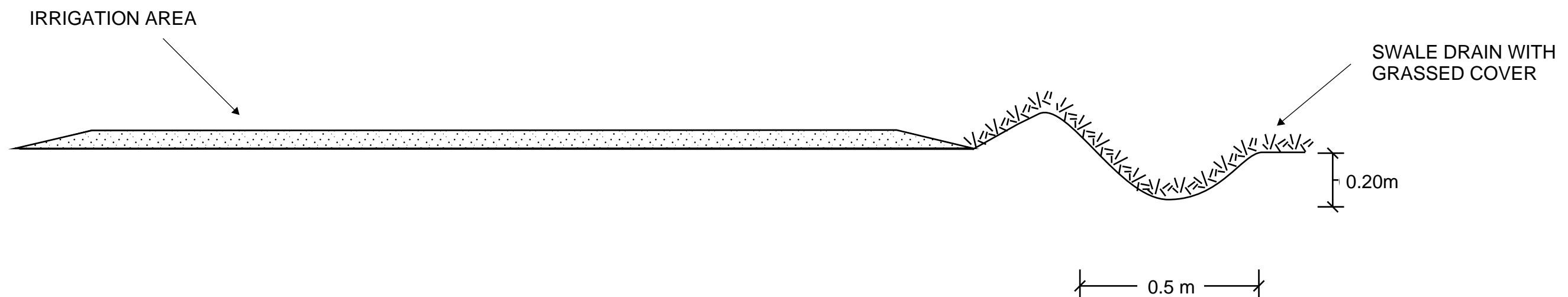
Design specifications:

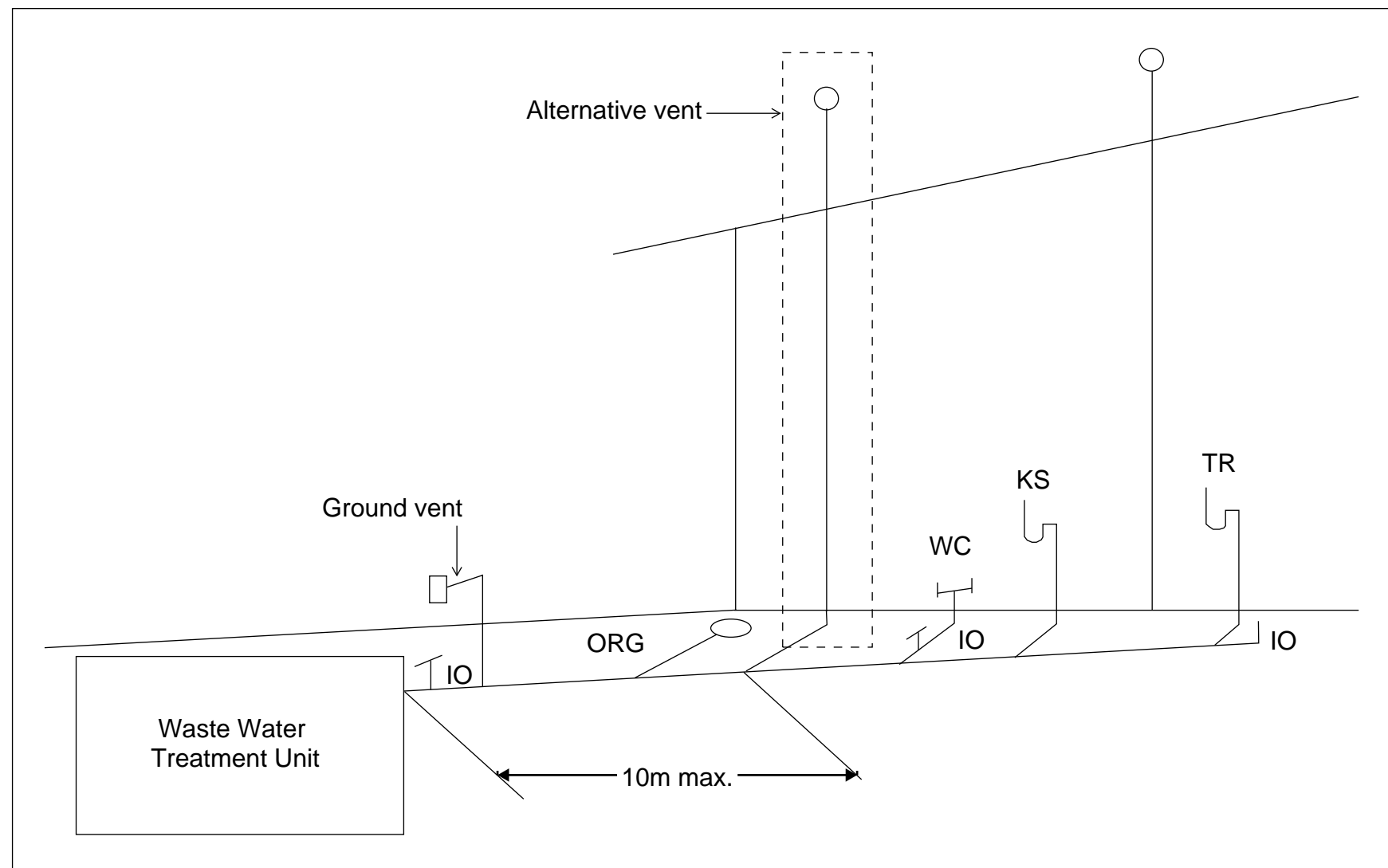
1. Manufacturer's recommendations for spacing of lateral irrigation lines should be followed (either Techline brand, Geoflow or KISSS) with commonly used with spacing of 0.3m (0.5m KISSS) in highly permeable soils and 0.6m (1.0-1.2m KISSS) in less permeable loams and clays.
2. Dependant upon treatment system a 200µm filter may be installed at the pumping chamber outlet, but a 100-120 µm inline disc filter should be installed prior to discharge into the irrigation area.
3. A vacuum breaker valve must be installed at the highest point of each irrigation zone in a marked and protected valve control box.
4. A flush line must be installed at the lowest point/bottom of the irrigation area with a return valve for flushing back into the treatment chamber of the system (not into the primary chamber as it may affect the performance of the microbial community) or to a dedicated absorption trench.
5. The minimum irrigation pumping capacity should be equivalent to 120kpa (i.e. 12m of head) at the highest point of the irrigation area (a gauge should be placed at the vacuum breaker) – therefore pump size can be matched on site to the irrigation pipe size and design.

