

STORMWATER ASSESSMENT

Lot 2 Longmans Road

Snug

July 2025

Revised August 2025



GEO-ENVIRONMENTAL

S O L U T I O N S

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Investigation Details

Client:	JOSCON Tasmania Pty Ltd
Site Address:	Lot 2 Longmans Road, Snug
Date of Inspection:	16/06/2025
Proposed Works:	Proposed dwelling
Investigation Method:	Geoprobe 540UD – Direct Push
Inspected by:	C. Cooper

Site Details

Certificate of Title (CT):	143579/2
Title Area:	Approx. 3.73 ha
Applicable Planning Overlays:	Bushfire-prone Areas Scenic Landscape Area Biodiversity Protection Area Low Landslide Hazard Area Medium Landslide Hazard Area
Slope & Aspect:	Approx. 20% with variable aspect
Vegetation:	Mixed pasture species

Background Information

Geology Map:	MRT 1:250 000
Geological Unit:	Jurassic dolerite
Climate:	Annual rainfall approx. 750mm
Water Connection:	Tank
Sewer Connection:	Unserviced-on-site required
Testing and Classification:	Onsite stormwater

Investigation

A number of test holes were completed to identify the distribution of, and variation in soil materials on the site. See soil profile conditions presented below.

Soil Profile Summary

Hole 3 Depth (m)	Horizon	Description
0.00 – 0.10	A1	Dark Brown Silty SAND (SM) : slightly moist medium dense consistency, gradual boundary to
0.10 – 2.00	B2	Red Brown Clayey SAND (SC) : slightly moist dense consistency, with GRAVELS, lower boundary undefined.

Soil Conditions

The soils on site have developed over Jurassic dolerite Triassic sandstone and consist of predominantly sandy profiles consist sandy topsoil overlying sand to clayey sand. The soil has a high estimated permeability in the order of 1.5-3.0m/day.

GES have identified the following at the site:

- The site has a grade of approximately 20% and presents an acceptably low risk to slope stability and landslip
- There are proposals for cuts or change of grade which may impact on any proposed onsite stormwater absorption
- The site soils have been identified as comprising of deep sandy profiles presumed to be overlying highly weathered Jurassic dolerite
- 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 during investigations

Soil Dispersion

The soils on site were not identified as dispersive.

Existing Conditions and Assumptions

The site has an area of approximately 3.73ha with a total proposed impervious area of approx. 1280m² comprised of approx. 400m² of roof area and 880m² of gravel driveway, of which approximately 230m² will be captured for onsite detention. A large (>200KL) rainwater tank is proposed, which will have more than sufficient storage capacity for roof overflow.

There is no public stormwater system that the property can connect to, therefore it is proposed that stormwater from the site be routed through the proposed conventional underground drainage system comprising of Grated Sumps and PVC Pipes, coupled with soakage trench elements 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.

Detention Calculations

Detention calculations area provided in Appendix A

Summary and Conclusions

- Detention design to be adopted as per design and documentation.
- The designed solution complies with the performance solution design check carried out.
- The 30m² base (20m x 1.5m), 0.6m deep soakage trench is designed over a 20-minute storm duration and is proposed for dispersion of roof flows/tank overflow as well as the primary driveway and parking area which is to be captured by a spoon drain along the downslope edge.
- DN100 slotted PVC pipe with geotextile covering on top of aggregate to be installed within the soakage trench.

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 attached.

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

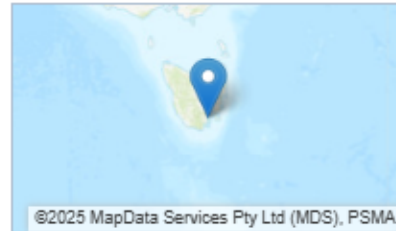
APPENDIX A: STORMWATER DETENTION CALCULATIONS

STORAGE TRENCH			
Hydrology			
Total Catchment Area		630	m ²
Runoff Coefficient		0.68	
Annual Recurrence Interval (ARI)		20	yr
Ground Conditions			
Hydraulic conductivity (K)		1.5	m/day
		1.040	mm/min
Adjusted Rate (15% clogging factor)		0.884	mm/min
Trench Design			
Length		20	m
Width		1.5	m
Depth		0.6	m
Infiltration Area		30	m ²
Porosity		0.35	%
Trench Storage		6.30	m ³
		6300	L
Final Check			
Criteria	Requirement	Design	Check
Detention reqd	5800	6300	OK

