Application for Planning Approval

Land Use Planning and Approvals Act 1993

APPLICATION NO.

DA2023/200

LOCATION OF AFFECTED AREA

126 BRAEVIEW DRIVE, OLD BEACH

DESCRIPTION OF DEVELOPMENT PROPOSAL

DWELLING & OUTBUILDING

A COPY OF THE DEVELOPMENT APPLICATION MAY BE VIEWED AT www.brighton.tas.gov.au AND AT THE COUNCIL OFFICES, 1 TIVOLI ROAD, OLD BEACH, BETWEEN 8:15 A.M. AND 4:45 P.M., MONDAY TO FRIDAY OR VIA THE QR CODE BELOW. ANY PERSON MAY MAKE WRITTEN REPRESENTATIONS CONCERNING AN APPLICATION UNTIL 4:45 P.M. ON **18/12/2023**. ADDRESSED TO THE GENERAL MANAGER AT 1 TIVOLI ROAD, OLD BEACH, 7017 OR BY EMAIL AT development@brighton.tas.gov.au.
REPRESENTATIONS SHOULD INCLUDE A DAYTIME TELEPHONE NUMBER TO ALLOW COUNCIL OFFICERS TO DISCUSS, IF NECESSARY, ANY MATTERS RAISED.

JAMES DRYBURGH
General Manager

SCAN ME

Brighton
going places

New Residence

for

M&T D'ORAZIO

PUGGLE PLACE
LOT 27 BRAEVIEW DRIVE,
OLD BEACH, TASMANIA, 7017

Title Reference: CT173735/27

PROJECT NUMBER 2046-DA

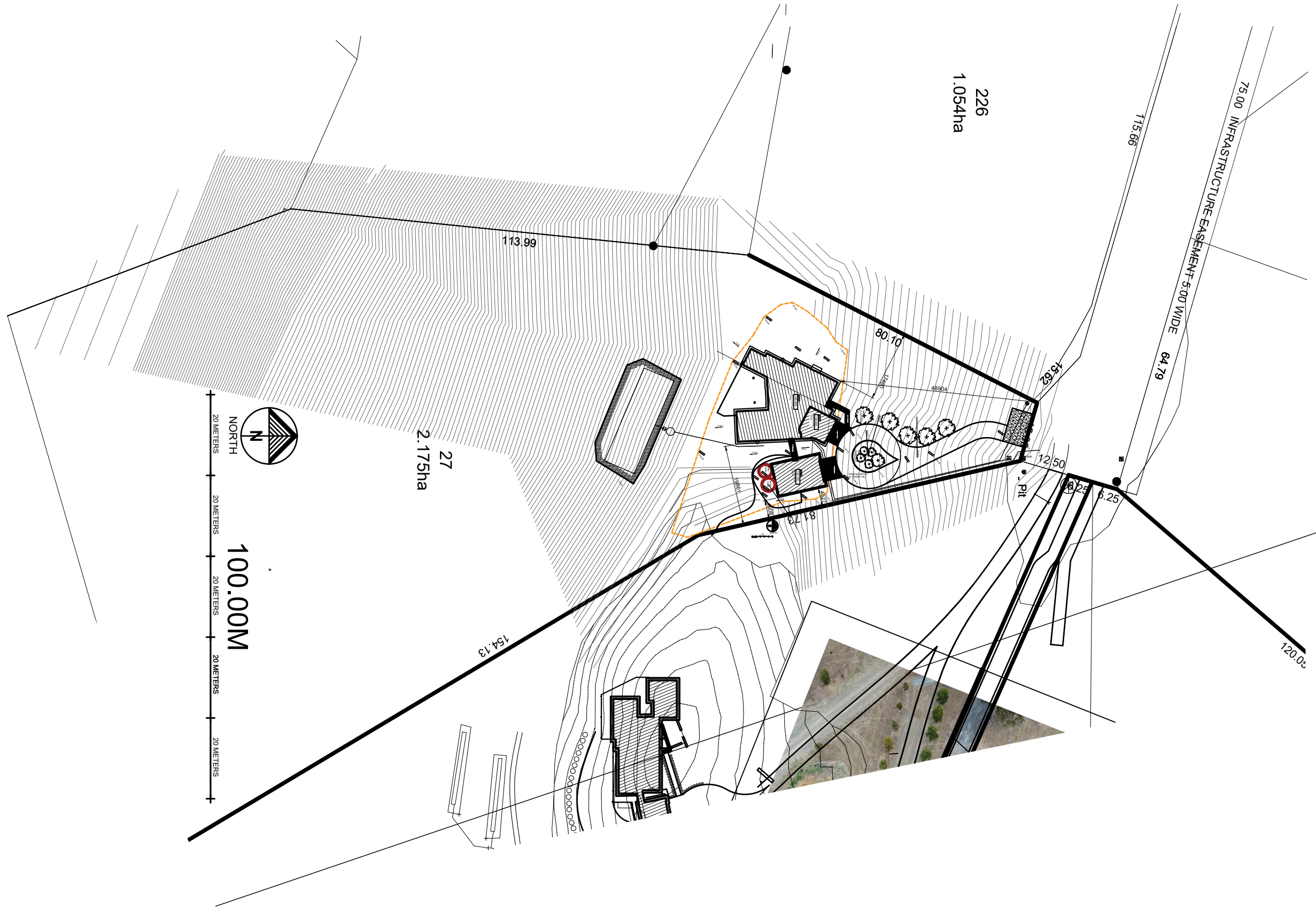
Pwilkins CC6445

SHEET	TITLE	REV	DATE
1000	LOCATION PLAN	2	20.10.2023
2000	SITE PLAN	2	20.10.2023
1201	SETOUT PLAN 1	2	20.10.2023
1202	SETOUT PLAN 2	2	20.10.2023
1300	FLOOR PLAN	DA	20.10.2023
2200	ATRIUM PLAN / ROOF PLAN	DA	20.10.2023
2300	REFLECTED CEILING PLAN	DA	20.10.2023
4000	ROOF PLAN	DA	20.10.2023
3200	ELEVATIONS 1	DA	20.10.2023
3202	ELEVATIONS 2	DA	20.10.2023
3203	ELEVATIONS 3	DA	20.10.2023
5100	SECTIONS 1	DA	20.10.2023
4100	SHED ELEVATIONS	DA	20.10.2023
4101	SHED PLAN - ROOF PLAN	DA	20.10.2023

Owner Details:	M&T D'ORAZIO
Title Reference:	CT173735/27 PID: LOT 27
Wind Classification:	A, TC1, T3, NS, N4 47m/s, 74m/s" Site classification to AS 4055-2006 Refer engineers report 27 April 2022
Soil Classification:	"M" / "S" Site classification to AS 2870-2011
Climate Zone:	7 (www.abcb.gov.au map)
BAL Level: Alpine Area:	BAL 19 (Lark Creese 50333-01) N/A BCA Figure 3.7.5.2
Corrosion Environment:	For steel subject to the influence of salt water, breaking surf or heavy industrial areas, refer to BCA section 3.4.2.2 & BCA Table 3.4.4.2. Cladding and fixings to manufacturer's recommendations
Other Hazards:	Refer AS2870-2011 Site classification report rccm. for High wind, earthquake, flooding, landslip, dispersive soils, sand dunes, mine subsidence, landfill, snow & ice or other relevant factors
Planning Permit	TBA
Site area New dwelling enclosed area Garage area	2.175ha 372.5m2 94.5m2

25.3.2023

DA PLANNING PERMIT DOCUMENTATION



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Paul Wilkins

SCALES	AS SHOWN
CONTRACT	
DRAWN	P.W
DATE	5.4.2023
CHKD	
ORIGINAL DRAWING SIZE	A3

CLIENT PRINCIPAL
M&T D'Orazio

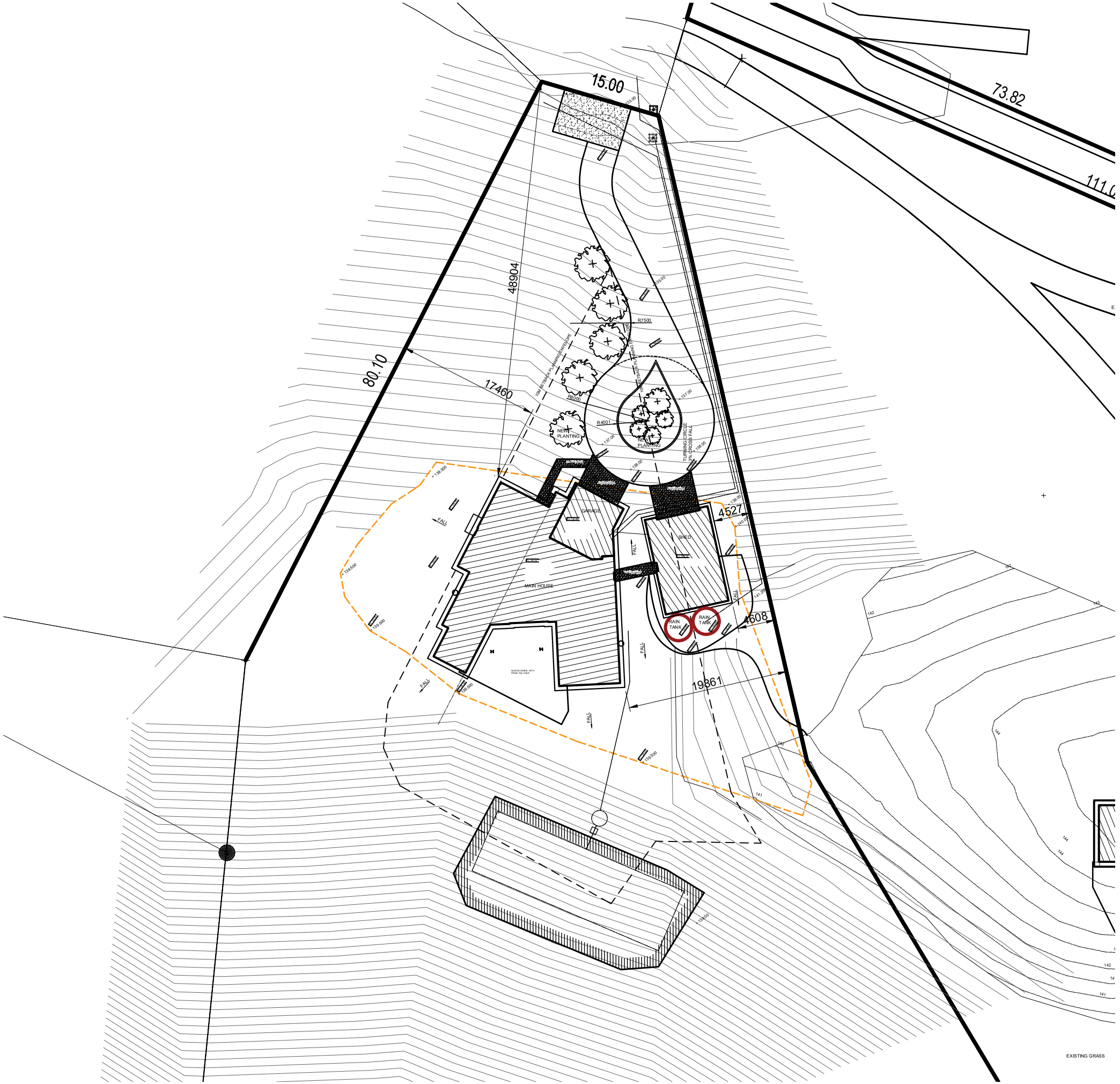
DRAWING TITLE
LOCATION PLAN

PROJECT TITLE Pwilkins CC6445
New Residence - Puggle Place
lot 27 Braeview drive,
Old Beach, Tasmania, 7017

REVISION	DRAWING NO
12	1000

CONTRACT
2046 - D.A.

2	RFI 1	PSW	13.11.23
DA	DEVELOPMENT APPLICATION	PSW	26.11.23
REV.	AMENDMENTS	DRWN	DATE



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SCALES	AS SHOWN
CONTRACT	DRAWN P.W
DATE 5.4.2023	CHKD
ORIGINAL DRAWING SIZE	A3

CLIENT PRINCIPAL
M&T D'Orazio

DRAWING TITLE
SITE PLAN

PROJECT TITLE Pwilkins CC6445
New Residence - Puggle Place
lot 27 Braeview drive,
Old Beach, Tasmania, 7017

REVISION	DRAWING NO
12	2000

CONTRACT
2046 - D.A.

REV.	AMENDMENTS	DRWN	DATE
2	RFI 1	PSW	13.11.23
DA	DEVELOPMENT APPLICATION	PSW	26.11.23

LEGEND

A SEDIMENT FENCE
C SEDIMENT SOCK
D EXISTING SITE ACCESS (DO NOT TRACK SOILS OFF SITE) CLEAN WHEELS BEFORE LEAVING SITE
F SOIL STOCK PILE LOCATION

BOUNDARY EASEMENT

LLA. NON CONVENTIONAL BED (NCB) WITH 200m2 DISTRIBUTION MODULE 25m LONG AND 8m WIDE REFER RCCM REPORT

FLOUT

SEPTIC TANK

NEW SEWER LINE

GROUND TO FALL AWAY FROM BUILDING AS PER THE REQUIREMENTS OF AS2870

FALL

MAIN HOUSE
NEW FLOOR LEVEL
140.000

SLAB ON GRADE, WITH STONE TILE OVER

GARAGE
NEW FLOOR LEVEL
139.900

SLAB ON GRADE

2 GALVANIZED STEEL WATER TANK 22,770 LITRE

RAIN TANK

RAIN TANK

SHED
NEW FLOOR LEVEL
140.150

SLAB ON GRADE

19861

4608

4527

2638

17460

10M SETBACK

NEW PLANTING

R8000

R4001

TURNING CIRCLE
3% CROSS FALL

NEW PLANTING S TO BE IN ACCORDANCE WITH BUSH FIRE HAZARD REPORT

DN150 STORMWATER OVER FLOW IN GROUND FROM TANKS

NORTH

5.00
1.00 1.00 1.00 1.00 1.00

MANAGEMENT PLAN

EROSION CONTROLS
EARTHWORKS SHOULD BE KEPT TO A MINIMUM AND SHOULD ONLY BE COMMENCED IMMEDIATELY PRIOR BUILDING, MAINTAIN AS MUCH OIL COVERAGE AS POSSIBLE WITH THE USE OF GRASS, LEAF LITTER AND MULCH (ONLY ON GARDEN BEDS), GRAVEL OR EROSION CONTROL BLANKET (ECB) OR MATTING.

VEGETATION LOCATED DOWN-SLOP OF THE WORK SITE. ASSISTS IN FILTERING OUT SEDIMENT. WHERE PRACTICAL, MAINTAIN KERB VEGETATION IN A HEALTHY STATE DURING THE BUILDING PROCESS. MINIMISE STOCKPILE LOSSES WITH THE USE OF COVERS, ALL STOCKPILES AND BUILDING MATERIALS SHOULD BE LOCATED WITHIN THE SEDIMENT FENCE.
ESTABLISHMENT NOTES

1. ESTABLISH A SINGLE STABILISED ENTRY/EXIT POINT (RUMBLE PAD).
2. INSTALL SEDIMENT FENCE(S) ALONG THE LOW SIDE OF THE SITE.
3. DIVERT UP-SLOPE WATER AROUND THE WORK SITE AND APPROPRIATELY STABILISE ANY DRAINAGE CHANNELS.
4. CLEAR ONLY THE AREAS NECESSARY (MAINTAINING VEGETATION ON FOOTPATH).
5. STOCKPILE TOPSOIL WITHIN THE SEDIMENT CONTROLLED ZONE.
6. STABILISE EXPOSED EARTH BANKS (FOR EXAMPLE, WITH VEGETATION OR EROSION CONTROL BLANKETS).
7. INSTALL ON-SITE WASTE RECEPTACLES (MINI-SKIPS, BINS, WIND-PROOF LITTER RECEPTORS).
8. INSTALL ROOF DOWNPIPES AS SOON AS PRACTICABLE AFTER THE ROOF IS LAID.
9. ENSURE THAT ALL CONTROL MEASURES ARE MAINTAINED IN GOOD WORKING ORDER.
10. REVEGETATE OR OTHERWISE STABILISE THE SITE.

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SCALES	1:200
CONTRACT	
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DATE	5.4.2023
CHKD	
ORIGINAL DRAWING SIZE	A3

CLIENT PRINCIPAL
M&T D'Orazio

DRAWING TITLE
SETOUT PLAN

PROJECT TITLE Pwilkins CC6445
New Residence - Puggle Place
lot 27 Braeview drive,
Old Beach, Tasmania, 7017

REVISION	DRAWING NO
12	1201

CONTRACT
2046 - D.A.

2	RFI 1	PSW	13.11.23
DA	DEVELOPMENT APPLICATION	PSW	26.11.23
REV.	AMENDMENTS	DRWN	DATE

GROUND TO FALL AWAY FROM BUILDING AS PER THE REQUIREMENTS OF AS2870

FALL

EL=139.700

+139.500

EL=139.600

+139.500

17460

48904

EXISTING TASWATER CONNECTION POINT.
NEW WATER MAIN TO HOUSE, SHARED TRENCH WITH POWER AND COMMS

10M SETBACK PLANNING ENVELOPE

NEW PLANTING

R8000

R4001

+137.00

EL=139.600

MAIN HOUSE

NEW FLOOR LEVEL

140.000

EL=140.000

SLAB ON GRADE WITH STONE TILE OVER

NEW FLOOR LEVEL

139.900

EL=139.900

GARAGE

SLAB ON GRADE WITH TILE OVER

EL=139.600

2638

FALL

EL=139.600

+138.00

NEW PLANTING

10M SETBACK PLANNING ENVELOPE

R7500

EL=139.600

+135.00

ALL WEATHER ACCESS DRIVEWAY UNSEALED 4 METERS WIDE

EL=133.300

NEW WIRE FENCE AND RURAL ENTRY GATES

EXISTING DRIVEWAY BY DEVELOPER 8.5 WIDE METERS DRIVEWAY TO BE SEALED AT 5.4 METERS WIDE AND EXTENDED TO ALLOW PASSING BAY

133.00

STORMWATER OUTLET TO EXISTING SWALE DRAIN

EXISTING POWER POLE; NEW POWER POLE TO LOT AND UNDERGROUND POWER TO HOUSE.

FALL

2 GALVANIZED STEEL WATER TANK 22,770 LITRE

RAIN TANK

EL=140.000

RAIN TANK

EL=140.000

EL=139.400

NEW FLOOR LEVEL

140.150

EL=140.150

SHED

SLAB ON GRADE WITH TILE OVER

EL=139.600

TURNING CIRCLE
3% CROSS FALL

+138.00

+137.00

PATH FOR IN GROUND SITE POWER AND WATER

POWER POLE TO BE PROVIDED BY DEVELOPER NEW UNDERGROUND POWER TO HOUSE.

19861

4527

4608

FALL

+139.00

+140.000

+141.200

ACCESS AND TURNING AREAS TO COMPLY WITH PART 4.2 OF DIRECTORS DETERMINATION

NEW PLANTING S TO BE IN ACCORDANCE WITH BUSH FIRE HAZARD REPORT

DN150 STORMWATER OVER FLOW IN GROUND FROM TANKS

N

NORTH

1.00 1.00 5.00 1.00 1.00

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SCALES	1:200
CONTRACT	
DRAWN	P.W
DATE	5.4.2023
CHKD	
ORIGINAL DRAWING SIZE	A3

CLIENT PRINCIPAL
M&T D'Orazio

DRAWING TITLE
SETOUT PLAN 2

PROJECT TITLE Pwilkins CC6445
New Residence - Puggle Place
lot 27 Braeview drive,
Old Beach, Tasmania, 7017

REVISION	DRAWING NO
12	1202

CONTRACT
2046 - D.A.

REV.	AMENDMENTS	DRWN	DATE
2	RFI 1	PSW	13.11.23
DA	DEVELOPMENT APPLICATION	PSW	26.11.23

139.900 NEW FLOOR LEVEL - GARAGE

140.000 NEW FLOOR LEVEL - HOUSE

140.190 NEW FLOOR LEVEL - GAMES ROOM TIMBER FLOOR 190 THICK OVER CONCRETE SLAB FLOOR

1.22 BED1 CP1

1.21 BED2 CP1

1.19 BATH T1

1.18 PWD T2

1.17 HALL T2

1.20 BED3 CP1

1.10 DECK ST2

PAVING OVER CONCRETE SLAB

CHRISTMAS TREE

1.14 LIVING KITCHEN T2

1.04 GAMES TIMBER 2

1.01 ENTRY T2

1.07 BED MASTER CP1

1.05 NOOK CP1

1.16 PANTRY T2

1.08 ENSUITE finish T1

1.11 WIR CP1

1.02 STUDY DADA?

1.10 WC T2

1.03 SERVER MONO

1.13 LAUNDRY T2

1.12 WC T2

1.06 GARAGE MONO1

22811

11625

6157

5063

1864

7525

1638

6728

18833

1.00 1.00 5.00 1.00 1.00 1.00

NORTH

Paul Wilkins PoBox 325 South Hobart Tasmania 7004 p: 0400 595 876 e: wilkinsp@netspace.net.au	SCALES 1:100	CLIENT PRINCIPAL M&T D'Orazio	PROJECT TITLE Pwilkins CC6445 New Residence - Puggle Place lot 27 Braeview drive, Old Beach, Tasmania, 7017
	CONTRACT / DRAWN P.W		
	DATE 5.4.2023 / CHKD	DRAWING TITLE FLOOR PLAN	
	ORIGINAL DRAWING SIZE A3		

REVISION	DRAWING NO
12	3400

CONTRACT 2046 - D.A.

DA	DEVELOPMENT APPLICATION	PSW	26.11.23
REV.	AMENDMENTS	DRWN	DATE

LEGEND

METAL TRIM DECK ROOFING

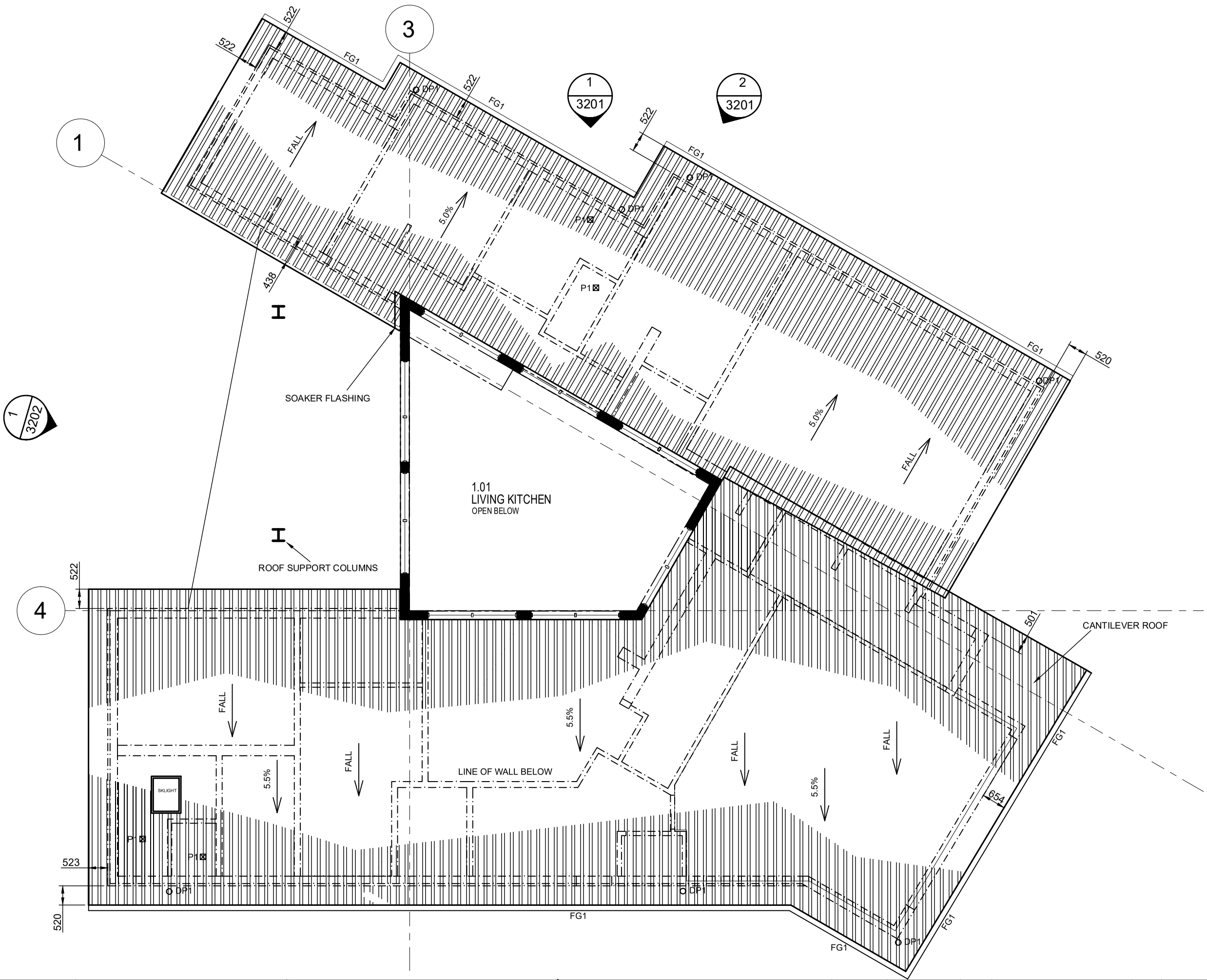
P1⊠ ROOF PENETRATION SIZED TO SUIT. FLASH AND SEAL SO OPENING IS WEATHER PROOF - COLOUR TO MATCH ROOF COLOUR

O DP1 100 DIA UPVC DOWN PIPE PAINT FINISHED

O DP2 150 DIA UPVC DOWN PIPE PAINT FINISHED

STORMWATER IS A CHARGED SYSTEM

P1⊠ ROOF PENETRATION SIZED TO SUIT. FLASH AND SEAL SO OPENING IS WEATHER PROOF - COLOUR TO MATCH ROOF COLOUR



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SCALES	1:100
CONTRACT	
DRAWN	P.W
DATE	5.4.2023
CHKD	
ORIGINAL DRAWING SIZE	A3
CLIENT PRINCIPAL	M&T D'Orazio
DRAWING TITLE	ATRIUM PLAN / ROOF PLAN
PROJECT TITLE	Pwilkins CC6445
	New Residence - Puggle Place
	lot 27 Braeview drive,
	Old Beach, Tasmania, 7017
REVISION	12
DRAWING NO	26.11.23
CONTRACT	2046 - D.A.