TYPICAL GRASSED SWALE DRAIN CROSS-SECTION

SWALE DRAIN TO BE MIN 0.5M WIDE BY MIN 0.20M DEEP

GRASS COVER TO BE MAINTAINED TO SLOW WATER FLOW AND MINIMSE EROSION





Tas Figure H101.2 Alternative Venting Arrangements

Vents must terminate in accordance with AS/NZS 3500.2

Alternative venting to be used by extending a vent to terminate as if an upstream vent, with the vent connection between the last sanitary fixture or sanitary appliance and the on-site wastewater management system. Use of a ground vent in not recommended

Inspection openings must be located at the inlet to an on-site wastewater management system treatment unit and the point of connection to the land application system and must terminate as close as practicable to the underside of an approved inspection opening cover installed at the finished surface level

Access openings providing access for desludging or maintenance of on-site wastewater management system treatment unites must terminate at or above finished surface level

Alternative vent is the preferred arrangement where possible.

STORMWATER ASSESSMENT

311 Marriott Street

Westbury

November 2023



GEO-ENVIRONMENTAL

S O L U T I O N S

Disclaimer: The author does not warrant the information contained in this document is free from errors or omissions. The author shall not in any way be liable for any loss, damage or injury suffered by the User consequent upon, or incidental to, the existence of errors in the information.

Investigation Details

Client:	Mat and Jessica O'Grady
Site Address:	311 Marriott Street, Westbury
Date of Inspection:	03/11/2022
Proposed Works:	New house
Investigation Method:	Drill Tech Auger
Inspected by:	AM

Site Details

Certificate of Title (CT):	179617/2
Title Area:	Approx. 5011 m ²
Applicable Planning Overlays:	Bushfire-prone area.
Slope & Aspect:	1-2° NE facing slope
Vegetation:	Grass / Disturbed

Background Information

Geology Map:	MRT 1:25000
Geological Unit:	Quaternary sediments
Climate:	Annual rainfall approx. 775mm
Water Connection:	Tank
Sewer Connection:	Unserviced-onsite wastewater
Testing and Classification:	AS2870:2011, AS1726:2017 & AS1547:2012

Investigation

A number of bore holes were completed to identify the distribution and variation of the soil materials at the site, bore hole locations are indicated on the site plan. See soil profile conditions presented below.

Soil Profile Summary

BH 1 Depth (m)	BH 2 Depth (m)	USCS	Description
0.00-0.40	0.00-0.35	MH	TOPSOIL: Clayey SILT : dark grey, moist, loose.
0.40-0.70	0.35-0.60	CH	Silty CLAY trace gravel & BH1 sand: high plasticity, grey mottled yellow, moist, very stiff.
0.70-0.90		CL	Gravelly CLAY : low plasticity, yellow mottled red, moist, very stiff.
0.90-1.50		CH	Silty CLAY : high plasticity, grey mottled yellow, moist, very stiff.
1.50-2.00+	0.60-2.00+	CH	Silty CLAY : high plasticity, pale grey mottled red-yellow, moist, very stiff, no refusal.

Soil Conditions

The soils on site have developed from Quaternary sediments and consist clayey silt topsoil overlying silty to gravelly clay subsoils. The soil has a low estimated permeability of approximately 0.12-0.18m/day.

GES have identified the following at the site:

- The site has a <2% grade and presents a low risk to slope stability and landslip
- There are no proposals for cuts or change of grade which will impact on any proposed onsite stormwater absorption,
- The site soils have been identified as comprising of clayey silt topsoil overlying silty to gravelly clay subsoils and no soil dispersion was identified
- No evidence of a water table was observed at the time of the investigation
- There is a low risk of the natural soils being impacted by contamination
- No bedrock was encountered within any investigations.

Soil Dispersion

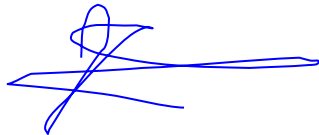
The soils are non-dispersive

Summary

The soils and site are suitable for in ground absorption of stormwater from the proposed structure. A hydraulic assessment and design for the absorption system has been completed by Flussig Engineers and can be found attached to this report with a form 35.

It is also recommended that regular inspection and maintenance is conducted to ensure the stormwater system is operating without obstruction. A schematic of recommended checks is also attached.

Please contact me if you have any further questions.



Dr John Paul Cumming PhD CPSS
Director

GES Stormwater Maintenance Plan Checklist

Indicative frequency	Inspection and criteria	Maintenance activities (where required)
Annual	Check whether any tree branches overhang the roof or are likely to grow to overhang the roof	If safe and where permitted, consider pruning back any overhanging branches
	Check that access covers to storage tanks are closed	Secure any open access covers to prevent risk of entry
	Check that screens on inlets, overflows and other openings do not have holes and are securely fastened	Repair any defective screens to keep out mosquitoes
	Inspect tank water for presence of rats, birds, frogs, lizards or other vermin or insects	Remove any infestations, identify point of entry and close vermin and insect-proof mesh
	Inspect tank water for presence of mosquito larvae (inspect more frequently in sub-tropical and tropical northern Australia, based on local requirements)	Identify point of entry and close with insect-proof mesh with holes no greater than 1.6 mm in diameter
	Inspect gutters for leaf accumulation and ponding	Clean leaves from gutters-remove more regularly if required. If water is ponding, repair gutter to ensure water flows to downpipe
	Check signage at external roof water taps and that any removable handle taps are being properly used	Replace or repair the missing or damaged signage and fittings
	Check plumbing and pump connections are watertight/without leakage	Repair any leaks as necessary
	Check suction strainers, in-line strainers and pump location for debris	Clean suction strainers, in-line strainers or debris from pump location
	Check pump installation is adequate for reliable ongoing operation	Modify and repair as required
	Check first flush diverter, if present	Clean first flush diverter, repair and replace if necessary
	Check health of absorption trench area and surrounding grass or plants	Investigate any adverse impacts observed that might be due to irrigation
	Check condition of roof and coatings	Investigate and resolve any apparent changes to roof condition, such as loss of material coatings

Triennial	Drain, clean out and check the condition of the tank walls and roof to ensure no holes have arisen due to tank deterioration	Repair any tank defects
	Check sediment levels in the tank	Organise a suitable contractor to remove accumulated sediment if levels are approaching those that may block tank outlets
	Undertake a systematic review of operational control of risks to the system	Identify the reason for any problems during inspections and take actions to prevent failures occurring in future
After 20 years and then every 5 years	Monitor the effectiveness of the stormwater absorption area to assess for any clogging due to algal growth, or blocking due to tree roots/grass growth/trench failure.	Clean or replace clogged equipment
Ongoing	Inspect and follow up on any complaints or concerns raised that could indicate problems with the system	Repair or replace any problems that are notified




HYDRAULIC DESIGN REPORT

FE-HOB-23007-108 PERFORMANCE SOLUTION REPORT

Document Information

Title	Client	Document Number	Project Manager
311 Marriott St, Westbury TAS 7303 Performance Solution Report	Geo Environmental Solutions PTY LTD	FE-HOB-23007- 108	Manuri Alwis <i>BEng (Hons)</i> <i>Civil Engineer</i>

Document Initial Revision

REVISION 00	Staff Name	Signature	Date
Prepared by	Manuri Alwis <i>Civil Engineer</i>		18/12/2023
Reviewed by	Ash Perera <i>Civil Hydraulic Engineer</i>		22/12/2023
Authorised by	Max W. Möller <i>Principal Hydraulic Engineer</i>		04/01/2024

Document Revision History

Rev No.	Description	Reviewed by	Authorised by	Date

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INTRODUCTION

This report details the stormwater management strategies for the proposed development **311 Marriott St, Westbury TAS 7303**. The objective of the report is to demonstrate how stormwater runoff would be captured and conveyed from the subject site safely to the receiving drainage network while considering stormwater quantity management and the incorporation of water tank and soakage trench elements.

