

# Lot 2, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 2  
October 2023

# Lot 2, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 2	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 2, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 31<sup>st</sup> of July 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the west and is currently vacant. At the time of the investigation, the surface of the site was moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, trace fine to medium gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner’s Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

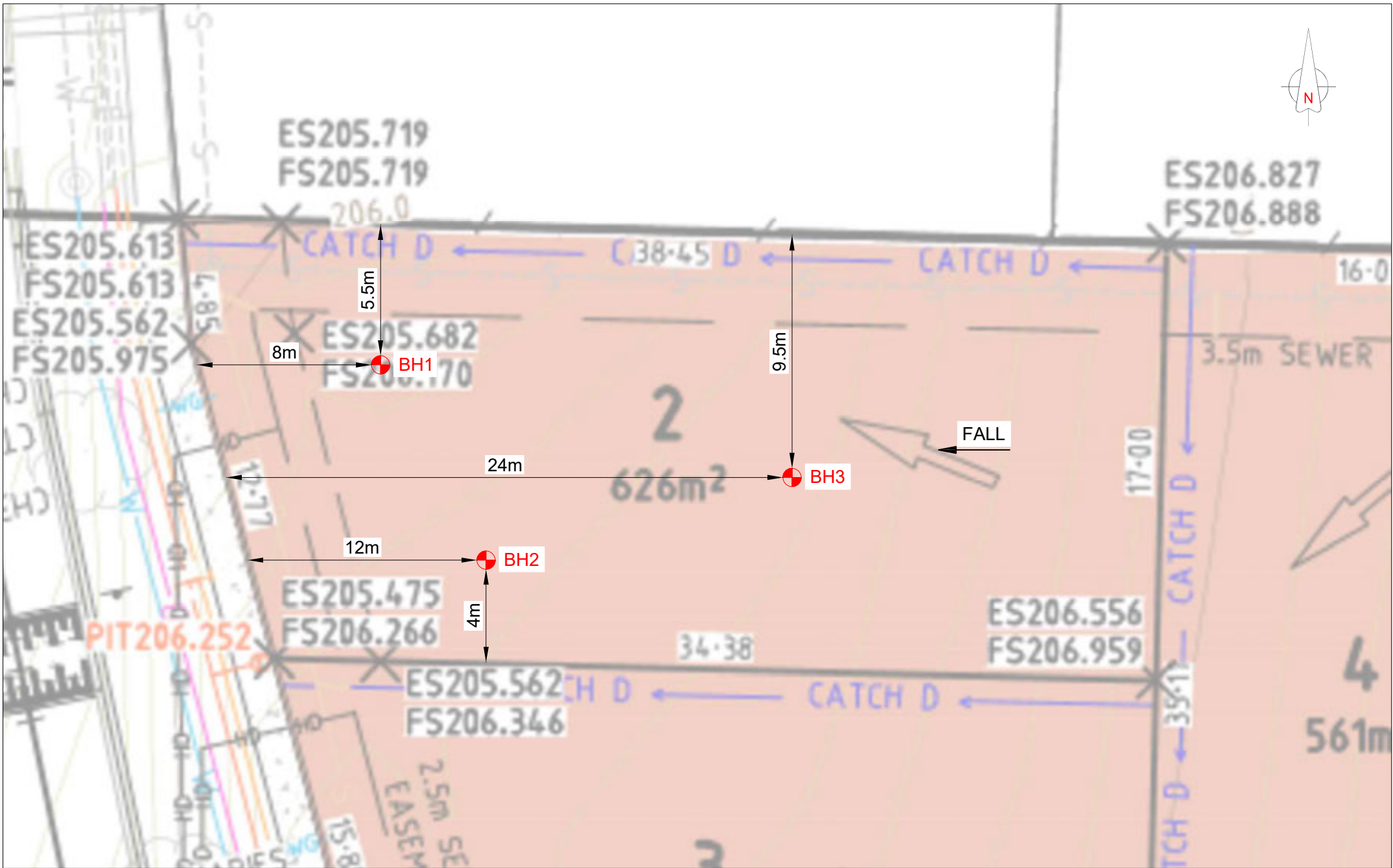
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 2, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-1  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 16 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-1
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 2, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 31/07/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.65	Controlled Fill		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine to medium sized gravel, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, pale orange brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St	
		1	Natural		CI	Silty CLAY (CI) : stiff, medium plasticity, orange brown, with fine to medium grained sand, moist.		M	St	
		2	Natural		CL-CI	Silty to sandy to gravelly CLAY (CL-CI) : stiff to very stiff, low to medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St-VSt	
		3				1 Terminated at 3 m				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-1
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 2, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 31/07/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.9	Controlled Fill		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine to medium sized gravel, moist to dry.		M-D	St	
		1.1	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, pale orange brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St	
		1.3	Natural		CI	Silty CLAY (CI) : stiff, medium plasticity, orange brown, with fine to medium grained sand, moist.		M	St	
		1.9	Natural		CL-CI	Silty to sandy to gravelly CLAY (CL-CI) : stiff to very stiff, low to medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St-VSt	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig :	Honda SCR - Trailer Mount	Job Number :	23C 0406-1
Easting (m) :	Driller Supplier :	Geotechnical Testing Services	Client :	Lansell Homes
Northing (m) :	Logged By :	PB	Project :	Site Classification
Ground Elevation : Not Surveyed	Reviewed By :	CP	Location :	Lot 2, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date :	31/07/0023	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.4	Controlled Fill		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine to medium sized gravel, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, pale orange brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St	
		2.1	Natural		CL	Sandy to gravelly CLAY (CL) : stiff to very stiff, low plasticity, pale orange brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St-Vst	
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-?	Possible boundary

# Lot 3, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 3  
October 2023

# Lot 3, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 3	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 3, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 31<sup>st</sup> of July 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the west and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, trace fine to medium gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***