REV.	AMENDMENTS	DRWN	DATE
DA	DEVELOPMENT APPLICATION	PSW	26.11.23

LEGEND

METAL TRIM DECK ROOFING

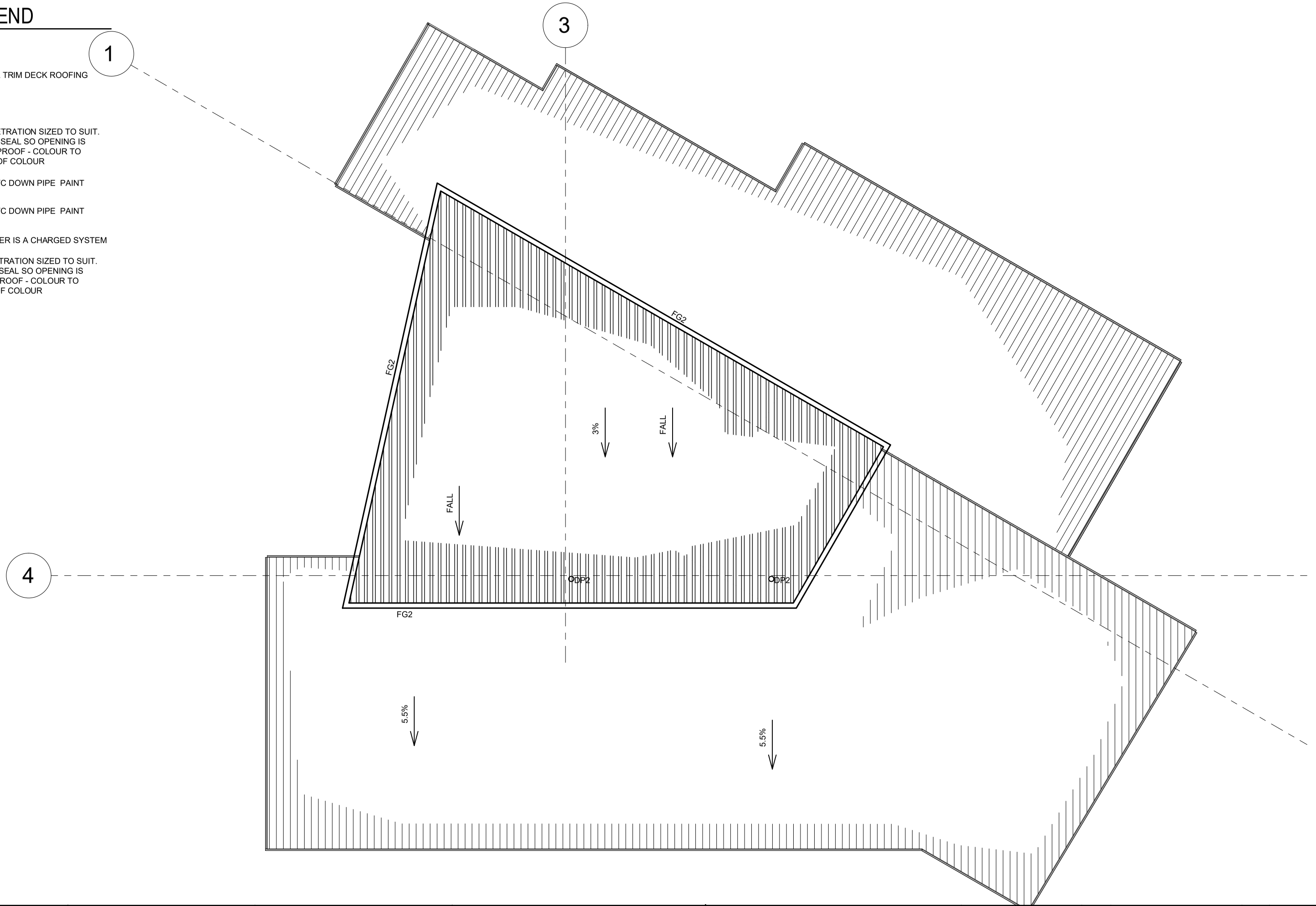
P1⊠ ROOF PENETRATION SIZED TO SUIT. FLASH AND SEAL SO OPENING IS WEATHER PROOF - COLOUR TO MATCH ROOF COLOUR

○ DP1 100 DIA UPVC DOWN PIPE PAINT FINISHED

○ DP2 150 DIA UPVC DOWN PIPE PAINT FINISHED

STORMWATER IS A CHARGED SYSTEM

P1⊠ ROOF PENETRATION SIZED TO SUIT. FLASH AND SEAL SO OPENING IS WEATHER PROOF - COLOUR TO MATCH ROOF COLOUR



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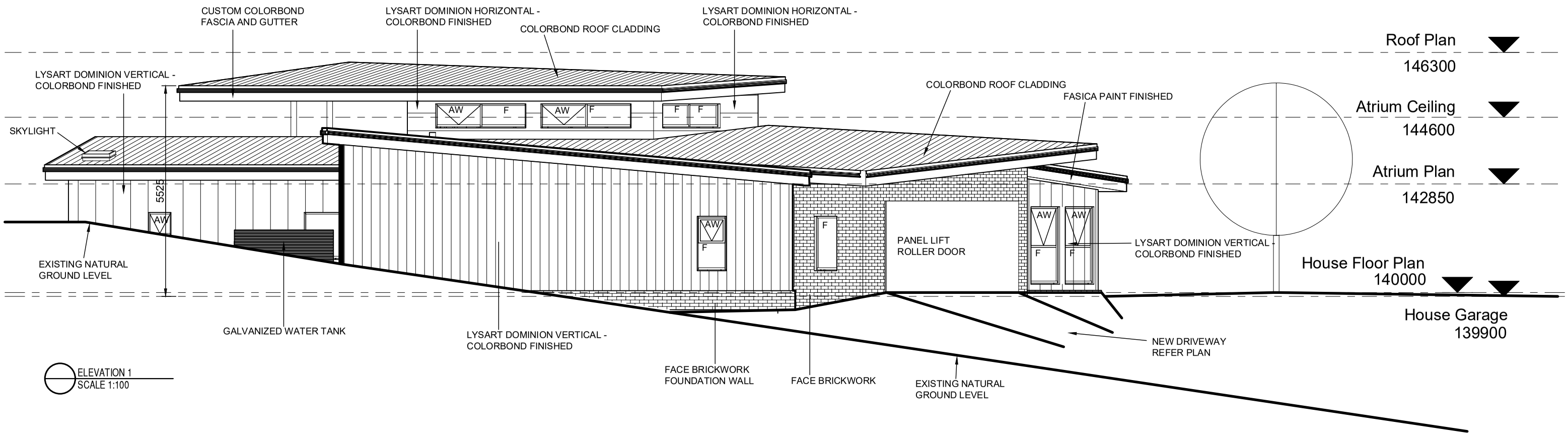
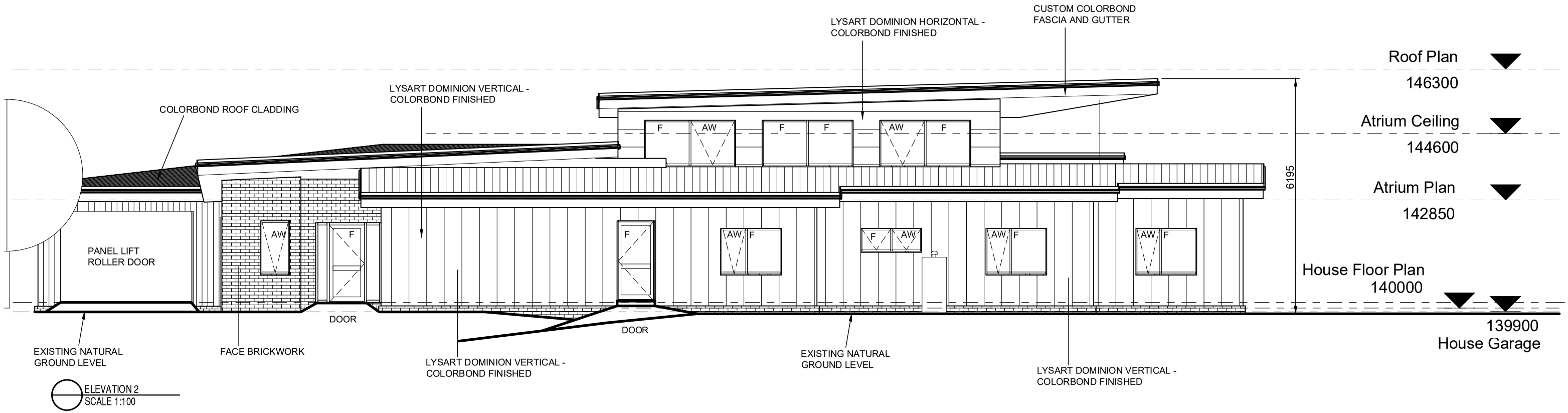
SCALES	1:100
CONTRACT	
DRAWN	P.W
DATE	5.4.2023
CHKD	
ORIGINAL DRAWING SIZE	A3
CLIENT PRINCIPAL	M&T D'Orazio
DRAWING TITLE	ROOF PLAN
PROJECT TITLE	Pwilkins CC6445
	New Residence - Puggle Place lot 27 Braeview drive, Old Beach, Tasmania, 7017
REVISION	12
DRAWING NO	4000
CONTRACT	2046 - D.A.

REV.	AMENDMENTS	DRWN	DATE
DA	DEVELOPMENT APPLICATION	PSW	26.11.23





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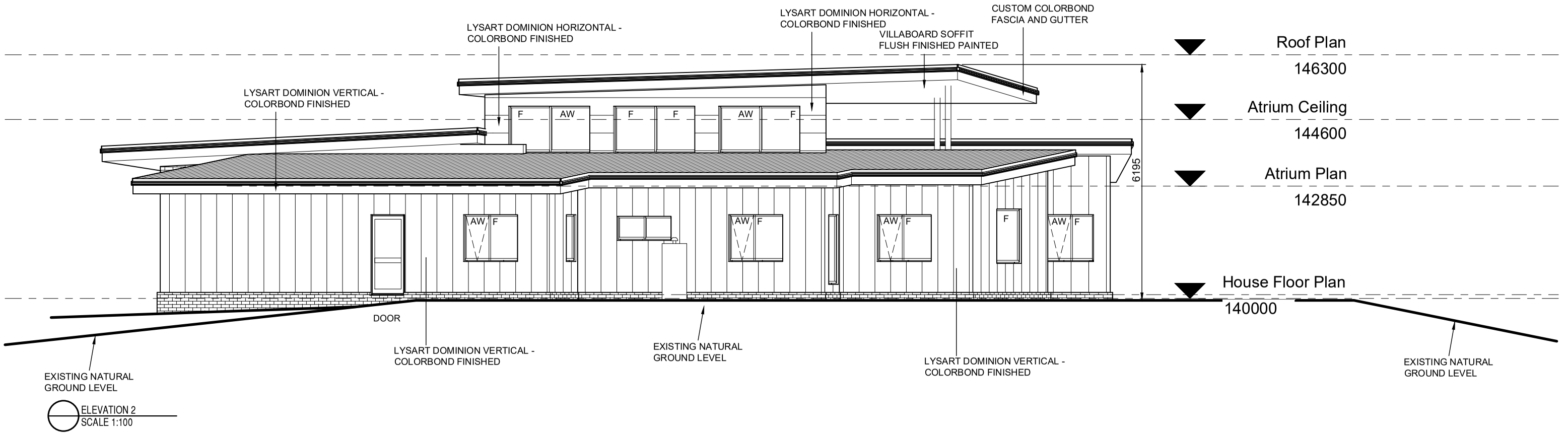
SCALES	1:100
CONTRACT	
DRAWN	P.W
DATE	5.4.2023
CHKD	
ORIGINAL DRAWING SIZE	A3
CLIENT PRINCIPAL	M&T D'Orazio
DRAWING TITLE	ELEVATIONS 1
PROJECT TITLE	Pwilkins CC6445
	New Residence - Puggle Place lot 27 Braeview drive, Old Beach, Tasmania, 7017
REVISION	12
DRAWING NO	3200
CONTRACT	2046 - D.A.

REV.	AMENDMENTS	DRWN	DATE
DA	DEVELOPMENT APPLICATION	PSW	26.11.23



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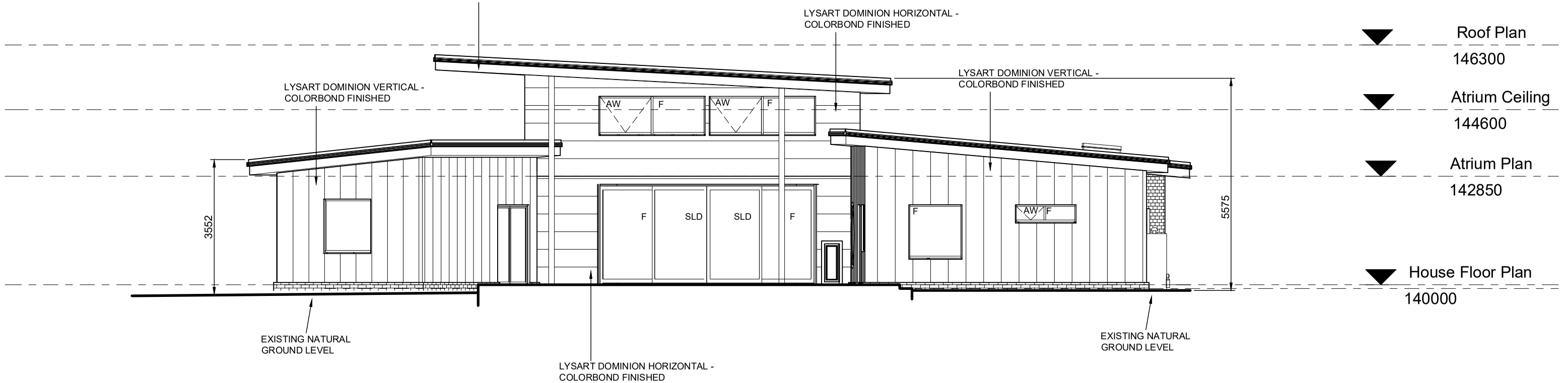
SCALE 1:100



ELEVATION 1
SCALE 1:100

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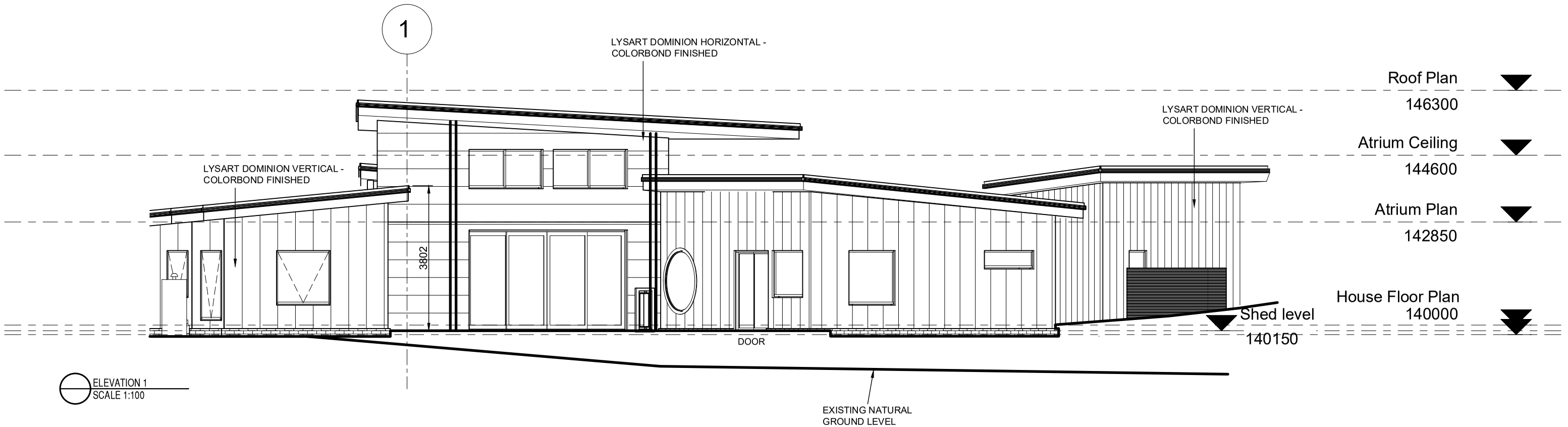
SCALES	1:100
CONTRACT	
DRAWN	P.W
DATE	5.4.2023
CHKD	
ORIGINAL DRAWING SIZE	A3
CLIENT PRINCIPAL	M&T D'Orazio
DRAWING TITLE	ELEVATIONS 2
PROJECT TITLE	Pwilkins CC6445
	New Residence - Puggle Place lot 27 Braeview drive, Old Beach, Tasmania, 7017
REVISION	12
DRAWING NO	3201
CONTRACT	2046 - D.A.

REV.	AMENDMENTS	DRWN	DATE
DA	DEVELOPMENT APPLICATION	PSW	26.11.23



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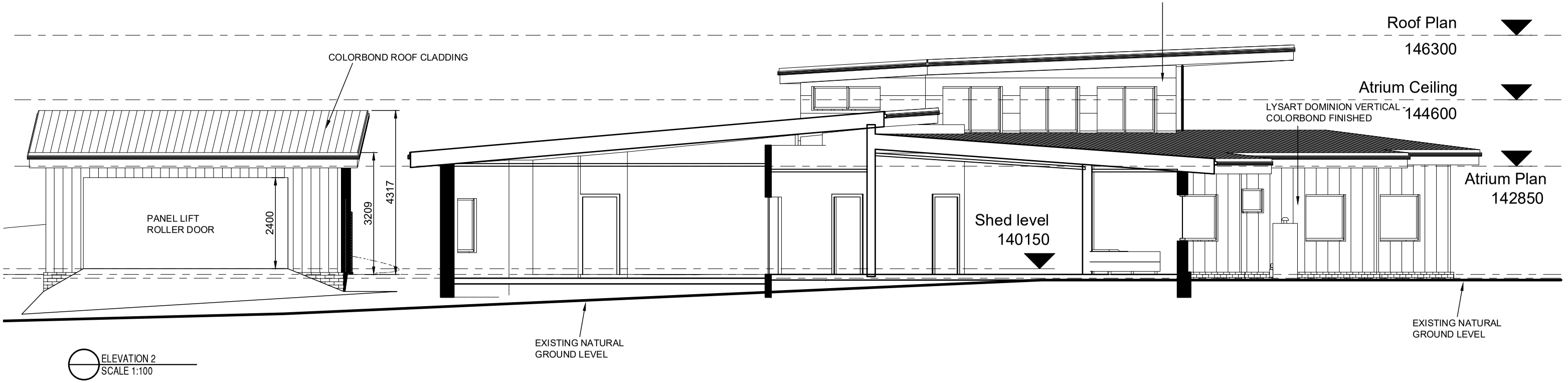

ELEVATION 2
SCALE 1:100

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SCALES	1:100
CONTRACT	
DRAWN	P.W
DATE	5.4.2023
CHKD	
ORIGINAL DRAWING SIZE	A3

CLIENT PRINCIPAL
M&T D'Orazio

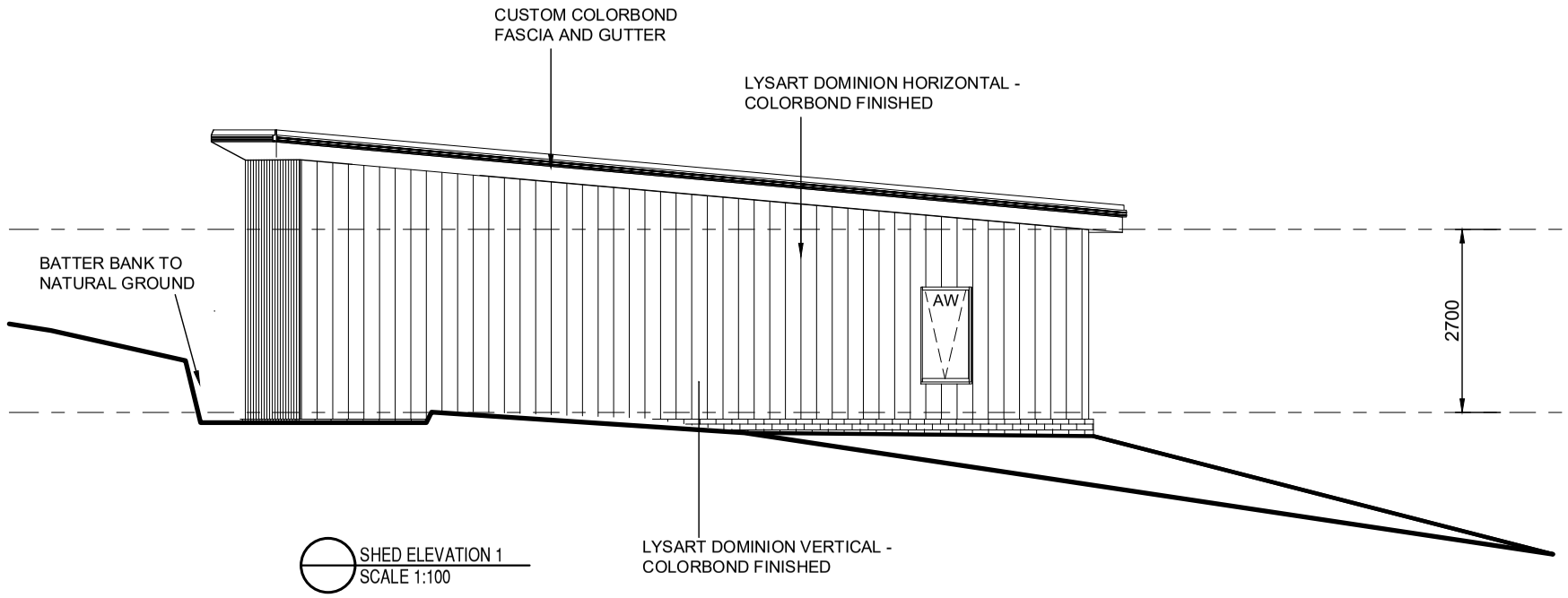
DRAWING TITLE
ELEVATIONS 3

PROJECT TITLE Pwilkins CC6445
New Residence - Puggle Place
lot 27 Braeview drive,
Old Beach, Tasmania, 7017

REVISION	DRAWING NO
12	3202

CONTRACT
2046 - D.A.