The suggestion is to add detention to the proposed stormwater tanks and install soakage trench elements to provide the function of detention and dispersion for the new impervious areas.

EXISTING CONDITIONS AND ASSUMPTIONS

The site covers an area of approximately 5,007m². Proposed dwelling, shed, carport and gravel driveway will increase the total impervious area by 1066m². The increase of the total impervious area of the site is 21.29%.

Stormwater from the site would be routed through the proposed conventional underground drainage system comprising of Grated Sumps and PVC Pipes, coupled with the use of water tank elements and a soakage trench for on-site detention.

The stormwater management report is prepared in accordance with the design criteria listed below:

- The stormwater drainage system is designed using Bureau of Meteorology (BOM) published rainfall Intensity Frequency Duration (IFD) data as a minor / major system to accommodate the 5% AEP / 20 min storm events.
- The flow rate of stormwater leaving the site shall be designed so that it does not exceed the pre-developed flow rate for both the minor and major rain events.
- The total site discharges are modelled as described in *Storm Drainage Design in Small Urban Catchments*, a handbook for Australian practice by *Australian Rainfall and Runoff (ARR2019)*, Book 9 – Runoff in Urban Areas.

Existing site conditions are to remain except the new roof impervious areas dwelling (including carport) and shed are to discharge to their respective stormwater tanks and then outflow into the proposed 96m², 1.5m deep soakage trench. Proposed gravel driveway will also be detained and dispersed the above-mentioned soakage trench. This stormwater solution is to be implemented for operational purposes and improvement.

PERFORMANCE SOLUTION COMPLIANCE

AS 3500.3 – CL 7.10 ARR2019 Book 9	7.10.1 – Overflow is safe and does not compromise freeboard to habitable spaces. 7.10.3 – Tank to be of approved zinc coated steel or poly tank. On-Site Detention
General	<ul style="list-style-type: none"> AS/NZS 3500.3: Part 3 Stormwater Drainage Australian Rainfall and Run-off Volume 8: Urban Stormwater Management Australian Runoff Quality – A Guide to Water Sensitive Urban Design Storm drainage design in small urban catchments: A handbook for Australian practice Water Sensitive Urban Design (WSUD) Engineering Procedure: Stormwater Water Services Association of Australia Code (WSAA).

DETENTION DESIGN

Detention calculations are provided in Appendix B with the following summary for design:

Detention Volume = 3360L (Carport and dwelling) 2560L (Shed) 4150L (Driveway)

Stored Volume = 0L

Permissible Site discharge = 1.03L/s (Carport and dwelling) 0.79L/s (Shed) 2.68L/s (Driveway)

Pre-Development New Impervious Areas Only			Post-Development New Impervious Areas Only	
Land Use	Area m ²	% Total land	Area m ²	% Total land
Total Pervious	1066	100	0	0
Total Impervious	0	0	1066	100

As per best practices in stormwater management, the post-development allowable site discharge must not exceed the pre-development site discharge. As seen from the figures above, this is exceeded in the 5% AEP 20min storm duration by a Permissible Site discharge for dwelling & carport, shed and driveway as 1.03L/s, 0.79L/s and 2.68L/s

respectively. Therefore, the site must detain the difference using an onsite stormwater detention (OSD) system with 3360L and 2560L minimum capacity rainwater detention tanks for dwelling (including carport) and shed roof respectively and 4150L minimum capacity soakage trench of gravel driveway.

General Maintenance,

Task	Action	Frequency
General Cleaning – gutters, downpipe, filters etc.	Clear all debris from gutters and tank filters, ensure operational	Approximately every 3 months
Specialised cleaning and inspection	Inspect all gutters downpipes, inflow, and outflow – flush if required. Inspect all filters replace if required. Inspect main tank for defects	Yearly
Maintenance	Perform detailed inspection and maintenance of tank and associated infrastructure by a qualified person.	Every 5 years.

SUMMARY AND CONCLUSIONS

- Detention tank to be adopted as per design and documentation.
- The designed solution complies with the Performance solution design check carried out above.
- The 26,000L stormwater detention tank has been sized to detain 3500L over a 20min storm duration for the dwelling roof and carport.
- The 26,000L stormwater detention tank has been sized to detain 3000L over a 20min storm duration for the shed roof.
- The 1.5m deep, 96m² soakage trench is sized to detain the overflow from the detention tanks over a 20min storm duration.
- The gravel driveway will also be detained by the above-mentioned soakage trench.