**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-2
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 3, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 31/07/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.9	Controlled Fill		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine to medium sized gravel, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, pale orange brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St	
		1.5	Natural		CI	Silty CLAY (CI) : stiff, medium plasticity, orange brown, with fine to medium grained sand, moist.		M	St	
		1.8	Natural		CL-CI	Silty to sandy to gravelly CLAY (CL-CI) : stiff to very stiff, low to medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St-VSt	
		3				<b>1 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig :	Honda SCR - Trailer Mount	Job Number :	23C 0406-2
Easting (m) :	Driller Supplier :	Geotechnical Testing Services	Client :	Lansell Homes
Northing (m) :	Logged By :	PB	Project :	Site Classification
Ground Elevation : Not Surveyed	Reviewed By :	CP	Location :	Lot 3, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date :	31/07/0023	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine to medium sized gravel, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, pale orange brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St	
		1.5	Natural		CI	Silty CLAY (CI) : stiff, medium plasticity, orange brown, with fine to medium grained sand, moist.		M	St	
		1.9	Natural		CL-CI	Silty to sandy to gravelly CLAY (CL-CI) : stiff to very stiff, low to medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St-VSt	
		2								
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-2
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 3, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 31/07/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.5	Controlled Fill		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine to medium sized gravel, moist to dry.		M-D	St	
		1.0	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, pale orange brown, fine to coarse grained sand, moist to dry.		M-D	St	
		2.2	Natural		CL	Sandy to gravelly CLAY (CL) : stiff to very stiff, low plasticity, pale orange brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St-VSt	
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

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Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

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### Density of Granular Soils

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Very Loose (VL)	< 15
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### Minor Components

Term	Field Guide	Proportion of Minor Component In:
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### Moisture Condition

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### Method

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<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
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### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-	Possible boundary

# Lot 5, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 5  
October 2023

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The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

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After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, trace fine to medium gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

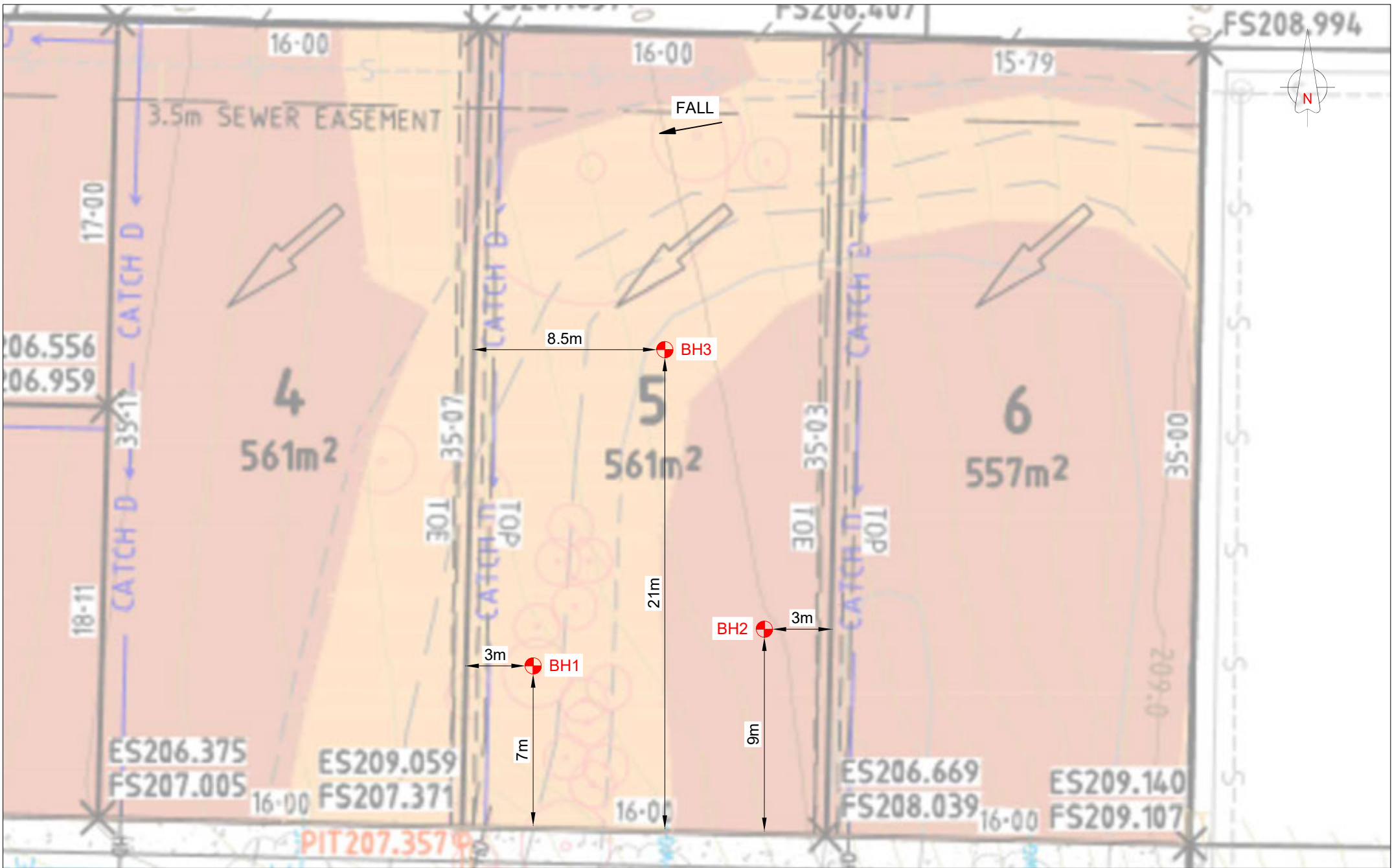
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 5, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-4  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-4
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 5, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 31/07/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.3	Controlled Fill		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St	
			Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, pale orange brown, fine to coarse grained sand, moist to dry.		M-D	St	
		1.6	Natural		CL	Sandy to gravelly CLAY (CL) : stiff to very stiff, low plasticity, pale orange brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St-VSt	
		3				<b>1 Terminated at 3 m</b>				



**GTS - Bendigo**




13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-4
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 5, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 31/07/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.2	Natural		CI	Sandy to gravelly CLAY (CI) : stiff, medium plasticity, pale orange brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St	
		2.8	Rock		SLT	SILTSTONE: distinctly weathered, low strength, pale brown, grained, dry.	DW	D	LS	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-4
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 5, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 31/07/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.4	Controlled Fill		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, pale orange brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St	
		1.8	Natural		CL	Sandy to gravelly CLAY (CL) : stiff to very stiff, low plasticity, pale orange brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St-VSt	
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-?	Possible boundary

# Lot 6, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 6  
October 2023

# Lot 6, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 6	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 6, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 31<sup>st</sup> of July 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the west and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There is 1 medium sized tree within proximity of the proposed development. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class P**, due to the proximity of trees which may cause abnormal moisture conditions across the site.

