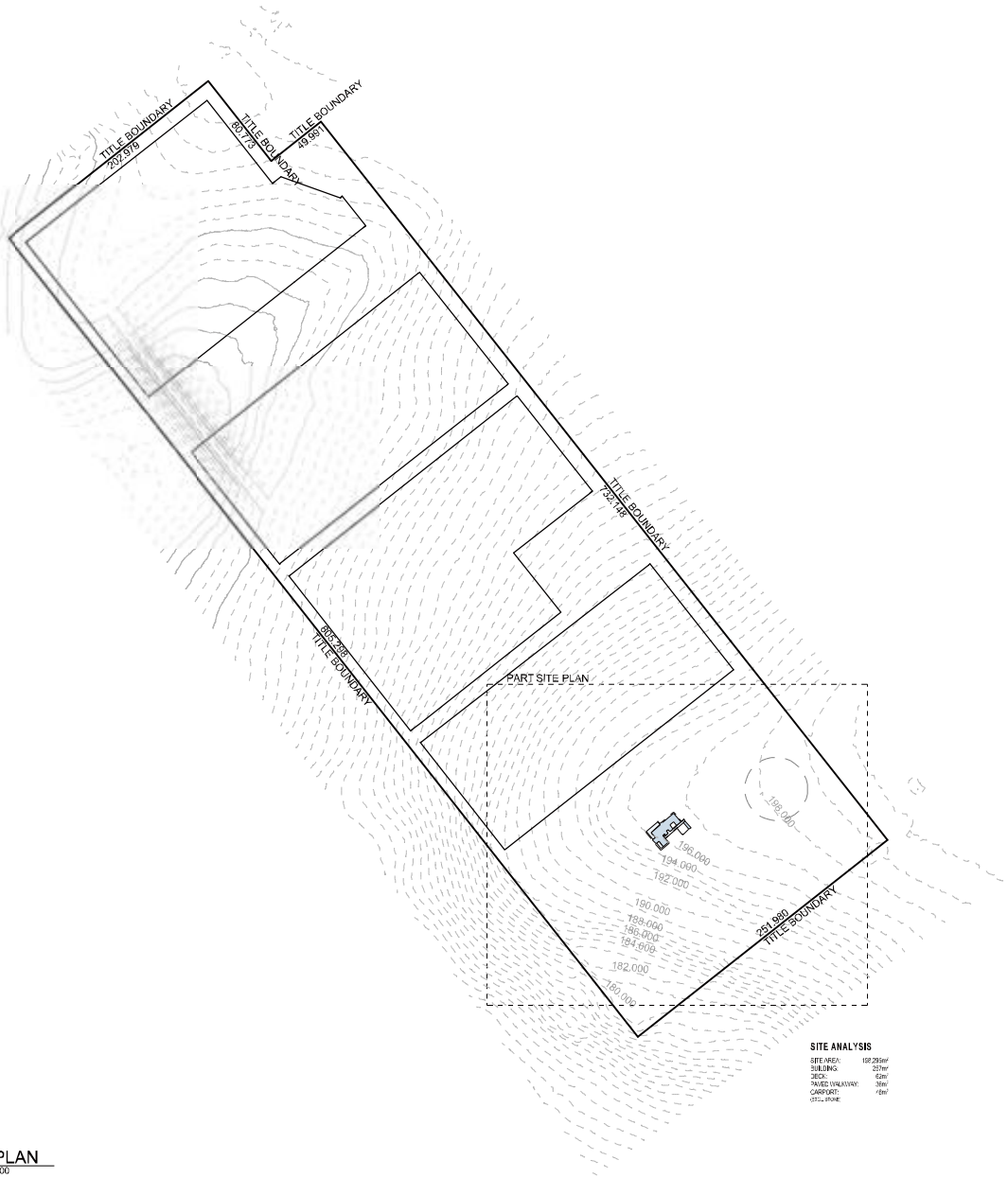
SITE LOCATION IMAGE
SCALE 1:1044.96



SITE PLAN
SCALE 1:2000

SITE ANALYSIS

SITE AREA:	182,293m²
BUILDING:	257m²
DECK:	62m²
RAISED WALKWAY:	36m²
CARPORT:	18m²
(STILL SHADE:	

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PLANNING DOCUMENT

ISSUE	DATE	DESCRIPTION	REV.
01	05-09-19	DEVELOPMENT APPLICATION	-

TRUE NORTH

PROJECT NORTH

DIMENSIONS ARE IN MILLIMETRES, DO NOT SCALE, CHECK AND VERIFY ALL DIMENSIONS ON SITE, REFER DISCREPANCIES TO THE SUPERINTENDENT. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH BUILDING CODE OF AUSTRALIA, APPLICABLE AUSTRALIAN STANDARDS & LOCAL AUTHORITY REQUIREMENTS.

PROJECT: NEW RESIDENCE

AT: 195 WHITE HILLS ROAD
WHITE HILLS TAS 7258

FOR: MR SAMIR SEN

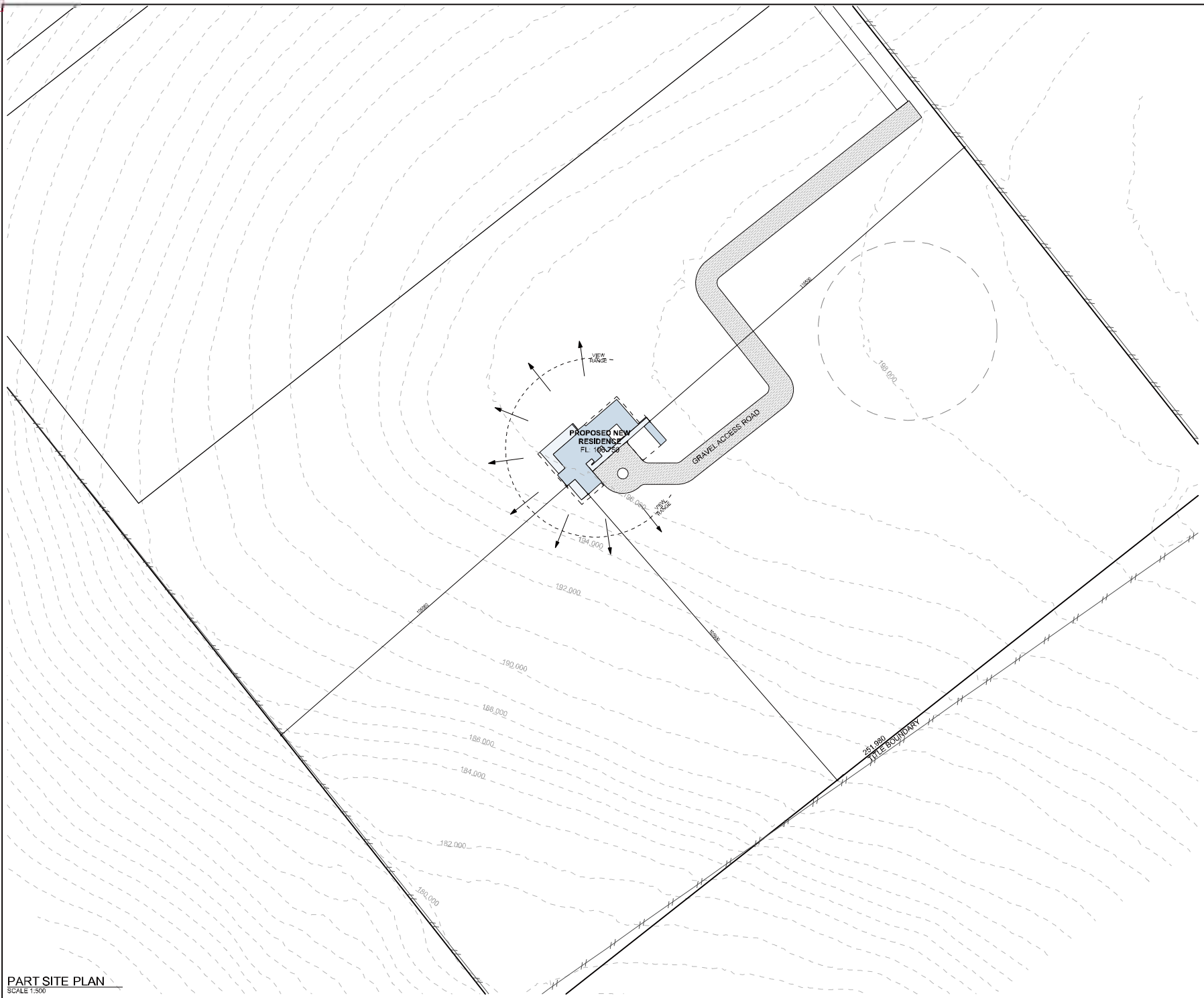
DRAWING: SITE LOCATION PLAN & IMAGE

DESIGNED: DVG DRAWN: ADB CHECKED:

SCALES: 1:2000, 1:1044.96, 1:100 AT A1 SIZE DRAWING SHEET

PROJECT No. 18.386 DRAWING No. Ap01 REV. -

Council Agenda - 2 May 2019 - Agenda Item 8.1
Attachment 2 - Plans for Endorsement
95-211 White Hills Road, White Hills



PART SITE PLAN
SCALE 1:500

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PLANNING DOCUMENT

ISSUE	DATE	DESCRIPTION	REV.
01	05-09-19	DEVELOPMENT APPLICATION	-

TRUE NORTH

PROJECT NORTH

DIMENSIONS ARE IN MILLIMETRES, DO NOT SCALE, CHECK AND VERIFY ALL DIMENSIONS ON SITE, REFER DISCREPANCIES TO THE SUPERINTENDENT. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH BUILDING CODE OF AUSTRALIA, APPLICABLE AUSTRALIAN STANDARDS & LOCAL AUTHORITY REQUIREMENTS.