End of Report

APPENDIX A

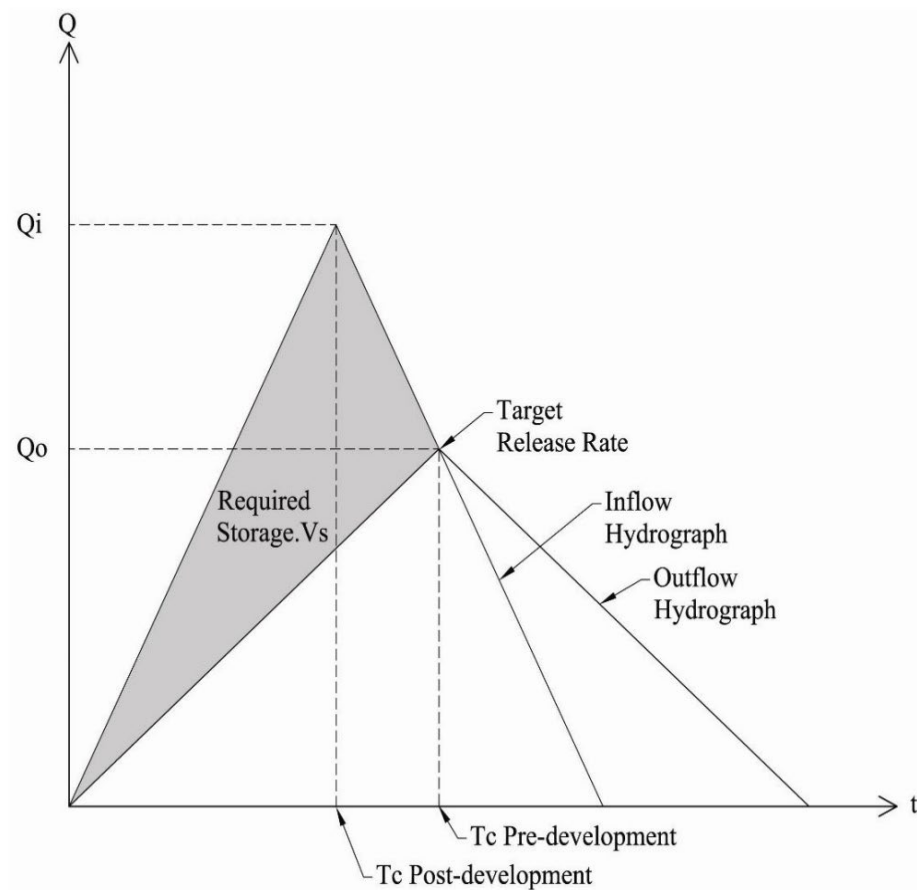
STORMWATER DESIGN DRAWINGS



SITE:			
311 MARRIOTT ST, WESTBURY TAS 7303			
TITLE:			
STORMWATER DESIGN			
SCALE AT A3:	DATE:	DRAWN:	CHECKED:
AS SHOWN	04.01.2024	MA	MM
PROJECT NO:	DRAWING NO:	REVISION:	
FE-HOB-23007-108	C-101	00	

APPENDIX B

DETENTION COMPUTATIONS



Triangular Hydrograph Method Schematic

STORMWATER DETENTION V5.04

Flüssig Engineers

Location: Westbury, TAS
Site: 236m² with tc = 20 and tcs = 15 mins.
PSD: AEP of 5%, Above ground PSD = 1.03L/s
Storage: AEP of 5%, Above ground volume = 3.36m³

Design Criteria (Custom AEP IFD data used)

Location = Westbury, TAS
Method = E (A)RI 2001,A(E)P 2019

PSD annual exceedance probability (APE) = 5 %
Storage annual exceedance probability (APE) = 5 %

Storage method = A (A)bove,(P)ipe,(U)nderground,(C)ustom

Site Geometry

Site area (As) = 236 m² = 0.0236 Ha
Pre-development coefficient (Cp) = 0.30
Post development coefficient (Cw) = 1.00
Total catchment (tc) = 20 minutes
Upstream catchment to site (tcs) = 15 minutes

Coefficient Calculations

Pre-development				Post development			
Zone	Area (m ²)	C	Area * C	Zone	Area (m ²)	C	Area * C
Concrete	0	0.90	0	Concrete	0	0.90	0
Roof	0	1.00	0	Roof	236	1.00	236
Gravel	0	0.50	0	Gravel	0	0.50	0
Garden	236	0.30	71	Garden	0	0.30	0
Total	236	m²	71	Total	236	m²	236
Cp = $\Sigma \text{Area} * C / \text{Total} = 0.300$				Cw = $\Sigma \text{Area} * C / \text{Total} = 1.000$			

Permissible Site Discharge (PSD) (AEP of 5%)

PSD Intensity (I) = 50.4 mm/hr For catchment tc = 20 mins.
Pre-development (Qp = Cp*I*As/0.36) = 0.99 L/s
Peak post development (Qa = 2*Cw*I*As/0.36) = 6.61 L/s = (0.131 x I) Eq. 2.24
Storage method = A (A)bove,(P)ipe,(U)nderground,(C)ustom
Permissible site discharge (Qu = PSD) = 1.034 L/s

Above ground - Eq 3.8

$$0 = \text{PSD}^2 - 2 * Q_a / t_c * (0.667 * t_c * Q_p / Q_a + 0.75 * t_c + 0.25 * t_{cs}) * \text{PSD} + 2 * Q_a * Q_p$$

Taking x as = PSD and solving

$$a = 1.0 \quad b = -13.7 \quad c = 13.1$$

$$\text{PSD} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\text{PSD} = 1.034 \text{ L/s}$$

Below ground pipe - Eq 3.3

$$Q_p = \text{PSD} * [1.6 * t_{cs} / \{t_c * (1 - 2 * \text{PSD} / (3 * Q_a))\} - 0.6 * t_{cs}^{2.67} / \{t_c * (1 - 2 * \text{PSD} / (3 * Q_a))\}^{2.67}]$$

$$= 0.99$$

$$\text{PSD} = 1.027 \text{ L/s}$$

Below ground rectangular tank - Eq 3.4

$$t = t_{cs} / \{t_c * (1 - 2 * \text{PSD} / (3 * Q_a))\} = 0.834$$

$$Q_p = \text{PSD} * [0.005 - 0.455 * t + 5.228 * t^2 - 1.045 * t^3 - 7.199 * t^4 + 4.519 * t^5]$$

$$= 0.99$$

$$\text{PSD} = 0.996 \text{ L/s}$$

STORMWATER DETENTION V5.04

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Design Storage Capacity (AEP of 5%)

Above ground (Vs) = $[0.5 \cdot Q_a \cdot t_d - [(0.875 \cdot PSD \cdot t_d)(1 - 0.917 \cdot PSD/Q_a) + (0.427 \cdot t_d \cdot PSD^2/Q_a)]] \cdot 60/10^3 \text{ m}^3$ Eq 4.23
Below ground pipe (Vs) = $[(0.5 \cdot Q_a - 0.637 \cdot PSD + 0.089 \cdot PSD^2/Q_a) \cdot t_d] \cdot 60/10^3 \text{ m}^3$ Eq 4.8
Below ground rect. tank (Vs) = $[(0.5 \cdot Q_a - 0.572 \cdot PSD + 0.048 \cdot PSD^2/Q_a) \cdot t_d] \cdot 60/10^3 \text{ m}^3$ Eq 4.13

td (mins)	I (mm/hr)	Qa (L/s)	Above Vs (m³)	Pipe Vs (m³)	B/G Vs (m³)
5	97.5	12.8	1.66		
15	59.0	7.7	2.71		
20	50.4	6.6	2.95		
25	44.4	5.8	3.11		
31	39.1	5.1	3.23		
36	35.8	4.7	3.30		
41	33.1	4.3	3.34		
46	30.8	4.0	3.36		
51	29.0	3.8	3.36		
56	27.3	3.6	3.36		

Table 1 - Storage as function of time for AEP of 5%

Type	td (mins)	I (mm/hr)	Qa (L/s)	Vs (m³)
Above Pipe B/ground	44.9	31.3	4.1	3.36

Table 2 - Storage requirements for AEP of 5%

Frequency of operation of Above Ground storage

$Q_{p2} = 0.75$ Cl 2.4.5.1
 $Q_{p2} = Q_{p2} \cdot Q_{p1}$ (where $Q_{p1} = PSD$) = 0.78 L/s at which time above ground storage occurs
 $I = 360 \cdot Q_{p2} / (2 \cdot C_w \cdot A_s \cdot 10^3) = 5.9 \text{ mm/h}$ Eq 4.24