REV.	AMENDMENTS	DRWN	DATE
DA	DEVELOPMENT APPLICATION	PSW	26.11.23



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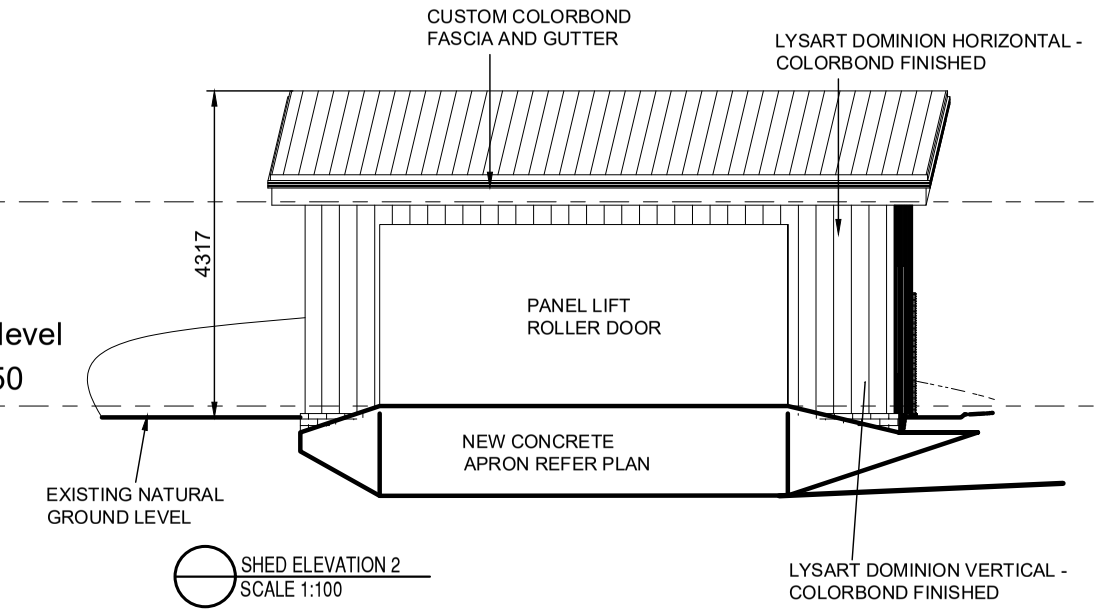
SCALE 1:100



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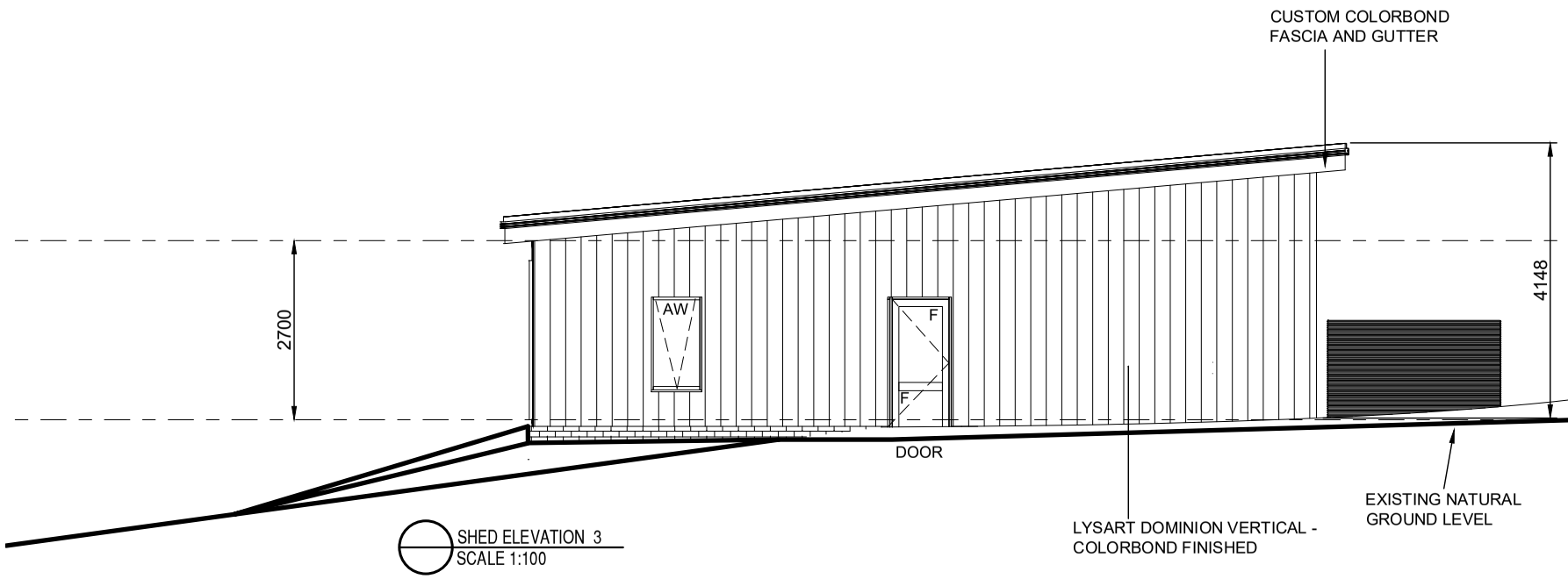

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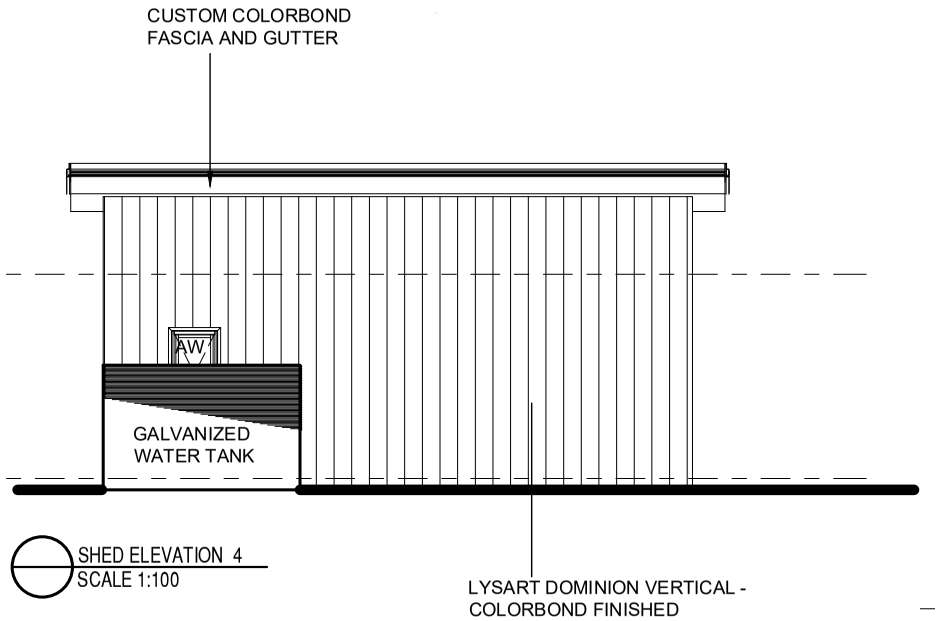

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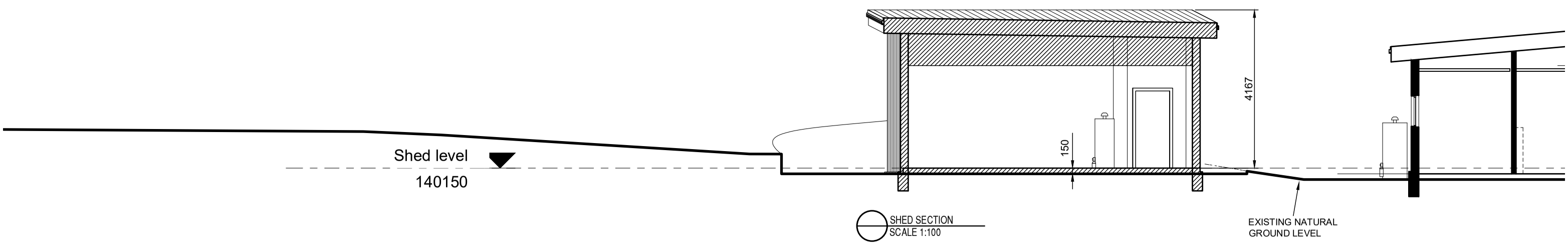

SHED SECTION
SCALE 1:100

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Paul Wilkins

SCALES	1:100
CONTRACT	
DRAWN	P.W
DATE	5.4.2023
CHKD	
ORIGINAL DRAWING SIZE	A3

CLIENT PRINCIPAL
M&T D'Orazio

DRAWING TITLE
SHED ELEVATIONS

PROJECT TITLE Pwilkins CC6445
New Residence - Puggle Place
lot 27 Braeview drive,
Old Beach, Tasmania, 7017

REVISION	DRAWING NO
12	4100

CONTRACT
2046 - D.A.

REV.	AMENDMENTS	DRWN	DATE
DA	DEVELOPMENT APPLICATION	PSW	26.11.23

LOT 27
BRAEVIEW DRIVE
HONEYWOOD

GEOTECHNICAL SUMMARY

In general accordance with AS1726 (2017) *Geotechnical Site Investigations*

SITE (SOIL TEST) CLASSIFICATION

In general accordance with AS2870 (2011) *Residential slabs and footings*

AND

WIND LOAD CLASSIFICATION

In general accordance with AS4055 (2012) *Wind loads for housing*

Cover

View southeast over the site for the proposed house on Lot 27 Braeview Drive, Honeywood. Test pit C is in the foreground, and test pit D is at the backhoe. Test pit A is behind the white 4WD, and test pit B is out of view at right of camera.
Photo: Bill Cromer, 19 April 2022.

Refer to this report as

Cromer, W. C. (2022). *Geotechnical summary, site classification and wind classification, Lot 27 Braeview Drive, Honeywood.* Unpublished report for R. D'Orazio by William C. Cromer Pty. Ltd., 27 April 2022.

Important Notes

New geotechnical information is contained in this report. The information may be useful to regulators and other geotechnical practitioners. Dissemination of such knowledge ought to be encouraged by practitioners and regulators.

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Footings and foundations

In this report, foundations are (usually) natural materials into which man-made footings are placed to support man-made structures.

Limitations of this geotechnical report

Site investigations for geotechnical reports usually but not always involve digging test holes and taking samples, at locations thought appropriate based on site conditions and general experience. The reports only apply to that part of the site actually tested, and if not specifically stated otherwise results should not be extrapolated to adjacent areas.

The main aim of the investigations is to reasonably determine the variability in subsurface conditions at the time of inspection. The number and location of test sites, and the number and types of tests done and samples collected, will vary from site to site. Subsurface conditions may change laterally and vertically between test sites, so discrepancies may occur between what is described in the reports, and what is exposed by subsequent excavations. No responsibility is therefore accepted for (a) any differences between what is reported, and actual site and soil conditions for parts of an investigation site not assessed at the time of inspection, and (b) subsequent activities on site by others, and/or climate variability (eg rainfall),which may alter subsurface conditions at the sites assessed at the time of inspection.

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SUMMARY STATEMENTS

Geotechnical risk

Risks to property for residential development of Lot 27 Braeview Drive Honeywood range from Very High to Low and Very Low.

The highest risks relate to (a) dispersive soils, and (b) reactive clayey subsoils.

Risks for all geotechnical issues will be reduced to Low and Acceptable levels with appropriate risk treatment.

Risk treatment suggestions are included in Table 4.3 in Attachment 4, and Attachment 5.

AS2870 Site Classification

In accordance with Australian Standard 2870 (2011) *Residential slabs and footings* the area **abcdef** on Lot 27 Braeview Drive Honeywood in Attachment 2 is classed as **Class M**. The reasons for this classification are discussed in Attachment 4.

If al house footings extend through the soil profile to weathered bedrock at depths below about 0.6m, the classification is **Class S**.

Site works subsequent to the date of investigation in this report may alter this latter classification.

AS4055 Wind Classification

In accordance with Australian Standard 4055 (2012) *Wind loads for housing*, the following wind load classification is made for Lot 27 Braeview Drive Honeywood:

Wind Region	**A**
Terrain Category classification	**TC1**
Topographic classification	**T3**
Shielding classification	N**S**
Wind classification	**N4**
Max. Design Gust Wind Speed	47**m/s** [Serviceability limit state ($V_{h,\,s}$)] **74m/s** [Ultimate limit state ($V_{h,\,u}$)]

W. C. Cromer
Principal

27 April 2022

This report is and must remain accompanied by the following Attachments

Attachment 1. Location and landslide hazard bands, aerial imagery, hillshading and published geology (4 pages)

Attachment 2. Aerial image showing test pits and the area abcd to which the AS2870 site classification in Attachment 4 applies (1 page)

Attachment 3. Site and test pit photographs (6 pages)

Attachment 4. Interpretation of site geology and soils, AS2870 site classification, and Notes for Designers, Engineers, Builders, Building Surveyors and Owners (8 pages)

Attachment 5. Summary of geotechnical issues, risks and consequences to development site, and suggested risk treatment practices (2 pages)
Terminology used in geotechnical risk assessment (1 page), and
Examples of good and poor hillside engineering practices (2 pages)

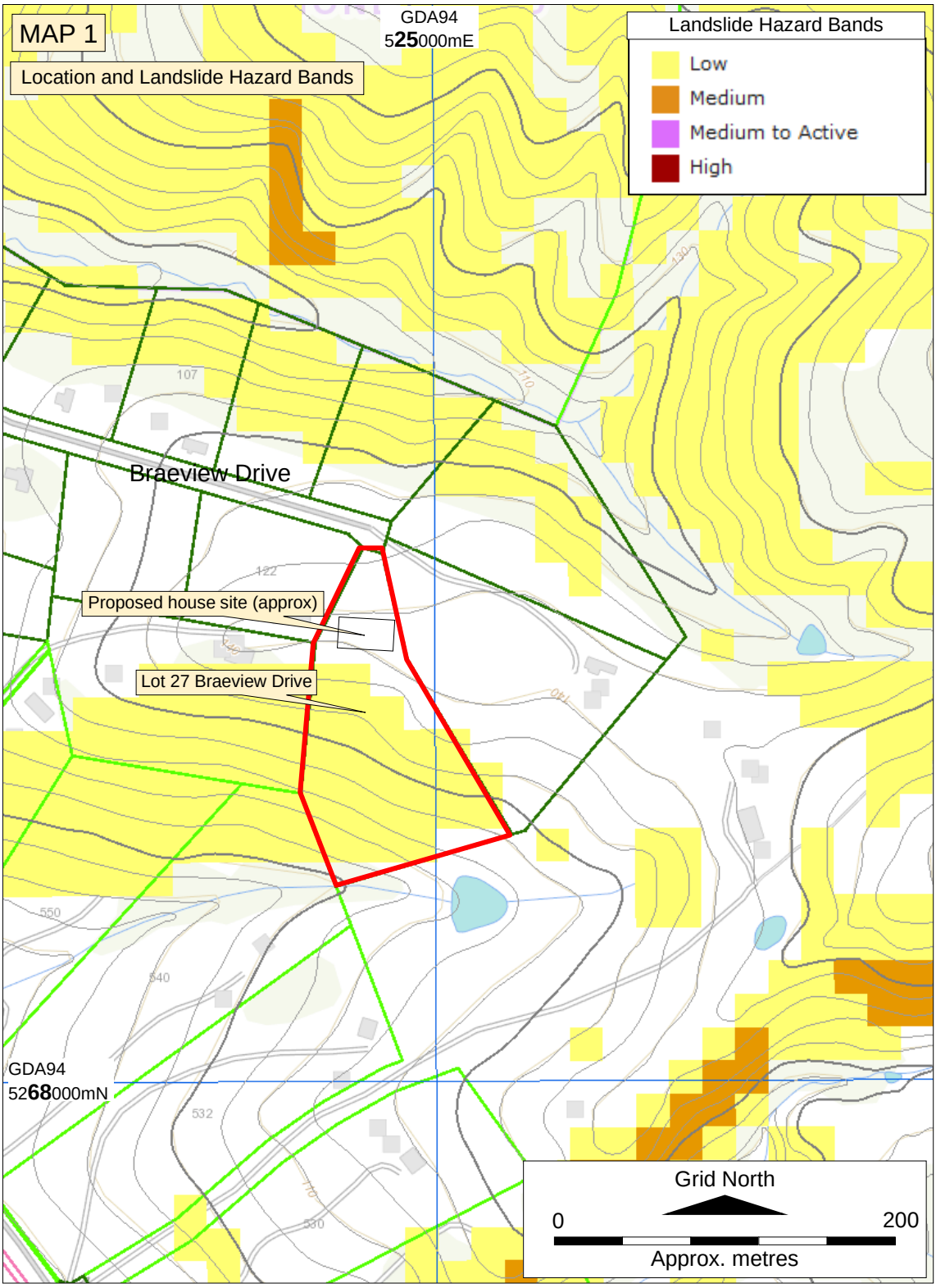
Designers, builders, engineers, building surveyors, developers, and owners/occupiers are encouraged to read the Attachments to this report.

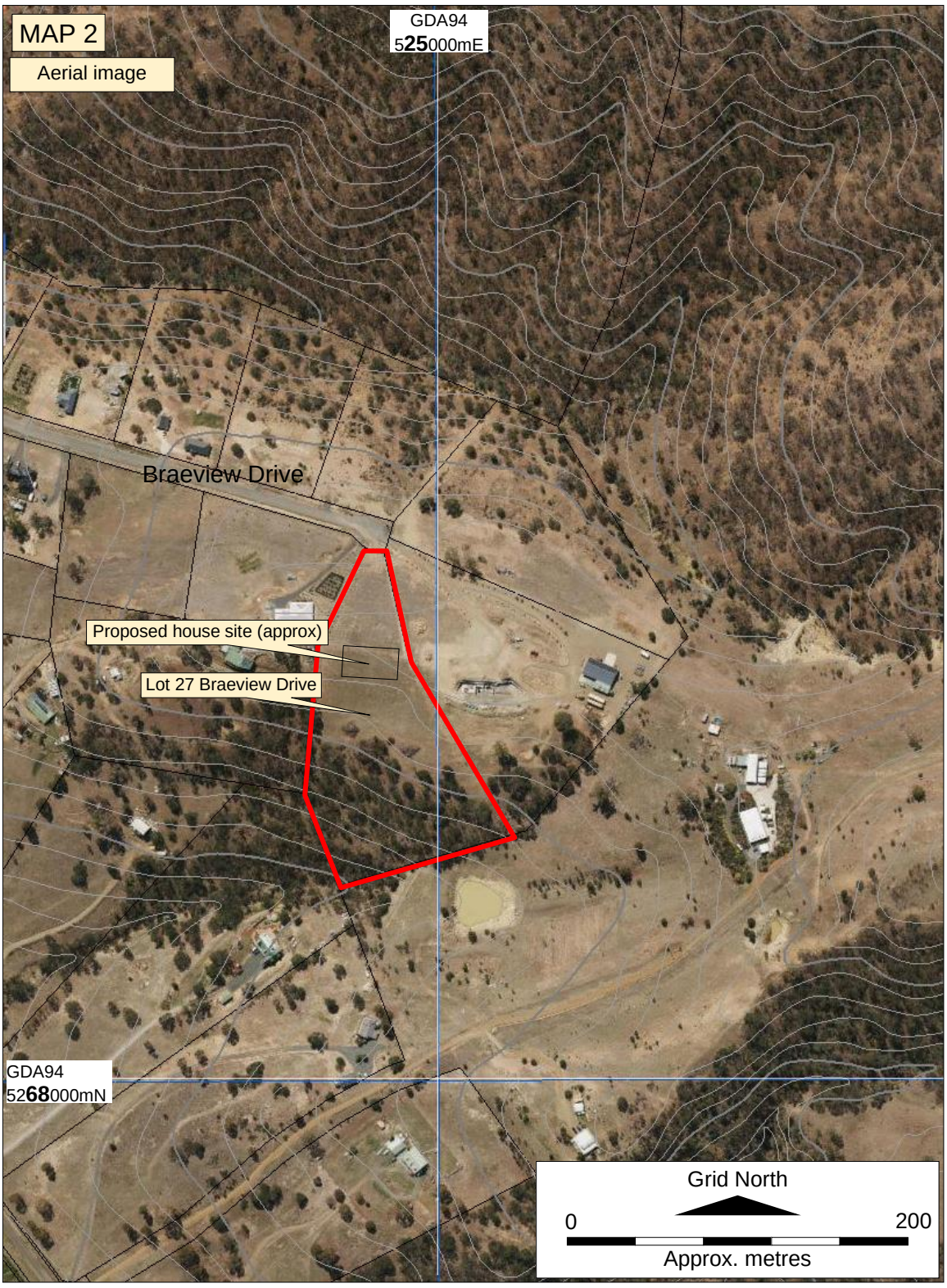
Attachment 1

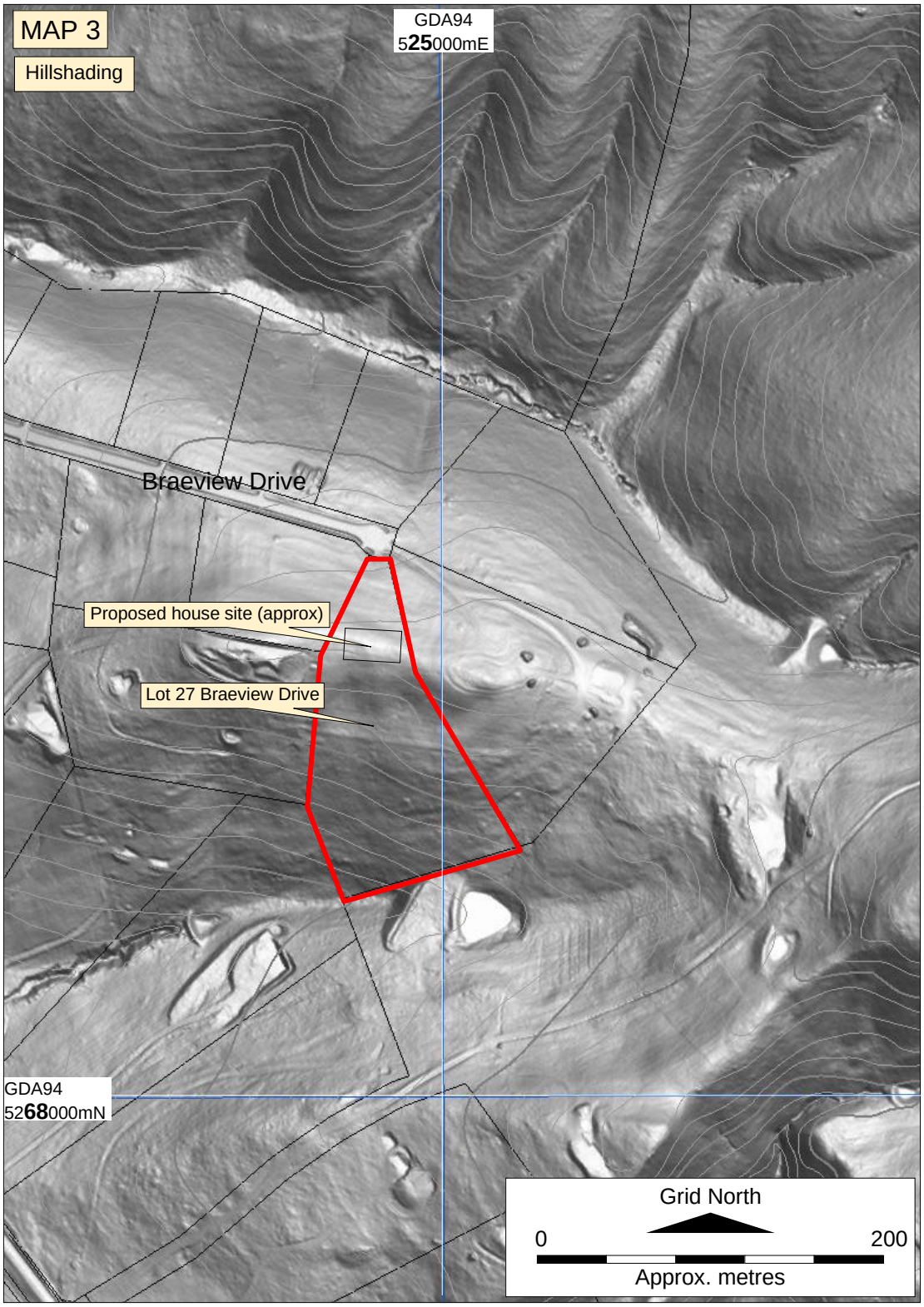
(4 pages)

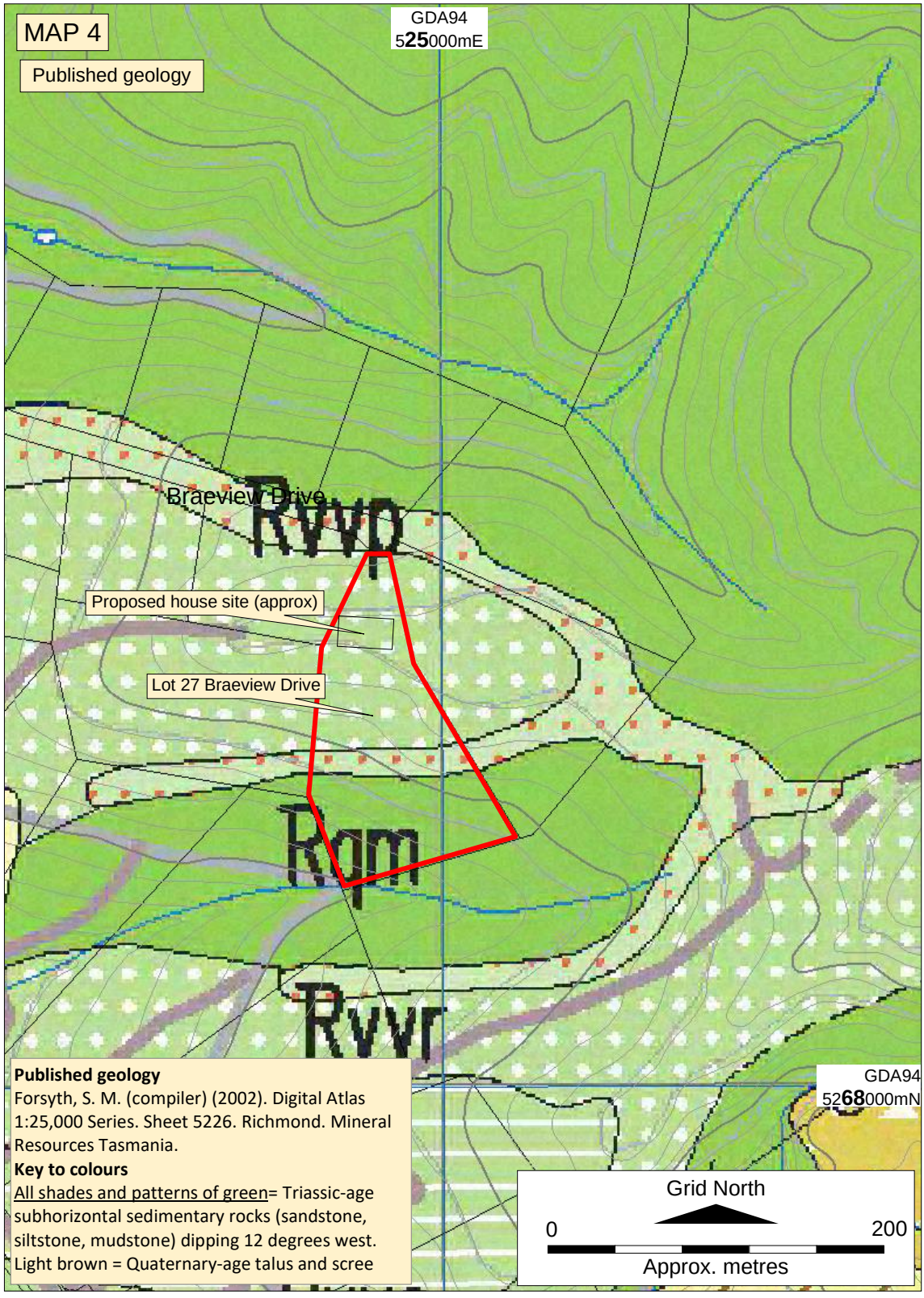
Location and landslide hazard bands, aerial imagery, hillshading and published geology

