GEOTON Pty Ltd
Geotechnical Consultants

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04 July 2025

Reference No. GL23301Ab Rev.01

Mr Garry & Ms Lesley Dawkins
Paisley, 40768 Tasman Highway
WAVERLEY TAS 7250

Dear Sir & Madam,

RE: Preliminary On-site Wastewater Disposal Evaluation
40768 Tasman Highway, Waverley

We have pleasure in submitting herein our report detailing the results of a preliminary on-site wastewater disposal evaluation conducted at the above site.

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

For and on behalf of

Geoton Pty Ltd

Tony Barriera

Director – Principal Geotechnical Engineer

1 INTRODUCTION

At the request of Mr Garry & Ms Lesley Dawkins, Geoton Pty Ltd has carried out a limited scope investigation at the site of a proposed 23-Lot residential subdivision at 40768 Tasman Highway, Waverley.

The investigation is to determine if each of the proposed new lots to be subdivided can support an on-site wastewater disposal system (in accordance with AS/NZS 1547:2012 “On-site domestic-wastewater management”) for the purposes of subdivision approval.

It should be noted that this is a preliminary assessment for subdivision approval and that site-specific assessments for the proposed new lots will be required by the developer/owners once the actual location and size of each of the residential developments is known.

A site plan showing the subdivision layout was provided, prepared by 6ty° Pty Ltd, Project No. 22.257, Drawing No. Cp01, Rev. G Dated 21.05.2025. We understand that the proposed subdivision of the property will allocate the existing dwelling to be contained within proposed Lot 17, with the remainder of the site to be divided into 22 vacant lots ranging from 10,048m^2 to 15,231m^2 in size.

2 FIELD INVESTIGATION

The field investigation was conducted on 23 May 2023 and involved the drilling of 13 boreholes by 4WD mounted auger rig to the auger refusal or investigated depths of 0.7m to 2.0m.

The logs of the boreholes are included in Appendix A and their locations are shown on Figure 1 attached.

3 SITE CONDITIONS

The site is located on the corner of Tasman Highway and Boomer Road, is approximately 24.61 hectares in size, and is currently developed with a residence located within the northeast portion of the site. The proposed lots 1 to 16 and 18 to 23 are currently vacant and generally vegetated predominantly with grassland and mature trees. Exposed dolerite boulders were encountered on the surface during the site investigation. There is an existing pond within the middle of the site, which will be allocated to the proposed lot 11.

The ground surface across the site generally has a gentle fall of 1° to 5° towards the northwest.

Photographs of the site are attached as Plates 1 to 4.

The MRT Digital Geological Atlas 1:25,000 Series, indicates that the majority of the site is mapped as being underlain by Jurassic period dolerite or dolerite beneath soil or Cainozoic deposit, with the northeastern portion of the site mapped as Quaternary period sediments and area within the western portion of the site mapped as Cretaceous – Quaternary Period moderately-consolidated dolerite conglomerate.

Examination of the LIST Landslide Planning Map indicates that the majority of the site is not within a mapped landslide hazard band; however, a small portion along the southwest boundary of the site is mapped on a low landslide hazard band.

The investigation indicated that the soil profile varies across the site.

Boreholes BH1 and BH4 encountered disturbed sandy silt to depths of 0.2m to 0.3m, overlying sandy clay to depths of 1.3m, underlain by extremely weathered material (having rock fabric with soil properties) to the refusal depths of 1.5m.

Borehole BH2 encountered disturbed sandy silt to a depth of 0.2m, underlain by sandy clay to the refusal depth of 0.7m.

Borehole BH3 encountered disturbed sandy silt to a depth of 0.2m, overlying silty clay to a depth of 1.1m, underlain by clayey silt to the investigated depth of 2.0m.

Boreholes BH5 to BH7 & BH10 to BH12 encountered disturbed sandy silt or silty clay topsoil to depths of 0.2m, overlying silty clay to depths of 0.6m to 1.9m, underlain by extremely weathered material to the refusal or investigated depths of 0.8m to 2.0m.

Borehole BH8 encountered silty clay topsoil to a depth of 0.2m, overlying silty clay to a depth of 1.7m, underlain by gravelly clay to the investigated depth of 2.0m.

Borehole BH9 encountered disturbed sandy silt to a depth of 0.2m, overlying clayey silt to a depth of 0.4m, underlain by silty clay to the refusal depth of 1.3m.