Period of Storage

Time to Fill:

Above ground (tf) = $t_d \cdot (1 - 0.92 \cdot PSD/Q_a)$ Eq 4.27
Below ground pipe (tf) = $t_d \cdot (1 - 2 \cdot PSD/(3 \cdot Q_a))$ Eq 3.2
Below ground rect. tank (tf) = $t_d \cdot (1 - 2 \cdot PSD/(3 \cdot Q_a))$ Eq 3.2

Time to empty:

Above ground (te) = $(V_s + 0.33 \cdot PSD^2 \cdot t_d / Q_a \cdot 60/10^3) \cdot (1.14/PSD) \cdot (10^3/60)$ Eq 4.28
Below ground pipe (te) = $1.464/PSD \cdot (V_s + 0.333 \cdot PSD^2 \cdot t_d / Q_a \cdot 60/10^3) \cdot (10^3/60)$ Eq 4.32
Below ground rect. tank (te) = $2.653/PSD \cdot (V_s + 0.333 \cdot PSD^2 \cdot t_d / Q_a \cdot 60/10^3) \cdot (10^3/60)$ Eq 4.36

Storage period (Ps = tf + te) Eq 4.26

Type	td (mins)	Qa (L/s)	Vs (L/s)	tf (mins)	te (mins)	Ps (mins)
Above Pipe B/ground	44.9	4.1	3.4	34.5	65.9	100.4

Table 3 - Period of Storage requirements for AEP of 5%

Orifice

Permissible site discharge ($Q_u = PSD$) = 1.03 L/s (Above ground storage)
Orifice coefficient (CD) = 0.61 For sharp circular orifice
Gravitational acceration (g) = 9.81 m/s²
Maximum storage depth above orifice (H) = 430 mm
Orifice flow (Q) = $CD \cdot A_o \cdot \sqrt{2 \cdot g \cdot H}$
Therefore:
Orifice area (A_o) = 583 mm²
Orifice diameter ($D = \sqrt{4 \cdot A_o / \pi}$) = 27.3 mm

STORMWATER DETENTION V5.04

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Location: Westbury, TAS
Site: 180m² with tc = 20 and tcs = 15 mins.
PSD: AEP of 5%, Above ground PSD = 0.79L/s
Storage: AEP of 5%, Above ground volume = 2.56m³

Design Criteria (Custom AEP IFD data used)

Location = Westbury, TAS
Method = E (A)RI 2001,A(E)P 2019

PSD annual exceedance probability (APE) = 5 %
Storage annual exceedance probability (APE) = 5 %

Storage method = A (A)bove,(P)ipe,(U)nderground,(C)ustom

Site Geometry

Site area (As) = 180 m² = 0.018 Ha
Pre-development coefficient (Cp) = 0.30
Post development coefficient (Cw) = 1.00
Total catchment (tc) = 20 minutes
Upstream catchment to site (tcs) = 15 minutes

Coefficient Calculations

Pre-development				Post development			
Zone	Area (m ²)	C	Area * C	Zone	Area (m ²)	C	Area * C
Concrete	0	0.90	0	Concrete	0	0.90	0
Roof	0	1.00	0	Roof	180	1.00	180
Gravel	0	0.50	0	Gravel	0	0.50	0
Garden	180	0.30	54	Garden	0	0.30	0
Total	180	m²	54	Total	180	m²	180
Cp = $\Sigma \text{Area} * C / \text{Total} = 0.300$				Cw = $\Sigma \text{Area} * C / \text{Total} = 1.000$			

Permissible Site Discharge (PSD) (AEP of 5%)

PSD Intensity (I) = 50.4 mm/hr For catchment tc = 20 mins.
Pre-development (Qp = Cp*I*As/0.36) = 0.76 L/s
Peak post development (Qa = 2*Cw*I*As/0.36) = 5.04 L/s = (0.100 x I) Eq. 2.24
Storage method = A (A)bove,(P)ipe,(U)nderground,(C)ustom
Permissible site discharge (Qu = PSD) = 0.788 L/s

Above ground - Eq 3.8

$$0 = \text{PSD}^2 - 2 * Q_a / t_c * (0.667 * t_c * Q_p / Q_a + 0.75 * t_c + 0.25 * t_{cs}) * \text{PSD} + 2 * Q_a * Q_p$$

Taking x as = PSD and solving

$$a = 1.0 \quad b = -10.5 \quad c = 7.6$$

$$\text{PSD} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\text{PSD} = 0.788 \text{ L/s}$$

Below ground pipe - Eq 3.3

$$Q_p = \text{PSD} * [1.6 * t_{cs} / \{t_c * (1 - 2 * \text{PSD} / (3 * Q_a))\} - 0.6 * t_{cs}^{2.67} / \{t_c * (1 - 2 * \text{PSD} / (3 * Q_a))\}^{2.67}]$$

$$= 0.76$$

$$\text{PSD} = 0.783 \text{ L/s}$$

Below ground rectangular tank - Eq 3.4

$$t = t_{cs} / \{t_c * (1 - 2 * \text{PSD} / (3 * Q_a))\} = 0.834$$

$$Q_p = \text{PSD} * [0.005 - 0.455 * t + 5.228 * t^2 - 1.045 * t^3 - 7.199 * t^4 + 4.519 * t^5]$$

$$= 0.76$$

$$\text{PSD} = 0.759 \text{ L/s}$$

STORMWATER DETENTION V5.04

Flüssig Engineers

Design Storage Capacity (AEP of 5%)

$$\begin{aligned} \text{Above ground (Vs)} &= [0.5 \cdot Q_a \cdot t_d - [(0.875 \cdot \text{PSD} \cdot t_d)(1 - 0.917 \cdot \text{PSD}/Q_a) + (0.427 \cdot t_d \cdot \text{PSD}^2/Q_a)]] \cdot 60/10^3 \text{ m}^3 & \text{Eq 4.23} \\ \text{Below ground pipe (Vs)} &= [(0.5 \cdot Q_a - 0.637 \cdot \text{PSD} + 0.089 \cdot \text{PSD}^2/Q_a) \cdot t_d] \cdot 60/10^3 \text{ m}^3 & \text{Eq 4.8} \\ \text{Below ground rect. tank (Vs)} &= [(0.5 \cdot Q_a - 0.572 \cdot \text{PSD} + 0.048 \cdot \text{PSD}^2/Q_a) \cdot t_d] \cdot 60/10^3 \text{ m}^3 & \text{Eq 4.13} \end{aligned}$$

td (mins)	I (mm/hr)	Qa (L/s)	Above Vs (m³)	Pipe Vs (m³)	B/G Vs (m³)
5	97.5	9.8	1.26		
15	59.0	5.9	2.07		
20	50.4	5.0	2.25		
25	44.4	4.4	2.37		
31	39.1	3.9	2.47		
36	35.8	3.6	2.52		
41	33.1	3.3	2.55		
46	30.8	3.1	2.56		
51	29.0	2.9	2.57		
56	27.3	2.7	2.56		