PROJECT: NEW RESIDENCE

AT: 195 WHITE HILLS ROAD
WHITE HILLS TAS 7258

FOR: MR SAMIR SEN

DRAWING: PART SITE PLAN

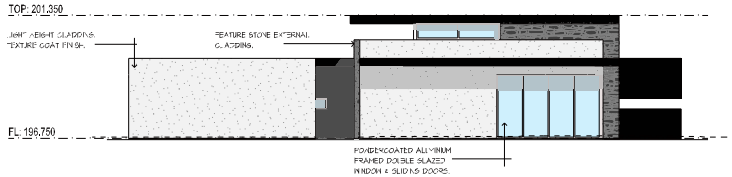
DESIGNED: DVG DRAWN: ADB CHECKED:

SCALES: 1:500 AT A1 SIZE DRAWING SHEET

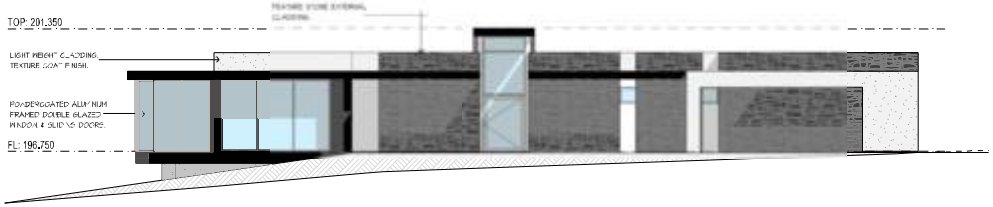
PROJECT No. 18.386 DRAWING No. Ap02 REV. -

FLOOR PLAN
SCALE 1:100

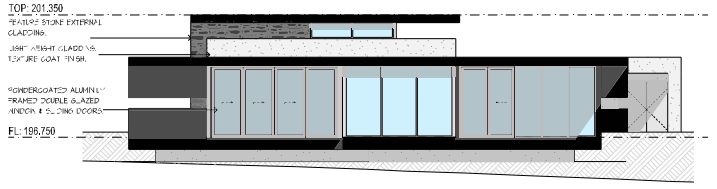
NORTH ELEVATION
SCALE 1:100



EAST ELEVATION
SCALE 1:100



SOUTH ELEVATION
SCALE 1:100



WEST ELEVATION
SCALE 1:100

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APPROVED COMPANY
ISO 9001 Quality Management Systems
QMS

PLANNING DOCUMENT

ISSUE	DATE	DESCRIPTION	REV.
01	05-09-19	DEVELOPMENT APPLICATION	-

DIMENSIONS ARE IN MILLIMETRES, DO NOT SCALE, CHECK AND VERIFY ALL DIMENSIONS ON SITE, REFER DISCREPANCIES TO THE SUPERINTENDENT. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH BUILDING CODE OF AUSTRALIA, APPLICABLE AUSTRALIAN STANDARDS & LOCAL AUTHORITY REQUIREMENTS.

PROJECT: NEW RESIDENCE

AT: 195 WHITE HILLS ROAD
WHITE HILLS TAS 7258

FOR: MR SAMIR SEN

DRAWING: PROPOSED FLOOR PLAN

DESIGNED: DVG DRAWN: ADB CHECKED:

SCALES: 1:100 AT A1 SIZE DRAWING SHEET

PROJECT No. 18.386 DRAWING No. Ap03 REV. -

GEOTON Pty Ltd
Geotechnical Consultants

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26 June 2018

Reference No. GL18259Ab

Samir Sen
5 Stonybrook Terrace
BELLA VISTA NSW 2153

Attention: Natalie (Contracts Admin)

Dear Madam

RE: On-site Wastewater Disposal & Stormwater Detention Evaluation & Design
195 White Hills Road, White Hills

We have pleasure in submitting herein our report detailing the results of the geotechnical investigation conducted at the above site.

Should you require clarification of any aspect of this report, please contact Michael Banks or the undersigned on 03 6326 5001.

For and on behalf of Geoton Pty Ltd

Tony Barriera
Director

1 INTRODUCTION

A limited scope investigation has been conducted for Samir Sen at the site of a proposed residential development at 195 White Hills Road, White Hills.

The investigation has been conducted to assess the following:

- The suitability of the site for disposal of septic effluent in accordance with AS/NZS 1547:2012 "On-site domestic wastewater management"; and
- An assessment and design for on-site stormwater disposal.

A preliminary site plan was provided, prepared by AK Consultants (unreferenced and undated). We understand that the proposed development will comprise a 4-bedroom dwelling.

2 FIELD INVESTIGATION

The field investigation was conducted on 12 June 2018 and involved the drilling of 5 boreholes by a 4WD mounted auger rig to auger refusal depths of between 1.2m and 1.5m.

In-situ vane shear strength tests were conducted in the clay layers encountered in the investigation, with sampling of these soils being conducted for subsequent laboratory testing.

The logs of the boreholes are included in Appendix A and their locations are shown in Figure 1 attached. The results of the field and laboratory tests are shown in the borehole logs.

In addition, the permeability of the site was tested using a constant head permeameter.

3 SITE CONDITIONS

The site is currently vacant and approximately 19 hectares in size located on the southern side of White Hills Road, White Hills. The northern portion of the site off White Hills Road has a slight to moderate south-easterly fall down to a shallow drainage depression before rising gently to moderately up towards the southeast and east. The proposed dwelling site is located on the upper rear southernmost portion of the site on a relatively level platform.

The site is split into three grazing paddocks with the ground surface having a low grass cover. Some mature trees are located along the fence lines.

The wastewater irrigation field and stormwater trench will be located to the southwest of the dwelling site on a gentle south-westerly facing slope.

The MRT Digital Geological Atlas, 1:25,000 Series, indicates that the northern portion of the site is located on Tertiary aged sediments with this being generally confirmed by our field investigation.

The investigation indicated that the soil profile is relatively uniform over the site. All the boreholes encountered clayey silt topsoil to depths of 0.2m, overlying high plasticity

silty clay to depths of 0.9m to 1.2m, underlain by extremely weathered rock to the auger refusal depths of 1.2m to 1.6m on the extremely weathered rock.

The boreholes did not encounter any sign of seepage over the investigated depths.

Full details of soil conditions encountered are presented on the borehole logs.

4 EFFLUENT DISPOSAL

The AS/NZS 1547:2012 provides a guide for typical wastewater flow allowances under a range of circumstances. As a general guide, the standard recommends a typical wastewater flow of 120L/person/day for households on tank water. As the proposed development is to be a four-bedroom dwelling a population equivalent of 7 has been adopted. As such, the wastewater daily design flow is **840L/day**.

4.1 Permeability of Soil and Soil Category

The soil has been classified as follows:

- Texture – Medium to Heavy Clay (Table E1 from AS/NZS 1547:2012);
- Structure – Moderately Structured (Table E4 from AS/NZS 1547:2012); and
- Category – 6 (Table E1 from AS/NZS 1547:2012).

The permeability (K_{sat}) at the site was measured at <0.06m/day. For Moderately Structured Category 6 soils the indicative K_{sat} from AS/NZS 1547:2012 Table 5.1 is <0.06m/day. Therefore, the measured permeability is consistent with massive Category 6 soils.

- Adopted Permeability – 0.02m/day.

4.2 Disposal and Treatment Method

The soils within the proposed effluent disposal area are assessed as having sufficient depth and clay content to provide an adequate attenuation period for the breakdown of pathogens within the treated effluent.

As the site has Category 6 soils that have very low permeability, the site is not suitable for traditional absorption trenches or beds.

As such, the site is considered suitable for the disposal of domestic wastewater by way of an AWTS in conjunction with sub-surface (near surface) irrigation.

4.3 Design Irrigation Rate

From AS/NZS 1547:2012 Table M1, for Category 6 soils the adopted design irrigation rate (DIR) for sub-surface irrigation (drip irrigation) has been set at **2mm/day**.

4.4 AWTS and Sub-Surface Irrigation

The disposal area is calculated using the following equation:

$$A = \frac{Q}{DIR}$$

where A is area in m^2;

Q is design daily flow in L/day; and

DIR is design irrigation rate in mm/day.

As the DIR has been set at 2mm/day and the Q at 840L/day, the area required for the effluent disposal field is **420m²** as per the equation above. Therefore, the disposal field will have dimensions of 21m long by 20m wide. These dimensions can vary provided the overall size of the disposal field is at least 420m^2 in size.

There is adequate reserved (back-up) area of 420m^2 if required.

The sub-surface irrigation is to be constructed as per the cross sections detailed in Figure WW-05 attached. The design details for the irrigation area are as follows:

- The irrigation field is to be raised by approximately 300mm with good quality topsoil or mulch;
- The irrigation lines are required to have a typical line spacing of 1m; and
- The irrigation area is not to be located through any poorly drained depressions. As such, minor filling/mounding of the irrigation area may be required to ensure there is no localised saturated area.

Guidelines for the design of sub-surface irrigation are outlined in AS/NZS 1547:2012 Appendix M.

4.5 Setbacks

The minimum separation distance between the disposal area and downslope features is based on slope stability factors and Appendix R from AS/NZS 1547:2012 "Recommended Setback Distances for Land Application Systems". As such, the following setbacks are required:

- 25m from downslope sensitive features such as watercourses;
- 3m from buildings;
- 10m from downslope property boundaries;
- 1.5m from property boundaries situated cross slope or up-slope; and
- 0.6m depth from bedrock.

4.6 Wastewater Recommendations

It is recommended that the following actions are undertaken in looking after your system:

- Minimise domestic water use;
- Minimise the use of non-biodegradable detergents;
- Minimise the use of detergents containing phosphorous (e.g. Calgon or similar);
- Avoid discharging polluting chemicals into wastewater systems; and
- Monitor quality of groundwater

5 ON-SITE STORMWATER DISPOSAL

5.1 General

The stormwater generated by rainfall runoff from the developed area is required to be disposed of on-site as there is no council stormwater system at 195 White Hills Road, White Hills

The stormwater detention and disposal has been designed to accommodate a 10% AEP storm event.