Sources: http://maps.thelist.tas.gov.au; Mineral Resources Tasmania




MAP 2
Aerial image
GDA94
525000mE
Braeview Drive
Proposed house site (approx)
Lot 27 Braeview Drive
GDA94
5268000mN
Grid North
0
200
Approx. metres


MAP 3
Hillshading
GDA94
525000mE
Braeview Drive
Proposed house site (approx)
Lot 27 Braeview Drive
GDA94
5268000mN
Grid North
0
200
Approx. metres

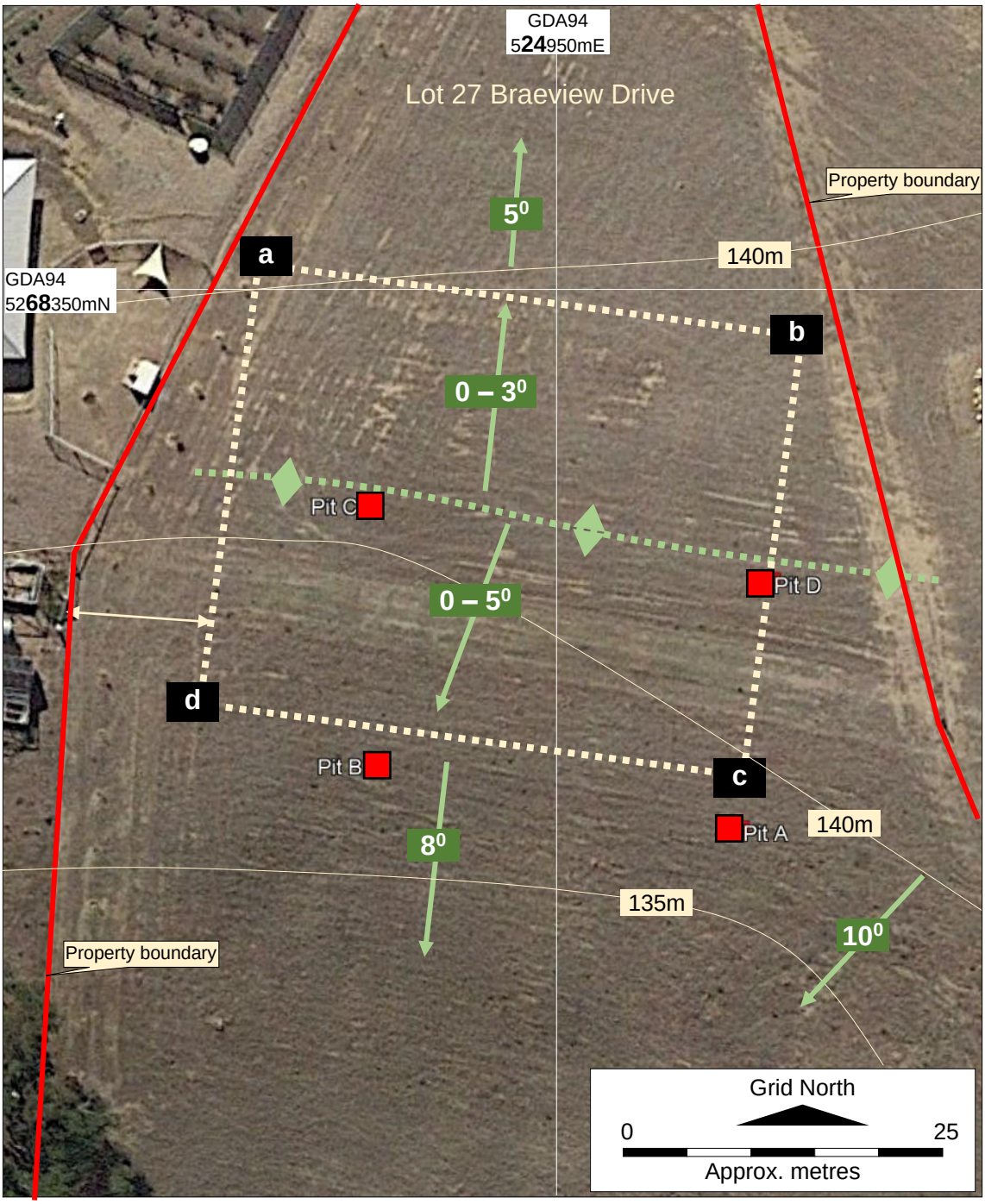

MAP 4
Published geology
GDA94
525000mE
Braeview Drive
Rvvd
Proposed house site (approx)
Lot 27 Braeview Drive
Rqm
Rvvr
GDA94
5268000mN
Published geology
Forsyth, S. M. (compiler) (2002). Digital Atlas 1:25,000 Series. Sheet 5226. Richmond. Mineral Resources Tasmania.
Key to colours
All shades and patterns of green= Triassic-age subhorizontal sedimentary rocks (sandstone, siltstone, mudstone) dipping 12 degrees west.
Light brown = Quaternary-age talus and scree
Grid North
0
200
Approx. metres

Attachment 2

(1 page)

Aerial image showing test pits and the area abcd to which the AS2870 site classification in Attachment 4 applies

Source for base image: Google Earth; image date 12 April 2019



Attachment 3

(6 pages including this page)

Site and test pit photographs

The scale in the photos is graduated into red- and black-numbered segments each one metre long.
The numbers are decimetres.

There are three photos for test pits A, B and D (no photos were taken of pit C).
The first and main photo shows the soil profile in the test pit, the second shows the location of the test pit relative to site features, and the third shows the materials excavated from the test pit (first to last is from right to left)

From top to bottom: views looking east, east-southeast and southeast from near the western property boundary over the area (between pits C and D) proposed for the new house.

LOT 27
BRAEVIEW
DRIVE
MAR22
PIT A
Layer 1
Layer 2
Layer 3
Layer 4

LOT 27
BRAEVIEW
DRIVE
MAR 22
PIT B
Layer 1
Layer 2
Layer 3
Layer 4

There are no photographs of test pit C
Table 4.1 in Attachment 4 shows its soil profile to be very similar to that in test pit D.


Layer 1
Layer 2
Layer 3

Attachment 4
(8 pages)
Interpretation of site geology, AS2870 site classification and Notes for Designers, Builders and Owners

4.1 Site geology

4.1.1 Published geology of the property

The geological map[1] of the area (Map 4, Attachment 1) shows the property to be entirely underlain by subhorizontal Triassic-age sedimentary rocks (sandstone, siltstone).

4.1.2 My interpretation of the geology

No surface exposures of bedrock was observed on the property, but siltstone and mudstone were encountered at shallow depth in all four backhoe test pits dug at and near the proposed house site.

These materials are interpreted as Triassic in age. n the surface metre or so, they are extremely weathered (Layer 3 in Table 4.1; exhibiting soil properties) strengthening to highly weathered with depth (Layer 4 in Table 4.1).

4.2 Soils

4.2.1 Texture and thickness

Soils in pits A – D (Layers 1 and 2 in Table 4.1) on the property are duplex (two-layered) consisting of a sandy silt topsoil (SM, GM) 0.25 – 0.3m thick over a high plasticity silty clay subsoil 0.25 –0.3m thick.

4.2.2 Soil reactivity[2]

To assess potential ground surface movement from reactive clays, and to assist in site classification in terms of *AS2870:2011 Residential slabs and footings*, clayey subsoils are sometimes tested for their shrink swell indices (I_{ss}).

However, the subsoils were too thin for sampling.

Clayey soils (Layer 2) on Triassic sedimentary rocks elsewhere in southern Tasmania typically have Iss values in the 2 – 4% range.

When this range of Iss values[3] is applied to the soil profiles in test pits A – D in Table 4.1, ground surface movements in the 15 – 25mm range are indicated. This range corresponds to Class S – M in terms of *AS2870 (2011) Residential slabs and footings.* But see Section 4.7.

[1] Forsyth, S. M. (compiler) (2002). Digital Atlas 1:25,000 Series. Sheet 5226. Richmond. Mineral Resources Tasmania.

[2] Reactive materials contain clays which shrink and swell in volume when their moisture content decreases or increases respectively.

[3] When estimating ground surface movement, Iss values of 0.5% have also and conservatively been applied to Layers 1 and 3 in Table 4.1. The regional suction base is the bedrock depth (c. 1m)

Table 4.1. Summary of test pits A – D

Client R. D'ORAZIO
Location Lot 27
Braeview Drive, Honeywood
Date dug 19-Apr-22

Test pit	**A**	**B**	**C**	**D**
Depth dug (m)	1.1	1.7	0.9	1.3
Easting (GDA94)	524965	524935	524935	524967
Northing (GDA94)	5268308	5268313	5268334	5268328
Water inflow (depths in m)	None	None	None	None
Standing water level (m)	N/A	N/A	N/A	N/A

				Interpretation					
No.	**Layer**	**Details**	**USCS**	**Horizon**	**AS/NZS1547 soil category**	Figures are depths to top and bottom of layer, in metres			
1	**Sandy SILT**	Grey brown grading to light grey; cloddy, fractured; non-plastic; locally with up to 20% angular siltstone/mudstone clasts well-graded to 50mm; D; Fb-H	SM, GM	Topsoil (A horizon)	4 - 5	0 to 0.25 D@0.1	0 to 0.25 D@0.15	0 to 0.3 D@0.1	0 to 0.3 D@0.15
2	**Silty CLAY**	Orange brown; some silt and sand; high plasticity; fractured to base; M<<PL; H	CH	Subsoil (B horizon)	5 - 6	0.25 to 0.6 D@0.4	0.25 to 0.5 D@0.4	0.3 to 0.6 D@0.4	0.3 to 0.6 D@0.4
3	**Silty CLAY - clayey SILT**	Grey brown, light yellowish brown; low plasticity to non-plastic with depth; strength increases with depth; weak horizontal texture/bedding; D; Fb-D	CL	CB horizon (extremely weathered bedrock	4 - 5	0.6 to c1.2	0.9 to 1.1		
4	**SILTSTONE, MUDSTONE, SANDSTONE**	Grey brown; subhorizontal; strongly fracture; highly weathered	SP	Triassic-age siltstone - mudstone bedrock	N/A	c1.2 to 1.65 EAR	1.1 EAR	0.6 to 0.9 CR	0.6 to 1.3 CR

Notes and abbreviations

USCS = Unified Soil Classification System
Grey cells indicate a missing layer or layers in a test pit
Easting and Northing coordinates from Google Earth and hand-held GPS. Datum is GDA94.

Excavability Equipment = Backhoe; 0.45m GP bucket; 4 teeth; Operator: Renzo D'Orazio
EAR = end as required; NR = no refusal; CR = close to refusal; R = refusal.

Samples D = disturbed sample; U50 = Undisturbed 50mm diam drive tube sample

Weathering For rock only. F = fresh; SW = slightly weathered; MW = moderately weathered; HW = highly weathered;
EW = extremely weathered (ie soil properties; material can be remolded in the hand, with or without water)

Moisture D = dry; M = moist (M<=>PL = moisture less than, equal to or greater than Plastic Limit); W = wet.

Consistency Fb = Friable (crumbles to powder when scraped with thumbnail)
S = Soft (Easily penetrated by fist; 25 – 50kPa)
F = Firm (Easily penetrated by thumb; 50 – 100kPa)
St = Stiff (Indented with thumb; penetrated with difficulty; 100 – 200kPa)
VSt = Very stiff (Easily indented with thumbnail; 200 – 400kPa)
H = Hard (Indented by thumbnail with difficulty; >400kPa)

Rel density VL = Very loose (ravelling)
L = Loose (easy shovelling)
MD = Medium dense (hard shovelling)
D = Dense (picking)
VD = Very dense (hard picking)

4.2.3 Soil moisture

No free water was observed in pits.

At the time of investigation Layers 1 and 2 in pits A and D were relatively dry, and Layer 2 was of hard consistency.

4.2.4 Soil dispersion

Testing of Layer 1 and 2 soils showed that Layer 1 topsoils are non-dispersive, and Layer 2 clayey subsoils are moderately – severely dispersive (Figure 4.1). This has implications for stormwater management and the design of an on-site wastewater management system.

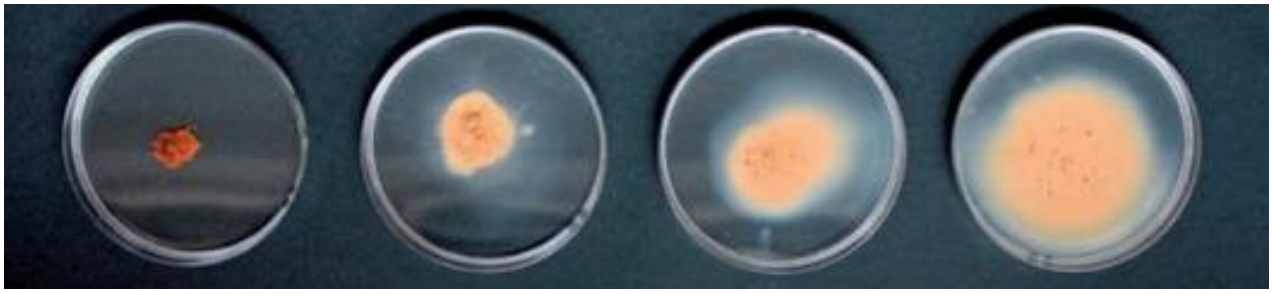


Figure 4.1 General example of degrees of soil dispersion in four different soils. Each is a single ped in a flat glass dish in a laboratory – after adding tap water. Left to right: no dispersion, slight dispersion, moderate dispersion, and severe dispersion. The soil at left is non-sodic; the soil at right is highly sodic.
Source: https://www.agric.wa.gov.au/dispersive-and-sodic-soils/identifying-dispersive-sodic-soils

4.3 Fill

No fill is present at the proposed house site.

4.4 Bearing capacities of materials

A dynamic cone penetrometer (DCP) profile was done adjacent to each of pits C and D in an to attempt to assess the strength of the soil profile. These profiles are designated DCP Pit C and DCP Pit in Figure 4.2. DCP values are expressed as the number of hammer blows/100mm.

Results are very similar in both profiles and strength increases with depth. Surface values in Layer 1 increase from 5 – 8 blows/100mm, and in Layer 2 from about 8 blows/100mm to over 20 blows/100m.

Comparison with Table 4.2 shows that DCP values more than about 6 – 9 blows/100mm correspond with allowable bearing capacities of 200 – 400kPa. These are adequate to support a house.

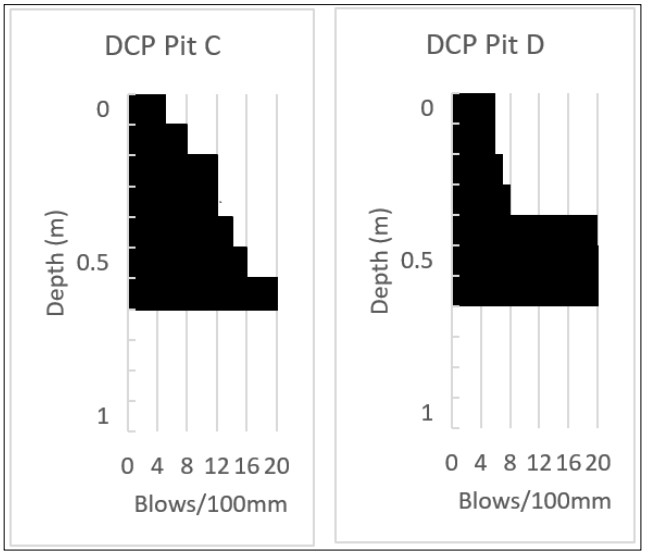
4.5 Groundwater

4.5.1 Temporary groundwater conditions

At the time of investigation, no shallow subsurface water was encountered in test pits. None is expected to occur even after heavy rain because the gentle slope of the property currently allows for adequate surface drainage.

4.5.2 Permanent groundwater

Permanent groundwater conditions are expected to exist in fractured bedrock beneath the property and throughout the area, but at depths which will not affect residential subdivision.



The Dynamic Cone Penetrometer (DCP) Test is a standard method of assessing the strengths of subsurface materials. A steel hammer weighing 9kg falls 510mm down a steel rod onto a stop, driving the rod (with a 20mm diameter steel cone tip) into the ground. The number of hammer blows to penetrate each 100mm of depth is recorded. The method is described in Australian Standard AS 1289.6.3.2 – 1997 Method 6.3.2: *Soil strength and consolidation tests – Determination of the penetration resistance of a soil – 9 kg dynamic cone penetrometer test.*

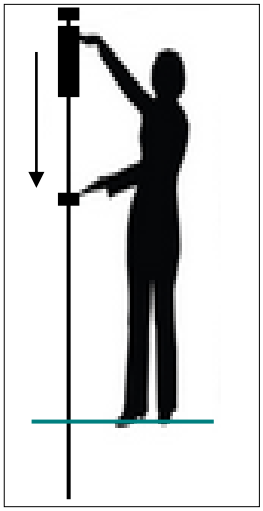


Figure 4.2 DCP results adjacent to test pits C and D at the house site (see Attachment 2 for locations). See Figure 4.2 for some published correlations between DCP values and some soil properties

4.6 Slope stability

The lower, southern parts of Lot 27 are in the Low Landslide Hazard Band (Map 1, Attachment 1). Map 2 (hillshading) shows broad but subtle topographic undulations over the same area. A small feature on $10+^0$ slopes some 40m south of the proposed house site may be evidence of former shallow slope instability.

At the proposed house site on the broad crest of a topographic divide:

- slope angles are in the $0 – 3^0$ range, and
- stable (albeit weathered) bedrock is at depths less than about 0.6m (Table 4.1).

The risk of future instability is regarded as low.

Table 4.2. Allowable bearing capacity from DCP results

Blows/ 100mm	Allowable bearing capacity (kPa)	Typical material
<=1	<=50	Very soft to soft clays, very loose sands
1 – 2	50 – 100	Firm clays, loose sands
2 – 5	100 – 200	Stiff clays, medium dense sands
6 – 9	200 – 400	Very stiff clays, medium dense to dense sands
>=10	>400	Hard clays, dense to very dense sands

Reference: Look, B. (2014). *Handbook of Geotechnical Investigation and Design Tables* (2nd edition). CRC Press. The Netherlands. Table 5.15. The Table applies to shallow footings. Factor of Safety =3. For high and low plasticity clays the allowable bearing capacity may be lower and higher, respectively.

Note: Practitioners may prefer other published or unpublished correlations.

4.7 AS2870 site classification

In accordance with Australian Standard 2870 (2011) *Residential slabs and footings* the area **abcd** in Attachment 2 is classed as **Class M** for the current situation. This classification is based on the presence of Layer 2 reactive clayey subsoils up to about 0.3m thick, beneath a similar thickness of much less reactive topsoil.

However, if all house footings extend through the Layer 2 subsoil into either extremely weathered bedrock (Layer 3) or highly weathered bedrock (Layer 4), the classification becomes Class S.

If major site works occur and change the current land surface this latter classification may need to be changed.

4.8 Notes for designers, engineers, builders, and building surveyors

4.8.1 Table 4.3 Risk assessments

Designers, engineers, builders and building surveyors are strongly encouraged to read, and take note of, Table 4.3. Many of the 18 geotechnical issues listed in the Table are carefully addressed on a site-specific basis.

4.8.2 Variability of subsurface conditions

Based on the soil profiles in test pits A – D, there is little variability in subsurface conditions over the house footprint.

However, if significant variability is encountered, WCC should be immediately contacted for advice.

4.8.3 Footings

My firm recommendation is that all house footings should be extended into Layer 3 or 4 bedrock.

4.8.4 Excavations

As a general comment, it is preferable to avoid or minimise the depth of cut and fill at house sites, as shown in the hillside construction examples in Attachment 5.

However, if the house footprint is to be cut into the site, the deeper part of the excavation is likely to reveal variably-weathered mudstone or siltstone bedrock, and the shallower parts, Layer 1 and 2 soil.

4.8.5 Use of fill

Fill may be required to complete the house footprint. If so, it should be placed in an engineered manner (ie topsoil removed and the site benched, and fill placed in properly compacted layers in an engineered fashion). In any case, fill should not be used as a weight-bearing material, and all footings should extend to in-situ Layer 3 or 4 materials.

Elsewhere, on-site Layer 1 material may be used as fill, but not to support infrastructure.

4.8.6 Drainage

All roof and hardstand runoff should be discharged to reticulated TasWater stormwater mains if available. If not, and because of the dispersive subsoils, stormwater shall be tightly controlled:

- it shall be discharged to lower slopes in a diffuse manner (for example, through perforated pipework laid along contours), and
- it shall not be discharge upslope from the on-site wastewater management system.

4.9 Notes for owners and occupiers

Owners and occupiers are advised to:

- read Table 4.3,
- read the AGS Geoguides[4] and in particular, the examples provided for good and bad hillside construction methods (the latter, and a geoguide on retaining walls, are included here as Attachment 6), and
- take plenty of photographs at all stages of building.

4.10 Geotechnical risk assessment

See Table 4.3. Ensure recommendations are applied.

[4] AGS (2007e). The Australian Geoguides for Slope Management and Maintenance. Australian Geomechanics Vol 42 No 1 March 2007

Table 4.3. Geotechnical issues, risks and treatments for residential development of this property. See also Attachment 5.

			Before treatment				After treatment		
	Issue #	Issue	Likelihood of occurrence	Consequences to property	Level of risk to property	Recommended risk treatment	Likelihood of occurrence	Consequences to property	Level of risk to property
Landslide/slope instability	1	Rotational or translational deep seated earth or debris slide.	Barely credible	Major	Very low	None	Barely credible	Major	Very low
	2	Rotational or translational shallow earth or debris slide.		Medium				Medium	
	3	Translational earth or debris slide, fall or topple: Very small scale; on steep, unsupported (artificial) excavations.	Unlikely	Minor	Low	Control stormwater discharge. Avoid or minimise excavations. Support excavations >0.8m high with engineered, drained retaining walls. Ensure fill placement is controlled.	Unlikely	Minor	Low
	4	Rotational or translational earth or debris slide: Very small to small scale; shallow, in fill (eg beneath or next to building, on the outside of access drive).							
	5	Earth or debris flow: Very small to small scale; shallow; in soil and/or uncontrolled fill.							
	6	Soil creep							

Table 4.3 (continued)

			Before treatment				After treatment		
	Issue #	Issue	Likelihood of occurrence	Consequences to property	Level of risk to property	Recommended risk treatment	Likelihood of occurrence	Consequences to property	Level of risk to property
Erosion, fill, drainage, subsurface conditions, coastal issues	7	Surface soil erosion	Possible	Minor	Moderate	As for Issues 3-6. Use diffuse stormwater outlets along contours to avoid point discharges.Obtain advice on the design of these.	Unlikely	Minor	Low
	8	Tunnel erosion (dispersive soils)	Likely	Medium	High				
	9	Foundation movement (eg settlement) due to low strength materials (eg uncontrolled fill, soft soils)	Possible	Medium to High	Moderate to High	As for Issues 3 – 6. Also. design footings in accord with AS2870 - 2011 *Residential slabs and footings* and the site classification recommendation(s) in this report.			
	10	Foundation movement due to reactive or unstable soils	Likely		High to Very High				
	11	Foundation movement due to tree removal or planting	Possible		Moderate to High	Restrict tree planting to (and tree removal from) a distance from a building of 1.5x, 1x and 0.75x mature tree height for Class P, (H1, H2) and M sites respectively			
	12	Poor surface drainage	Possible	Minor	Moderate	Divert surface drainage away from buildings and the wastewater disposal area			
	13	Flooding or waterlogging	Unlikely		Low	As for Issues 3 – 6, and 12			
	14	Shallow groundwater seepages				Divert seepages with interception drains behind retaining walls, away from buildings			
	15	Site contamination from previous activities				Visual examination during construction.			
	16	Earthquake (magnitude <=4)	Likely	Insignificant		None	Likely	Insignificant	
	16	Earthquake (magnitude >4)	Unlikely	Minor			Unlikely	Minor	
	17	Coastal erosion	Not applicable						
	18	Sea level rise	Not applicable						

Notes

1. The risk assessments are qualitative and colour-coded in accordance with Appendix C of Practice Note Guidelines for Landslide Risk Management AGS (2007c)
2. Further reading: AGS (2007c). Practice Notes Guidelines for Landslide Risk Management, and AGS (2007e) *Australian Geoguides for Slope Management and Maintenance* . Australian Geomechanics Vol 42 No 1 March 2007

Attachment 5

(6 pages including this page)

Some AGS guidelines for hillside construction (1 page),
AGS Geoguide LR8 illustrating good and poor hillside engineering practices (2 pages),
and
AGS Geoguide LR6 Retaining walls (2 pages)

APPENDIX G - SOME GUIDELINES FOR HILLSIDE CONSTRUCTION

	GOOD ENGINEERING PRACTICE	*POOR ENGINEERING PRACTICE*
ADVICE		
GEOTECHNICAL ASSESSMENT	Obtain advice from a qualified, experienced geotechnical practitioner at early stage of planning and before site works.	Prepare detailed plan and start site works before geotechnical advice.
PLANNING		
SITE PLANNING	Having obtained geotechnical advice, plan the development with the risk arising from the identified hazards and consequences in mind.	Plan development without regard for the Risk.
DESIGN AND CONSTRUCTION		
HOUSE DESIGN	Use flexible structures which incorporate properly designed brickwork, timber or steel frames, timber or panel cladding. Consider use of split levels. Use decks for recreational areas where appropriate.	Floor plans which require extensive cutting and filling. Movement intolerant structures.
SITE CLEARING	Retain natural vegetation wherever practicable.	Indiscriminately clear the site.
ACCESS & DRIVEWAYS	Satisfy requirements below for cuts, fills, retaining walls and drainage. Council specifications for grades may need to be modified. Driveways and parking areas may need to be fully supported on piers.	Excavate and fill for site access before geotechnical advice.
EARTHWORKS	Retain natural contours wherever possible.	Indiscriminatory bulk earthworks.
CUTS	Minimise depth. Support with engineered retaining walls or batter to appropriate slope. Provide drainage measures and erosion control.	Large scale cuts and benching. Unsupported cuts. Ignore drainage requirements
FILLS	Minimise height. Strip vegetation and topsoil and key into natural slopes prior to filling. Use clean fill materials and compact to engineering standards. Batter to appropriate slope or support with engineered retaining wall. Provide surface drainage and appropriate subsurface drainage.	Loose or poorly compacted fill, which if it fails, may flow a considerable distance including onto property below. Block natural drainage lines. Fill over existing vegetation and topsoil. Include stumps, trees, vegetation, topsoil, boulders, building rubble etc in fill.
ROCK OUTCROPS & BOULDERS	Remove or stabilise boulders which may have unacceptable risk. Support rock faces where necessary.	Disturb or undercut detached blocks or boulders.
RETAINING WALLS	Engineer design to resist applied soil and water forces. Found on rock where practicable. Provide subsurface drainage within wall backfill and surface drainage on slope above. Construct wall as soon as possible after cut/fill operation.	Construct a structurally inadequate wall such as sandstone flagging, brick or unreinforced blockwork. Lack of subsurface drains and weepholes.
FOOTINGS	Found within rock where practicable. Use rows of piers or strip footings oriented up and down slope. Design for lateral creep pressures if necessary. Backfill footing excavations to exclude ingress of surface water.	Found on topsoil, loose fill, detached boulders or undercut cliffs.
SWIMMING POOLS	Engineer designed. Support on piers to rock where practicable. Provide with under-drainage and gravity drain outlet where practicable. Design for high soil pressures which may develop on uphill side whilst there may be little or no lateral support on downhill side.	
DRAINAGE		
SURFACE	Provide at tops of cut and fill slopes. Discharge to street drainage or natural water courses. Provide general falls to prevent blockage by siltation and incorporate silt traps. Line to minimise infiltration and make flexible where possible. Special structures to dissipate energy at changes of slope and/or direction.	Discharge at top of fills and cuts. Allow water to pond on bench areas.
SUBSURFACE	Provide filter around subsurface drain. Provide drain behind retaining walls. Use flexible pipelines with access for maintenance. Prevent inflow of surface water.	Discharge roof runoff into absorption trenches.
SEPTIC & SULLAGE	Usually requires pump-out or mains sewer systems; absorption trenches may be possible in some areas if risk is acceptable. Storage tanks should be water-tight and adequately founded.	Discharge sullage directly onto and into slopes. Use absorption trenches without consideration of landslide risk.
EROSION CONTROL & LANDSCAPING	Control erosion as this may lead to instability. Revegetate cleared area.	Failure to observe earthworks and drainage recommendations when landscaping.
DRAWINGS AND SITE VISITS DURING CONSTRUCTION		
DRAWINGS	Building Application drawings should be viewed by geotechnical consultant	
SITE VISITS	Site Visits by consultant may be appropriate during construction/	
INSPECTION AND MAINTENANCE BY OWNER		
OWNER'S RESPONSIBILITY	Clean drainage systems; repair broken joints in drains and leaks in supply pipes. Where structural distress is evident see advice. If seepage observed, determine causes or seek advice on consequences.	