Borehole BH13 encountered clayey silt topsoil to a depth of 0.2m, overlying clayey silt and silty clay to a depth of 1.0m, underlain by extremely weathered material to the refusal depth of 1.7m.

Auger refusal within boreholes BH1 to BH2, BH4 to BH6 & BH9 to BH13 was inferred to be on highly weathered rock or boulder.

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

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

4 EFFLUENT DISPOSAL

4.1 Soil Classification

Based on the findings of the investigation, the soil has been classified as follows:

- Texture – Light Clay (Table E1 from AS1547-2012);
- Structure – Massive (Table E4 from AS/NZS1547-2012); and
- Category – 5 (Table E1 from AS/NZS1547:2012).

For massive Category 5 soils the indicative permeability (K_{sat}) from AS/NZS1547 Table 5.1 is <0.06m/day.

- Adopted Permeability – 0.06m/day.

4.2 Disposal and Treatment Method

The soil within the proposed effluent disposal area is assessed as having sufficient depth to provide an adequate attenuation period for the breakdown of pathogens within the treated effluent.

This site assessment indicates that the site is not suitable for a traditional trench system as Category 5 soils have very low permeability. A trench system in these conditions will not allow for an adequate attenuation period for the breakdown of pathogens within the treated effluent before infiltration into the groundwater. Additionally, the site is shallow to bedrock.

Therefore, provided the setback distances are adhered to, this site assessment indicates that the proposed new lots are suitable for the disposal of secondary treated effluent.

- Aerated Wastewater Treatment System (AWTS) and sub-surface irrigation; and
- Aerated Wastewater Treatment System (AWTS) and conventional bed raised above the natural ground surface.

Alternatively, a Wisconsin mound treated wastewater disposal system may be suitable within each site, depending on the outcome of a site-specific investigation being carried out.

4.3 Setbacks

The minimum separation distance between the disposal area and downslope features is based on Appendix R from AS/NZS 1547:2012 “Recommended Setback Distances for Land Application Systems” and Section 3.1 from the *Building Act 2016:* Director’s Guidelines for On-site Wastewater Management Systems. As per Table R1 from AS/NZS 1547:2012. The following minimum setbacks are required:

4.3.1 Lots 1 to 8, 10 & 11, 15 &16

- 21.0m from downslope sensitive features such as watercourses and ponds;
- 4.5m from downslope property boundaries;
- 1.5m from cross slope or upslope property boundaries;
- 3.8m from downslope buildings; and
- 3.0m from upslope or cross slope buildings.

4.3.2 Lots 18 to 23

- 23.0m from downslope sensitive features such as watercourses;
- 5.5m from downslope property boundaries;
- 1.5m from cross slope or upslope property boundaries;
- 4.0m from downslope buildings; and
- 3.0m from upslope or cross slope buildings.

4.3.3 Lots 9, 12 to 14

- 17.0m from downslope sensitive features such as watercourses;
- 2.5m from downslope property boundaries;
- 1.5m from cross slope or upslope property boundaries;
- 3.3m from downslope buildings; and
- 3.0m from upslope or cross slope buildings.

4.4 Examples of Minimum System Requirements

4.4.1 AWTS and mounded sub-surface irrigation

About 600m^2 (300m^2 for the effluent disposal area and 300m^2 as a backup area) would be required for an AWTS and sub-surface irrigation system to support a standard 4-bedroom dwelling on town water within the assessed area of the site.

4.4.2 AWTS and raised conventional bed

About 180m^2 (90m^2 for the effluent disposal area and 90m^2 as a backup area) would be required for an AWTS and a conventional bed raised above the natural ground surface to support a standard 4-bedroom dwelling on town water within the assessed area of the site.

5 CONCLUSIONS

The results of the investigation indicate that the new proposed lots have sufficient available area suitable for the disposal of domestic effluent by way of secondary treated wastewater, including sufficient reserve area.