Table 1 - Storage as function of time for AEP of 5%

Type	td (mins)	I (mm/hr)	Qa (L/s)	Vs (m³)
Above Pipe B/ground	44.9	31.3	3.1	2.56

Table 2 - Storage requirements for AEP of 5%

Frequency of operation of Above Ground storage

$$\begin{aligned} Q_{p2} &= 0.75 \text{ CI 2.4.5.1} \\ Q_{p2} = Q_{p2} \cdot Q_{p1} \text{ (where } Q_{p1} = \text{PSD)} &= 0.59 \text{ L/s at which time above ground storage occurs} \\ I = 360 \cdot Q_{p2} / (2 \cdot C_w \cdot A_s \cdot 10^3) &= 5.9 \text{ mm/h} & \text{Eq 4.24} \end{aligned}$$

Period of Storage

Time to Fill:

$$\begin{aligned} \text{Above ground (tf)} &= t_d \cdot (1 - 0.92 \cdot \text{PSD}/Q_a) & \text{Eq 4.27} \\ \text{Below ground pipe (tf)} &= t_d \cdot (1 - 2 \cdot \text{PSD}/(3 \cdot Q_a)) & \text{Eq 3.2} \\ \text{Below ground rect. tank (tf)} &= t_d \cdot (1 - 2 \cdot \text{PSD}/(3 \cdot Q_a)) & \text{Eq 3.2} \end{aligned}$$

Time to empty:

$$\begin{aligned} \text{Above ground (te)} &= (V_s + 0.33 \cdot \text{PSD}^2 \cdot t_d / Q_a \cdot 60/10^3) \cdot (1.14 / \text{PSD}) \cdot (10^3/60) & \text{Eq 4.28} \\ \text{Below ground pipe (te)} &= 1.464 / \text{PSD} \cdot (V_s + 0.333 \cdot \text{PSD}^2 \cdot t_d / Q_a \cdot 60/10^3) \cdot (10^3/60) & \text{Eq 4.32} \\ \text{Below ground rect. tank (te)} &= 2.653 / \text{PSD} \cdot (V_s + 0.333 \cdot \text{PSD}^2 \cdot t_d / Q_a \cdot 60/10^3) \cdot (10^3/60) & \text{Eq 4.36} \end{aligned}$$

$$\text{Storage period (Ps = tf + te)} \quad \text{Eq 4.26}$$

Type	td (mins)	Qa (L/s)	Vs (L/s)	tf (mins)	te (mins)	Ps (mins)
Above Pipe B/ground	44.9	3.1	2.6	34.5	65.9	100.4

Table 3 - Period of Storage requirements for AEP of 5%

Orifice

$$\begin{aligned} \text{Permissible site discharge (Qu=PSD)} &= 0.79 \text{ L/s (Above ground storage)} \\ \text{Orifice coefficient (CD)} &= 0.61 \text{ For sharp circular orifice} \\ \text{Gravitational acceration (g)} &= 9.81 \text{ m/s}^2 \\ \text{Maximum storage depth above orifice (H)} &= 369 \text{ mm} \\ \text{Orifice flow (Q)} &= CD \cdot A_o \cdot \sqrt{2 \cdot g \cdot H} \\ \text{Therefore:} & \\ \text{Orifice area (Ao)} &= 480 \text{ mm}^2 \\ \text{Orifice diameter (D = } \sqrt{4 \cdot A_o / \pi}) &= 24.7 \text{ mm} \end{aligned}$$

STORMWATER DETENTION V5.04

Flüssig Engineers

Location: Westbury, TAS
Site: 650m² with tc = 20 and tcs = 15 mins.
PSD: AEP of 5%, Underground rectangular tank PSD = 2.68L/s
Storage: AEP of 5%, Underground rectangular tank volume = 4.15m³

Design Criteria (Custom AEP IFD data used)

Location = Westbury, TAS
Method = E (A)RI 2001,A(E)P 2019

PSD annual exceedance probabiliy (APE) = 5 %
Storage annual exceedance probabiliy (APE) = 5 %

Storage method = U (A)bove,(P)ipe,(U)nderground,(C)ustom

Site Geometry

Site area (As) = 650 m² = 0.065 Ha
Pre-development coefficient (Cp) = 0.30
Post development coefficient (Cw) = 0.53

Total catchment (tc) = 20 minutes
Upstream catchment to site (tcs) = 15 minutes

Coefficient Calculations

Pre-development				Post development			
Zone	Area (m ²)	C	Area * C	Zone	Area (m ²)	C	Area * C
Concrete	0	0.90	0	Concrete	52	0.90	47
Roof	0	1.00	0	Roof	0	1.00	0
Gravel	0	0.50	0	Gravel	598	0.50	299
Garden	650	0.30	195	Garden	0	0.30	0
Total	650	m²	195	Total	650	m²	346
Cp = $\Sigma \text{Area} * C / \text{Total} = 0.300$				Cw = $\Sigma \text{Area} * C / \text{Total} = 0.532$			

Permissible Site Discharge (PSD) (AEP of 5%)

PSD Intensity (I) = 50.4 mm/hr For catchment tc = 20 mins.
Pre-development (Qp = Cp*I*As/0.36) = 2.73 L/s
Peak post development (Qa = 2*Cw*I*As/0.36) = 9.63 L/s = (0.191 x I) Eq. 2.24

Storage method = U (A)bove,(P)ipe,(U)nderground,(C)ustom
Permissible site discharge (Qu = PSD) = 2.681 L/s

Above ground - Eq 3.8

$$Q = \text{PSD}^2 - 2 * Q_a / t_c * (0.667 * t_c * Q_p / Q_a + 0.75 * t_c + 0.25 * t_{cs}) * \text{PSD} + 2 * Q_a * Q_p$$

Taking x as = PSD and solving

$$a = 1.0 \quad b = -21.7 \quad c = 52.6$$

$$\text{PSD} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\text{PSD} = 2.781 \text{ L/s}$$

Below ground pipe - Eq 3.3

$$Q_p = \text{PSD} * [1.6 * t_{cs} / \{t_c * (1 - 2 * \text{PSD} / (3 * Q_a))\} - 0.6 * t_{cs}^{2.67} / \{t_c * (1 - 2 * \text{PSD} / (3 * Q_a))\}^{2.67}]$$

$$= 2.73$$

$$\text{PSD} = 2.751 \text{ L/s}$$

Below ground rectangular tank - Eq 3.4

$$t = t_{cs} / \{t_c * (1 - 2 * \text{PSD} / (3 * Q_a))\} = 0.921$$

$$Q_p = \text{PSD} * [0.005 - 0.455 * t + 5.228 * t^2 - 1.045 * t^3 - 7.199 * t^4 + 4.519 * t^5]$$

$$= 2.73$$

$$\text{PSD} = 2.681 \text{ L/s}$$

STORMWATER DETENTION V5.04

Flüssig Engineers

Design Storage Capacity (AEP of 5%)