STORM CHECK					
Storm Duration	Intensity	Inflow Volume	Outflow Volume	Required Storage	Emptying time
	(mm/hr)	(m ³)	(L)	(L)	(hr)
1 min	149	1064	27	1037	0.65
2 min	119	1699	53	1646	1.03
3 min	108	2313	80	2234	1.40
4 min	99.1	2830	106	2724	1.71
5 min	92	3284	133	3152	1.98
10 min	68.5	4891	265	4626	2.91
15 min	55.4	5933	398	5536	3.48
20 min	47	6712	530	6181	3.88
25 min	41.2	7354	663	6691	4.21
30 min	37	7925	796	7130	4.48
45 min	29.2	9382	1193	8189	5.15
1 hour	24.8	10624	1591	9033	5.68
1.5 hour	20	12852	2387	10465	6.58
2 hour	17.3	14823	3182	11640	7.32
3 hour	14.4	18507	4774	13733	8.63
4.5 hour	12.2	23519	7160	16359	10.28
6 hour	10.8	27760	9547	18213	11.45
9 hour	9.18	35394	14321	21074	13.24
12 hour	8.1	41640	19094	22546	14.17
18 hour	6.66	51357	28642	22715	14.28
24 hour	5.67	58297	38189	20108	12.64
30 hour	4.93	63360	47736	15624	9.82
36 hour	4.36	67242	57283	9958	6.26
48 hour	3.51	72177	76378	-	-
72 hour	2.5	77112	114566	-	-
			Full volume	6300	14.28
Notes:					
Inflow volume calculated using Equation 10.1 (WSUD Guidelines: Chapter 10)					
Outflow volume calculated using Equation 10.2 (WSUD Guidelines: Chapter 10)					
Required storage and emptying time is left blank when outflow volume exceeds inflow volume					

Location

Label: Lot 2 Longmans Road, Snug
Easting: 518789
Northing: 5232314
Zone: 55
Latitude: Nearest grid cell: 43.0625 (S)
Longitude: Nearest grid cell: 147.2375 (E)



IFD Design Rainfall Intensity (mm/h)

Issued: 02 July 2025

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

Table	Chart	Coefficients	Unit: mm/h				
	Annual Exceedance Probability (AEP)						
Duration	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	64.5	73.5	104	126	149	183	210
2 min	55.5	62.9	86.4	103	119	140	156
3 min	49.2	55.8	77.3	92.3	108	128	143
4 min	44.3	50.4	70.3	84.5	99.1	119	135
5 min	40.5	46.1	64.6	78.1	92.0	111	127
10 min	29.2	33.2	47.1	57.5	68.5	84.5	97.9
15 min	23.5	26.8	38.0	46.4	55.4	68.4	79.4
20 min	20.1	22.9	32.4	39.5	47.0	58.0	67.1
25 min	17.8	20.2	28.5	34.7	41.2	50.6	58.5
30 min	16.1	18.3	25.7	31.2	37.0	45.3	52.1
45 min	12.9	14.7	20.5	24.8	29.2	35.3	40.2
1 hour	11.1	12.7	17.6	21.2	24.8	29.7	33.7
1.5 hour	9.08	10.3	14.4	17.2	20.0	23.7	26.6
2 hour	7.91	9.03	12.5	14.9	17.3	20.4	22.8
3 hour	6.56	7.51	10.5	12.5	14.4	16.9	18.8
4.5 hour	5.46	6.28	8.83	10.5	12.2	14.3	15.9
6 hour	4.79	5.53	7.83	9.36	10.8	12.8	14.2
9 hour	3.95	4.59	6.57	7.90	9.18	10.9	12.2
12 hour	3.42	3.99	5.75	6.94	8.10	9.67	10.9
18 hour	2.74	3.20	4.66	5.66	6.66	8.01	9.08
24 hour	2.31	2.69	3.93	4.80	5.67	6.86	7.80
30 hour	2.00	2.33	3.41	4.16	4.93	5.99	6.83
36 hour	1.77	2.06	3.00	3.67	4.36	5.29	6.05
48 hour	1.43	1.66	2.42	2.96	3.51	4.27	4.88
72 hour	1.05	1.21	1.73	2.11	2.50	3.03	3.45
96 hour	0.830	0.951	1.35	1.63	1.92	2.32	2.63
120 hour	0.693	0.791	1.11	1.34	1.56	1.87	2.12
144 hour	0.599	0.682	0.950	1.14	1.32	1.58	1.78
168 hour	0.533	0.606	0.838	0.997	1.15	1.37	1.54

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.