5.2 Disposal Method

The soil within the proposed stormwater drainage area is shallow to rock. As such, it is proposed to dispose of on-site stormwater via a shallow and wide soakage trench.

5.3 Rainfall and Runoff

The Intensity-Frequency-Design (IFD) rainfall curve table for the site was generated from the Bureau of Meteorology IFD data website (BOM 2013).

Based off Table 3.3.4 Average Recurrence Interval (ARI) AS/NZS3500.3 a 1 in 10 year Average Recurrence Interval 5 minute event was selected.

The corresponding 10% Annual Exceedance Probabilities (AEP), i.e. 1 in 10 year ARI 5 minute event is 6.26mm.

The event flowrate is calculated using the Rational Method formula:

$$\mathbf{Q = CIA}$$

Q= Flowrate (m^3/s)

C= Coefficient of runoff

I= Intensity of the storm (mm/storm intensity duration)

A=Area of catchment that rainfall will runoff (m^2)

1 in 10 year ARI, 5 minute event = $\mathbf{Q_{10}}$

The coefficient of Runoff is assigned a value of unity, i.e. 1.0.

The event flowrate is calculated dividing storage quantity by the storm intensity duration of 5 minutes (i.e. 300 seconds).

The surface area of the developed area is assumed as approximately $247m^2$.

The 10% AEP volume for the developed area is calculated as follows:

$$\mathbf{Q_{10} = (1.0 \times 0.00626 \times 247) / 300}$$

$$= \mathbf{0.00414 m^3/s}$$

The onsite 10% AEP storage from the development is calculated as $1.55m^3$ for a 5 minute event.

5.4 Stormwater Infiltration System

The proposed stormwater disposal area is to be located within the south-western portion of the site (see Figure 2). This area has been selected due to the following reasons:

- The area is setback appropriately from the downslope boundaries;
- The overflow will not concentrate flows onto neighbouring residential blocks;
- The area will not impact on the proposed wastewater irrigation field; and
- The area will not impact on any of the proposed structures.

We consider that the stormwater can be disposed via an absorption trench with the following dimensions:

- Trench length = 20m
- Trench width = 1.0m
- Trench depth = 0.4m

The system is to be geotextile lined, with a crushed rock fill of 20 to 40mm nominal size "blue metal" gravel. The crushed rock has a depth of 300mm, with a cover of 100 mm of topsoil. The stormwater trench will have a capacity of approximately 2.0m^3 (0.8m^3 from arch and 1.2m^3 within gravel).

The trench is to be constructed as per the cross sections shown on Figure 2 attached and is to include an overflow grate.

References:

AS 2870 - 2011 Residential Slabs and Footings Construction

AS 4055 - 2012 Wind Loads for Housing

AS/NZS 1547- 2012 On-site domestic-wastewater management

Bureau of Meteorology Rainfall

IFD Data System: http://www.bom.gov.au/water/designRainfalls/ifd/

AS/NZS 3500.3 – Stormwater Drainage

Attachments:

Limitations of report

Figure 1 – Locality Plan

Figure 2 – Borehole Plan

Figure 3 – Wastewater Plan

Figure 4 – Stormwater Drain Cross-section

Figure WW-05 – Sub-surface drip irrigation system

Site Photo

Appendix A – Borehole Logs & Explanation Sheets

Appendix B – List of AWTS Example Plants

Appendix C – Certificate Forms

GEOTON Pty Ltd

Geotechnical Consultants - Limitations of report

These notes have been prepared to assist in the interpretation and understanding of the limitations of this report.

Project specific criteria

The report has been developed on the basis of unique project specific requirements as understood by Geoton and applies only to the site investigated. Project criteria are typically identified in the Client brief and the associated proposal prepared by Geoton and may include risk factors arising from limitations on scope imposed by the Client. The report should not be used without further consultation if significant changes to the project occur. No responsibility for problems that might occur due to changed factors will be accepted without consultation.

Subsurface variations with time

Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. In the event of significant delays in the commencement of a project, further advice should be sought.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and at the time they are taken. All available data is interpreted by professionals to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, as it is virtually impossible to provide a definitive subsurface profile which includes all the possible variabilities inherent in soil and rock masses.

Report Recommendations

The report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until earthworks and/or foundation construction is almost complete and therefore the report recommendations can only be regarded as preliminary. Where variations in conditions are encountered, further advice should be sought.

Specific purposes

This report should not be applied to any project other than that originally specified at the time the report was issued.

Interpretation by others

Geoton will not be responsible for interpretations of site data or the report findings by others involved in the design and construction process. Where any confusion exists, clarification should be sought from Geoton.

Report integrity

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Geoenvironmental issues

This report does not cover issues of site contamination unless specifically required to do so by the client. In the absence of such a request, Geoton take no responsibility for such issues.

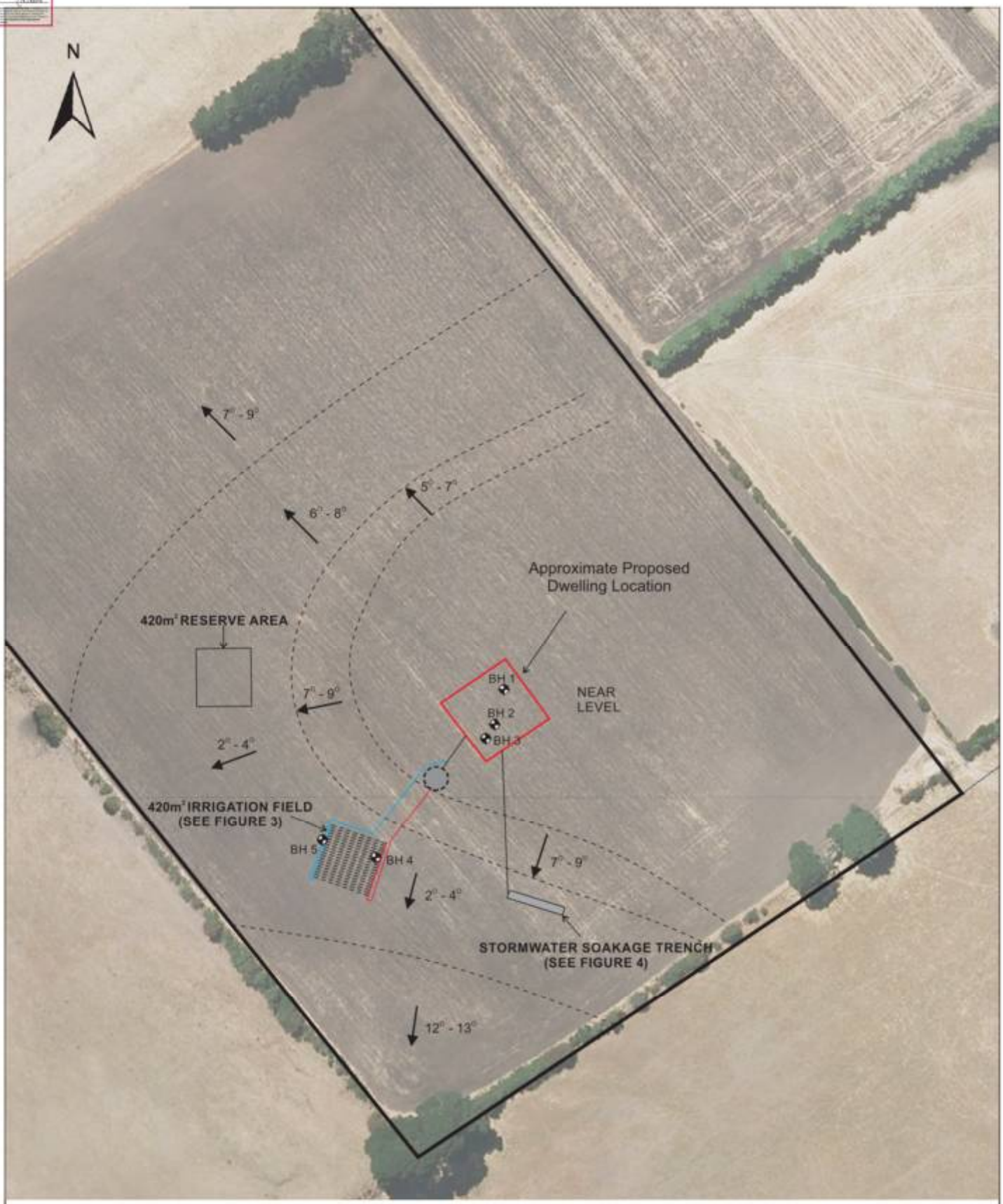
Legend

Contour Lines (LISTMap)

Approximate Scale (m)

0 50 100 150 200

GEOTON Pty Ltd				client:	SAMIR SEN
				project:	195 WHITE HILLS ROAD WHITE HILLS
date	26/06/18	drawn	MB		
scale	AS SHOWN	approved	TB	title:	LOCALITY PLAN
original size	A3	rev		project no: GL18259A	figure no. 1