References:

AS 1726 - 2017 Geotechnical Site Investigations

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

Building Act 2016: Director's Guidelines for On-site Wastewater Management Systems

Attachments:

Limitations of report

Figure 1 – Site Plan

Site Photographs

Appendix A – Borehole Logs & Explanation Sheets

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

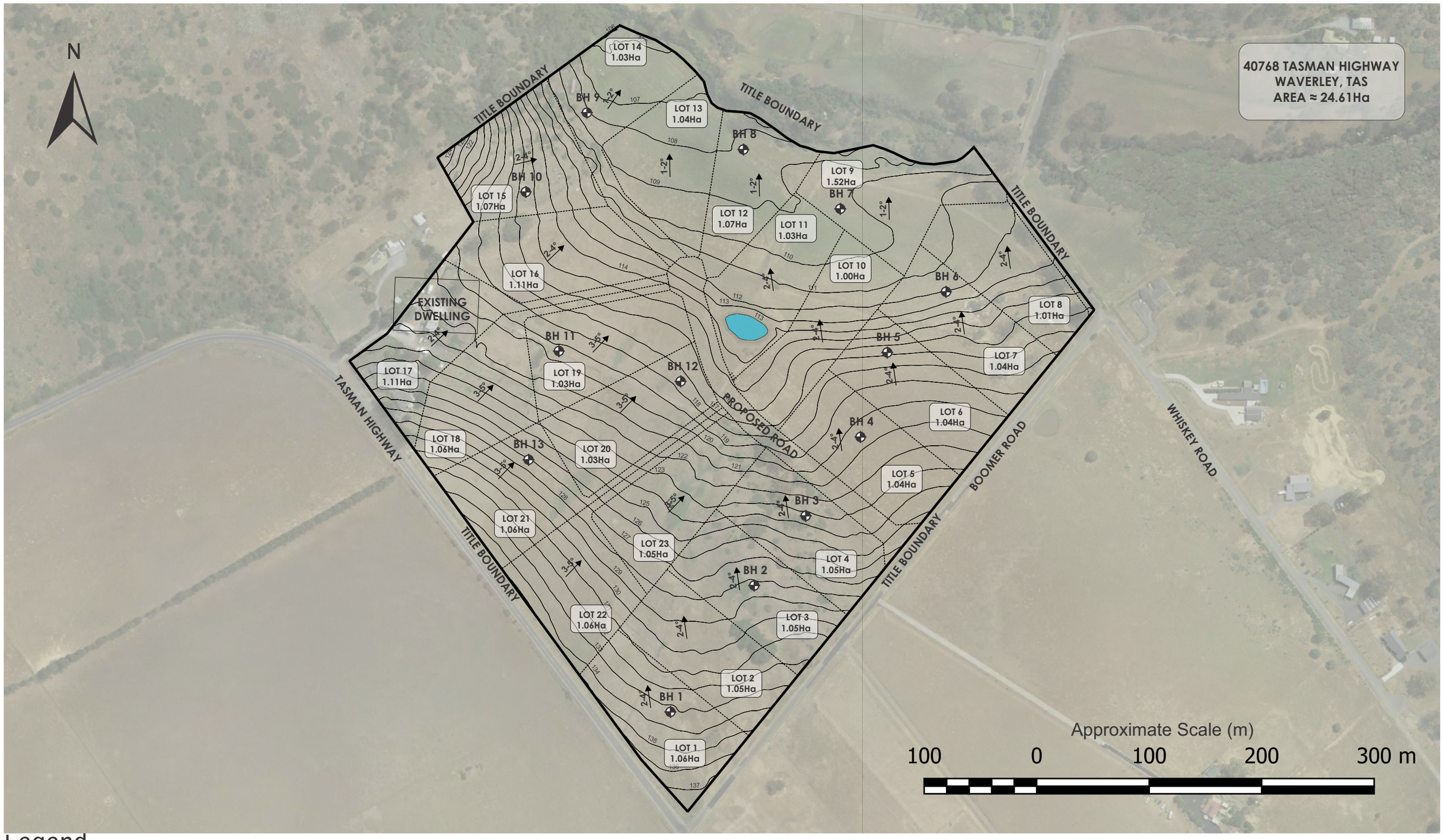
Geoton will not be responsible for interpretations of site data or the report findings by others involved in the design and construction process. Where any confusion exists, clarification should be sought from Geoton.