The reactivity of the material across the site would typically lead to a Class M-D.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine to medium gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

Or

- **SILTSTONE**, distinctly weathered, pale brown, low strength rock.  
At depth below 1.6 metres in the region of BH3, below 2.0 metres in the region of BH2 and at depths below 2.7 metres in the region of BH1.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural gravelly sandy silty clays, increasing to an allowable bearing pressure of 300kPa for footings founded in the weathered siltstone rock. All foundations should extend a minimum of 100mm into the above foundation material.

If founding in the siltstone rock, bored or screw piers may be considered. Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.

- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.
- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

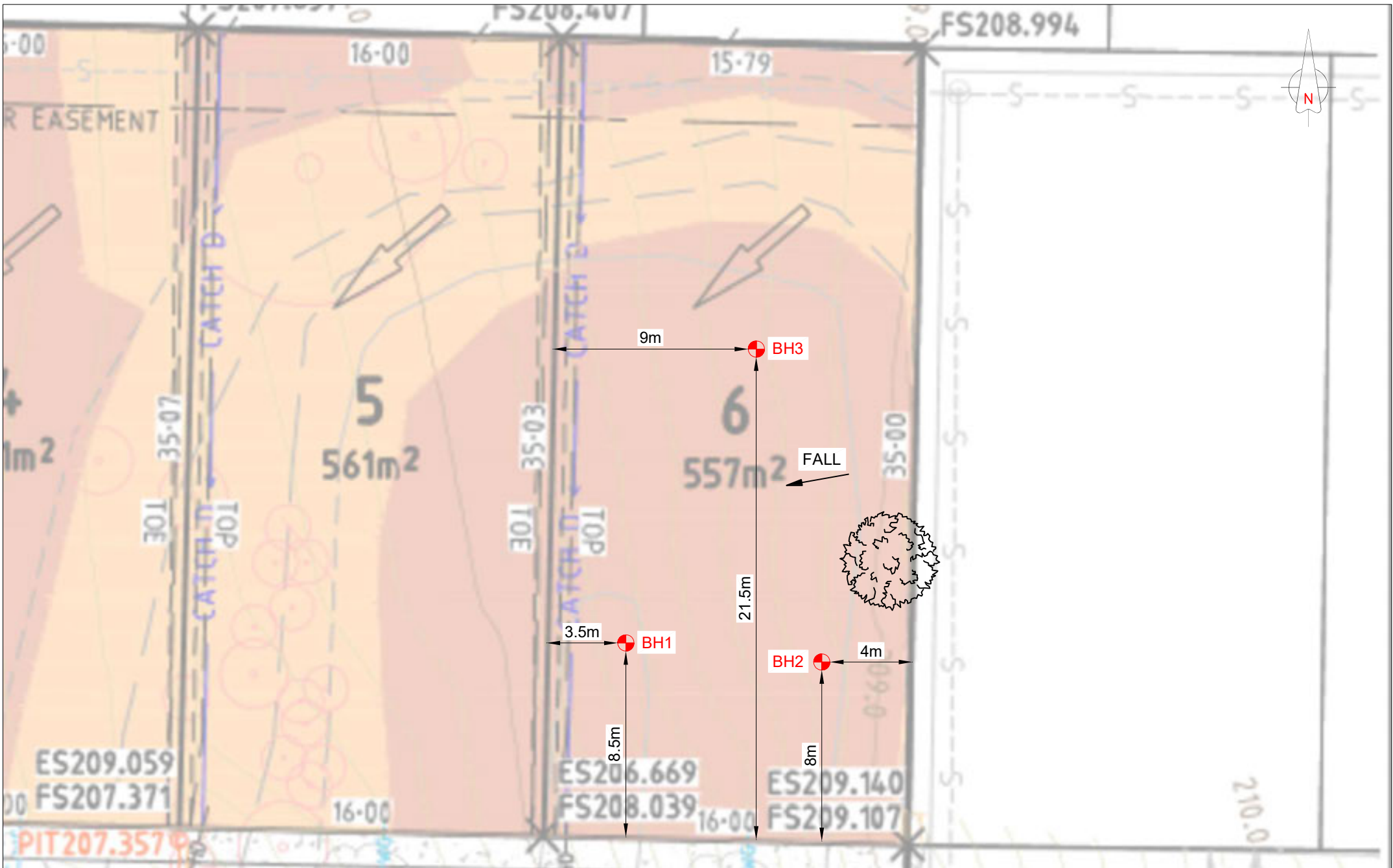
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 6, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-5  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-5
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 6, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 31/07/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.6	Natural		CL	Sandy to gravelly CLAY (CL) : stiff, low plasticity, pale orange brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		2.7	Rock		SLT	SILTSTONE: distinctly weathered, low strength, pale brown, grained, dry.	DW	D	LS	
		3				<b>1 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-5
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 6, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 31/07/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1.1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		2	Natural		CL	Sandy to gravelly CLAY (CL) : stiff, low plasticity, pale orange brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		2	Rock		SLT	SILTSTONE: distinctly weathered, low strength, pale brown, grained, dry.	DW	D	LS	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-5
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 6, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 2.5 m BGL	Date : 31/07/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.6	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.0	Natural		CL	Sandy to gravelly CLAY (CL) : stiff, low plasticity, pale orange brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		1.6	Rock		SLT	SILTSTONE: distinctly weathered, low strength, pale brown, grained, dry.	DW	D	LS	
		3.0				3 Terminated at 2.5 m				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-?	Possible boundary

# Lot 7, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 7  
October 2023

# Lot 7, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 7	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 7, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 11<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the west and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, trace fine gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

Or

- **SILTSTONE,** distinctly weathered, pale orange, low strength rock.  
At depth below 2.0 metres in the region of BH1, below 2.4 metres in the region of BH2 and at depths below 2.5 metres in the region of BH3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural sandy silty clays, increasing to an allowable bearing pressure of 300kPa for footings that extend into the weathered siltstone rock. All foundations should extend a minimum of 100mm into the above foundation material.