Legend

BH 1 — Approximate Borehole Location

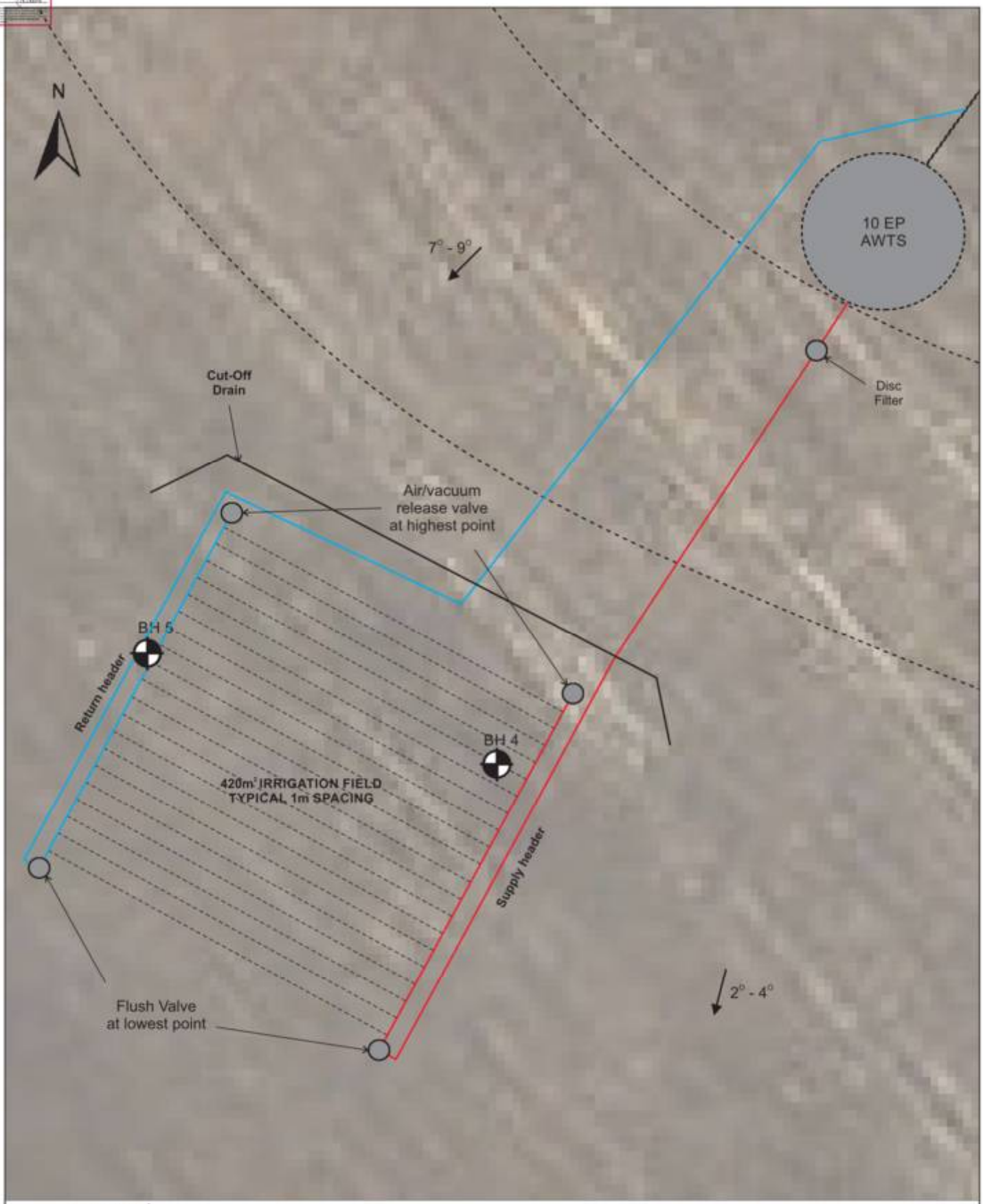
Approximate Change in Slope

8° — Approximate Slope Angle

Approximate Scale (m)

0 50 100 150

GEOTON Pty Ltd				client:	SAMIR SEN
				project:	195 WHITE HILLS ROAD WHITE HILLS
date	26/06/18	drawn	MB		
scale	AS SHOWN	approved	TB	title:	SITE PLAN
original size	A3	rev		project no: GL18259A	figure no. 2



Legend

BH 1 — Approximate Borehole Location

Approximate Change in Slope

8° — Approximate Slope Angle

GEOTON Pty Ltd				client:	SAMIR SEN
				project:	195 WHITE HILLS ROAD WHITE HILLS
date	26/06/18	drawn	MB		
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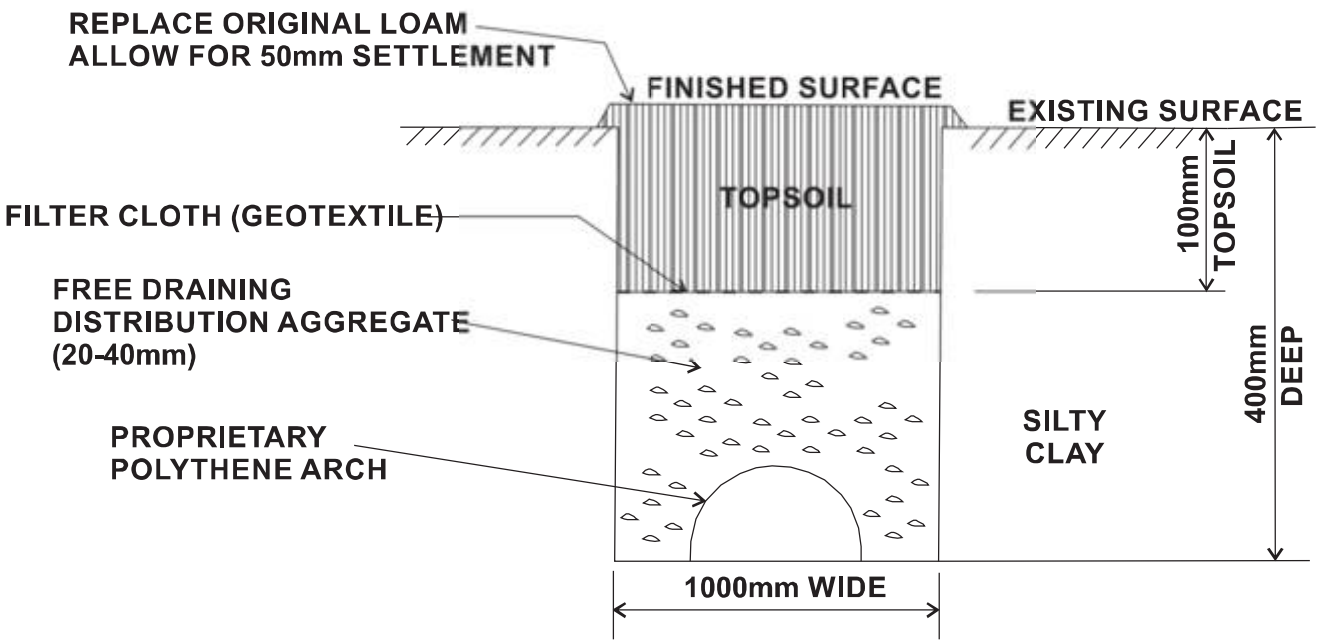
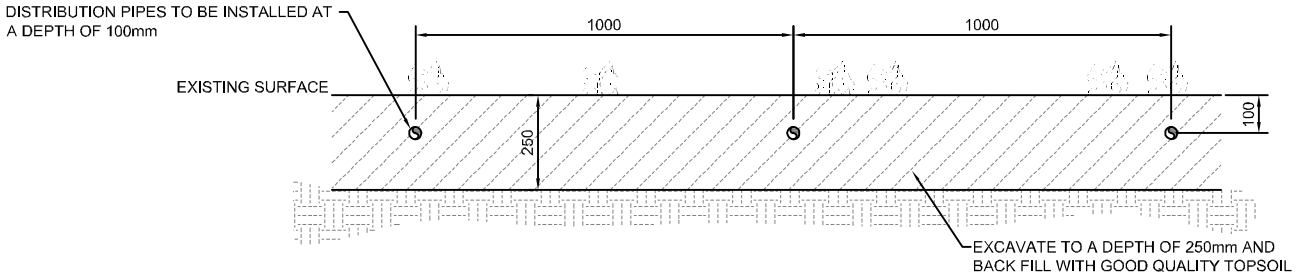
original size	A3	rev		project no: GL18259A	figure no. 3



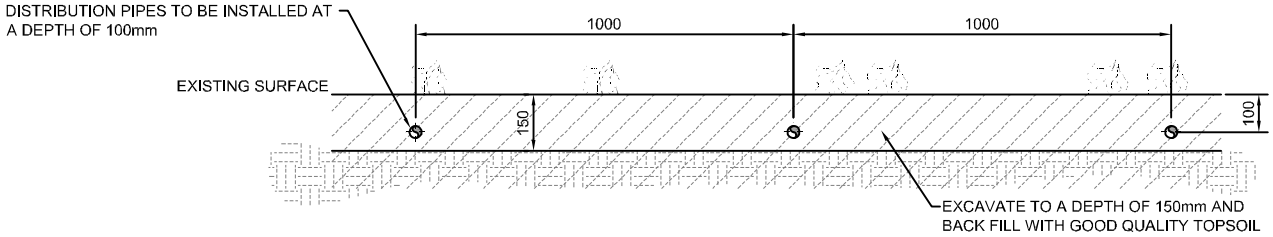
ARCH TRENCH SECTION

GEOTON Pty Ltd				client:	SAMIR SEN
				project:	195 WHITE HILLS ROAD WHITE HILLS
date	26/062018	drawn	MB		
scale	As Shown	approved	TB	title:	STORMWATER TRENCH SECTION
original size	A4	rev		project no: GL18259Ab	figure no. 4