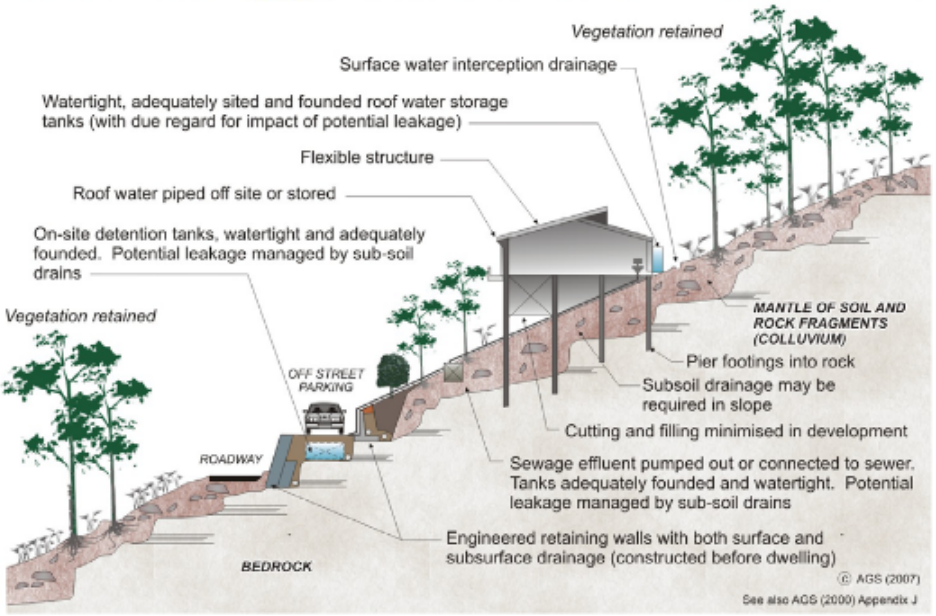
Good and poor hillside construction practices

AGS Geoguide LR8 (Construction Practice)

HILLSIDE CONSTRUCTION PRACTICE

Sensible development practices are required when building on hillsides, particularly if the hillside has more than a low risk of instability (GeoGuide LR7). Only building techniques intended to maintain, or reduce, the overall level of landslide risk should be considered. Examples of good hillside construction practice are illustrated below.

EXAMPLES OF **GOOD** HILLSIDE CONSTRUCTION PRACTICE



WHY ARE THESE PRACTICES GOOD?

Roadways and parking areas - are paved and incorporate kerbs which prevent water discharging straight into the hillside (GeoGuide LR5).

Cuttings - are supported by retaining walls (GeoGuide LR6).

Retaining walls - are engineer designed to withstand the lateral earth pressures and surcharges expected, and include drains to prevent water pressures developing in the backfill. Where the ground slopes steeply down towards the high side of a retaining wall, the disturbing force (see GeoGuide LR6) can be two or more times that in level ground. Retaining walls must be designed taking these forces into account.

Sewage - whether treated or not is either taken away in pipes or contained in properly founded tanks so it cannot soak into the ground.

Surface water - from roofs and other hard surfaces is piped away to a suitable discharge point rather than being allowed to infiltrate into the ground. Preferably, the discharge point will be in a natural creek where ground water exits, rather than enters, the ground. Shallow, lined, drains on the surface can fulfil the same purpose (GeoGuide LR5).

Surface loads - are minimised. No fill embankments have been built. The house is a lightweight structure. Foundation loads have been taken down belowthe level at which a landslide is likely to occur and, preferably, to rock. This sort of construction is probably not applicable to soil slopes (GeoGuide LR3). If you are uncertain whether your site has rock near the surface, or is essentially a soil slope, you should engage a geotechnical practitioner to find out.

Flexible structures - have been used because they can tolerate a certain amount of movement with minimal signs of distress and maintain their functionality.

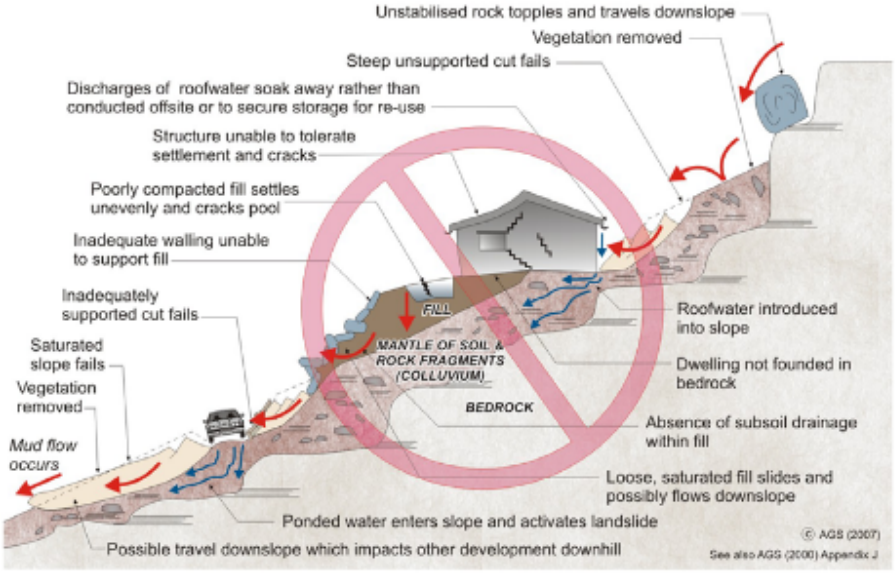
Vegetation clearance - on soil slopes has been kept to a reasonable minimum. Trees, and to a lesser extent smaller vegetation, take large quantities of water out of the ground every day. This lowers the ground water table, which in turn helps to maintain the stability of the slope. Large scale clearing can result in a rise in water table with a consequent increase in the likelihood of a landslide (GeoGuide LR5). An exception may have to be made to this rule on steep rock slopes where trees have little effect on the water table, but their roots pose a landslide hazard by dislodging boulders.

Possible effects of ignoring good construction practices are illustrated on page 2. Unfortunately, these poor construction practices are not as unusual as you might think and are often chosen because, on the face of it, they will save the developer, or owner, money. You should not lose sight of the fact that the cost and anguish associated with any one of the disasters illustrated, is likely to more than wipe out any apparent savings at the outset.

ADOPT GOOD PRACTICE ON HILLSIDE SITES

AUSTRALIAN GEOGUIDE LR8 (CONSTRUCTION PRACTICE)

EXAMPLES OF **POOR** HILLSIDE CONSTRUCTION PRACTICE



WHY ARE THESE PRACTICES POOR?

Roadways and parking areas - are unsurfaced and lack proper table drains (gutters) causing surface water to pond and soak into the ground.

Cut and fill - has been used to balance earthworks quantities and level the site leaving unstable cut faces and added large surface loads to the ground. Failure to compact the fill properly has led to settlement, which will probably continue for several years after completion. The house and pool have been built on the fill and have settled with it and cracked. Leakage from the cracked pool and the applied surface loads from the fill have combined to cause landslides.

Retaining walls - have been avoided, to minimise cost, and hand placed rock walls used instead. Without applying engineering design principles, the walls have failed to provide the required support to the ground and have failed, creating a very dangerous situation.

A heavy, rigid, house - has been built on shallow, conventional, footings. Not only has the brickwork cracked because of the resulting ground movements, but it has also become involved in a man-made landslide.

Soak-away drainage - has been used for sewage and surface water run-off from roofs and pavements. This water soaks into the ground and raises the water table (GeoGuide LR5). Subsoil drains that run along the contours should be avoided for the same reason. If felt necessary, subsoil drains should run steeply downhill in a chevron, or herring bone, pattern. This may conflict with the requirements for effluent and surface water disposal (GeoGuide LR9) and if so, you will need to seek professional advice.

Rock debris - from landslides higher up on the slope seems likely to pass through the site. Such locations are often referred to by geotechnical practitioners as "debris flow paths". Rock is normally even denser than ordinary fill, so even quite modest boulders are likely to weigh many tonnes and do a lot of damage once they start to roll. Boulders have been known to travel hundreds of metres downhill leaving behind a trail of destruction.

Vegetation - has been completely cleared, leading to a possible rise in the water table and increased landslide risk (GeoGuide LR5).

DON'T CUT CORNERS ON HILLSIDE SITES - OBTAIN ADVICE FROM A GEOTECHNICAL PRACTITIONER

More information relevant to your particular situation may be found in other Australian GeoGuides:

- GeoGuide LR1 - Introduction
- GeoGuide LR2 - Landslides
- GeoGuide LR3 - Landslides in Soil
- GeoGuide LR4 - Landslides in Rock
- GeoGuide LR5 - Water & Drainage
- GeoGuide LR6 - Retaining Walls
- GeoGuide LR7 - Landslide Risk
- GeoGuide LR9 - Effluent & Surface Water Disposal
- GeoGuide LR10 - Coastal Landslides
- GeoGuide LR11 - Record Keeping

The Australian GeoGuides (LR series) are a set of publications intended for property owners; local councils; planning authorities; developers; insurers; lawyers and, in fact, anyone who lives with, or has an interest in, a natural or engineered slope, a cutting, or an excavation. They are intended to help you understand why slopes and retaining structures can be a hazard and what can be done with appropriate professional advice and local council approval (if required) to remove, reduce, or minimise the risk they represent. The GeoGuides have been prepared by the Australian Geomechanics Society, a specialist technical society within Engineers Australia, the national peak body for all engineering disciplines in Australia, whose members are professional geotechnical engineers and engineering geologists with a particular interest in ground engineering. The GeoGuides have been funded under the Australian governments' National Disaster Mitigation Program.

AUSTRALIAN GEOGUIDE LR6 (RETAINING WALLS)

RETAINING WALLS

Retaining walls are used to support cuts and fills. Some are built in the open and backfill is placed behind them (gravity walls). Others are inserted into the ground (cast *in situ* or driven piles) and the ground is subsequently excavated on one side. Retaining walls, like all man-made structures, have a finite life. Properly engineered walls should last 50 years, or more, without needing significant repairs. However, not all walls fit this category. Some, particularly those built by inexperienced tradesmen without engineering input, can deflect and even fail because they are unable to withstand the pressures that develop in the ground around them or because the materials from which they are built deteriorate with time. Design of retaining walls more than 900mm high should be undertaken by a geotechnical practitioner or structural engineer and normally require local council approval.

Retaining walls have to withstand the weight of the ground on the high side, any water pressure forces that develop, any additional load (surcharge) on the ground surface and sometimes swelling pressures from expansive clays. These forces are resisted by the wall itself and the ground on the low side. Engineers calculate the forces that the retained ground, the water, and the surcharge impose on a wall (the disturbing force) as well as the maximum force that the wall and ground on the low side can provide to resist them (the restoring force). The ratio of the restoring force to the disturbing force is called the "factor of safety" (GeoGuide LR1). Permanent retaining walls designed in accordance with accepted engineering standards will normally have a factor of safety in the range 1.5 to 2.

Never add surcharge to the high side of a wall (e.g. place fill, erect a structure, stockpile bulk materials, or park vehicles) unless you know the wall has been designed with that purpose in mind.

Never more than lightly water plants on the high side of a retaining wall.

Never excavate at the toe of a retaining wall.

Any of these actions will reduce the factor of safety of the wall and could lead to failure. If in doubt about any aspect of an existing retaining wall, or changes you would like to make near one, seek advice from a geotechnical practitioner, or a structural engineer. This GeoGuide sets out basic inspection requirements for retaining walls and identifies some common signs that might indicate all is not well. GeoGuide LR11 provides information about records that should be kept.

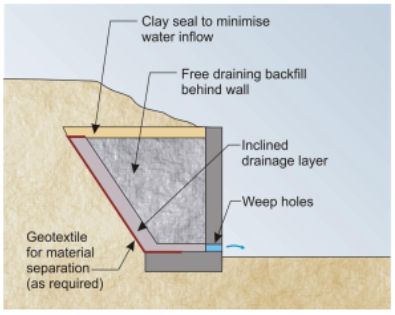


Figure 1- Typical formed concrete wall

GRAVITY WALLS

Gravity walls are so called because they rely on their own weight (the force of gravity) to hold the ground behind in place.

Formed concrete and reinforced blockwork walls (Figure 1) - should be built so the backfill can drain. They should be inspected at least once a year. Look for signs of tilting, bulging, cracking, or a drop in ground level on the high side, as any of these may indicate that the wall has started to fail. Look for rust staining, which may indicate that the steel reinforcement is deteriorating and the wall is losing structural strength ("concrete cancer"). Ensure that weep holes are clear and that water is able to drain at all times, as high water pressures behind the wall can lead to sudden and catastrophic failure.

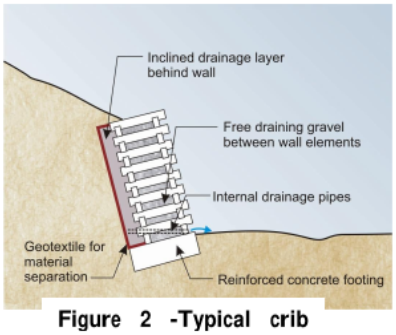


Figure 2 -Typical crib

Concrete "crib" walls (Figure 2) - should be filled with clean gravel, or "blue metal" with a nominated grading. Sometimes soil is used to reduce cost, but this is undesirable, from an engineering perspective, unless internal drainage is incorporated in the wall's construction. Without backfill drainage, a soil filled crib wall is likely to have a lower factor of safety than is required. Crib walls should be inspected as for formed concrete walls. In addition, you should check that material is not being lost through the structure of the wall, which has large gaps through it.

Timber "crib" walls - should be checked as for concrete crib walls. In addition, check the condition of the timber. Once individual elements show signs of rotting, it is necessary to have the wall replaced. If you are uncertain seek advice from a geotechnical practitioner, or a structural engineer.

Masonry walls: natural stone, brick, or interlocking blocks (Figure 3) - more than about 1m high, should be wider at the bottom than at the top and include specific measures to permit drainage of the backfill. They should be checked as for formed concrete walls. Natural stone walls should be inspected for signs of deterioration of the individual blocks: strength loss, corners becoming rounded, cracks appearing, or debris from the blocks collecting at the foot of the wall.

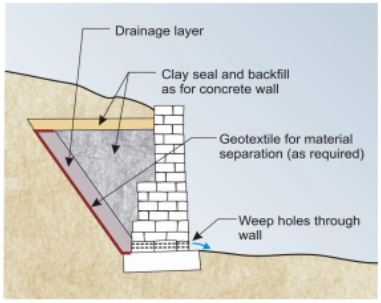


Figure 3 -Typical masonry wall

AUSTRALIAN GEOGUIDE LR6 (RETAINING WALLS)

Old Masonry walls (Figure 4) - Many old masonry retaining walls have not been built in accordance with modern design standards and often have a low "factor of safety" (GeoGuide LR1). They may therefore be close to failure and a minor change in their condition, or loading, could initiate collapse. You need to take particular care with such structures and seek professional advice sooner rather than later. Although masonry walls sometimes deflect significantly over long periods of time collapse, when it occurs, is usually sudden and can be catastrophic. Familiarity with a particular situation can instil a false sense of confidence.

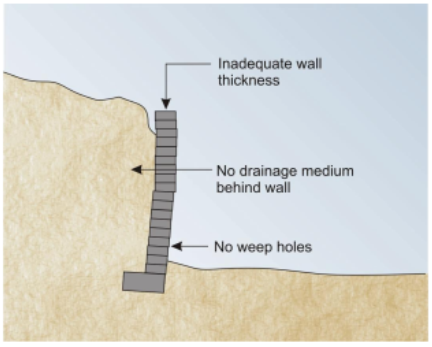


Figure 4 - Poorly built masonry wall

Reinforced soil walls (Figure 5) - are made of compacted select fill in which layers of reinforcement are buried to form a "reinforced soil zone". The reinforcement is all important, because it holds the soil "wall" together. Reinforcement may be steel strip, or mesh, or a variety of geosynthetic ("plastic") products. The facing panels are there to protect the soil "wall" from erosion and give it a finished appearance.

Most reinforced soil walls are proprietary products. Construction should be carried out strictly in accordance with the manufacturer's instructions. Inspection and maintenance should be the same as for formed concrete and concrete block walls. If unusual materials such as timber, or used tyres, are used as a facing it should be checked to see that it is not rotting, or perishing.

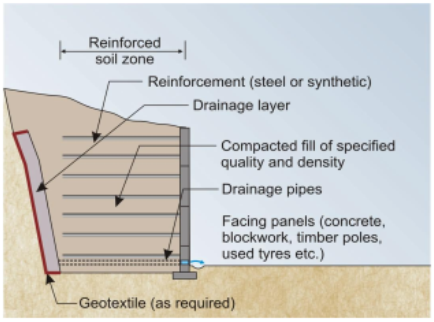


Figure 5 - Typical reinforced soil wall

OTHER WALLS

Cantilevered and anchored walls (Figure 6) - rely on earth pressure on the low side, rather than self-weight, to provided the restoring force and an adequate factor of safety. These walls may comprise:

- a line of touching bored piers (contiguous bored pile wall) or
- sprayed concrete panels between bored piers (shotcrete wall) or
- horizontal timber or concrete planks spanning between upright timber or steel soldier piles or
- steel sheet piles.

Depending on the form of construction and ground conditions, walls in excess of 3 m height normally require at least one row of permanent ground anchors.

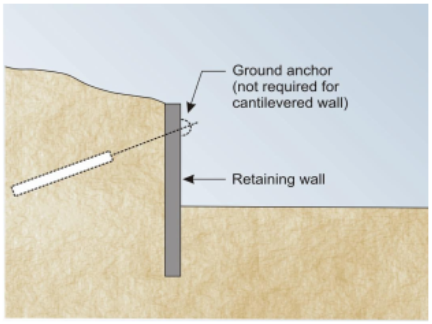


Figure 6 - Typical cantilevered or anchored wall

INSPECTION

All walls should be inspected at least once a year, looking for tilting and other signs of deterioration. Concrete walls should be inspected for cracking and rust stains as for formed concrete gravity walls. Contiguous bored pile walls can have gaps between the piles - look for loss of soil from behind which can become a major difficulty if it is not corrected. Timber walls should be inspected for rot, as for timber crib walls. Steel sheet piles should be inspected for signs of rusting. In addition, you should make sure that ground anchors are maintained as described in GeoGuide LR4 under the heading "Rock bolts and rock anchors".

One of the most important issues for walls is that their internal drainage systems are operational. Frequently verify that internal drainage pipes and surface interception drains around the wall are not blocked nor have become inoperative.

More information relevant to your particular situation may be found in other Australian GeoGuides:

- GeoGuide LR1 - Introduction
- GeoGuide LR2 - Landslides
- GeoGuide LR3 - Landslides in Soil
- GeoGuide LR4 - Landslides in Rock
- GeoGuide LR5 - Water & Drainage
- GeoGuide LR7 - Landslide Risk
- GeoGuide LR8 - Hillside Construction
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Proposed new house
Lot 27 Braeview Drive, Honeywood

Site and Soil Evaluation Report
and
System Design
for On-site
Wastewater Management

April 2022

Cover

View west-northwest towards on Lot 27 Braeview Drive, Honeywood. The site for the proposed house is on the broad crest of the hill (right of camera). The proposed land application area (LAA) for wastewater disposal is on the gentle southwest-facing slope in the foreground and middleground shown here.
Photo: Bill Cromer, 19 April 2022.

Refer to this report as

Cromer, W. C. (2022). *Site and Soil Evaluation Report, and System Design for On-site Wastewater Management, new house, Lot 27 Braeview Drive, Honeywood.* Unpublished report for R. D'Orazio by William C. Cromer Pty. Ltd., 28 April 2022.

Important Note

Permission is hereby given by William C. Cromer as author, and the client, for this report to be copied and distributed to interested parties, but only if it is reproduced in colour, and only distributed in full. No responsibility is otherwise taken for the contents.

IMPORTANT NOTES FOR CLIENT

Guidance documents

Where required or appropriate, this document is in accordance with, or obtains guidance from, the following:

- Australian/New Zealand Standard AS/NZS1547:2012 *On-site domestic wastewater management; "*AS/NZS1547" in this report
- The Tasmanian *On-site Wastewater Management Code* (Code E23 in 2015 interim planning schemes)
- The Tasmanian Director of Building Control's *Guidelines for On-site Wastewater Management* Systems (Nov 2017); the "Guidelines" in this report
- The Tasmanian Director of Building Control's *Determination – Accreditation and Maintenance of Plumbing Installations* (Dec 2016), and
- The software program Trench^{R}3[1] for site assessment and system sizing for domestic wastewater management

Scope and intent of this report

This document includes:

- a Site and Soil Evaluation Report in accordance with AS/NZS1547:2012 and
- a wastewater design and recommendations for wastewater management.

Applying for a Plumbing Permit (PP)

This document is intended to support, not replace, an application (if required) to local Council for a Plumbing Permit.

The designer and system certification

William C Cromer Pty Ltd is the Designer for the design(s) suggested in this report. A **Form 35** is included as Attachment 6 in this document.

The designer may make site inspections to assess whether:

- the installed system appears to conform with the approved design, and
- the system, as installed, appears to conform with AS/NZS1547

It is the responsibility of the client or the client's agent to contact the designer before construction starts on the wastewater disposal system, to establish the stages of construction (if any) required to be inspected by the designer.

[1] Cromer, W. C. (1999). Trench^{TM}3.0: A computer application for site assessment and system sizing, in Patterson, R. A. (Ed.) *On-site '99 – Proceedings of the On-Site '99 Conference: Making on-site wastewater systems work*. Univ. of New England, Armidale, 13-15 Jul 1999, pp 85-88.

SUMMARY STATEMENT

A new five-bedroom equivalent house is proposed for Lot 27 Braeview Drive, Honeywood.

The water supply is reticulated mains water.. A daily wastewater volume of 1,050L is assumed.

Topsoils on site are Category 4 – 5 clayey silt up to about 0.3m thick. Subsoils are Category 5 – 6 silty clay. The natural profile will first be thoroughly ripped to 0.6m and topped by the addition of up to 1.5m of nearby-stockpiled Category 4 topsoil to produce a Category 5 profile.

The proposed on-site wastewater management system will comprise a min. 3500L dual purpose septic tank (4,000L preferred) with outlet filter, discharging via a *Flout* dosing device to a nonconventional (raised) bed of 200m^2 wetted area and (with soil apron) approx. 420m^2 footprint.

Detailed design specifications are provided.

A reserve area is available if required.

The design and location of the wastewater system satisfies AS/NZS1547:2012 *On-site domestic wastewater management*, and Section 3.1 of the Director of Building Control's *Guidelines for On-site Wastewater Management Systems* (November 2017).