If founding on the siltstone rock, bored or screw piers may be considered. Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of *AS2870* and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.

- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.
- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

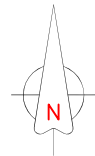
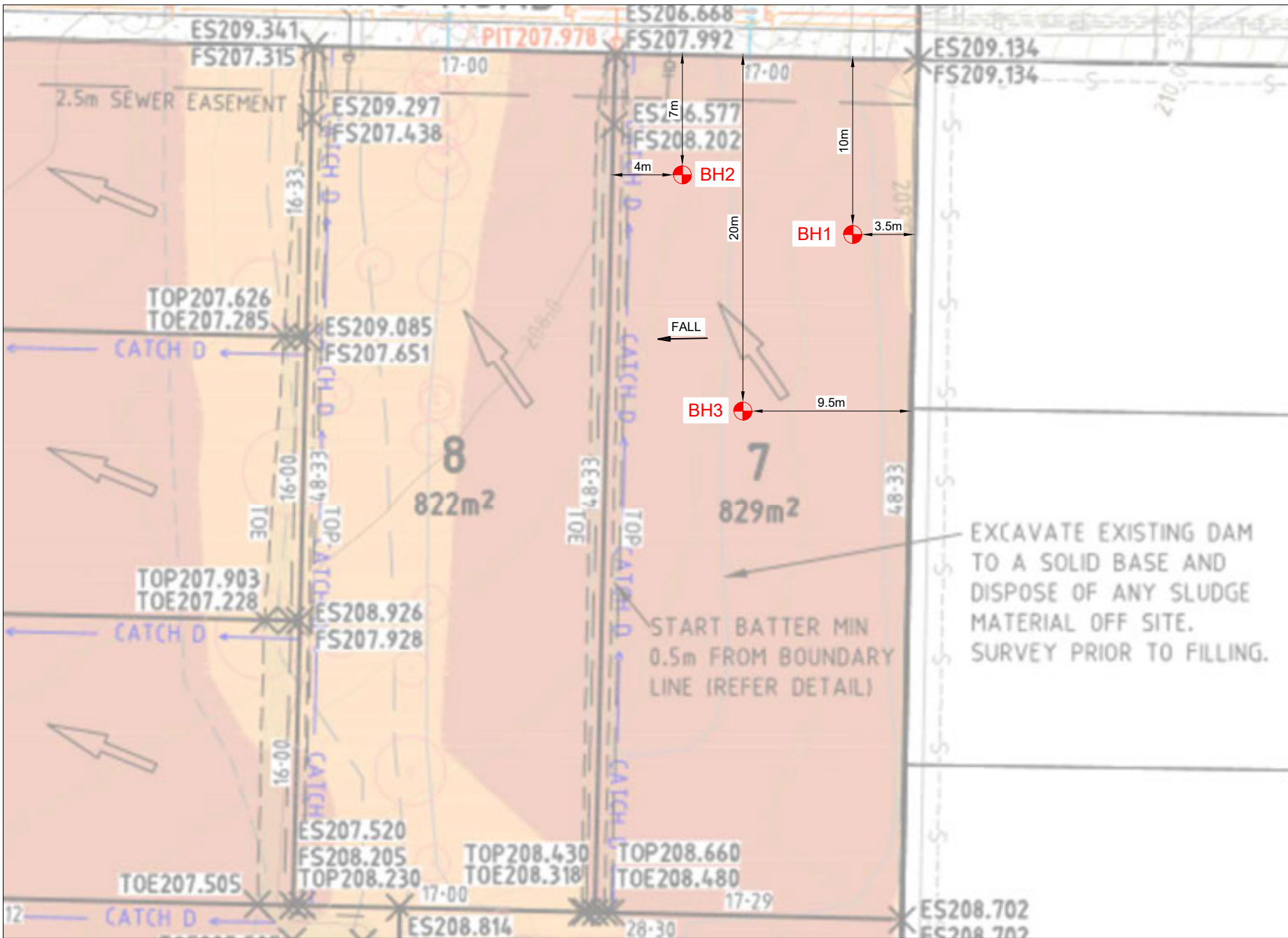
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



EXCAVATE EXISTING DAM TO A SOLID BASE AND DISPOSE OF ANY SLUDGE MATERIAL OFF SITE. SURVEY PRIOR TO FILLING.

START BATTER MIN 0.5m FROM BOUNDARY LINE (REFER DETAIL)



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 7, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-6  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-6
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 7, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing	
100mm SFA		1	Controlled Fill		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St		
		1.2	Natural		CL	Sandy to gravelly CLAY (CL) : stiff, low plasticity, pale orange brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St		
		2	Rock		SLT	SILTSTONE: distinctly weathered, low strength, pale orange, grained, dry.	DW	D	LS		
		3				1 Terminated at 3 m					



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-6
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 7, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA			Controlled Fill		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St	
		1.7	Natural		CL	Sandy to gravelly CLAY (CL) : stiff, low plasticity, pale orange brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		2.4	Rock		SLT	SILTSTONE: distinctly weathered, low strength, pale orange, grained, dry.	DW	D	LS	
		3				<b>2 Terminated at 3 m</b>				






**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-6
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 7, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA			Controlled Fill		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St	
		1.7	Natural		CL	Sandy to gravelly CLAY (CL) : stiff, low plasticity, pale orange brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		2.5	Rock		SLT	SILTSTONE: distinctly weathered, low strength, pale orange, grained, dry.	DW	D	LS	
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-	Possible boundary

# Lot 8, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 8  
October 2023

# Lot 8, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 8	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 8, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 11<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the west and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

*Or*

- **SILTSTONE,** distinctly weathered, pale brown, low strength rock.  
At depth below 1.5 metres in the region of BH2, below 2.0 metres in the region of BH1 and at depths below 2.4 metres in the region of BH3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural gravelly sandy silty clays, increasing to an allowable bearing pressure of 300kPa for footings that extend into the weathered siltstone rock. All foundations should extend a minimum of 100mm into the above foundation material.

If founding on the siltstone rock, bored or screw piers may be considered. Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

It is noted that the fill in BH1 is likely the old dam bank and was deemed to have suitable strength, had been down for a long time with no signs of leaking or deterioration from the initial site inspection. As such, this fill is considered a suitable founding medium.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.

- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner’s Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.
- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

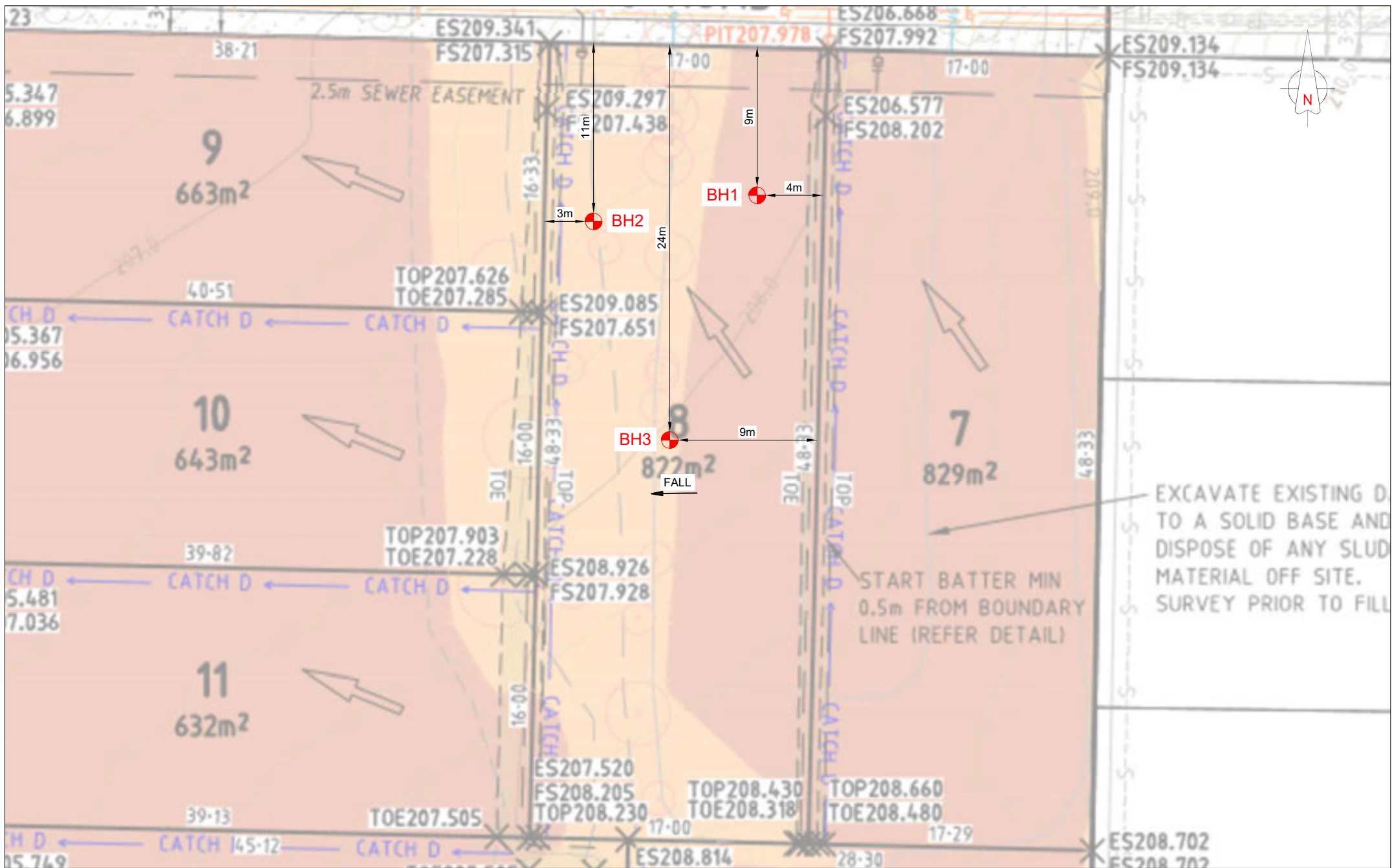
**Graduate Geotechnical Engineer**

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

**Principal Geotechnical Engineer**



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 8, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-7  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-7
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 8, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 2.5 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.5	Natural		CL	Sandy to gravelly CLAY (CL) : stiff, low plasticity, pale orange brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		2	Rock		SLT	SILTSTONE: distinctly weathered, low strength, pale brown, grained, dry.	DW	D	LS	
		3				1 Terminated at 2.5 m				





**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-7
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 8, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 2.5 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		1.5	Rock		SLT	SILTSTONE: distinctly weathered, low strength, pale brown, grained, dry.	DW	D	LS	
		2								
		3				<b>2 Terminated at 2.5 m</b>				






**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-7
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 8, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 2.5 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1.2	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		2.4	Natural		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		2.4	Rock		SLT	SILTSTONE: distinctly weathered, low strength, pale brown, grained, dry.	DW	D	LS	
		3				3 Terminated at 2.5 m				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-	Possible boundary

# Lot 9, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 9  
October 2023

# Lot 9, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 9	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 9, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 11<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the west and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine to medium gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural gravelly sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