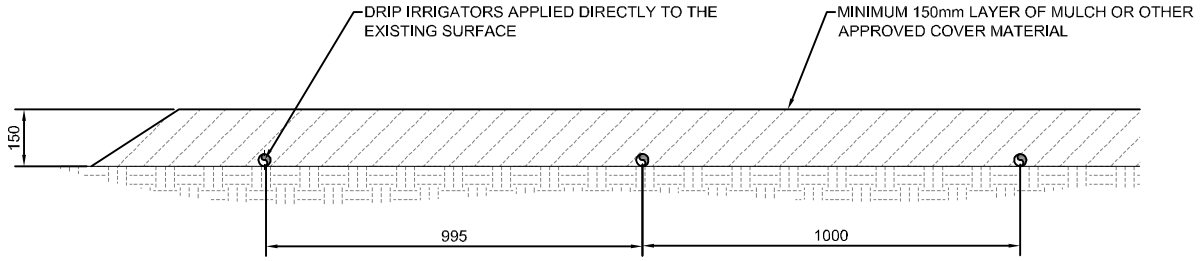


SHALLOW SUB-SURFACE DRIP IRRIGATION
CATEGORY 1,2 & 6 SOILS

SCALE 1:20



SHALLOW SUB-SURFACE DRIP IRRIGATION
CATEGORY 3,4 & 5 SOILS



COVERED SURFACE DRIP IRRIGATION

SCALE 1:20

SCALE

0mm 250mm 500mm 750mm 1000mm

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GEOTECHNICAL CONSULTANTS

- GEOTECHNICAL INVESTIGATIONS
- SITE CLASSIFICATION
- WASTEWATER ASSESSMENT
- ROADWORKS
- LANDSLIDE RISK ASSESSMENT
- DAMS
- ENVIRONMENTAL ASSESSMENT
- FOUNDATION INVESTIGATION

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Invermay, TAS
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www.geoton.com.au

FIGURE:	WW-05
DATE:	18/10/17
REVISION:	A
SCALE:	@ A4
DRAWN:	B.STREET
DESIGNED:	T.BARRIERA
APPROVED:	T.BARRIERA

Plate 1 - Looking east towards the proposed wastewater disposal area

GEOTON Pty Ltd				client:	SAMIR SEN	
				project:	195 WHITE HILLS ROAD WHITE HILLS	
title:	PHOTOGRAPH					
date:	12/06/2018	original size	A4	project no:	GL18259A	figure no. Plate 1

Appendix A

Borehole Logs

ENGINEERING BOREHOLE LOG

GEOTON Pty Ltd
Geotechnical Consultants
PO Box 522 Prospect TAS 7250
Unit 24, 16-18 Goodman Court, Invermay TAS
Tel (03) 6326 5001

Borehole no. BH1
Sheet no. 1 of 1
Job no. GL18259A

Client : Samir Sen
Project : Onsite Wastewater Design and Storm Water Design
Location : 195 White Hills Road, White Hills
Date : 12/06/18
Logged By : MB

Drill model : Drilltech
Hole diameter : 150mm
Easting:
Northing:
Slope: 90°
Bearing: -
RL Surface :
Datum :

Method	Support	Penetration	Water	Notes Samples Tests	Depth (m)	Graphic log	Classification Symbol	Material Description	Moisture condition	Consistency density, index	Structure, additional observations
ADV	N						MH	TOPSOIL - Clayey Silt, high plasticity, dark grey, root fibres	M	F	TOPSOIL - disturbed
					0.25		CH	SILTY CLAY - high plasticity, grey mottled black	M	St	W≈PL
					0.50						V=60kPa
					0.75						
					1.00			Pockets of sand, orange and white			V=90kPa
					1.25		-	EXTREMELY WEATHERED ROCK - silty sand properties, medium grained, white and orange	M	VSt	
					1.50			BH1 refusal @ 1.4m on extremely weathered rock			
					1.75						
					2.00						
					2.25						

ENGINEERING BOREHOLE LOG

GEOTON Pty Ltd
Geotechnical Consultants
PO Box 522 Prospect TAS 7250
Unit 24, 16-18 Goodman Court, Invermay TAS
Tel (03) 6326 5001

Borehole no. BH2
Sheet no. 1 of 1
Job no. GL18259A

Client : Samir Sen
Project : Onsite Wastewater Design and Storm Water Design
Location : 195 White Hills Road, White Hills
Date : 12/06/18
Logged By : MB

Drill model : Drilltech
Hole diameter : 150mm
Easting:
Northing:
Slope: 90°
Bearing: -
RL Surface :
Datum :

Method	Support	Penetration	Water	Notes Samples Tests	Depth (m)	Graphic log	Classification Symbol	Material Description	Moisture condition	Consistency density, index	Structure, additional observations
ADV	N						MH	TOPSOIL - Clayey Silt, high plasticity, dark grey, root fibres	M	F	TOPSOIL - disturbed
					0.25		CH	SILTY CLAY - high plasticity, grey mottled black, with cobbles and gravel	M	St	
					0.50						V=80kPa
					0.75						
					1.00		-	EXTREMELY WEATHERED ROCK - clayey silt properties, high plasticity, grey mottled white/black/orange Transitioning to silty sand properties	M	VSt	V=105kPa
					1.25			BH2 refusal @ 1.2m on extremely weathered rock			
					1.50						
					1.75						
					2.00						
					2.25						

ENGINEERING BOREHOLE LOG

GEOTON Pty Ltd
Geotechnical Consultants
PO Box 522 Prospect TAS 7250
Unit 24, 16-18 Goodman Court, Invermay TAS
Tel (03) 6326 5001

Borehole no. BH3
Sheet no. 1 of 1
Job no. GL18259A

Client : Samir Sen
Project : Onsite Wastewater Design and Storm Water Design
Location : 195 White Hills Road, White Hills
Date : 12/06/18
Logged By : MB

Drill model : Drilltech
Hole diameter : 150mm
Easting:
Northing:
Slope: 90°
Bearing: -
RL Surface :
Datum :

Method	Support	Penetration	Water	Notes Samples Tests	Depth (m)	Graphic log	Classification Symbol	Material Description	Moisture condition	Consistency density, index	Structure, additional observations
ADV	N						MH	TOPSOIL - Clayey Silt, high plasticity, dark grey, root fibres	M	F	TOPSOIL - disturbed
					0.25		CH	SILTY CLAY - high plasticity, grey mottled black, with cobbles and gravel	M	St	
					0.50						V=50kPa
					0.75						
					1.00		-	EXTREMELY WEATHERED ROCK - clayey silt properties, high plasticity, grey mottled white/black/orange Transitioning to silty sand properties	M	VSt	V=80kPa
					1.25						
								BH3 refusal @ 1.3m on extremely weathered rock			
					1.50						
					1.75						
					2.00						
					2.25						

ENGINEERING BOREHOLE LOG

GEOTON Pty Ltd
Geotechnical Consultants
PO Box 522 Prospect TAS 7250
Unit 24, 16-18 Goodman Court, Invermay TAS
Tel (03) 6326 5001

Borehole no. BH4
Sheet no. 1 of 1
Job no. GL18259A

Client :	Samir Sen		Date : 12/06/18
Project :	Onsite Wastewater Design and Storm Water Design		Logged By : MB
Location :	195 White Hills Road, White Hills		
Drill model :	Drilltech	Easting: Slope: 90°	RL Surface :
Hole diameter :	150mm	Northing: Bearing: -	Datum :

Method	Support	Penetration	Water	Notes Samples Tests	Depth (m)	Graphic log	Classification Symbol	Material Description	Moisture condition	Consistency density, index	Structure, additional observations
ADV	N						MH	TOPSOIL - Clayey Silt, high plasticity, dark grey, root fibres	M	F	TOPSOIL - disturbed
					0.25		CH	SILTY CLAY - high plasticity, grey, with cobbles and gravel	M	St	W≈PL
					0.50						
					0.75						
					1.00		-	EXTREMELY WEATHERED ROCK - clayey silt properties, high plasticity, with medium grained sand, becoming orange and grey	M	VSt	
					1.25						
					1.50			Becoming low plasticity			
								BH4 refusal @ 1.5m on extremely weathered rock			
					1.75						
					2.00						
					2.25						

ENGINEERING BOREHOLE LOG

GEOTON Pty Ltd
Geotechnical Consultants
PO Box 522 Prospect TAS 7250
Unit 24, 16-18 Goodman Court, Invermay TAS
Tel (03) 6326 5001

Borehole no. BH5
Sheet no. 1 of 1
Job no. GL18259A

Client :	Samir Sen		Date : 12/06/18
Project :	Onsite Wastewater Design and Storm Water Design		Logged By : MB
Location :	195 White Hills Road, White Hills		
Drill model :	Drilltech	Easting: Slope: 90°	RL Surface :
Hole diameter :	150mm	Northing: Bearing: -	Datum :

Method	Support	Penetration	Water	Notes Samples Tests	Depth (m)	Graphic log	Classification Symbol	Material Description	Moisture condition	Consistency density, index	Structure, additional observations
							MH	TOPSOIL - Clayey Silt, high plasticity, dark grey, root fibres	M	F	TOPSOIL - disturbed
ADV	N				0.25		CH	SILTY CLAY - high plasticity, grey, with cobbles and gravel	M	St	W≈PL
					0.50						
					0.75						
					1.00		-	EXTREMELY WEATHERED ROCK - clayey silt properties, high plasticity, with medium grained sand, becoming orange and grey	M	VSt	
					1.25						
					1.50			Becoming low plasticity			
					1.75			BH5 refusal @ 1.6m on extremely weathered rock			
					2.00						
					2.25						

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Investigation Log Explanation Sheet

METHOD – BOREHOLE

TERM	Description
AS	Auger Screwing*
AD	Auger Drilling*
RR	Roller / Tricone
W	Washbore
CT	Cable Tool
HA	Hand Auger
DT	Diatube
B	Blank Bit
V	V Bit
T	TC Bit

* Bit shown by suffix e.g. ADT

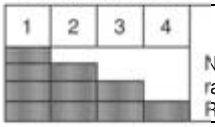
METHOD – EXCAVATION

TERM	Description
N	Natural exposure
X	Existing excavation
H	Backhoe bucket
B	Bulldozer blade
R	Ripper
E	Excavator

SUPPORT

TERM	Description
M	Mud
N	Nil
C	Casing
S	Shoring

PENETRATION



No resistance ranging to Refusal

WATER

Symbol	Description
	Water inflow
	Water outflow
	17/3/08 water on date shown

NOTES, SAMPLES, TESTS

TERM	Description
U_{50}	Undisturbed sample 50 mm diameter
U_{63}	Undisturbed sample 63 mm diameter
D	Disturbed sample
N	Standard Penetration Test (SPT)
N*	SPT – sample recovered
N_C	SPT with solid cone
V	Vane Shear
PP	Pocket Penetrometer
P	Pressumeter
B_S	Bulk sample
E	Environmental Sample
R	Refusal
DCP	Dynamic Cone Penetrometer (blows/100mm)
PL	Plastic Limit
LL	Liquid Limit
LS	Linear Shrinkage

CLASSIFICATION SYMBOLS AND SOIL DESCRIPTION

Based on AS 1726:2017

MOISTURE

TERM	Description
D	Dry
M	Moist
W	Wet

CONSISTENCY/DENSITY INDEX

TERM	Description
VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fr	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	Very dense

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Soil Description Explanation Sheet (1of 2)

DEFINITION

In engineering terms, soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using rock description terms.