1 BACKGROUND

A new five-bedroom equivalent house is proposed for the 2.18ha Lot 27 Braeview Drive, Honeywood (Attachments 1 and 2).

The property is un-sewered.

This report is a site and soil assessment (SSER) and system design for an on-site wastewater management system (OSWMS) for the proposed development.

2 SITE AND SOIL EVALUATION

2.1 Topography and drainage

The proposed house is on the broad crest of a west-northwest – east-southeast hill. Natural slope angles are in the range 3 – 8^0. The property's southern corner extends to an un-named, west-flowing intermittent creek.

2.2 Vegetation

Cleared to pasture.

2.3 Land use

Property is zoned *Rural Living* in the Tasmanian Interim Planning Scheme.

2.4 Water and power supply

Reticulated mains water; electrical power available.

2.5 Assumed daily wastewater

Five bedroom equivalents = 7 people = 150 L/day/person x 7 = 1,050L/day

2.6 Geology and soils

2.6.1 Published geology of the property

The geological map[2] of the area (Map 4, Attachment 1) shows the property to be entirely underlain by subhorizontal Triassic-age sedimentary rocks (sandstone, siltstone).

2.6.2 My interpretation of the geology

No surface exposures of bedrock was observed on the property, but siltstone and mudstone were encountered at shallow depth in all four backhoe test pits dug at and near the proposed LAA.

These materials are interpreted as Triassic in age. In the surface metre or so, they are extremely weathered (Layer 3 in Table 1; exhibiting soil properties) strengthening to highly weathered with depth (Layer 4 in Table 1).

[2] Forsyth, S. M. (compiler) (2002). Digital Atlas 1:25,000 Series. Sheet 5226. Richmond. Mineral Resources Tasmania.

2.6.3 Soil

Texture and thickness

Soils in pits A – D (Layers 1 and 2 in Table 1) on the property are duplex (two-layered) consisting of a sandy silt topsoil (SM, GM) 0.25 – 0.3m thick over a high plasticity silty clay subsoil 0.25 –0.3m thick.

Soil moisture

The soil profile in all test pits was dry to only slightly moist at the time of investigation.

Soil reactivity[3]

To assess potential ground surface movement from reactive clays, and to assist in site classification in terms of *AS2870:2011 Residential slabs and footings*, clayey subsoils are sometimes tested for their shrink swell indices (I_{ss}).

However, the subsoils were too thin for sampling.

Clayey soils (Layer 2) on Triassic sedimentary rocks elsewhere in southern Tasmania typically have Iss values in the 2 – 4% range.

Soil dispersion

Testing of Layer 1 and 2 soils showed that Layer 1 topsoils are non-dispersive, and Layer 2 clayey subsoils are moderately – severely dispersive (Figures 1 and 2).

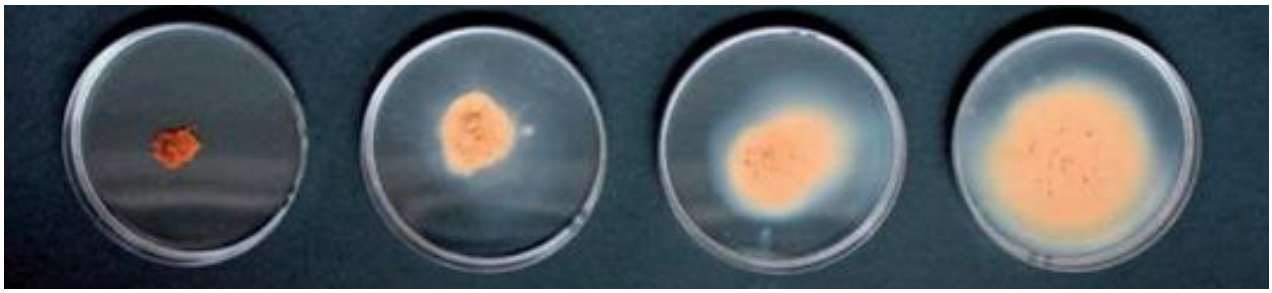


Figure 1 General example of degrees of soil dispersion in four different soils. Each is a single ped in a flat glass dish in a laboratory – after adding tap water. Left to right: no dispersion, slight dispersion, moderate dispersion, and severe dispersion. The soil at left is non-sodic; the soil at right is highly sodic.
Source: https://www.agric.wa.gov.au/dispersive-and-sodic-soils/identifying-dispersive-sodic-soils

Acid sulphate soils

It is inferred that no soils in and near the test pits have the potential to be acid-forming.

2.6.4 AS/NZS1547 soil categories (Table 1)

Topsoil (Layer 1): judged to be Category 4 – 5
Subsoil (Layer 2): judged to be Category 5 – 6
Extremely weathered bedrock (Layer 3): judged to be Category 4 –5

On this basis, the existing soil profile at the LAA is conservatively classified Category 6.

[3] Reactive materials contain clays which shrink and swell in volume when their moisture content decreases or increases respectively.

Table 1. Summary of test pits A – D

Client R. D'ORAZIO
Location Lot 27
Braeview Drive, Honeywood
Date dug 19-Apr-22

Test pit	**A**	**B**	**C**	**D**
Depth dug (m)	1.1	1.7	0.9	1.3
Easting (GDA94)	524965	524935	524935	524967
Northing (GDA94)	5268308	5268313	5268334	5268328
Water inflow (depths in m)	None	None	None	None
Standing water level (m)	N/A	N/A	N/A	N/A

				Interpretation					
No.	**Layer**	**Details**	**USCS**	**Horizon**	**AS/NZS1547 soil category**	Figures are depths to top and bottom of layer, in metres			
1	**Sandy SILT**	Grey brown grading to light grey; cloddy, fractured; non-plastic; locally with up to 20% angular siltstone/mudstone clasts well-graded to 50mm; D; Fb-H	SM, GM	Topsoil (A horizon)	4 - 5	0 to 0.25 D@0.1	0 to 0.25 D@0.15	0 to 0.3 D@0.1	0 to 0.3 D@0.15
2	**Silty CLAY**	Orange brown; some silt and sand; high plasticity; fractured to base; M<<PL; H	CH	Subsoil (B horizon)	5 - 6	0.25 to 0.6 D@0.4	0.25 to 0.5 D@0.4	0.3 to 0.6 D@0.4	0.3 to 0.6 D@0.4
3	**Silty CLAY - clayey SILT**	Grey brown, light yellowish brown; low plasticity to non-plastic with depth; strength increases with depth; weak horizontal texture/bedding; D; Fb-D	CL	CB horizon (extremely weathered bedrock	4 - 5	0.6 to c1.2	0.9 to 1.1		
4	**SILTSTONE, MUDSTONE, SANDSTONE**	Grey brown; subhorizontal; strongly fracture; highly weathered	SP	Triassic-age siltstone - mudstone bedrock	N/A	c1.2 to 1.65 EAR	1.1 EAR	0.6 to 0.9 CR	0.6 to 1.3 CR

Notes and abbreviations

USCS = Unified Soil Classification System
Grey cells indicate a missing layer or layers in a test pit
Easting and Northing coordinates from Google Earth and hand-held GPS. Datum is GDA94.
Excavability Equipment = Backhoe; 0.45m GP bucket; 4 teeth; Operator: Renzo D'Orazio
EAR = end as required; NR = no refusal; CR = close to refusal; R = refusal.
Samples D = disturbed sample; U50 = Undisturbed 50mm diam drive tube sample
Weathering For rock only. F = fresh; SW = slightly weathered; MW = moderately weathered; HW = highly weathered;
EW = extremely weathered (ie soil properties; material can be remolded in the hand, with or without water)
Moisture D = dry; M = moist (M<=>PL = moisture less than, equal to or greater than Plastic Limit); W = wet.
Consistency Fb = Friable (crumbles to powder when scraped with thumbnail)
S = Soft (Easily penetrated by fist; 25 – 50kPa)
F = Firm (Easily penetrated by thumb; 50 – 100kPa)
St = Stiff (Indented with thumb; penetrated with difficulty; 100 – 200kPa)
VSt = Very stiff (Easily indented with thumbnail; 200 – 400kPa)
H = Hard (Indented by thumbnail with difficulty; >400kPa)
Rel density VL = Very loose (ravelling)
L = Loose (easy shovelling)
MD = Medium dense (hard shovelling)
D = Dense (picking)
VD = Very dense (hard picking)

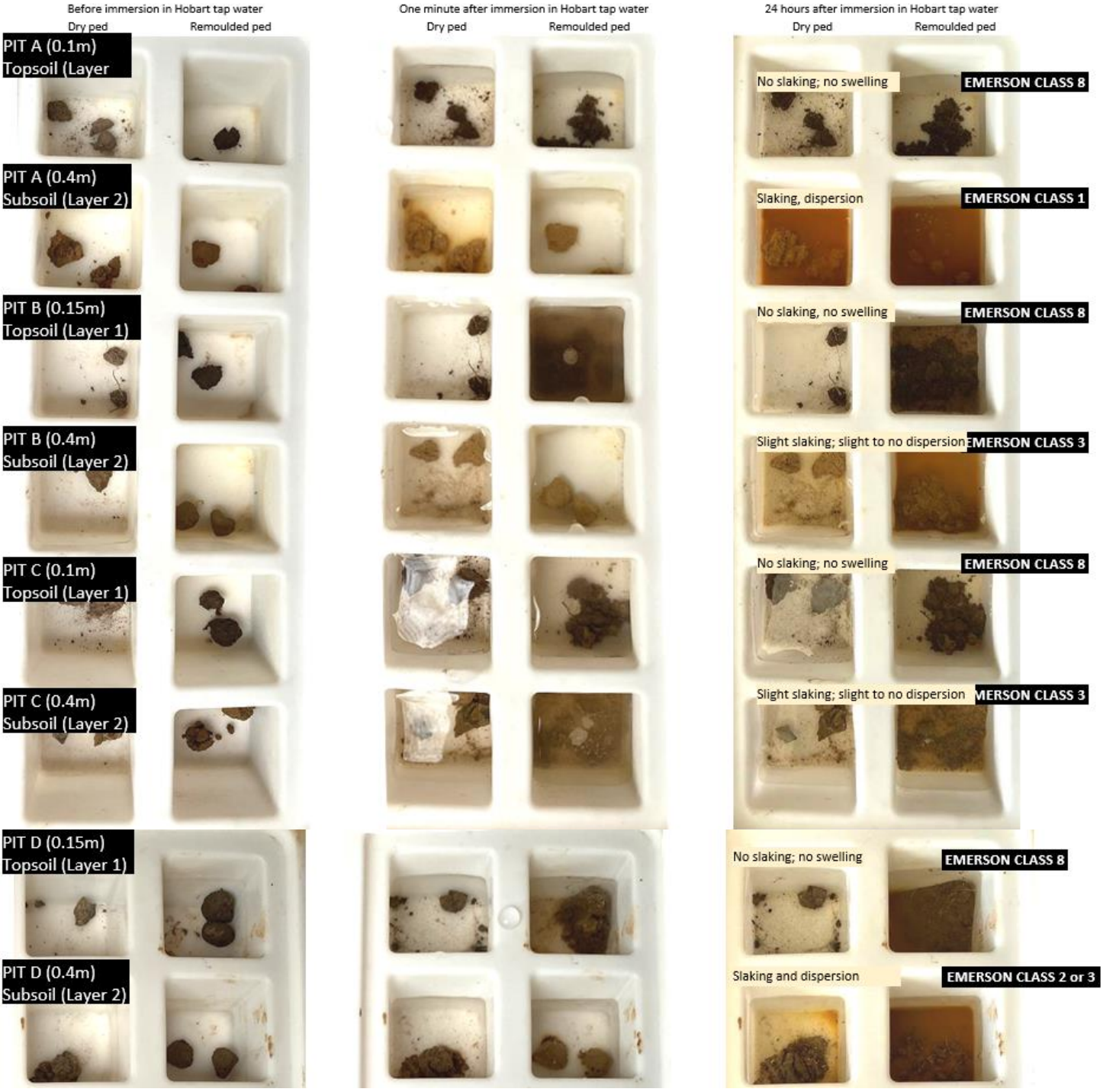


Figure 2. Results of dispersion testing of samples from pits A – D at and near the LAA. Soil peds immersed for 24 hours in tap water either slake (Emerson Classes 1 – 6) or don't slake (Classes 7 and 8)
Of those that slake, some clearly disperse (Classes 1 and 2) or show no or slight dispersion (Classes 3 – 6).
Peds in Classes 3 – 6 which disperse after remoulding are Class 3. Other remoulded peds which do not disperse (or do so after shaking) are Classes 4, 5, or 6. The testing for this project does not distinguish between Classes 4, 5 or 6.

2.7 Soil selected for wastewater disposal

The existing soil profile (Category 6) will be used for wastewater disposal. The profile will be modified by the construction of a nonconventional (raised) bed (here called an NCB), with imported topsoil[4].

This topsoil has been stockpiled on and from adjacent lots owned by the D'Orazio family and is available in sufficient quantities for constructing wastewater disposal system.

The soil from two of these stockpiles was tested for permeability (Plates 1 and 2). Results were 0.06m/day and 0.25m/day (geometric mean = 0.12m/day; Category 4 clay loam; Table L1 of AS/NZS1547).

Thickness

Combined existing Category 4 –5 topsoil and imported Category 4 topsoil, up to one metre thick.

The overall Category for system sizing = Category 5 in terms of Table L1 of AS/NZS1547.

Design Loading Rate (DLR)

Adopted as 5mm/day for Category 5 soils.

2.8 Groundwater

2.8.1 Temporary groundwater conditions

At the time of investigation, no shallow subsurface water was encountered in test pits. None is expected to occur even after heavy rain because the gentle slope of the property currently allows for adequate surface drainage.

2.8.2 Permanent groundwater

Permanent groundwater conditions are expected to exist in fractured bedrock beneath the property and throughout the area, but at depths which will not affect residential subdivision.

2.8.3 Closest water bore

There are no recorded groundwater extraction bores within one kilometre or so of the area proposed for wastewater disposal (see the Groundwater Information Access Portal).

[4] Any topsoil from the house site on Lot 27 should not be used in the NCB because it is Category 4 – 5.

Plate 1 (above). A Cromer Constant Head permeameter test (duration 117 mins) on stockpile 1 at grid coordinate GDA94 525049mE, 5268351mN produced a permeability of 0.06m/day. Texturally, in hand specimen, the topsoil was a dark brown clayey sandy silt. In terms of AS/NZS1547 Table L1, the field permeability corresponds to a "Light clay; weakly to moderately structured (Category 5).

Plate 2 (below). A Cromer Constant Head permeameter test (duration 55 mins) on stockpile 2 at grid coordinate GDA94 525134mE, 5268350mN produced a permeability of 0.25m/day. Texturally, in hand specimen, the topsoil was a dark brown clayey sandy silt. In terms of AS/NZS1547 Table L1, the field permeability corresponds to a "Clay loam; weakly structured (Category 4).

3 SYSTEM DESIGN

3.1 Regulatory requirements

Wastewater management on this property must comply with:

- the requirements of AS/NZS1547:2012 *On-site domestic wastewater management* and (in lieu of any wastewater provisions in the Tasmanian Planning Scheme – Brighton Council),
- the Director of Building Control's *Guidelines for On-site Wastewater Management Systems* (November 2017; the "Guidelines")

3.2 System selection

Because there is a large area of land available for wastewater disposal on moderate slopes down-gradient from the house site, it is proposed to install a septic tank (with outlet filter), discharging via a dosing device to a nonconventional (raised) bed (Attachment 4).

3.3 System sizing

3.3.1 Septic tank

For reticulated mains water supply and five bedrooms equivalents (seven people and a daily wastewater flow of 1,050L), Table J1 of AS/NZS1547 specifies a minimum volume of between 3,500L and 4,000L for the dual purpose septic tank. The latter is suggested. It shall be fitted with an outlet filter. A bristle filter is appropriate.

3.3.2 Pump pit

Not required.

3.3.3 Sizing of the wetted area for wastewater disposal

In accordance with Section L4.2 of AS/NZS154, a minimum of 200m^2 of wetted area is required for a daily wastewater volume of 1,050L and a DLR of 5mm/day.

3.3.4 Design for land application area (LAA)

Attachment 4 contains a detailed design for the nonconventional bed.

The LAA includes the minimum 200m^2 wetted area, and an apron of soil on all sides. These together constitute the nonconventional bed. The footprint of the nonconventional bed is approximately 30m x 14= 420m^2.

3.3.5 *Flout* dosing device

It is recommended that a *Flout* dosing device be installed between the septic tank and the nonconventional bed. The suggested dosing volume is 400L. See Attachment 4 for details of the device, and links to short videos of it operating. An address for ordering the *Flout* is provided.

3.3.6 Cut-off drain

Required. See Attachment 4. A suggested drain design is 0.15 – 0.2m wide and 0.5m deep, with a basal 65mm ag pipe or slotted PVC pipe in a bed of clean aggregate to the surface; the aggregate is wrapped in geofabric.

3.4 Land area available

Sufficient area is available for a back-up system, and to satisfy Table 3 of the Guidelines.

3.5 Compliance with regulations

The system as designed complies with AS/NZS1547: 2012, and Section 3.1 of the Guidelines (Table 1).

3.6 Summary of system design (Attachment 4)

Method	Dual purpose septic tank of min. 3,500L fitted with an outlet filter, and gravity discharge via a *Flout* to a nonconventional bed
Design details	See Attachment 4. The installer shall also refer to further details for nonconventional beds on my website
Wetted Area	Min. 200m^2

Second. Disposal Area Available if required.

Dosing facility	Required.
Cut-off drain(s)	**R**equired. See Attachment 4.
Setback(s)	See Table 1.

Table 1. System compliance with Guidelines Section 3.1 *Standards for Land Application Areas*

Address
Lot 27 Braeview Drive, Honeywood
Director's Guidelines for Onsite Wastewater Management Systems
Section 3.1 Standards for Land Application Areas

OBJECTIVE: To provide for sustainable onsite wastewater management through the provision of appropriately designed and located land application areas and wastewater treatment units

Separation distances to a LAA	Compliance of proposed new lot	Reasons for compliance
Horizontal distance from a building	Complies with A1(i) and (ii)	LAA more than 2m from closest upslope building; no downslope building
Horizontal distance from downslope surface water	Complies with A2(a)	LAA more than 100m from downslope surface water
Horizontal distance from a property boundary (measured at right angles to contours)	Complies with A3(a)	LAA more than 40m from downslope property boundary
Horizontal distance from a downslope bore, well or similar water supply	Complies with A4	No recorded operating water bore within 1km or so of site. See the Groundwater Information Access Portal (http://dpipwe.tas.gov.au/water/groundwater/groundwater-information-access-portal)
Vertical distance from groundwater	Complies with A5(a)	Vertical separation to groundwater >1.5m
Vertical distance from a limiting layer	Complies with P6	Primary treatment, subsurface application, setback is consistent with AS/NZS1547 Appendix R
Arrangement of the LAA	Complies with P7	LAA will have a minimum horizontal dimension >3m, and will not include areas beneath buildings, driveways or other hard stand areas.

4 GENERAL NOTES

Depending on the type of on-site wastewater management system installed, owners may be required by Council to satisfy all or some of the following, which would usually form a set of conditions of approval for a Plumbing Permit.

1. The system shall comply with the currently-adopted version of AS/NZS1547.

2. All tank and system openings shall be accessible at finished surface level for inspection and servicing, and adequately sealed to prevent stormwater infiltration.

3. Where pumps are fitted and power is required for system operation, a hard-wired audible and visible (indicator light) alarm shall be installed to warn of pump failure, blower failure and power failure.

4. Where an existing disposal system is being added to or altered and the existing septic tank is going to be used, a filter will need to be retro-fitted to the existing septic tank. Owners will need to advise their plumber to ensure that this matter is taken into consideration when purchasing a new septic tank or where the filter is to be retro-fitted.

5. The minimum wetted area requirement for wastewater disposal must be installed and maintained in the approved locations as per the design by the Designer and lodged with the application for a Plumbing Permit.

6. All wastewater disposal (including irrigation) areas shall be completed, approved and formally signed off by the Designer as complying with AS/NZS1547 prior to commissioning of the system. Certification, in a format approved by Council; shall include a site plan to scale showing the wastewater disposal locations and areas property boundaries, infrastructure, GPS grid coordinates.

7. All pipes, pipe sleeves, identification tapes, and outlets on an irrigation system shall be coloured lilac (P23), in accordance with AS2700.

8. If one or more wastewater irrigation systems are proposed, they shall be constructed and installed in accordance with approved plans accompanying the Plumbing Permit, and the following:

Spray Irrigation Systems:

- The sprinklers used for distributing the wastewater must of a type that minimise formation of small droplets and aerosols. Impact and pencil type sprays shall not be used.
- A flush valve is to be installed on each irrigation area so that the lines can be flushed. The discharge from the flush valve must discharge either onto the irrigation area or piped back to a suitable chamber of the treatment system, having regard to whether the wastewater is chlorinated or not, so that the efficacy of the treatment plant is not compromised by the introduction of the flush water.
- Flush valves are to be installed in valve boxes to enable inspection and service.

Drip and Sub-surface Irrigation Systems:

- Only pressure compensated drip line shall be used.
- Vacuum breaker valves are to be provided at the high point(s) of all irrigation fields. Such valves are to be installed in valve boxes to enable inspection and service.
- A flush valve is to be installed on the low point of each irrigation field with piping discharging the flush water to a suitable chamber of the treatment system, having regard to whether the wastewater is chlorinated or not, so that the efficacy of the treatment plant is not compromised by the introduction of the flush water. Flush valves are to be installed in valve boxes to enable inspection and service.

9. Unless specifically advised by the Designer as unnecessary or inappropriate, an effective surface water diversion drain or mound shall be provided and maintained on the high side of wastewater disposal (including irrigation) areas. Note that all concentrated stormwater must be retained on the property.

10. Weed matting, plastic or other materials that impede water penetration into the soil shall not be used between the irrigation system and the soil surface.

11. All wastewater irrigation areas shall be maintained in good order at all times. Such maintenance includes but may not be restricted to weeding, mowing, and replacement of mulch or plants.

12. Council shall be provided with an amended plan if the location of the irrigation area is altered or changed from the "as installed" plan. The owner shall ensure that any altered wastewater disposal (including irrigation) areas meet minimum setback distances from boundaries and buildings and any other conditions contained within this permit.

13. The wastewater treatment system shall be regularly maintained in accordance with the conditions of accreditation issued under relevant plumbing codes, guidelines or regulations.

14. Any septic tank associated with the disposal system shall be desludged at least once every three years.

15. Where required, the owner shall enter into and maintain an on-going service maintenance agreement with a person with appropriate qualifications and experience to maintain the wastewater disposal system in accordance with relevant plumbing codes, guidelines or regulations. A copy of the signed agreement shall be submitted to Council before commissioning of the system.

16. Where required, secondary treated effluent quality for covered drip and shallow subsurface irrigation on a land application area shall meet the criteria specified in the installed system's certificate of accreditation or, if not specified, as follows (from Appendix M of AS/NZS1547:2012):

5-day Biological Oxygen Demand (BOD5)	90% of samples <=20g/m3
	(no sample >30g/m3)
Total Suspended Solids (TSS)	90% of samples <=30g/m3

(no sample >45g/m3)

For spray irrigation of secondary treated wastewater, the above shall apply, and in addition the following shall apply:

E. coli	average concentration 10cfu/100ml
	(less than 20% of samples >20cfu/100ml)
Free available chlorine	between 0.5 – 2mg/L

17. Only when these tests indicate compliance will the unit be regarded as being commissioned. A NATA approved laboratory should conduct such tests. Testing shall be conducted as follows:

a) Commissioning phase: Mandatory testing after three months from the final installation inspection (to coincide with the normal on-going scheduled maintenance visits) but fortnightly in the event of failure to comply

b) On going operational phase: Mandatory testing for a free chlorine residue is required every three months. Remedial works should be undertaken when the minimum fire chlorine residual is not met. Random surveillance for BOD5, TSS and thermotolerant coliforms shall be done at no less than once each 4 years. An authorised person may require sampling for BOD5, TSS and thermotolerant coliforms or to undertake other chemical analyses to help identify operational problems.

18. Where required, monitoring details for individual on-site waste water management systems are to be recorded on a standardised form and lodged with the Council each quarter.

19. A final inspection of all installations may be conducted by a Council Environmental Health Officer following receipt of the written certification from the system designer. Plumbers and owners should be made aware that a minimum number of working days' notice is required for such inspections and the building will need to be open for inspection as required.