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

- BH 1 — Approximate Borehole Location
- 5° — Approximate Slope angle in Degrees
- Contour in Metres (LiDAR Derived)
- Existing Pond
- Proposed Title Boundary

GEOTON Pty Ltd				client:	MR GARRY & MS LESLEY DAWKINS
				project:	40768 TASMAN HIGHWAY WAVERLEY
date	04/07/2025	drawn	RS		
scale	As Shown	approved	TB	title:	SITE PLAN
original size	A3	rev	1	project no: GL23301A	figure no. 1

PLATE 1 - View of the site looking to the northwest

PLATE 2 - View of the site looking to the northeast

GEOTON Pty Ltd				client:	MR GARRY & MS LESLEY DAWKINS	
title: PHOTOGRAPH				project:	40768 TASMAN HIGHWAY WAVERLEY	
date:	23/05/2023	original size	A4	project no: GL23301A		figure no. PLATES 1 & 2

PLATE 3 - View of exposed dolerite boulder within the site

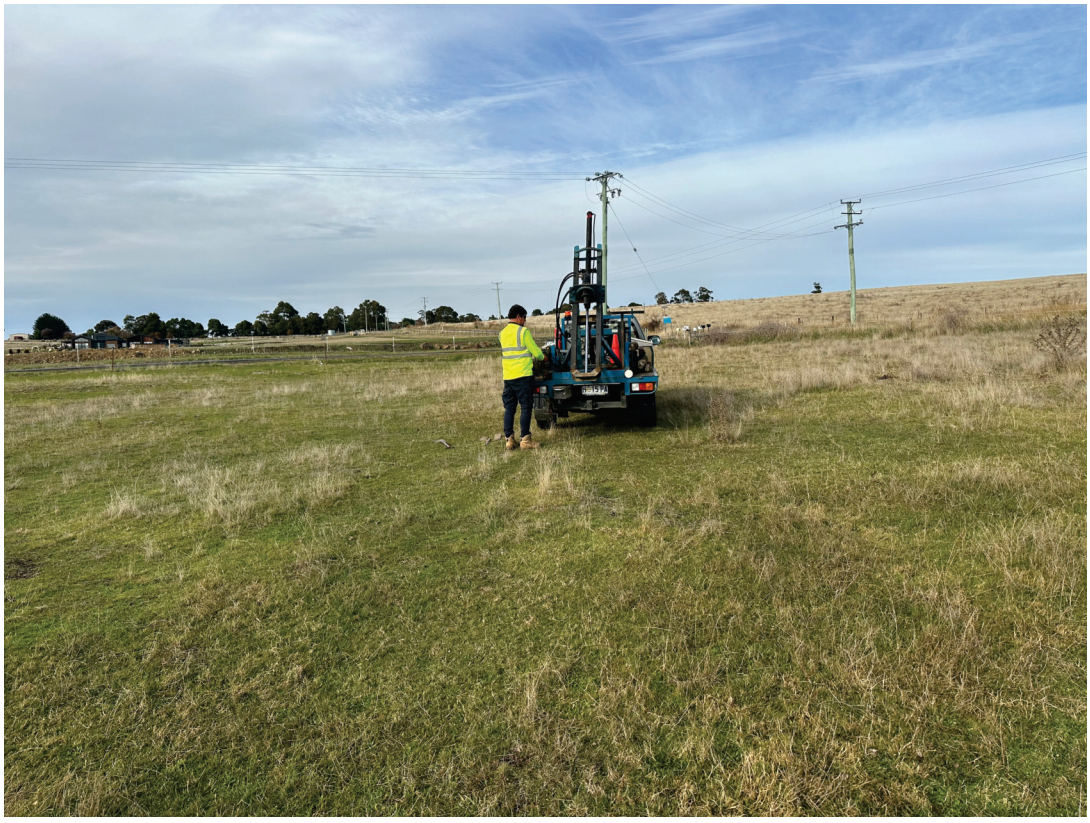


PLATE 4 - view of site looking to the south

GEOTON Pty Ltd				client:	MR GARRY & MS LESLEY DAWKINS	
				project:	40768 TASMAN HIGHWAY WAVERLEY	
title:	PHOTOGRAPH					
date:	23/05/2023	original size	A4	project no: GL23301A		figure no. PLATES 3 & 4

Appendix A

Borehole Logs

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ENGINEERING BOREHOLE LOG

Borehole no. BH1
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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				0.25			DISTURBED SOIL - Sandy SILT, low plasticity, dark grey or black, trace fine grained sand	M	St	**DISTURBED SOIL**
					0.50		CI	Sandy CLAY - medium plasticity, brown/grey, fine to medium grained sand trace cobbles	M	VSt	**NATURAL** W < PL
					0.75						
					1.00						
					1.25						
					1.50		XW	Highly Weathered Material - Remoulded to Sandy Clay, orange/ brown, fine to medium grained sand	D	VSt/ H	
					1.75			Borehole BH1 refusal @ 1.5m on inferred rock/boulder			
					2.00						
					2.25						