CLASSIFICATION SYMBOL AND SOIL NAME

Soils are described in accordance with the AS 1726: 2017 as shown in the table on Sheet 2.

PARTICLE SIZE DEFINITIONS

NAME	SUBDIVISION	SIZE (mm)
BOULDERS		>200
COBBLES		63 to 200
GRAVEL	Coarse	19 to 63
	Medium	6.7 to 19
	Fine	2.36 to 6.7
SAND	Coarse	0.6 to 2.36
	Medium	0.21 to 0.6
	Fine	0.075 to 0.21
SILT		0.002 to 0.075
CLAY		<0.002

MOISTURE CONDITION

Coarse Grained Soils

Dry Non-cohesive and free running.

Moist Soil feels cool, darkened in colour. Soil tends to stick together.

Wet As for moist but with free water forming when handling.

Fine Grained Soils

Moist, dry of Plastic Limited – w < PL
Hard and friable or powdery.

Moist, near Plastic Limit – w ≈ PL
Soils can be moulded at a moisture content approximately equal to the plastic limit.

Moist, wet of Plastic Limit – w > PL
Soils usually weakened and free water forms on hands when handling.

Wet, near Liquid Limit - w ≈ LL

Wet, wet of Liquid Limit - w > LL

CONSISTENCY TERMS FOR COHESIVE SOILS

TERM	UNDRAINED STRENGTH s_u (kPa)	FIELD GUIDE
Very Soft	≤12	Exudes between the fingers when squeezed in hand
Soft	12 to 25	Can be moulded by light finger pressure
Firm	25 to 50	Can be moulded by strong finger pressure
Stiff	50 to 100	Cannot be moulded by fingers
Very Stiff	100 to 200	Can be indented by thumb nail
Hard	>200	Can be indented with difficulty by thumb nail
Friable	–	Can be easily crumbled or broken into small pieces by hand

RELATIVE DENSITY OF NON-COHESIVE SOILS

TERM	DENSITY INDEX (%)
Very Loose	≤15
Loose	15 to 35
Medium Dense	35 to 65
Dense	65 to 85
Very Dense	> 85

DESCRIPTIVE TERMS FOR ACCESSORY SOIL COMPONENTS

DESIGNATION OF COMPONENT	IN COARSE GRAINED SOILS		IN FINE GRAINED SOILS	TERM
	% Fines	% Accessory coarse fraction	% Sand/ gravel	
Minor	≤5	≤15	≤15	Trace
	>5, ≤12	>15, ≤30	>15, ≤30	With
Secondary	>12	>30	>30	Prefix

SOIL STRUCTURE

ZONING		CEMENTING	
Layer	Continuous across the exposure or sample.	Weakly cemented	Easily disaggregated by hand in air or water.
Lens	Discontinuous layer of different material, with lenticular shape.	Moderately cemented	Effort is required to disaggregate the soil by hand in air or water.
Pocket	An irregular inclusion of different material.		

GEOLOGICAL ORIGIN

WEATHERED IN PLACE SOILS

Extremely weathered material	Structure and/or fabric of parent rock material retained and visible.
Residual soil	Structure and/or fabric of parent rock material not retained and visible.

TRANSPORTED SOILS

Aeolian soil	Carried and deposited by wind.
Alluvial soil	Deposited by streams and rivers.
Colluvial soil	Soil and rock debris transported downslope by gravity.
Estuarine soil	Deposited in coastal estuaries, and including sediments carried by inflowing rivers and streams, and tidal currents.
Fill	Man-made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.
Lacustrine soil	Deposited in freshwater lakes.
Marine soil	Deposited in a marine environment.

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Soil Description Explanation Sheet (2 of 2)

SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 63 mm and basing fractions on estimated mass)						GROUP SYMBOL	PRIMARY NAME
COARSE GRAINED SOIL More than 65% of soil excluding oversize fraction is larger than 0.075 mm	(A 0.075 mm particle is about the smallest particle visible to naked eyes)	GRAVEL More than half of coarse fraction is larger than 2.36 mm	CLEAN GRAVEL (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes		GW	GRAVEL
				Predominantly one size or a range of sizes with some intermediate sizes missing		GP	GRAVEL
			GRAVEL WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML and MH below)		GM	SILTY GRAVEL
				Plastic fines (for identification procedures see CL, CI and CH below)		GC	CLAYEY GRAVEL
		SAND More than half of coarse fraction is smaller than 2.36 mm	CLEAN SAND (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes		SW	SAND
				Predominantly one size or a range of sizes with some intermediate sizes missing		SP	SAND
			SAND WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML and MH below)		SM	SILTY SAND
				Plastic fines (for identification procedures see CL, CI and CH below)		SC	CLAYEY SAND
FINE GRAINED SOIL More than 35% of soil excluding oversize fraction is smaller than 0.075 mm		IDENTIFICATION PROCEDURES ON FRACTIONS <0.075 mm					
			DRY STRENGTH	DILATANCY	TOUGHNESS		
		SILT & CLAY (low to medium plasticity, LL ≤ 50)	None to Low	Slow to Rapid	Low	ML	SILT
			Medium to High	None to Slow	Medium	CL, CI	CLAY
			Low to Medium	Slow	Low	OL	ORGANIC SILT
		SILT & CLAY (high plasticity, LL > 50)	Low to Medium	None to Slow	Low to Medium	MH	SILT
			High to Very High	None	High	CH	CLAY
			Medium to High	None to Very Slow	Low to Medium	OH	ORGANIC CLAY
		Highly Organic Soil	Readily identified by colour, odour, spongy feel and frequently by fibrous texture.			Pt	PEAT

• LL – Liquid Limit.

COMMON DEFECTS IN SOILS

TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (e.g. bedding). May be open or closed.	
FISSURE	A surface or crack across which the soil has little or no tensile strength, but which is not parallel or sub parallel to layering. May be open or closed. May include desiccation cracks.	
SHEARED SEAM	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting fissures which divide the mass into lenticular or wedge-shaped blocks.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.	

TERM	DEFINITION	DIAGRAM
SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter.	
TUBE CAST	An infilled tube. The infill may be uncemented or weakly cemented soil or have rock properties.	
INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open defects.	

Appendix B

Certificate Forms

CERTIFICATE OF THE RESPONSIBLE DESIGNER

Section 94
Section 106
Section 129
Section 155

To: Samir Sen *Owner name*
5 Stonybrook Terrace *Address*
Bella Vista NSW 2153 *Suburb/postcode*

Form **35**

Designer details:

Name: Tony Barriera
Category: Civil Engineer – Hydraulic - Domestic
Business name: Geoton Pty Ltd
Phone No: 03 6326 5001
Business address: P O Box 522
PROSPECT TAS 7250
Fax No:
Licence No: IEAust 471929, CC6220 P
Email address: tbarriera@geoton.com.au

Details of the proposed work:

Owner/Applicant Samir Sen
Designer's project reference No. GL18259Ab
Address: 195 White Hills Road
Lot No: 53412/1
WHITE HILLS TAS 7258

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

Description of work:
New building
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:
All design documents provided in Report GL18259Ab, dated 26/06/2018

Design documents provided:

The following documents are provided with this Certificate –

Document description:

Drawing numbers:	Prepared by:	Date:
Schedules:	Prepared by:	Date:
Specifications:	Prepared by:	Date:
Computations:	Prepared by:	Date:
Performance solution proposals:	Prepared by:	Date:
Test reports:	Prepared by:	Date:

Standards, codes or guidelines relied on in design process:

All design documents are contained within report

AS/NZS1547:2012 On-site domestic-wastewater management

Any other relevant documentation:

Attribution as designer:

I Tony Barriera of Geoton Pty Ltd 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:	Tony Barriera		26/06/2018
Licence No:	CC6220P		

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:			

GEOTON Pty Ltd
Geotechnical Consultants

LOADING CERTIFICATE

To:	**Samir Sen**		*Owner /Agent*	Certificate Ref: AS/NZS 1547:2012 Section 7.4.2
	5 Stonybrook Terrace		*Address*	
	Bella Vista NSW	**2153**	*Suburb/postcode*	

Details of work:

Address:	**195 White Hills Road**	Lot No:	1
	WHITE HILLS TAS **7258**	Certificate of title No:	53412/1
The work related to this certificate:	On-site domestic-wastewater management	*(description of the work or part work being certified)*	

Certificate details:

In issuing this certificate the following matters are relevant –

Documents:	Report GL18259Ab dated 26/06/2018 Figure 1 – Locality Plan Figure 2 – Borehole Plan Figure 3 – Wastewater Plan Figure 4 – Stormwater Drain Cross-section Figure WW-05 – Sub-surface drip irrigation system
Relevant calculations:	Contained in the above
References:	AS/NZS1547:2012 On-site domestic-wastewater management

Substance of Certificate:

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

Wastewater Characteristics

Population equivalent used for this assessment = 7 (4 bedroom dwelling)
Wastewater volume (L/day) used for this assessment = 840 (120 Litres per person)
Approximate blackwater volume (L/day) = 336
Approximate greywater volume (L/day) = 504

Soil Characteristics/Design Criteria

Texture (Table E4 from AS/NZS 1547) = Medium to Heavy Clay
Soil category (Table E1 from AS/NZS 1547) = 6
Soil structure (Table E4 from AS/NZS 1547) = Moderately Structured
Indicative permeability (Table 5.1 from AS/NZS 1547) = <0.06m/day
Measured permeability = <0.06m/day
Adopted permeability = 0.02m/day
Adopted Design Irrigation Rate = 2mm/day
Soil thickness for disposal = 0.9m
Minimum depth (m) to water = >2m

Dimensions for On-Site Treatment System

Disposal and treatment methods = Aerated Wastewater Treatment System (AWTS) and sub-surface irrigation
Site modification and specific design = Not required
Primary disposal area required = 420m^2
Reserve disposal area required = 420m^2
Location and use of Reserve area = Reserve area located northwest of the proposed dwelling location on a northwesterly facing gentle slope.
Is there sufficient area available on site for disposal (including reserve) = Yes

Notes

The purpose of the reserve area is to allow for future extention of the land application system to allow a factor of safety against unforseen malfunction or failure, perhaps following increased household occupancy or inadvertent misuse of the system.