W. C. Cromer
Principal

This report is and must remain accompanied by the following Attachments

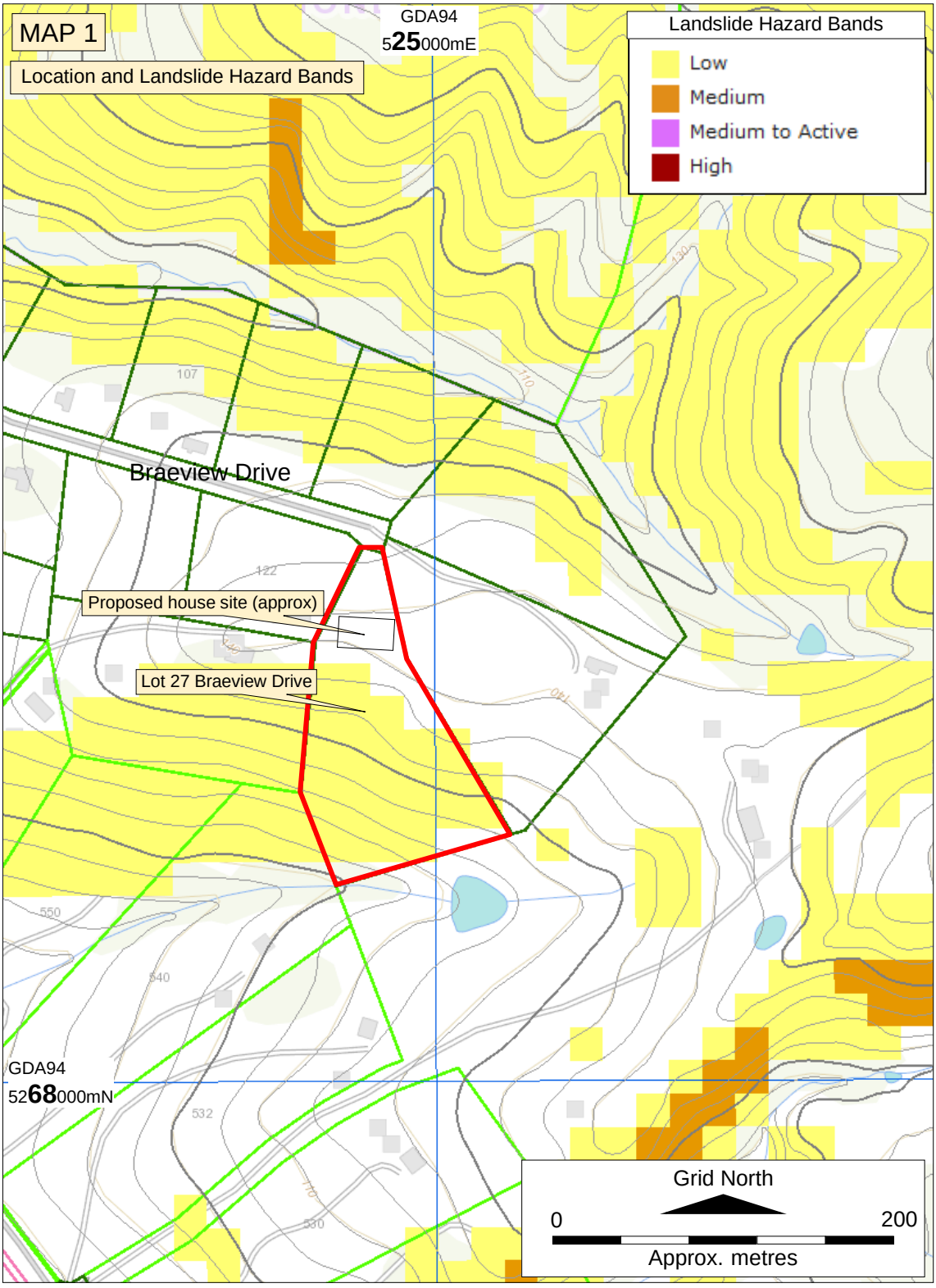
Attachment 1. Location and landslide hazard bands, aerial imagery, hillshading and published geology (1 page)
Attachment 2. Site and test pit photographs (6 pages)
Attachment 3. Aerial image showing test pits and approximate house site, and the location of proposed LAA relative to house site ((1 page)
Attachment 4. Schematic system layout and construction details (6 pages)
Attachment 5. Loading Certificate and risk assessment (4 pages)
Attachment 6. Form 35 for this project (3 pages)
Attachment 7. Documents required in relation to a plumbing permit for an on-site wastewater management system (2 pages)

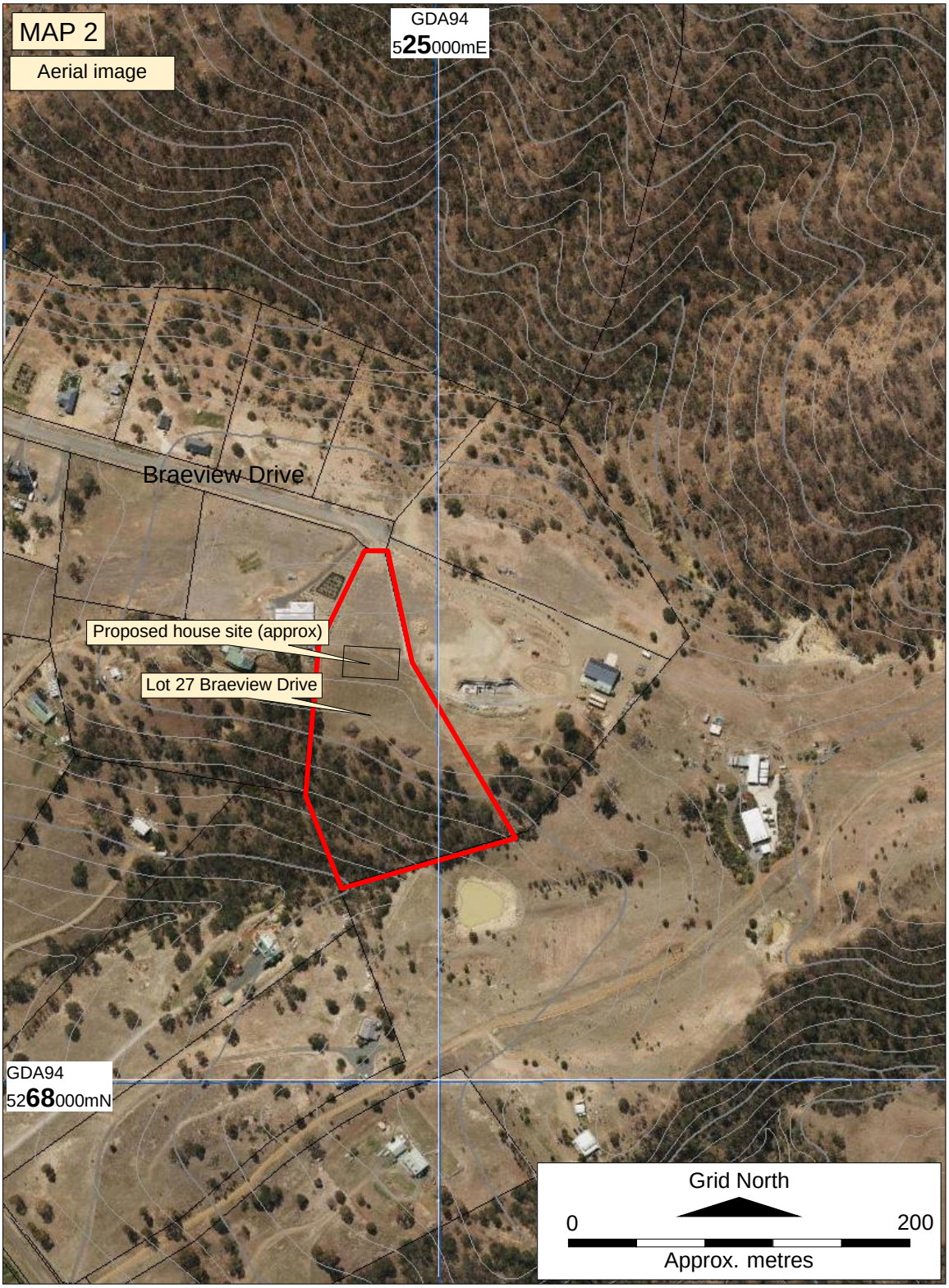
Attachment 1

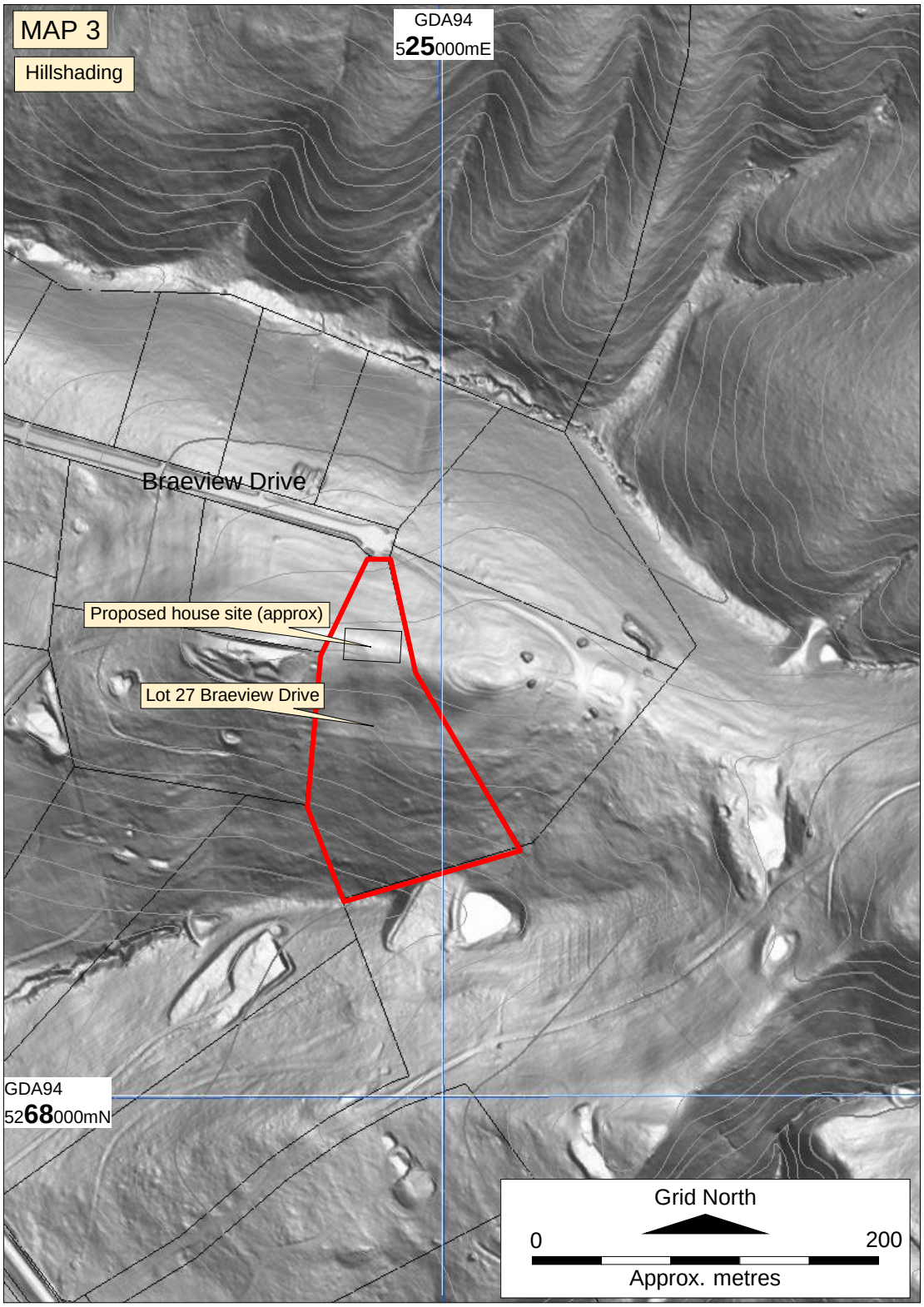
(4 pages)

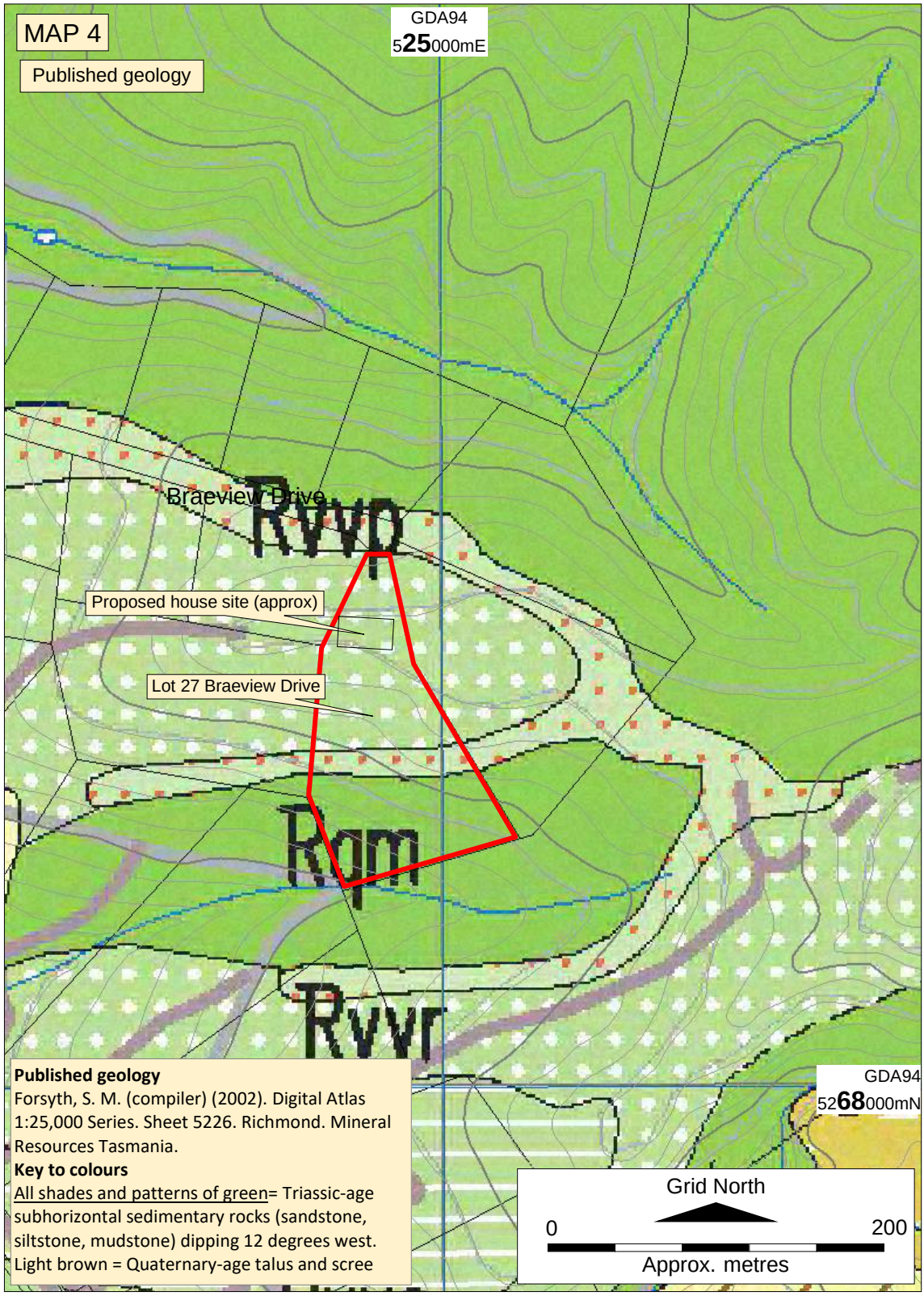
Location and landslide hazard bands, aerial imagery, hillshading and published geology

Sources: http://maps.thelist.tas.gov.au; Mineral Resources Tasmania




MAP 2
Aerial image
GDA94
525000mE
Braeview Drive
Proposed house site (approx)
Lot 27 Braeview Drive
GDA94
5268000mN
Grid North
0
200
Approx. metres


MAP 3
Hillshading
GDA94
525000mE
Braeview Drive
Proposed house site (approx)
Lot 27 Braeview Drive
GDA94
5268000mN
Grid North
0
200
Approx. metres


MAP 4
Published geology
GDA94
525000mE
Braeview Drive
Rvvd
Proposed house site (approx)
Lot 27 Braeview Drive
Rqm
Rvvr
GDA94
5268000mN
Grid North
0
200
Approx. metres
Published geology
Forsyth, S. M. (compiler) (2002). Digital Atlas 1:25,000 Series. Sheet 5226. Richmond. Mineral Resources Tasmania.
Key to colours
All shades and patterns of green= Triassic-age subhorizontal sedimentary rocks (sandstone, siltstone, mudstone) dipping 12 degrees west.
Light brown = Quaternary-age talus and scree

Attachment 2

(6 pages including this page)

Site and test pit photographs

The scale in the photos is graduated into red- and black-numbered segments each one metre long.
The numbers are decimetres.

There are three photos for test pits A, B and D (no photos were taken of pit C).
The first and main photo shows the soil profile in the test pit, the second shows the location of the test pit relative to site features, and the third shows the materials excavated from the test pit (first to last is from right to left)

From top to bottom: views looking east, east-southeast and southeast from near the western property boundary over the area (between pits C and D) proposed for the new house.

LOT 27
BRAEVIEW
DRIVE
MAR22
PIT A
Layer 1
Layer 2
Layer 3
Layer 4

LOT 27
BRAEVIEW
DRIVE
MAR 22
PIT B
Layer 1
Layer 2
Layer 3
Layer 4

There are no photographs of test pit C
Table 4.1 in Attachment 4 shows its soil profile to be very similar to that in test pit D.

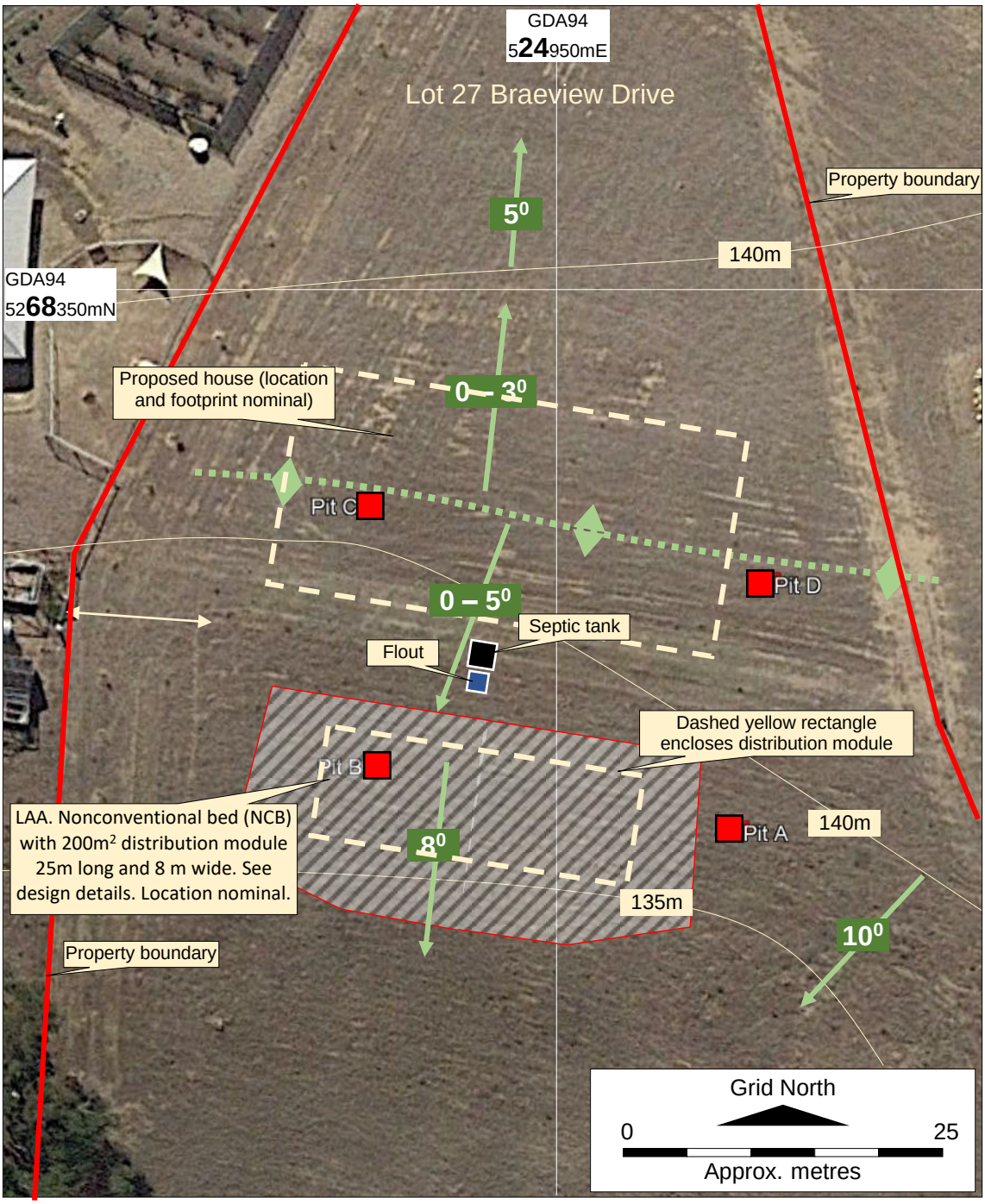

Layer 1
Layer 2
Layer 3

Attachment 3

(1 page)

Aerial image showing test pits and approximate house site, and the location of proposed LAA relative to house site

Source for base image: Google Earth; image date 12 April 2019

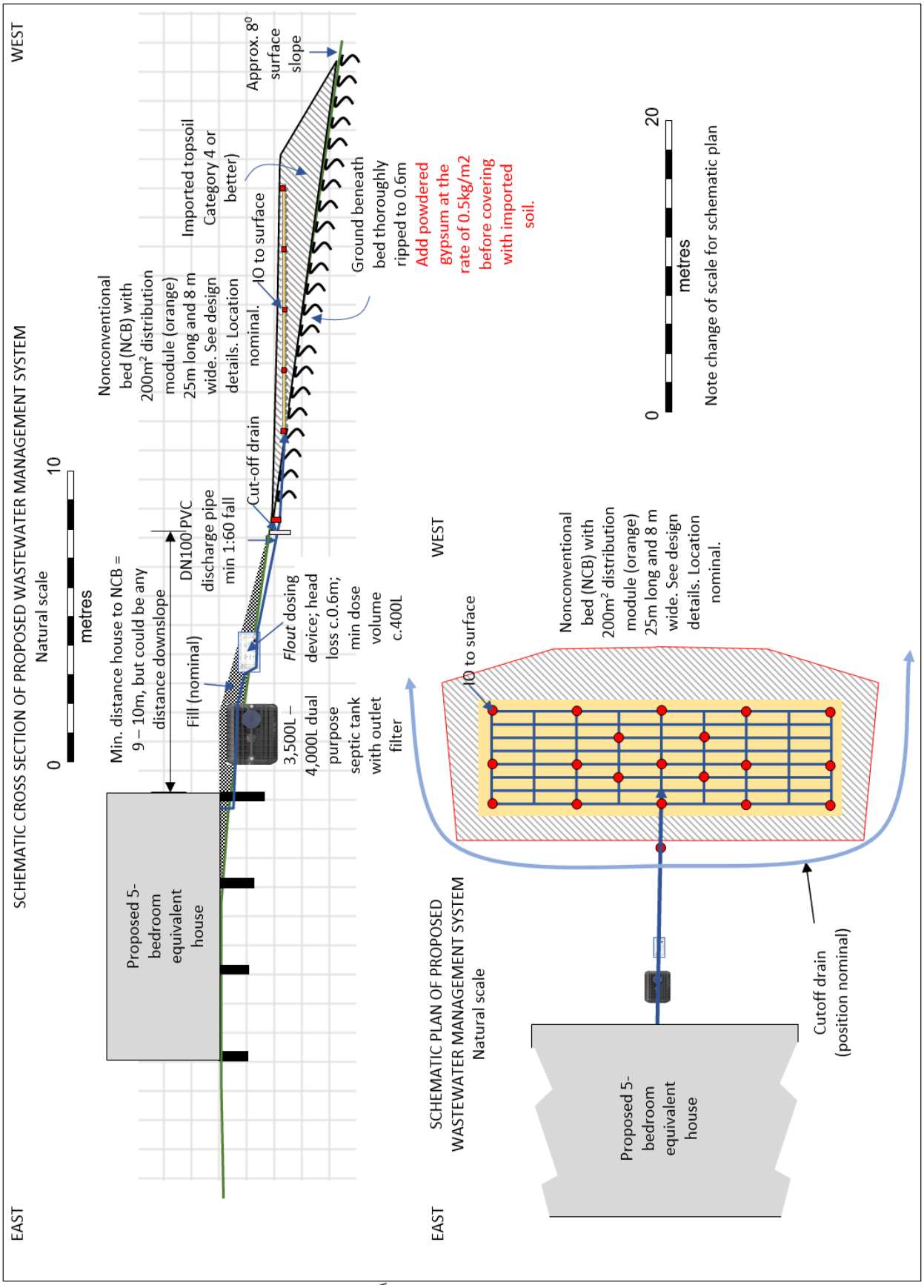


Attachment 4

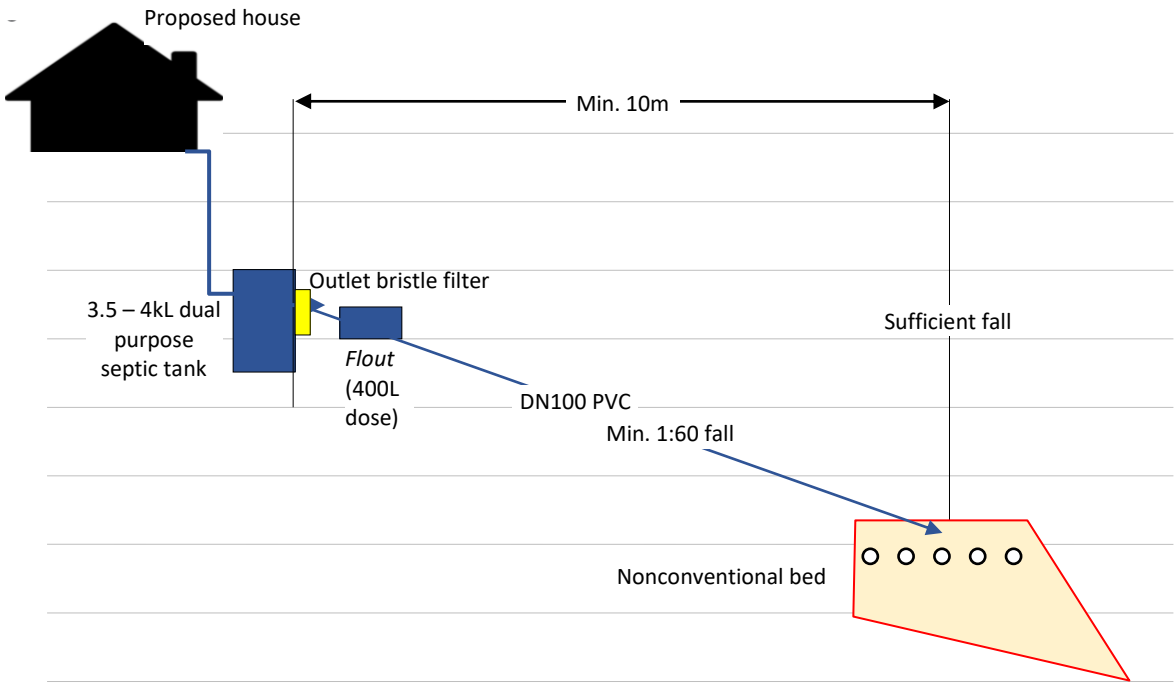
(6 pages)