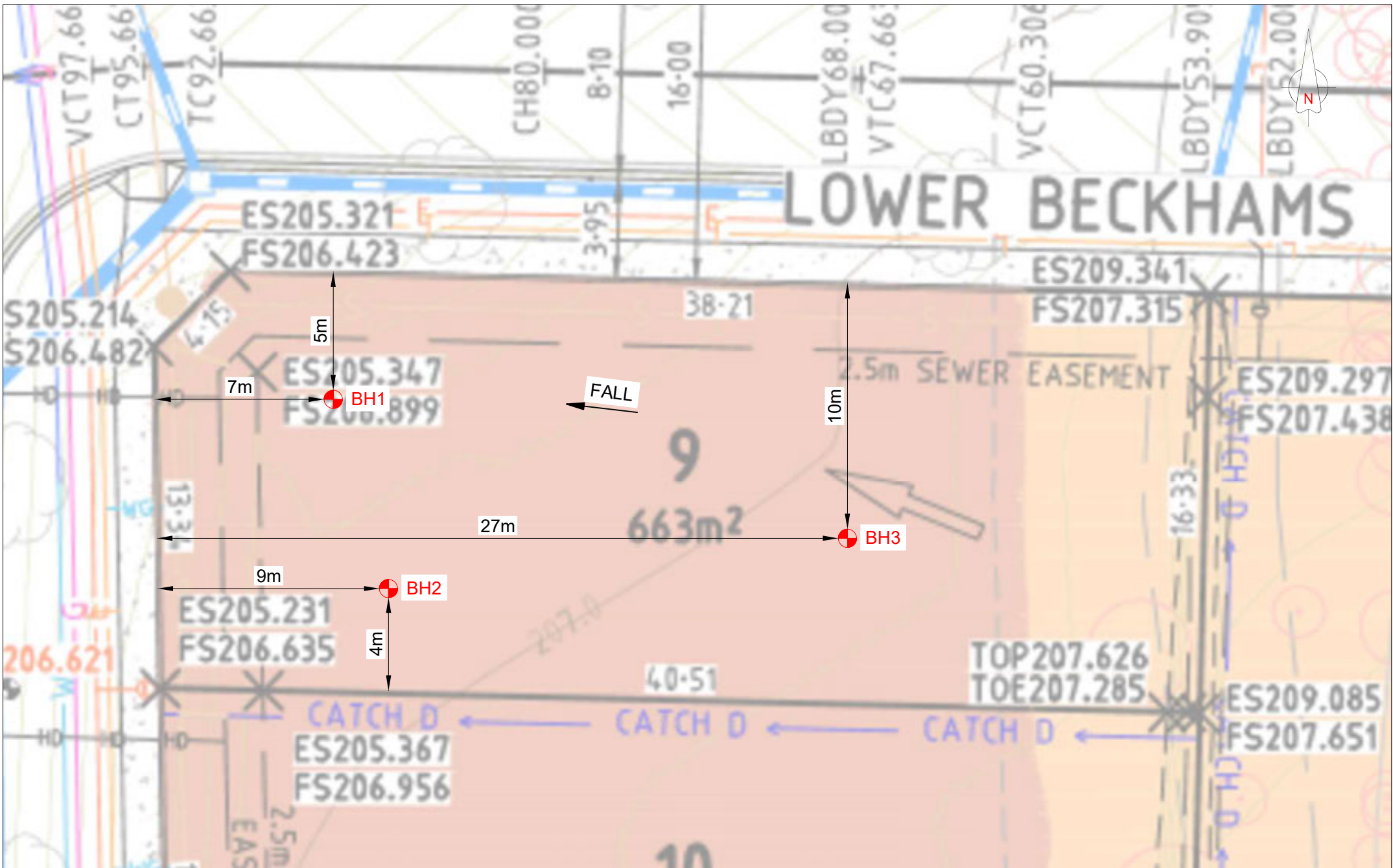
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 9, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-8  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-8
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 9, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA			Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.5	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St	
		2.2	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St	
		3				<b>1 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-8
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 9, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.4	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St	
		2.3	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM : Drill Rig : Honda SCR - Trailer Mount Job Number : 23C 0406-8  
 Easting (m) : 0 Driller Supplier : Geotechnical Testing Services Client : Lansell Homes  
 Northing (m) : 0 Logged By : PB Project : Site Classification  
 Ground Elevation : Not Surveyed Reviewed By : CP Location : Lot 9, Sanctuary Gardens Estate, Maiden Gully  
 Total Depth : 3 m BGL Date : 11/10/0023 Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.9	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CL-CI	Silty to sandy CLAY (CL-CI) : stiff to very stiff, low to medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff to very stiff, low plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St-VSt	
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-?	Possible boundary

# Lot 10, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 10  
October 2023

# Lot 10, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 10	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 10, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 11<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the west and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine to medium gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural gravelly sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

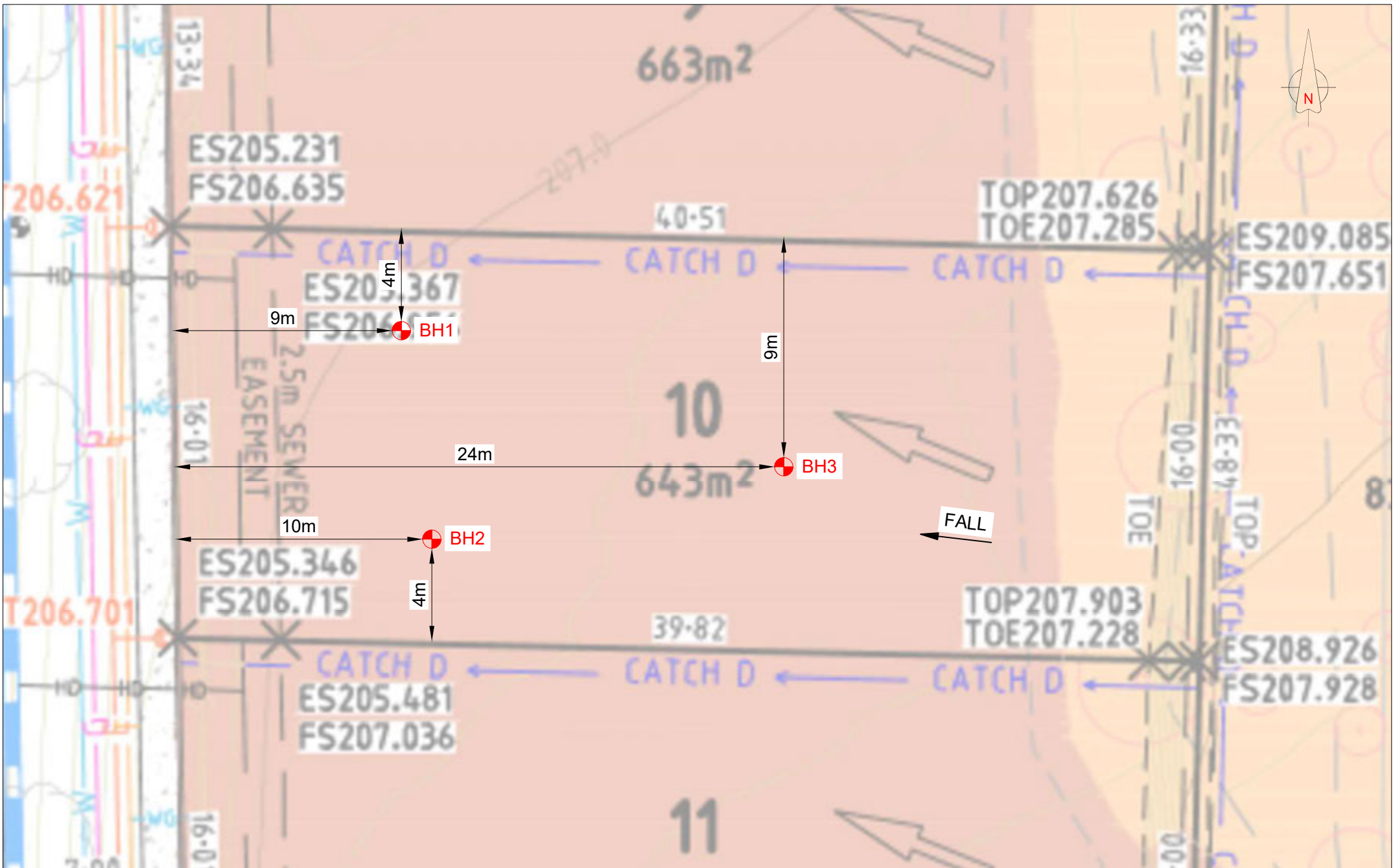
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 10, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-9  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-9
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 10, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.4	Natural		CI	Silty to sandy CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2.3	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		3				<b>1 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-9
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 10, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.4	Natural		CI	Silty to sandy CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2.5	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM : Drill Rig : Honda SCR - Trailer Mount Job Number : 23C 0406-9  
 Easting (m) : 0 Driller Supplier : Geotechnical Testing Services Client : Lansell Homes  
 Northing (m) : 0 Logged By : PB Project : Site Classification  
 Ground Elevation : Not Surveyed Reviewed By : CP Location : Lot 10, Sanctuary Gardens Estate, Maiden Gully  
 Total Depth : 3 m BGL Date : 11/10/0023 Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CL-CI	Silty to sandy CLAY (CL-CI) : stiff to very stiff, low to medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2.1	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff to very stiff, low plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St-VSt	
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
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	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-?	Possible boundary