Above ground (Vs) = $[0.5*Qa*td - [(0.875*PSD*td)(1 - 0.917*PSD/Qa) + (0.427*td*PSD^2/Qa)]] * 60/10^3 \text{ m}^3$ Eq 4.23
Below ground pipe (Vs) = $[(0.5*Qa - 0.637*PSD + 0.089*PSD^2/Qa)*td] * 60/10^3 \text{ m}^3$ Eq 4.8
Below ground rect. tank (Vs) = $[(0.5*Qa - 0.572*PSD + 0.048*PSD^2/Qa)*td] * 60/10^3 \text{ m}^3$ Eq 4.13

td (mins)	I (mm/hr)	Qa (L/s)	Above Vs (m³)	Pipe Vs (m³)	B/G Vs (m³)
5	97.5	18.6			2.34
11	69.2	13.2			3.37
13	63.6	12.2			3.57
16	57.0	10.9			3.79
19	51.9	9.9			3.94
22	47.8	9.1			4.05
25	44.4	8.5			4.12
27	42.5	8.1			4.15
30	39.9	7.6			4.18
33	37.7	7.2			4.19

Table 1 - Storage as function of time for AEP of 5%

Type	td (mins)	I (mm/hr)	Qa (L/s)	Vs (m³)
Above Pipe B/ground	26.4	43.0	8.2	4.15

Table 2 - Storage requirements for AEP of 5%

Frequency of operation of Above Ground storage

$Q_{p2} = 0.75$ Cl 2.4.5.1
 $Q_{p2} = Q_{p2} * Q_{p1}$ (where $Q_{p1} = PSD$) = 2.09 L/s at which time above ground storage occurs
 $I = 360 * Q_{p2} / (2 * C_w * A_s * 10^3) = 10.9 \text{ mm/h}$ Eq 4.24

Period of Storage

Time to Fill:

Above ground (tf) = $td * (1 - 0.92 * PSD / Qa)$ Eq 4.27
Below ground pipe (tf) = $td * (1 - 2 * PSD / (3 * Qa))$ Eq 3.2
Below ground rect. tank (tf) = $td * (1 - 2 * PSD / (3 * Qa))$ Eq 3.2

Time to empty:

Above ground (te) = $(Vs + 0.33 * PSD^2 * td / Qa * 60 / 10^3) * (1.14 / PSD) * (10^3 / 60)$ Eq 4.28
Below ground pipe (te) = $1.464 / PSD * (Vs + 0.333 * PSD^2 * td / Qa * 60 / 10^3) * (10^3 / 60)$ Eq 4.32
Below ground rect. tank (te) = $2.653 / PSD * (Vs + 0.333 * PSD^2 * td / Qa * 60 / 10^3) * (10^3 / 60)$ Eq 4.36

Storage period ($Ps = tf + te$) Eq 4.26

Type	td (mins)	Qa (L/s)	Vs (L/s)	tf (mins)	te (mins)	Ps (mins)
Above Pipe B/ground	26.4	8.2	4.1	20.7	76.0	96.6

Table 3 - Period of Storage requirements for AEP of 5%

Orifice

Permissible site discharge ($Q_u = PSD$) = 2.68 L/s (Underground storage)
Orifice coefficient (CD) = 1 For sharp circular orifice
Gravitational acceration (g) = 9.81 m/s²
Maximum storage depth above orifice (H) = 1200 mm
Orifice flow (Q) = $CD * A_o * \sqrt{2 * g * H}$
Therefore:
Orifice area (A_o) = 552 mm²
Orifice diameter ($D = \sqrt{4 * A_o / \pi}$) = 26.5 mm

Soakage Trench

Hydrology		
A1 = impervious area collected	416	sqm
C1 = coefficient	1.00	
A2=Impervious area	650	sqm
C2= Coefficient	0.53	
ARI = Annual Recurrence Interval	20	yr
Ground Conditions		
Hydraulic conductivity K (absorption rate)	0.1250	mm/min
Adjusted rate (15% clogging factor)	0.1063	mm/min
Trench Design		
Length, L	16	m
Width, B	6	m
Depth, h	1.5	m
Base area, BA	96	sqm
Void space	35%	
Trench Storage	50.4	cum
	50400.00	L
Detention tank data		
Tank storage	6.50	cum
Tank Underflow	1.82	L/s
Tank Underflow	109.20	L/m
Total Available storage	56.9	cum
	56900	L

C(roof)	1.00
C(Gravel)	0.53

Final Check			
Criteria	Required	Design	Check
Total Detention needed	10,070	56900	OK
Trench capacity underflow for 5% AEP 20-minute storm	7768	50400	OK

Checking storms

	Duration (min)	Intensity (mm/hr)	Vol in System(L)	Vol in Trench (L)	Vol out Trench (L)	Storage total System (L)	Storage Trench(L)	Hours to empty Trench
5Mins	5	97.5	6179	3345	51	6128	3294	5
6Mins	6	92.5	7035	3842	61	6973	3781	6
10Mins	10	72.5	9189	5255	102	9087	5153	9
20Mins	20	50.4	12776	7972	204	12572	7768	13
30Mins	30	39.9	15172	8672	306	14866	8366	14
1Hr	60	26.2	19925	13425	612	19313	12813	22
2Hrs	120	17.1	26009	19509	1224	24785	18285	32
3Hrs	180	13.4	30572	24072	1836	28736	22236	39
6Hrs	360	8.79	40109	33609	3672	36437	29937	55
12Hrs	720	5.77	52657	46157	7344	45313	38813	75
24Hrs	1440	3.71	67715	61215	14688	53027	46527	100
48Hrs	2880	2.29	83594	77094	29376	54218	47718	126
72Hrs	4320	1.69	92538	86038	44064	48474	41974	141

IFD Design Rainfall

Location

Label: 311 Marriott St, Westbury TAS 7303
Latitude: -41.5496 [Nearest grid cell: 41.5375 (S)]
Longitude: 146.8379 [Nearest grid cell: 146.8375 (E)]



IFD Design Rainfall Intensity (mm/h)

Issued: 27 November 2023

Rainfall intensity for Durations, Exceedance per Year (EV), and Annual Exceedance Probabilities (AEP).
[FAQ for New ARR probability terminology](#)