The land application area may be reduced to account for flow reductions by water-saving devices, provided the organic loading rate is not higher than it would have been without the flow reduction.

Water efficient fittings, fixtures, or appliances

The system has been designed without the use of water efficient fittings, fixtures or appliances. Therefore, water efficient fittings, fixtures or appliances are not required.

Allowable Variation from Design Flow

Based on an approved AWTS 10 EP system (10 equivalent persons) rated at 1500 litres per day and a wastewater design volume of 840L/day the allowable variation from design flow (peak loading events) would be an additional 660L/day.

Water efficient fittings, fixtures, or appliances

The system has been designed without the use of water efficient fittings, fixtures or appliances. Therefore, water efficient fittings, fixtures or appliances are not required.

System Limitations

Consequences of overloading the system:

(A) Adverse effects on soil properties and plant growth through excess salt accumulation in the root zone during extended dry periods

(B) Hardful long-term environmental effects to the soil of land application system or the adjacent surface water and groundwater; or

(C) Increased risk to public heath from surface ponding in the land application area or channelling or seepage beyond the land application area.

Consequences of underloading the system (Lack of Operation):

Not applicaple to this type of system.

Consequences of changes in loading of the system:

The system has been designed for domestic onsite wastewater disposal, and as such effluent will be domestic and is not expected to change significantly. Significant changes in loading of the system can result in system failure.

Operation Requirements

Refer to operation manual of preferred aerated waterwater treatment system.

Maintenace Requirements

Refer to operation manual of preferred aerated waterwater treatment system.

I certify the matters described in this certificate.

	Signed:	*Date:*	*Certificate No.*
Certifier:		26/06/2018	GL18259Ab

AK Consultants
AGRICULTURAL & NATURAL RESOURCE MANAGEMENT

Mr Samir Sen
5 Stonybrook Terrace
Bella Vista
NSW 2153

Via email: Samir.sen@teekay.com

4th September 2018

Dear Samir,

Setbacks of proposed dwelling to adjacent land within the Rural Resource Zone

We have undertaken a desktop assessment of the feasibility of a proposed dwelling at 195 White Hills Rd, White Hills (CT 53412/1) being able to meet the setback requirements for a new dwelling in the Rural Resource Zone under the *Launceston Interim Planning Scheme 2015* (the Planning Scheme). The proposed dwelling is to support the development of a 5-12ha vineyard on the site.

The following section of the Planning Scheme is relevant;
26.4.1 Development Standards in the Rural Resource Zone – Building Height, Setback and Siting
A3 – Buildings for Sensitive use:

a) Must be setback no less than 200m from the frontage, side and rear boundaries.

If A3 cannot be achieved, then the following Performance Criteria must be considered:
P3 – Buildings for sensitive uses, must be setback an appropriate distance, having regard to;

a) The topography of the site;
b) The prevailing setbacks of existing buildings on nearby lots;
c) The location of existing buildings on the site;
d) The visual impact of the building when viewed from an adjoining road;
e) Any proposed upgrading of adjoining roads;
f) The retention of vegetation within the front setback;
g) The existing use on adjoining and immediately opposite sites;
h) The nature, frequency and intensity of emissions produced by primary industry uses on adjoining and immediately opposite lots;
i) Any proposed attenuation measures; and
j) Any buffers created by natural or other features.

The rest of this letter considers the location of a proposed dwelling on the subject title in light of the requirements from an agricultural perspective.

ABN 34 137 578 440
40 Tamar Street
Launceston Tas 7250
Phone: (03) 6334 1033
E: office@akconsultants.com.au
Web: www.akconsultants.com.au

The proposed vineyard on the subject title will occupy the most northern three quarters of the land (see Figure 1) this means that there is only a relatively small area of the title at the southern end that is available for the development of a dwelling. Because of the proposed location of the vineyard a distance of greater than 200m will be achieved to the northern boundary for the proposed dwelling. However, a 200m setback can not be achieved on the eastern, southern or western boundaries. Because of this P3 has been considered for these boundaries.

There are four adjacent titles to the potential building area (see Figure 2). These range in size from 23.8ha to 32.5ha. To the west is a title that is 32.3ha in area (CT 160525/2). This title has a westerly aspect is steeply to moderately sloped and is downslope from the subject title. The south eastern corner of this title sits at approximately 180m ASL while the most western point of the title sits at 110m ASL. There is a particularly steep area of this title directly adjacent to the subject title in the south eastern corner with a slope gradient of approximately 25%. There is also an area in this corner that has been identified as having evidence of landslip. The title is mostly mapped as having a Land Capability classification of Class 4; it has an existing dwelling and is utilised for pasture for grazing. The title does not appear to be farmed in conjunction with any other titles. It would best be described as having 'hobby scale' characteristics[1].

To the south west is a title that is 32.5ha in area (CT 101411/2). This title also has a westerly aspect with a moderate slope. The title is predominately mapped as having a Land Capability classification of Class 4+5 with around a third in the middle of the title being mapped as Class 5 land. There is no existing dwelling on this title. The title appears to be farmed in conjunction with land the west as part of a 'commercial scale' enterprise (2012, Ketelaar & Armstrong) and seems to be predominately utilised for grazing with occasional cropping.

To the south is a title of 23.77ha (CT45403/1) and to the east is a title that is 28.77ha (CT 220523/1). These titles are under the same ownership and appear to be farmed in conjunction with land to the south as part of a 'commercial scale' enterprise. Published Land Capability for both titles is predominately Class 4, however the south western third of CT 45403/1 is mapped as Class 4+5. CT 45403/1 has a westerly aspect, while CT 220523/1 has a northerly aspect. Both titles have an existing dwelling. Analysis of historical google imagery indicates that grazing and occasional cropping are the principle agricultural activities on these titles.

According to the Department of Primary Industry, Parks, Water and Environment (DPIPWE) Water Information System Tool (WIST) there are no existing water resources located on the adjacent titles. However, the area is within the North Esk Irrigation Scheme (NEIS), which is currently being constructed. A pipeline for this scheme will run adjacent to the southern boundary of the subject title. The NEIS is not yet operational, however, water from the scheme is already fully subscribed. It is feasible that adjacent land holders may have acquired water from this scheme, however, at the time of writing this report water allocation information has not been made publicly available so it is difficult to assess the likelihood of land use intensifying above existing uses as a result of the irrigation scheme.

[1] As defined by AK Consultants in Ketelaar, A and Armstrong, D. 2012, *Discussions paper – Clarification of the Tools and Methodologies and Their Limitations for Understanding the Use of Agricultural Land in the Northern Region* which was a paper written for Northern Tasmania Development.

Potential for conflict between the proposed new dwelling and adjacent primary industry uses needs be considered. There are a range of activities associated with grazing and cropping. Learmonth et.al. (2007) detail the common range of issues associated with sensitive uses such as residential use in the Rural Resource Zone which can constrain primary industry activities (see Appendix 3). Common conflict issues associated with residential use in the Rural Resource Zone include spray drift from chemicals which would include fungicide, herbicide, and insecticide, noise from equipment (including shooting for game control), irrigation spray drift, odours and dust.

The Western Australia Department of Health (DOH, 2012) has published guidelines relating specifically to minimising conflict between agricultural activities and residential areas through management of buffer areas. This study particularly focuses on spray drift and dust generation and recommends a minimum separation of 300m to reduce the impact of spray drift, dust, smoke and ash. Through the establishment of an adequately designed, implemented and maintained vegetative buffer, this minimum separation distance can be reduced to 40m.

The proposed dwelling development area on the subject title can achieve a minimum setback of 100m from the eastern, southern and western boundaries. This setback is also offset by existing hawthorn hedges along these boundaries. There is also scope for these vegetation buffers to be widened if required. While occasional cropping (dryland cereal and fodder crops) occurs on the titles to the south and east, the prevailing wind is from the north west so potential for spray drift towards the dwelling from these titles is considered to be low. The proposed location of the dwelling also provides greater setbacks to adjacent land than existing dwellings along White Hills Rd.

In our opinion, the proposed setbacks for the new dwelling are appropriate for the setting and provide sufficient separation from existing agricultural uses on adjacent land.

Yours Sincerely,

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Appendix 1 – Maps

Figure 1 – Site map of proposed vineyard, with proposed building area and setbacks.