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ENGINEERING BOREHOLE LOG

Borehole no. BH2
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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
								DISTURBED SOIL - Sandy SILT, low plasticity, dark grey or black, trace fine grained sand	M	VSt	**DISTURBED SOIL**
ADV	N				0.25		CI	Sandy CLAY - medium plasticity, brown/grey, fine to medium grained sand trace cobbles	M	VSt	**NATURAL**
					0.50						
					0.75			Borehole BH2 refusal @ 0.7m on inferred rock/boulder			
					1.00						
					1.25						
					1.50						
					1.75						
					2.00						
					2.25						

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ENGINEERING BOREHOLE LOG

Borehole no. BH3
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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
								DISTURBED SOIL - Sandy SILT, low plasticity, dark grey or black, trace fine grained sand	M	St	**DISTURBED SOIL**
ADV	N				0.25		CH	Silty CLAY - high plasticity, red/brown	M	St/ VSt	**NATURAL** W < PL
					0.50						
					0.75						
					1.00						
					1.25		MH	Clayey SILT - high plasticity, red/ brown	M	VSt	
					1.50						
					1.75						
					2.00						
					2.25			Borehole BH3 terminated @ 2.0m			

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ENGINEERING BOREHOLE LOG

Borehole no. BH4
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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							DISTURBED SOIL - Sandy SILT, low plasticity, dark grey or black, trace fine grained sand	M	St	**DISTURBED SOIL**
					0.25		CI	Sandy CLAY - medium plasticity, brown/grey, fine to medium grained sand	M	St	**NATURAL** W ≈ PL
					0.50						
					0.75						
					1.00			Becoming brown/orange			W < PL
					1.25						
							XW	Highly Weathered Material - Remoulded to Sandy Clay, orange/ brown, fine to medium grained sand	D	VSt/ H	
					1.50						
								Borehole BH4 refusal @ 1.5m on inferred rock/boulder			
					1.75						
					2.00						
					2.25						

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ENGINEERING BOREHOLE LOG

Borehole no. BH5
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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
								DISTURBED SOIL - Sandy SILT, low plasticity, dark grey or black, trace fine grained sand	M/ D	St	**DISTURBED SOIL**
ADV	N				0.25		CH	Silty CLAY - high plasticity, pale brown/yellow, trace fine grained sand	M	VSt	**NATURAL** W ≈ PL
					0.50						
					0.75		XW	Highly Weathered Material - Remoulded to Sandy Clay, orange/ brown, fine to medium grained sand	D	VSt/ H	
								Borehole BH5 refusal @ 0.8m on inferred rock/boulder			
					1.00						
					1.25						
					1.50						
					1.75						
					2.00						
					2.25						

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ENGINEERING BOREHOLE LOG

Borehole no. BH6
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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							DISTURBED SOIL - Sandy SILT, low plasticity, dark grey or black, trace fine grained sand	M	St	**DISTURBED SOIL**
					0.25		CH	Silty CLAY - high plasticity, pale brown/yellow, trace fine grained sand	M	VSt	**NATURAL** W ≈ PL
					0.50						
					0.75			Becoming brown/orange			
					1.00						
							XW	Highly Weathered Material - Remoulded to Sandy Clay, orange/ brown, fine to medium grained sand	D	VSt/ H	
					1.25						
								Borehole BH6 refusal @ 1.3m on inferred rock/boulder			
					1.50						
					1.75						
					2.00						
					2.25						

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ENGINEERING BOREHOLE LOG

Borehole no. BH7
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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							TOPSOIL - Silty CLAY, high plasticity, dark grey or black, trace fine to medium grained sand	M	St	**ALLUVIAL SOIL**
					0.25		CH	Silty CLAY - high plasticity, dark grey or black	M	St	W >PL, W < LL
					0.50						
							CH	Silty CLAY - high plasticity, pale brown/yellow mottled grey	M	VSt	**RESIDUAL SOIL** W < PL
					0.75						
					1.00						
					1.25						
					1.50						
					1.75						
					2.00		XW	Highly Weathered Material - Remoulded to Sandy Clay, orange/ brown, fine to medium grained sand	D	VSt/ D	
								Borehole BH7 terminated @ 2.0m			
					2.25						