# Lot 11, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 11  
October 2023

# Lot 11, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406- Lot 11	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 11, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 11<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the west and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural gravelly sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

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Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

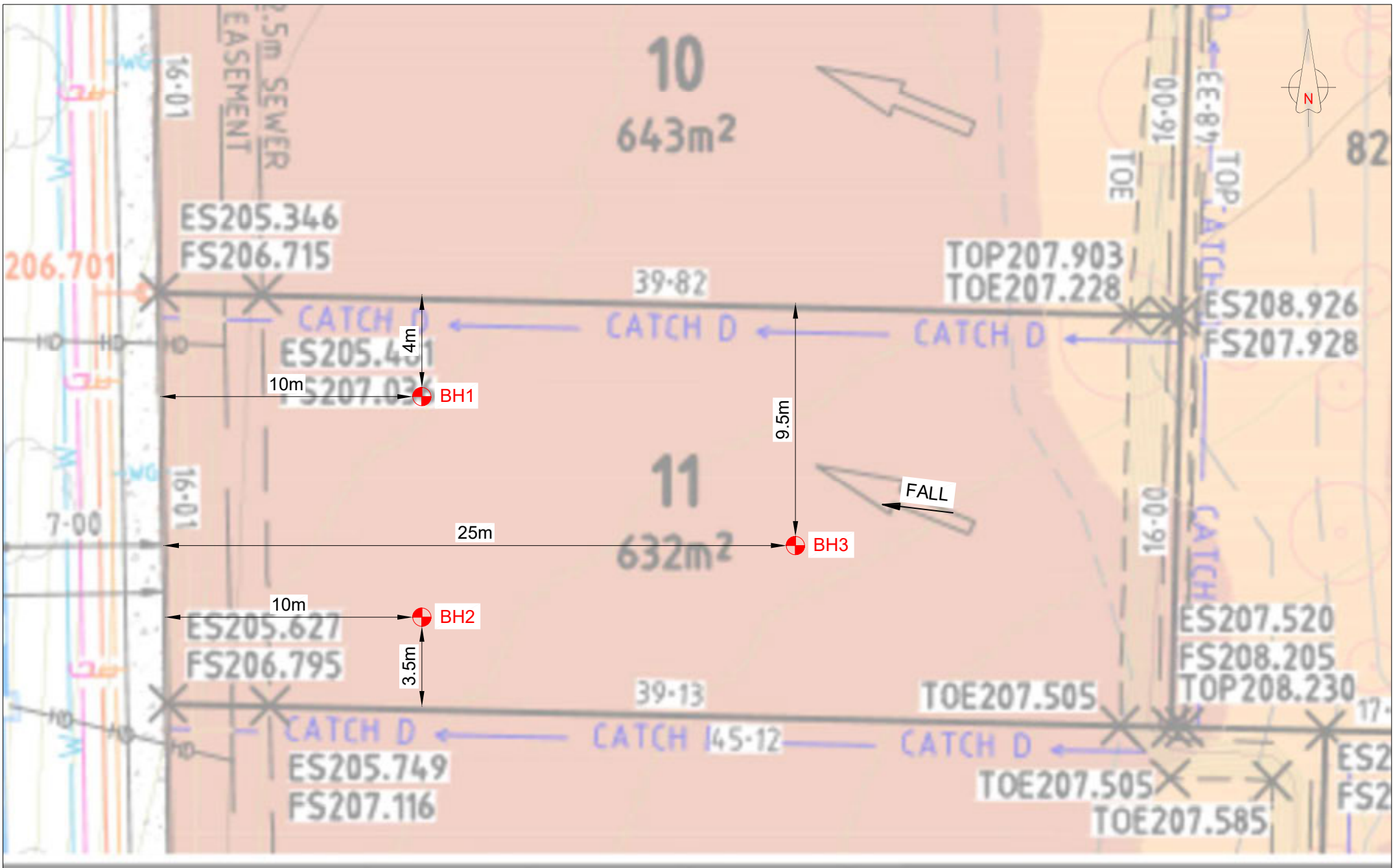
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 11, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-10  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-10
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 11, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.35	Natural		CI	Silty to sandy CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2.2	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		3				1 Terminated at 3 m				