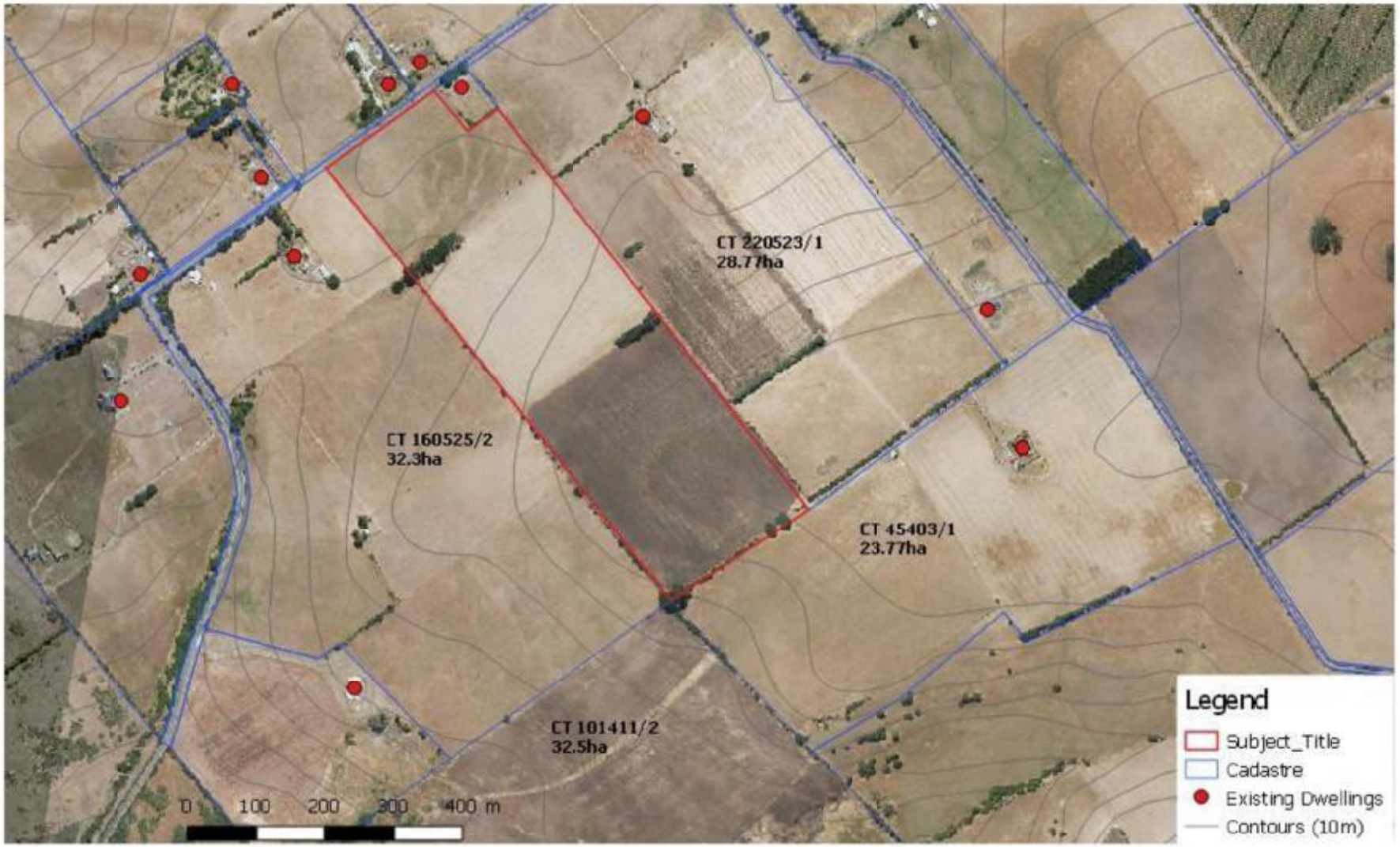

Figure 2 – Adjacent titles and existing dwellings.

Appendix 2

CLASS 1. Land well suited to a wide range of intensive cropping and grazing activities. It occurs on flat land with deep, well drained soils, and in a climate that favours a wide variety of crops. While there are virtually no limitations to agricultural usage, reasonable management inputs need to be maintained to prevent degradation of the resource. Such inputs might include very minor soil conservation treatments, fertiliser inputs or occasional pasture phases. Class 1 land is highly productive and capable of being cropped eight to nine years out of ten in a rotation with pasture or equivalent without risk of damage to the soil resource or loss of production, during periods of average climatic conditions.

CLASS 2. Land suitable for a wide range of intensive cropping and grazing activities. Limitations to use are slight, and these can be readily overcome by management and minor conservation practices. However, the level of inputs is greater, and the variety and/or number of crops that can be grown is marginally more restricted, than for Class 1 land.

This land is highly productive but there is an increased risk of damage to the soil resource or of yield loss. The land can be cropped five to eight years out of ten in a rotation with pasture or equivalent during 'normal' years, if reasonable management inputs are maintained.

CLASS 3. Land suitable for cropping and intensive grazing. Moderate levels of limitation restrict the choice of crops or reduce productivity in relation to Class 1 or Class 2 land. Soil conservation practices and sound management are needed to overcome the moderate limitations to cropping use. Land is moderately productive, requiring a higher level of inputs than Classes I and 2. Limitations either restrict the range of crops that can be grown or the risk of damage to the soil resource is such that cropping should be confined to three to five yens out of ten in a rotation with pasture or equivalent during normal years.

CLASS 4. Land primarily suitable for grazing but which may be used for occasional cropping. Severe limitations restrict the length of cropping phase and/or severely restrict the range of crops that could be grown. Major conservation treatments and/or careful management is required to minimise degradation. Cropping rotations should be restricted to one to two years out of ten in a rotation with pasture or equivalent, during 'normal' years to avoid damage to the soil resource. In some areas longer cropping phases may be possible but the versatility of the land is very limited. (NB some parts of Tasmania are currently able to crop more frequently on Class 4 land than suggested above. This is due to the climate being drier than 'normal'. However, there is a high risk of crop or soil damage if 'normal' conditions return.)

CLASS 5. This land is unsuitable for cropping, although some areas on easier slopes may be cultivated for pasture establishment or renewal and occasional fodder crops may be possible. The land may have slight to moderate limitations for pastoral use. The effects of limitations on the grazing potential may be reduced by applying appropriate soil conservation measures and land management practices.

CLASS 6. Land marginally suitable for grazing because of severe limitations. This land has low productivity, high risk of erosion, low natural fertility or other limitations that severely restrict agricultural use. This land should be retained under its natural vegetation cover.

CLASS 7. Land with very severe to extreme limitations which make it unsuitable for agricultural use.

Living and Working in Rural Areas. A handbook for managing land use conflict issues on the NSW North Coast. Learmonth, R., Whitehead, R., Boyd, B., and Fletcher, S. n.d.

Table 1. Typical rural land use conflict issues in the north coast region

Issue	Explanation
Absentee landholders	Neighbours may be relied upon to manage issues such as bush fires, straying stock, trespassers etc. while the absentee landholder is at work or away.
Access	Traditional or informal 'agreements' for access between farms and to parts of farms may break down with the arrival of new people.
Catchment management	Design, funding and implementation of land, water and vegetatin management plans are complicated with larger numbers of rural land-holders with differing perspectives and values.
Clearing	Neighbours may object to the clearing of trees, especially when it is done apparently without approvals or impacts on habitat areas or local amenity.
Cooperation	Lack of mutual co-operation through the inability or unwillingness on behalf individuals to contribute may curtail or limit traditional work sharing practices on-farm or in the rural community.
Dogs	Stray domestic dogs and wild dogs attacking livestock and wildlife and causing a nuisance.
Drainage	Blocking or changing drainage systems through a lack of maintenance or failure to cooperate and not respect the rights of others.
Dust	Generated by farm and extractive industry operations including cultivating, fallow (bare) ground, farm vehicles, livestock yards, feed milling, fertiliser spreading etc.
Dwellings	Urban or residential dwellings located too close to or affecting an existing rural pursuit or routine land use practice.
Electric fences	Electric shocks to children, horses and dogs. Public safety issues.
Fencing	Disagreement about maintenance, replacement, design and cost.
Fire	Risk of fire escaping and entering neighbouring property. Lack of knowledge of fire issues and the role of the Rural Fire Service.
Firearms	Disturbance, maiming and killing of livestock and pest animals, illegal use and risk to personal safety.
Flies	Spread from animal enclosures or manure and breeding areas.
Heritage management	Destruction and poor management of indigenous and non indigenous cultural artefacts, structures and sites.
Lights	Bright lights associated with night loading, security etc.
Litter	Injury and poisoning of livestock via wind blown and dumped waste. Damage to equipment and machinery. Amenity impacts.
Noise	From farm machinery, scare guns, low flying agricultural aircraft, livestock weaning and feeding, and irrigation pumps.
Odours	Odours arising from piggeries, feedlots, dairies, poultry, sprays, fertiliser, manure spreading, silage, burning carcases/crop residues.
Pesticides	Perceived and real health and environmental concerns over the use, storage and disposal of pesticides as well as spray drift.
Poisoning	Deliberate poisoning and destruction of trees/plants. Spray drift onto non-target plants. Pesticide or poison uptake by livestock and human health risks.
Pollution	Water resources contaminated by effluent, chemicals, pesticides, nutrients and air borne particulates.
Roads	Cost and standards of maintenance, slow/wide farm machinery, livestock droving and manure.
Smoke	From the burning of crop residues, scrub, pasture and windrows.
Soil erosion	Loss of soil and pollution of water ways from unsustainable practices or exposed soils. Lack of adequate groundcover or soil protection.
Straying livestock	Fence damage, spread of disease, damage to crops, gardens and bush/rainforest regeneration.
Theft/vandalism	Interference with crops, livestock, fodder, machinery and equipment.
Tree removal	Removal of native vegetation without appropriate approvals. Removal of icon trees and vegetation.
Trespass	Entering properties unlawfully and without agreement.
Visual/amenity	Loss of amenity as a result of reflective structures (igloos, hail netting), windbreaks plantings (loss of
Water	Competition for limited water supplies, compliance with water regulations, building of dams, changes to flows. Stock access to waterways. Riparian zone management.
Weeds	Lack of weed control particularly noxious weeds, by landholders.

Based on: Smith, RJ (2003) Rural Land Use Conflict: Review of Management Techniques – Final Report to Lismore Living Centres (PlanningNSW).