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ENGINEERING BOREHOLE LOG

Borehole no. BH8
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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							TOPSOIL - Silty CLAY, high plasticity, dark grey or black, trace fine to medium grained sand	M	St	**ALLUVIAL SOIL**
					0.25		CH	Silty CLAY - high plasticity, dark grey or black	M	St	W >PL, W < LL
					0.50		CH	Silty CLAY - high plasticity, pale brown/yellow mottled grey	M	VSt	**RESIDUAL SOIL** W < PL
					0.75						
					1.00						
					1.25						
					1.50			trace cobbles			
					1.75		CI	Gravelly CLAY - medium plasticity, brown/yellow, fine grained gravel	M	VSt	
					2.00						
								Borehole BH8 terminated @ 2.0m			
					2.25						

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ENGINEERING BOREHOLE LOG

Borehole no. BH9
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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							DISTURBED SOIL - Sandy SILT, low plasticity, dark grey or black, trace fine grained sand	M	St	**DISTURBED SOIL**
					0.25		MH	Clayey SILT - high plasticity, dark grey or black	M	St	**NATURAL** W < PL
					0.50		CH	Silty CLAY - high plasticity, orange/ brown mottled grey	M	VSt	
					0.75						
					1.00			Becoming yellow/brown mottled grey			
					1.25			trace cobbles			
								Borehole BH9 refusal @ 1.3m on inferred rock/boulder			
					1.50						
					1.75						
					2.00						
					2.25						

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ENGINEERING BOREHOLE LOG

Borehole no. BH10
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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
								TOPSOIL - Silty CLAY, high plasticity, red/brown, trace fine grained sand	M	St	
					0.25		CH	Silty CLAY - high plasticity, red/brown, trace fine grained sand	M	VSt	W < PL
					0.50			trace cobbles			
ADV	N				0.75		XW	Highly Weathered Material - Remoulded to Sandy Clay, orange/ brown, fine to medium grained sand	D	VSt/ H	
					1.00						
					1.25						
					1.50						
					1.75			Borehole BH10 refusal @ 1.6m on inferred rock/boulder			
					2.00						
					2.25						

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ENGINEERING BOREHOLE LOG

Borehole no. BH11
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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
								TOPSOIL - Silty CLAY, high plasticity, red/brown, trace fine grained sand	M	St	
					0.25		CH	Silty CLAY - high plasticity, red/brown, trace fine grained sand	M	VSt	W < PL
ADV	N				0.50						
					0.75		XW	Highly Weathered Material - Remoulded to Sandy Clay, orange/ brown, fine to medium grained sand	D	VSt/ H	
					1.00				M		
					1.25			Becoming red/brown			
					1.50						
								Borehole BH11 refusal @ 1.5m on inferred rock/boulder			
					1.75						
					2.00						
					2.25						

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ENGINEERING BOREHOLE LOG

Borehole no. BH12
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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							TOPSOIL - Silty CLAY, high plasticity, red/brown, trace fine grained sand	M	St	
					0.25		CH	Silty CLAY - high plasticity, red/brown, trace fine grained sand	M	VSt	W < PL
					0.50						
					0.75						
					1.00		XW	Highly Weathered Material - Remoulded to Sandy Clay, orange/ brown, fine to medium grained sand	D	VSt/ H	
								Borehole BH12 refusal @ 1.0m on inferred rock/boulder			
					1.25						
					1.50						
					1.75						
					2.00						
					2.25						

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ENGINEERING BOREHOLE LOG

Borehole no. BH13
Sheet no. 1 of 1
Job no. GL23301A

Client :	Mr Garry & Ms Lesley Dawkins		Date : 23/05/2023
Project :	Preliminary On-site Wastewater Assessment		Logged By : RS
Location :	40768 Tasman Highway, Waverley		
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							TOPSOIL - Clayey SILT, high plasticity, dark grey or black	M	VSt	
					0.25		MH	Clayey SILT - high plasticity,dark grey or black	M	VSt	W ≈ PL
					0.50		CH	Silty CLAY - high plasticity, pale brown/yellow	M	VSt	
					0.75			Becoming orange/brown			W < PL
					1.00		XW	Highly Weathered Material - Remoulded to Sandy Clay, orange/ brown, fine to medium grained sand	D	VSt/ H	
					1.25						
					1.50						
					1.75			Borehole BH13 refusal @ 1.7m on inferred rock/boulder			
					2.00						
					2.25						

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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)

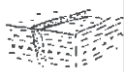
SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

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.	

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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

1	2	3	4	
				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