STORMWATER DETENTION V5.05

Geo-Environmental Solutions

Location: Snug, TAS
Site: 630m² with tc = 20 and tcs = 15 mins.
PSD: AEP of 5%, Underground rectangular tank PSD = 2.45L/s
Storage: AEP of 5%, Underground rectangular tank volume = 5.77m³

Design Criteria (Custom AEP IFD data used)

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

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

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

Site Geometry

Site area (As) = 630 m² = 0.063 Ha
Pre-development coefficient (Cp) = 0.30
Post development coefficient (Cw) = 0.68

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	400	0.90	360
Gravel	0	0.50	0	Gravel	230	0.30	69
Garden	630	0.30	189	Garden		0.17	0
Total	630	m ²	189	Total	630	m ²	429
Cp = $\Sigma \text{Area} * C / \text{Total} = 0.300$				Cw = $\Sigma \text{Area} * C / \text{Total} = 0.681$			

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

PSD Intensity (I) = 47.0 mm/hr For catchment tc = 20 mins.
Pre-development (Qp = Cp*I*As/0.36) = 2.47 L/s
Peak post development (Qa = 2*Cw*I*As/0.36) = 11.20 L/s = (0.238 x I) Eq. 2.24

Storage method = U (A)bove,(P)ipe,(U)nderground,(C)ustom
Permissible site discharge (Qu = PSD) = 2.448 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

$$a = 1.0 \quad b = -24.3 \quad c = 55.3$$

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

$$\text{PSD} = 2.542 \text{ L/s}$$

Below ground pipe - Eq 3.3

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

$$= 2.47$$

$$\text{PSD} = 2.513 \text{ L/s}$$

Below ground rectangular tank - Eq 3.4

$$t = t_{cs} / (t_c * (1 - 2 * \text{PSD} / (3 * Q_a))) = 0.878$$

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

$$= 2.47$$

$$\text{PSD} = 2.448 \text{ L/s}$$

Design Storage Capacity (AEP of 5%)

Above ground (Vs) = $[0.5*Q_a*td - [(0.875*PSD*td)(1-0.917*PSD/Q_a) + (0.427*td*PSD^2/Q_a)]] * 60/10^3 \text{ m}^3$ Eq 4.23

Below ground pipe (Vs) = $[(0.5*Q_a - 0.637*PSD + 0.089*PSD^2/Q_a)*td] * 60/10^3 \text{ m}^3$ Eq 4.8

Below ground rect. tank (Vs) = $[(0.5*Q_a - 0.572*PSD + 0.048*PSD^2/Q_a)*td] * 60/10^3 \text{ m}^3$ Eq 4.13

td (mins)	I (mm/hr)	Qa (L/s)	Above Vs (m³)	Pipe Vs (m³)	B/G Vs (m³)
5	92.0	21.9			2.87
19	48.4	11.5			5.01
25	41.2	9.8			5.32
32	35.6	8.5			5.53
39	31.7	7.6			5.65
46	28.8	6.9			5.73
53	26.6	6.3			5.76
59	25.0	6.0			5.77
66	23.5	5.6			5.75
73	22.3	5.3			5.73

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	58.6	25.1	6.0	5.77

Table 2 - Storage requirements for AEP of 5%

Frequency of operation of Above Ground storage

Qop2 = 0.75 CI 2.4.5.1

Qp2 = Qop2 * Qp1 (where Qp1 = PSD) = 1.91 L/s at which time above ground storage occurs
 $I = 360 * Qp2 / (2 * Cw * As * 10^3) = 8.0 \text{ mm/h}$ Eq 4.24

Period of Storage

Time to Fill:

Above ground (tf) = $td * (1 - 0.92 * PSD / Q_a)$ Eq 4.27

Below ground pipe (tf) = $td * (1 - 2 * PSD / (3 * Q_a))$ Eq 3.2

Below ground rect. tank (tf) = $td * (1 - 2 * PSD / (3 * Q_a))$ Eq 3.2

Time to empty:

Above ground (te) = $(Vs + 0.33 * PSD^2 * td / Q_a * 60 / 10^3) * (1.14 / PSD) * (10^3 / 60)$ Eq 4.28

Below ground pipe (te) = $1.464 / PSD * (Vs + 0.333 * PSD^2 * td / Q_a * 60 / 10^3) * (10^3 / 60)$ Eq 4.32

Below ground rect. tank (te) = $2.653 / PSD * (Vs + 0.333 * PSD^2 * td / Q_a * 60 / 10^3) * (10^3 / 60)$ 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	58.6	6.0	5.8	42.6	125.3	167.9

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

Orifice

Permissible site discharge (Qu = PSD) = 2.45 L/s (Underground storage)

Orifice coefficient (CD) = 0.61 For sharp circular orifice

Gravitational acceration (g) = 9.81 m/s²

Maximum storage depth above orifice (H) = 1500 mm

Orifice flow (Q) = $CD * A_o * \sqrt{2 * g * H}$

Therefore:

Orifice area (Ao) = 740 mm²

Orifice diameter (D = $\sqrt{4 * A_o / \pi}$) = 30.7 mm

CERTIFICATE OF THE RESPONSIBLE DESIGNER

Section 94
Section 106
Section 129
Section 155

To: JOSCON Tasmania Pty Ltd
119 Harrington Street
Hobart 7000

Owner name
Address
Suburb/postcode

Form **35**

Designer details:

Name: Vinamra Gupta Category: Civil Engineer
Business name: Geo-Environmental Solutions Phone No: 03 6223 1839
Business address: 29 Kirksway Place
Battery Point 7004 Fax No: N/A
Licence No: 685982720 Email address: office@geosolutions.net.au

Details of the proposed work:

Owner/Applicant: JOSCON Tasmania Pty Ltd Designer's project reference No: J11816
Address: Longmans Road Lot No: 143579/2
Snug 7054
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
	☐ Building design	Architect or Building Designer
	☐ Structural design	Engineer or Civil Designer
	☐ Fire Safety design	Fire Engineer
	☒ Civil design	Civil Engineer or Civil Designer
	☐ Hydraulic design	Building Services Designer
	☐ Fire service design	Building Services Designer
	☐ Electrical design	Building Services Designer
	☐ Mechanical design	Building Service Designer
	☐ Plumbing design	Plumber-Certifier; Architect, Building Designer or Engineer
	☐ Other (specify)	

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

Other details:
Onsite stormwater retention

Design documents provided:

The following documents are provided with this Certificate –

Document description:

Drawing numbers:	Prepared by: Geo-Environmental Solutions	Date: Aug-25
Schedules:	Prepared by:	Date:
Specifications:	Prepared by: Geo-Environmental Solutions	Date: Aug-25
Computations:	Prepared by:	Date:
Performance solution proposals: Onsite stormwater retention	Prepared by: Geo-Environmental Solutions	Date: Aug-25
Test reports:	Prepared by: Geo-Environmental Solutions	Date: Aug-25

Standards, codes or guidelines relied on in design process:

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

Any other relevant documentation:

Stormwater Assessment - Lot 2 Longmans Road Snug - Aug-25

Attribution as designer:

I Vinamra Gupta, 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.

	<i>Name: (print)</i>	<i>Signed</i>	<i>Date</i>
Designer:	Vinamra Gupta		15/08/2025
Licence No:	685982720		

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 Vinamra Gupta..... 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:	Vinamra Gupta		15/08/2025

Design notes:

- 1.Absorption trench dimensions of up to 20m long by 0.6m deep by 1.5m wide
 - total storage volume calculated at average 35% porosity.
- 2.Base of trenches to be excavated level and smearing and compaction avoided.
- 3.90-100mm slotted pipe should be placed in the top 100mm of the 20mm aggregate
- 4.Geotextile or filter cloth to be placed over the pipe to prevent clogging of the pipes and aggregate
- 5.All works on site to comply with AS3500 and Tasmanian Plumbing code.