Duration	Annual Exceedance Probability (AEP)						
	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	74.4	83.0	112	134	156	189	215
2 min	65.3	72.8	96.6	113	130	150	166
3 min	57.6	64.2	85.6	101	116	135	151
4 min	51.8	57.7	77.3	91.3	106	125	140
5 min	47.2	52.6	70.8	83.9	97.5	116	131
10 min	34.0	38.0	51.6	61.8	72.5	88.2	101
15 min	27.6	30.8	41.9	50.2	59.0	72.0	82.9
20 min	23.7	26.4	35.9	43.0	50.4	61.3	70.5
25 min	21.0	23.4	31.7	37.9	44.4	53.8	61.6
30 min	19.0	21.2	28.6	34.1	39.9	48.1	54.9
45 min	15.2	16.9	22.7	26.9	31.3	37.3	42.1
1 hour	13.0	14.4	19.3	22.7	26.2	31.0	34.7
1.5 hour	10.4	11.5	15.2	17.8	20.4	23.8	26.4
2 hour	8.86	9.83	12.9	15.0	17.1	19.8	21.9
3 hour	7.07	7.84	10.2	11.8	13.4	15.4	16.9
4.5 hour	5.62	6.22	8.05	9.27	10.4	12.0	13.2
6 hour	4.76	5.26	6.79	7.81	8.79	10.1	11.1
9 hour	3.73	4.11	5.31	6.11	6.88	7.96	8.80
12 hour	3.11	3.43	4.43	5.11	5.77	6.72	7.47
18 hour	2.38	2.63	3.41	3.94	4.47	5.26	5.89
24 hour	1.95	2.15	2.80	3.26	3.71	4.39	4.94
30 hour	1.66	1.84	2.40	2.79	3.19	3.79	4.28
36 hour	1.46	1.61	2.10	2.46	2.82	3.35	3.79
48 hour	1.18	1.30	1.70	1.99	2.29	2.73	3.09
72 hour	0.864	0.953	1.25	1.46	1.69	2.00	2.26
96 hour	0.696	0.766	0.999	1.17	1.34	1.58	1.77
120 hour	0.591	0.649	0.841	0.978	1.12	1.31	1.46
144 hour	0.520	0.570	0.732	0.846	0.962	1.11	1.23
168 hour	0.469	0.513	0.653	0.750	0.846	0.973	1.07

Note:
The 50% AEP IFD **does not** correspond to the 2 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 1.44 ARI.
* The 20% AEP IFD **does not** correspond to the 5 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 4.48 ARI.

CERTIFICATE OF THE RESPONSIBLE DESIGNER

Section 94
Section 106
Section 129
Section 155

Form **35**

To: Owner name

 Address
 Suburb/postcode

Designer details:

Name: Category:
Business name: Phone No:
Business address:
 Fax No:
Licence No: Email address:

Details of the proposed work:

Owner/Applicant Designer's project reference No.
Address: Lot No:

Type of work: Building work ☐ Plumbing work ☒ (X all applicable)

Description of work:

On-Site stormwater system - design

*(new building / alteration /
addition / repair / removal /
re-erection
water / sewerage /
stormwater /
on-site wastewater
management system /
backflow prevention / other)*

Description of the Design Work (Scope, limitations or exclusions): (X all applicable certificates)

Certificate Type:	Certificate	Responsible Practitioner
	<input type="checkbox"/> Building design	Architect or Building Designer
	<input type="checkbox"/> Structural design	Engineer or Civil Designer
	<input type="checkbox"/> Fire Safety design	Fire Engineer
	<input checked="" type="checkbox"/> Civil design	Civil Engineer or Civil Designer
	Hydraulic design	Building Services Designer
	<input type="checkbox"/> Fire service design	Building Services Designer
	<input type="checkbox"/> Electrical design	Building Services Designer
	<input type="checkbox"/> Mechanical design	Building Service Designer
	<input type="checkbox"/> Plumbing design	Plumber-Certifier; Architect, Building Designer or Engineer
	<input type="checkbox"/> Other (specify)	
Deemed-to-Satisfy: <input type="checkbox"/>		Performance Solution: <input checked="" type="checkbox"/> <small>(X the appropriate box)</small>

Other details:

Onsite stormwater retention

Design documents provided:

The following documents are provided with this Certificate –

Document description:

Drawing numbers: FS-HOB-23007-108_REV00-C100 FS-HOB-23007-108_REV00-C101	Prepared by: Flussig Engineers	Date: 04.01.24
Schedules:	Prepared by:	Date:
Specifications: Performance Solution Report	Prepared by: Flussig Engineers	Date: 04.01.24
Computations: Performance solution Report	Prepared by: Flussig Engineers	Date: 04.01.24
Performance solution proposals: Onsite stormwater retention	Prepared by: Flussig Engineers	Date: 04.01.24
Test reports:	Prepared by:	Date:

Standards, codes or guidelines relied on in design process:

AS1547-2012 On-site domestic wastewater management.

AS3500 (Parts 0-5)-2013 Plumbing and drainage set.

Any other relevant documentation:

GES stormwater assessment 'Site assessment - 311 Marriott Street, Westbury'

Attribution as designer:

I Max W. Moller, am responsible for the design of that part of the work as described in this certificate;

The documentation relating to the design includes sufficient information for the assessment of the work in accordance with the *Building Act 2016* and sufficient detail for the builder or plumber to carry out the work in accordance with the documents and the Act;

This certificate confirms compliance and is evidence of suitability of this design with the requirements of the National Construction Code.

Max W. Moller



04.01.24

Licence No: 650370893

Assessment of Certifiable Works: (TasWater)

Note: single residential dwellings and outbuildings on a lot with an existing sewer connection are not considered to increase demand and are not certifiable.

If you cannot check ALL of these boxes, LEAVE THIS SECTION BLANK.

TasWater must then be contacted to determine if the proposed works are Certifiable Works.

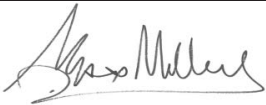
I confirm that the proposed works are not Certifiable Works, in accordance with the Guidelines for TasWater CCW Assessments, by virtue that all of the following are satisfied:

- ☒ The works will not increase the demand for water supplied by TasWater
- ☒ The works will not increase or decrease the amount of sewage or toxins that is to be removed by, or discharged into, TasWater's sewerage infrastructure
- ☒ The works will not require a new connection, or a modification to an existing connection, to be made to TasWater's infrastructure
- ☒ The works will not damage or interfere with TasWater's works
- ☒ The works will not adversely affect TasWater's operations
- ☒ The work are not within 2m of TasWater's infrastructure and are outside any TasWater easement
- ☒ I have checked the LISTMap to confirm the location of TasWater infrastructure
- ☒ If the property is connected to TasWater's water system, a water meter is in place, or has been applied for to TasWater.

Certification:

I Max W. Moller..... being responsible for the proposed work, am satisfied that the works described above are not Certifiable Works, as defined within the *Water and Sewerage Industry Act 2008*, that I have answered the above questions with all due diligence and have read and understood the Guidelines for TasWater CCW Assessments.

Note: the Guidelines for TasWater Certification of Certifiable Works Assessments are available at: www.taswater.com.au

	Name: (print)	Signed	Date
Designer:	Max W. Moller		04.01.24