Schematic system layout and construction details

Source for aerial image: www.thelist.tas.gov.au



SCHEMATIC CROSS SECTION SHOWING NOMINAL ELEVATIONS



MATERIALS AND RECOMMENDED DIMENSIONS

Materials

1	Topsoil after any grass cover stripped. Thoroughly rip as shown to depth s
2	Subsoil. Thoroughly rip as shown to depth s
3	Bedrock
4	On-site and/or imported Category 1, 2, 3 or 4 soil. See Note 1 below.
5	Distribution module: 7-10mm durable screened aggregate below and above distribution pipework
6	Distribution pipework: 100mm PVC perforated with 4mm diam holes nom. each metre or so.
7	Geofabric
8	Soil cover over bed and distribution module
9	100mm inspection opening to surface
10	Cut-off drain, with nom. 65mm ag pipe at base, backfilled to surface with aggregate; geofabric lined

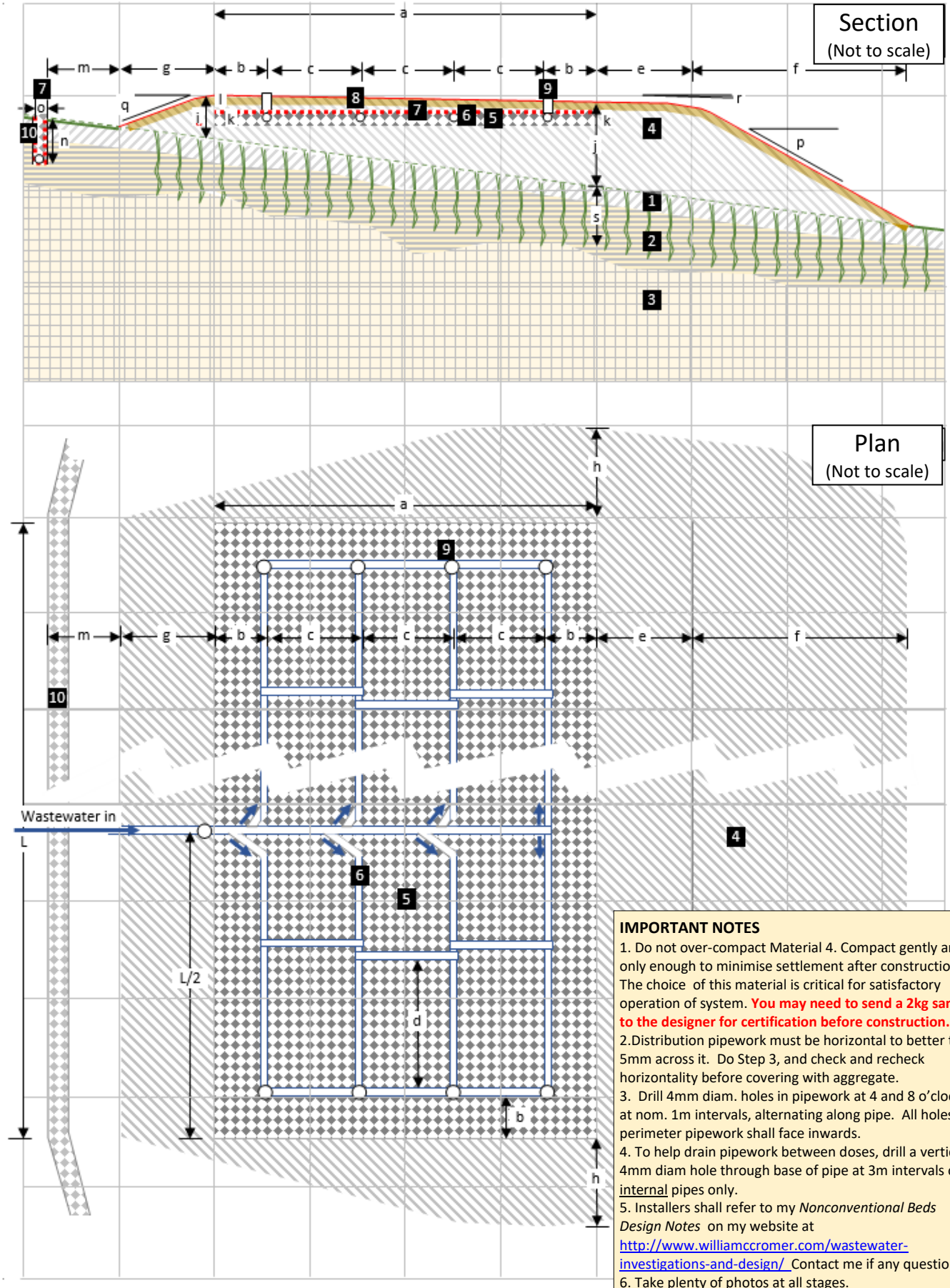
Recommended dimensions for the current system

	Unit	Size	Description/comment
L	m	25	Length of distribution module. L x a = wetted area.
a	m	8	Width of distribution module. L x a = wetted area.
b	m	0.8	Distance from pipework to outer edge of distribution module
c	m	1	Distance between centres of distribution pipework
d	m	3	Distance between centres of lateral pipework
e	m	1	Distance from edge of distribution module to break of slope of bed
f	m	3.5-4	Width of downslope apron
g	m	2	Width of upslope apron
h	m	2-Mar	Width of side apron
i	m	0.1	Thickness of Type 4 soil at upslope end of distribution module
j	m	1.5	Thickness of Type 4 soil at downslope end of distribution module
k	mm	160	Thickness of aggregate in distribution module; contains distribution pipework.
l	mm	120	Thickness of covering soil over distribution module and bed
m	m	0.5	Distance from bed to upslope cut-off drain
n	m	0.5	Depth of cut-off drain with ag. pipe and aggregate wrapped in geofabric.; maintain 1:50 gradient.
o	m	0.15-0.2	Width of cut-off drain. Continue aggregate to surface.
p	degrees	30	Slope of downslope apron
q	degrees	2	Slope of upslope apron
r	degrees	2	Slope of final surface of bed
s	m	0.6	Depth of ripping

Important notes

1. CHECK WHETHER DESIGNER REQUIRES A SAMPLE OF YOUR PROPOSED IMPORTED SOIL FOR CERTIFICATION BEFORE CONSTRUCTION.
2. CHECK WITH DESIGNER WHETHER SITE INSPECTION(S) ARE REQUIRED, AND AT WHAT STAGE(S) OF CONSTRUCTION.

DESIGN DETAILS (see accompanying Table for materials and dimensions)



IMPORTANT NOTES

1. Do not over-compact Material 4. Compact gently and only enough to minimise settlement after construction. The choice of this material is critical for satisfactory operation of system. **You may need to send a 2kg sample to the designer for certification before construction.**
2. Distribution pipework must be horizontal to better than 5mm across it. Do Step 3, and check and recheck horizontality before covering with aggregate.
3. Drill 4mm diam. holes in pipework at 4 and 8 o'clock, at nom. 1m intervals, alternating along pipe. All holes on perimeter pipework shall face inwards.
4. To help drain pipework between doses, drill a vertical 4mm diam hole through base of pipe at 3m intervals on internal pipes only.
5. Installers shall refer to my *Nonconventional Beds Design Notes* on my website at http://www.williamccromer.com/wastewater-investigations-and-design/ Contact me if any questions.
6. Take plenty of photos at all stages.

Flout dosing device

"The Flout is used to turn a normal, sporadic flow of wastewater into controlled, equal intermittent doses. This is useful when delivering water to reed beds or leachfields, ensuring an even spread of water, optimising treatment performance and reliability. Because they operate solely under gravity, where there is a suitable fall in the land Flouts eliminate the need for electrical pumps."
https://watercoursesystems.co.uk/flout-floating-outlet/
View a short lab video. View another with a Flout emptying

The Flout can be ordered from:

Whitehead & Associates
197 Main Road
Cardiff NSW 2285
Telephone 02 4954 4996
mail@whiteheadenvironmental.com.au

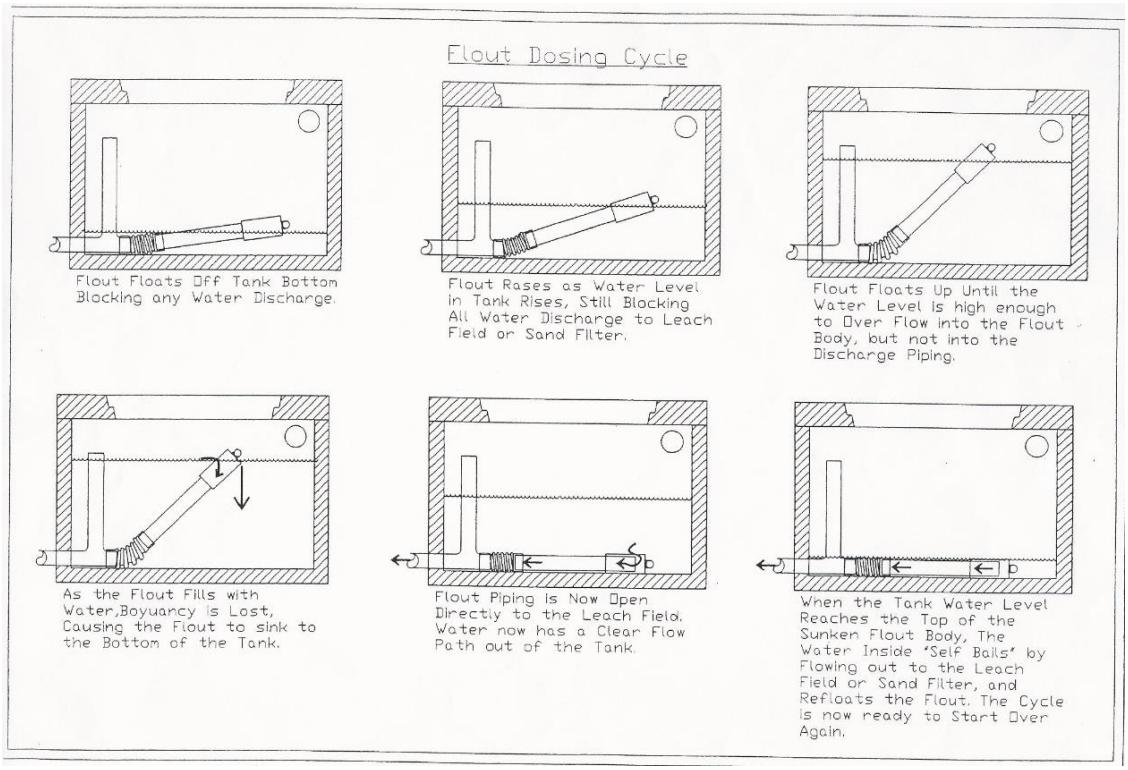


Plate 4.1 (above). Example of a nonconventional bed before covering the distribution pipework with more aggregate, geofabric, and covering soil. This is the stage when the pipework grid should be water- filled and carefully perforated. Start with 4mm holes every 2m or so, and in-fill the holes to obtain even distribution of wetted areas. Holes in outer pipework should point inwards. Note inspection openings (to surface) at ends of laterals.

Plate 4.2 (below). Detail of the inlet pipework and fittings to the distribution pipework. The setup is designed to facilitate even distribution of wastewater to the laterals. Note inspection opening on incoming line (foreground)

Plate 4.3 (above). Example of a nonconventional bed before covering the distribution pipework with more aggregate, geofabric, and covering soil. This is the stage when the pipework grid should be water- filled and carefully perforated.

Plate 4.4 (below). Example of completed nonconventional bed (arrowed)

Attachment 5

(4 pages)

Loading Certificate and risk assessment

The owner should retain and read any certificate of accreditation, operating manual or related documents for components of the selected wastewater treatment system, to ensure optimal, nuisance free operation of the system with minimal environmental health impacts.

This loading certificate is provided in accordance with Clause 7.4.2(d) of AS/NZS 1547

5.1 System capacity (medium-long term)

1,050 litres/day; 7 persons

5.2 Design criteria summary:

Effluent quality	Primary from a dual-purpose septic tank
Soil category	Category 4 – 5. Max medium-long term Design Loading Rate no more than 5mm/day.
Land application system	Discharge from the septic tank via an outlet (eg bristle) filter, through a *Flout* dosing device (400L dose) and thence to a nonconventional bed with a minimum wetted area of 200m^2. See this report.

5.3 Primary disposal area (land application area)

The LAA includes the wetted area, and an apron of soil on all sides. These together constitute the nonconventional bed. The footprint of the bed+apron is approximately 30m x 14m = c.420m^2. See Attachment 4.

5.4 Secondary disposal area (Reserve land application area)

A nominal location for the Reserve area (SDA) is available.

5.5 Water efficient fittings etc

Design assumes standard use of water efficient fixtures and fittings, eg 3L/6L flush toilets, 9L/min (max) showerheads, aerator fittings on taps.
(see https://apps5a.ris.environment.gov.au/wels-public/search-product-select-load.do)

5.6 Phosphorus free detergents, etc

Phosphorus free detergents and soaps are recommended for the house.

5.7 Variation from design flows etc.

The system should successfully manage additional occasional short term (eg no longer than daily) peak loadings provided that this does not exceed more than 25% of the design system capacity.

5.8 Consequences of changing wastewater characteristics.

Users of the system should avoid disposing of wastes which would be additional to those normally disposed in a household sewerage system; in particular, increases in organic loadings such as from the use of sink-waste disposal units are to be avoided.

Users of the system should avoid using disinfectants or bactericides in anything more than small amounts and at recommended rates of dilution, and should not dispose of solvents and other chemicals or pharmaceuticals such as antibiotics or antimicrobials which may kill bacteria and other microorganisms required for effective wastewater treatment.

5.9 Consequences of overloading the system.

Long term daily wastewater generation exceeding system capacity may result in biological and hydraulic overloading of the nonconventional bed, surfacing of effluent, environmental health nuisances, pollution of surface water and groundwater etc.

5.10 Consequences of underloading the system.

Long periods of zero use may result in poor functioning of the system when normal use recommences.

5.11 Consequences of lack of operation, maintenance and monitoring attention.

The components of the wastewater system are

1. the dual-purpose septic tank fitted with outlet filter,
2. the *Drainwave* dosing device,
3. the 100mm PVC delivery line, and
4. the nonconventional bed at the LAA

Consequences of failure to observe the regular maintenance requirements may include any of the following:

- Spread of infectious diseases
- Nuisance and unpleasant odours
- Pollution of waterways, streams, beaches and shellfish beds
- Contamination of bores, wells and groundwater
- Excessive and unsightly weed growth
- Alteration of local ecology
-

5.12 Maintenance of a system log book

It is recommended that a log book be kept of system maintenance (eg pump out of septic tank), problems or modifications.

5.13 Other relevant considerations

Fence off the land application area so people (including children), animals and vehicles do not have access.

Do not allow vehicles within the LAA. If grassed, the LAA and its batter slopes can be maintained with a lawn mower.

Make no modifications to the design of this system without authorisation.

5.14 Risk management of the proposed wastewater management system

Tables 5.1 and 5.2 summarise a risk management approach for the wastewater management system at this site, in general accordance with Clause A3.2 of AS/NZS1547.

Table 5.1 Terminology used in risk management in this report
Table 5.2 Issues relating to the use and sustainable management of the wastewater system at this site

Table 5.1. Terminology used in risk management in this report

Likelihood	Consequences to property and or indicated stakeholders			
	Major	Medium	Minor	Insignificant
Almost certain	VH	VH	H	L
Likely	VH	H	M	L
Possible	H	M	L	VL
Unlikely	M	L	L	VL
Rare	L	L	VL	VL
Barely credible	VL	VL	VL	VL

Notes

1. In this report, an **issue** is defined as a physical, chemical or environmental aspect of a particular site (as listed in Trench[R]3) which should usually (but not necessarily always) be considered in the design of a wastewater system at the site.
2. **Likelihood** describes the possibility – if untreated – of the issue causing a hazard over the projected operational life of the on-site wastewater management system
3. A **hazard** is a physical, chemical or biological agent with the potential to cause harm.
4. **Consequence** describes the level of impact or harm caused by a hazard, and in this report is defined as:

Insignificant = harm easily remedied by landowner or licenced plumber; all wastewater retained on land application area

Minor = harm requires licenced plumber to remedy; all wastewater retained on land application area

Medium = harm requires licenced plumber to remedy; some or all wastewater discharges via surface or shallow seepage off the land application area but all is retained on the property

Major = harm requires licenced plumber to remedy; some or all wastewater discharges via surface or shallow seepage off the land application area and property to one or more neighbours and/or receiving waters. Regulator may or may not serve notice to landowner.

5. **Risk** = Likelihood combined with Consequence. VL = Very Low; L = Low; M = Moderate; H = High; VH = Very High. Levels are colour-coded.
6. **Stakeholders** (Section A3.2.1 of AS/NZS1547:2012)

This risk assessment applies to the stakeholders indicated below:

Internal stakeholders

client (property owner)
property occupier (if not owner)
site investigator
system designer
system installer
equipment supplier
servicing agent

External stakeholders

regulator
neighbouring property owners

7. The definitions of issue, likelihood, consequence and risk shown here are proposed by William C Cromer Pty Ltd, but do not have the approval of any regulatory authority. In the interests of improving risk assessments for on-site wastewater management, constructive comment and feedback are invited and welcomed from wastewater practitioners and

Table 5.2 Issues relating to the use and sustainable management of the wastewater system at this site
From The Director of Building Control *Accreditation and Maintenance of Plumbing Installations* (December 2016)

					Before treatment				After treatment		
Issue #	System component	Size, etc	Confidence level of value used	Potential hazard(s) related to use	Likelihood of this issue causing a hazard	Consequences to property and stakeholders if issue causes a hazard	Level of risk to property and stakeholders if issue creates a hazard	Recommended risk treatment (and explanatory notes)	Likelihood of this issue becoming a hazard	Consequences to property and stakeholders if issue causes a hazard	Level of risk to property and stakeholders if issue becomes a hazard
1	Dual purpose septic tank	Min. 3500 with outlet filter and *Flout* dosing device (400L dose)	High	Malfunction of any component	Possible	Medium	Moderate	Maintian septic tank with the schedule of maintenance issued in accordance with Section 206 of the Building Act 2016. Pump out at least every 5 years (or as specified by the designer of the tank or as required) when the building has been permanently occupied. Check and clean outlet filter regularly (monthly?). Inspect and clean dosing device regularly as required.	Possible	Minor	Low
2	Buried pipework from septic tank to nonconventional bed	DN100 PVC; *Flout* tank, 250L dose volume	High	Breakage; clogging of pipework	Possible	Medium	Moderate	Heavy-footed animals (horses, cows, etc), and/or vehicles must not be located and have no access over the line of pipework. If necessary, fence off or otherwise isolate.	Possible	Minor	Low
3	Nonconventional bed (LAA)	Approx. 420m2 footprint with min. wetted area of 200m2	High	Clogging of pipework	Possible	Medium	Moderate	Heavy-footed animals (horses, cows, etc), and/or vehicles must not be located and have no access over the LAA. Inspect pipework annually or more frequently as required and if necessary flush out pipework via IOs.	Possible	Minor	Low

Attachment 6

(3 pages)

Form 35 for this project

CERTIFICATE OF THE RESPONSIBLE DESIGNER

Section 94
Section 106
Section 129
Section 155

Form **35**

To: R. D'Orazio *Owner name*

renzo@daystrom.com.au *Address*

Suburb/postcode

Designer details:

Name: Bill Cromer Category:

Business name: William C Cromer Pty Ltd Phone No: 0408 122 127

Business address: 74A Channel Highway

Taroona Fax No:

Licence No: CC6184Q Email address: billcromer@bigpond.com

Details of the proposed work:

Owner/Applicant R. D'Orazio Designer's project reference No.

Address: Lot 27 Braeview Drive

Honeywood

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

Description of work:

On-site wastewater management system

(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:

See Cromer (2022) report below

Director of Building Control - date approved: 2 August 2017 *Building Act 2016* - Approved Form No 35

Design documents provided:

The following documents are provided with this Certificate –

Document description:

Drawing numbers: See Cromer (2022) report below	Prepared by:	Date:
Schedules: See Cromer (2022) report below	Prepared by:	Date:
Specifications: See Cromer (2022) report below	Prepared by:	Date:
Computations: See Cromer (2022) report below	Prepared by:	Date:
Performance solution proposals: See Cromer (2022) report below	Prepared by:	Date:
Test reports: See Cromer (2022) report below	Prepared by:	Date:

Standards, codes or guidelines (where applicable) relied on in design process:

AS/NZS1547:2012 On-site domestic wastewater management

Cromer, W. C. (1999). Trench™3.0: A computer application for site assessment and system sizing, in Patterson, R. A. (Ed.) *On-site '99 – Proceedings of the On-Site '99 Conference: Making on-site wastewater systems work.* Univ. of New England, Armidale, 13-15 Jul 1999, pp 85-88

E23.0 Tasmanian *On-site Wastewater Management Code*

The Tasmanian Director of Building Control's *Guidance for On-site Wastewater Management* Systems (Nov 2017)

The Tasmanian Director of Building Control's *Determination – Accreditation and Maintenance of Plumbing Installations* (Dec 2016)

Any other relevant documentation:

Cromer, W. C. (2022). *Site and Soil Evaluation Report, and System Design for On-site Wastewater Management, new house, Lot 27 Braeview Drive, Honeywood.* Unpublished report for R. D'Orazio by William C. Cromer Pty. Ltd., 28 April 2022.

Attribution as designer:

I William C Cromer.....

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:	William C Cromer		28 Mar 2022
Licence No:	CC6184Q		

Director of Building Control - date approved: 2 August 2017 *Building Act 2016* - Approved Form No 35

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 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:			

Director of Building Control - date approved: 2 August 2017 *Building Act 2016* - Approved Form No 35

Attachment 7

(2 pages)

Documents required in relation to a plumbing permit for an on-site wastewater management system

Source: Director of Building Control Director's Specified List (Part 3), September 2017 v1.2

The documents listed below are required to accompany an application for a plumbing permit for the installation of an on-site wastewater management system.

1.Complete drawings of the installation, drawn to a scale of not less than 1:200 or as agreed to by the Permit Authority, showing the following:

(a) the title boundaries of the land;

(b) the position of any existing or proposed buildings on the land and their use;

(c) the position of any roads or driveways on the land;

(d) the location of any water courses;

(e) the contours on the land;

(f) the position of the Wastewater treatment unit; Wastewater land application area (absorption trenches, mound, irrigation area); Pump chamber, distribution box or other manual or automatic valve; Soil evaluation test holes.

(g) the location and size of any drains and vents;

(h) the location of any cut-off drains diverting surface water or sub-soil drains for ground water;

(i) the location of the outlets from the building;

(j) A cross section drawing demonstrating that there is sufficient gravity fall from the plumbing fixtures to the wastewater treatment unit and land application area.

(k) Operation and maintenance guidelines for the OWMS

(l) Installation instructions for the wastewater treatment unit and land application area

2. Written details of the proposed fixture unit load on the system or parts of the system.

3. A site-and-soil evaluation report completed in accordance with AS/NZS 1547:2012 clause 5.2

4. A Design report which is consistent with the Director of Building Control Onsite Wastewater Management Guidelines and includes the following;

(a) A design based on the site and soil evaluation report

(b) Design calculations for the wastewater land application system and wastewater treatment unit

(c) Specification for the wastewater treatment unit, if a unique on-site wastewater management system a design report from a suitably qualified designer demonstrating compliance with the performance requirements of the Volume 3 of the NCC.

(d) A loading certificate setting out the design criteria and the limitations associated with use of the system incorporating the following:

- System capacity (number of persons and daily flow)
- Summary of design criteria
- The location of and use of the reserve area
- Use of water efficient fittings, fixtures, or appliances
- Allowable variation from design flows (peak loading events)

- Consequences of changes in loading (due to varying wastewater characteristics)
- Consequences of overloading the system
- Consequences of underloading the system
- Consequences of lack of operation, maintenance, and monitoring attention
- Any other relevant considerations related to use of the system; and

(e) The results of the risk management process undertaken in accordance with AS/NZS 1547 Clause A3.2. if required by the Director of Building Control Onsite Wastewater Management Guidelines.

5. A written specification and construction details of the land application system to be used, including details of the following:

(a) the type of system;

(b) the trade name, if any;

(c) the manufacturer's name and address;

(d) the design capacity of the system; and

(e) a section (drawing detail) through the land application system, of not less than 1:20, specifying its construction.

(f) Pump chamber capacity, pump and supply pipe specifications (where appropriate)

(g) Distribution boxes, automatic sequencing valves, dosing syphons or other pulse dosing devices.

6. Copy of Certificate of Accreditation issued under the Building Act by the Director of Building Control for the on-site wastewater management system (if applicable).

7. Any other document or certificate required by the relevant permit authority or environmental health officer