**GTS - Bendigo**




13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig :	Honda SCR - Trailer Mount	Job Number :	23C 0406-10
Easting (m) :	Driller Supplier :	Geotechnical Testing Services	Client :	Lansell Homes
Northing (m) :	Logged By :	PB	Project :	Site Classification
Ground Elevation : Not Surveyed	Reviewed By :	CP	Location :	Lot 11, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date :	11/10/0023	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA			Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.2	Natural		CI	Silty to sandy CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-Vst	
		2.2	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-10
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 11, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.9	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CL-CI	Silty to sandy CLAY (CL-CI) : stiff to very stiff, low to medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff to very stiff, low plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St-VSt	
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-?	Possible boundary

# Lot 12, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 12  
October 2023

# Lot 12, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 12	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 12, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 11<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the west and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine to medium gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural gravelly sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

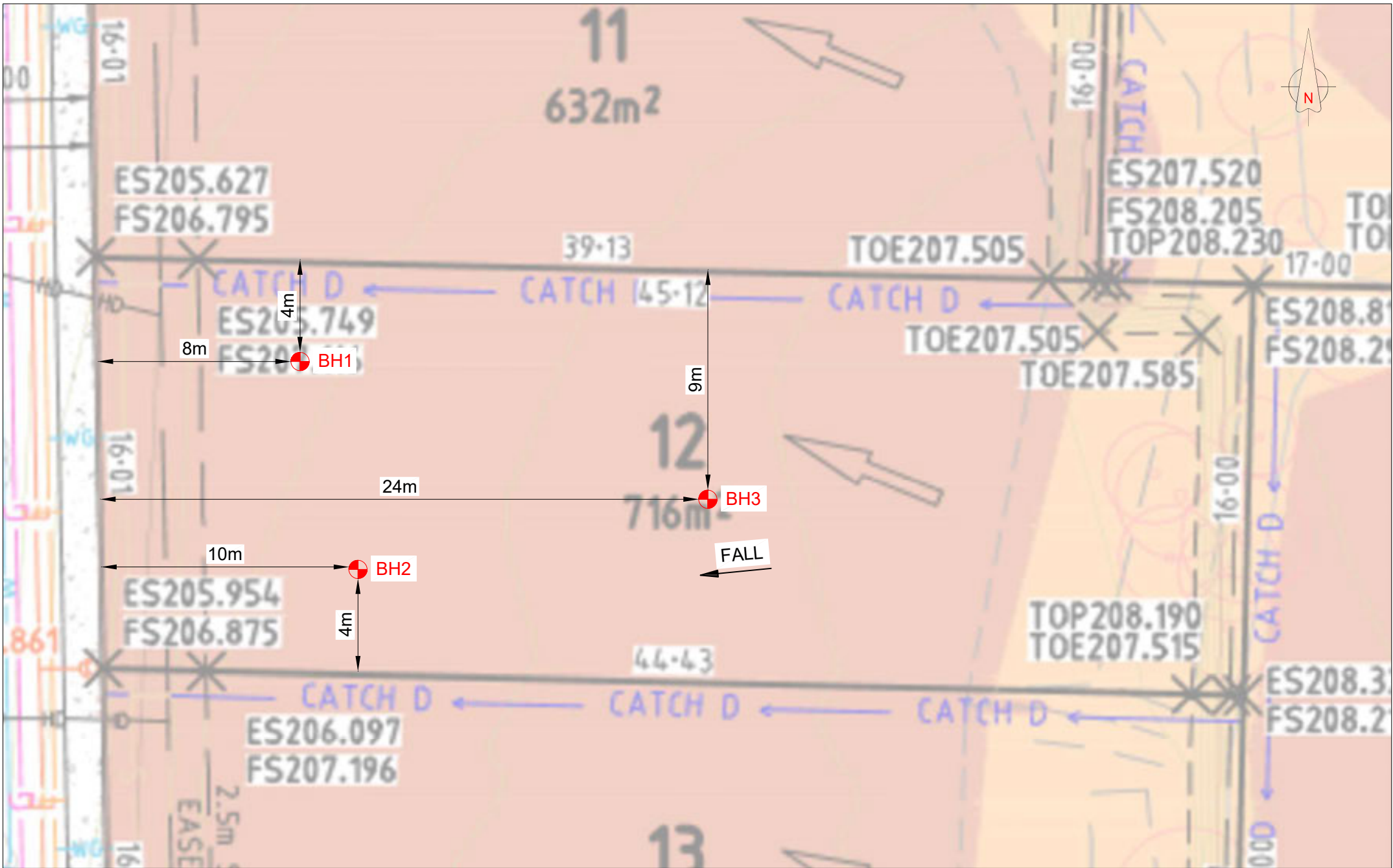
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 12, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-11  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-11
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 12, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2.2	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		3				1 Terminated at 3 m				






**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM : Drill Rig : Honda SCR - Trailer Mount Job Number : 23C 0406-11  
 Easting (m) : 0.0 Driller Supplier : Geotechnical Testing Services Client : Lansell Homes  
 Northing (m) : 0.0 Logged By : PB Project : Site Classification  
 Ground Elevation : Not Surveyed Reviewed By : CP Location : Lot 12, Sanctuary Gardens Estate, Maiden Gully  
 Total Depth : 3 m BGL Date : 11/10/0023 Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2.1	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM : Drill Rig : Honda SCR - Trailer Mount Job Number : 23C 0406-11  
 Easting (m) : 0 Driller Supplier : Geotechnical Testing Services Client : Lansell Homes  
 Northing (m) : 0 Logged By : PB Project : Site Classification  
 Ground Elevation : Not Surveyed Reviewed By : CP Location : Lot 12, Sanctuary Gardens Estate, Maiden Gully  
 Total Depth : 3 m BGL Date : 11/10/0023 Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.95	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CL-CI	Silty to sandy CLAY (CL-CI) : stiff to very stiff, low to medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2.3	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff to very stiff, low plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St-VSt	
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-?	Possible boundary

# Lot 13, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 13  
October 2023

# Lot 13, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 13	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 13, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 11<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the west and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural gravelly sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets therequirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

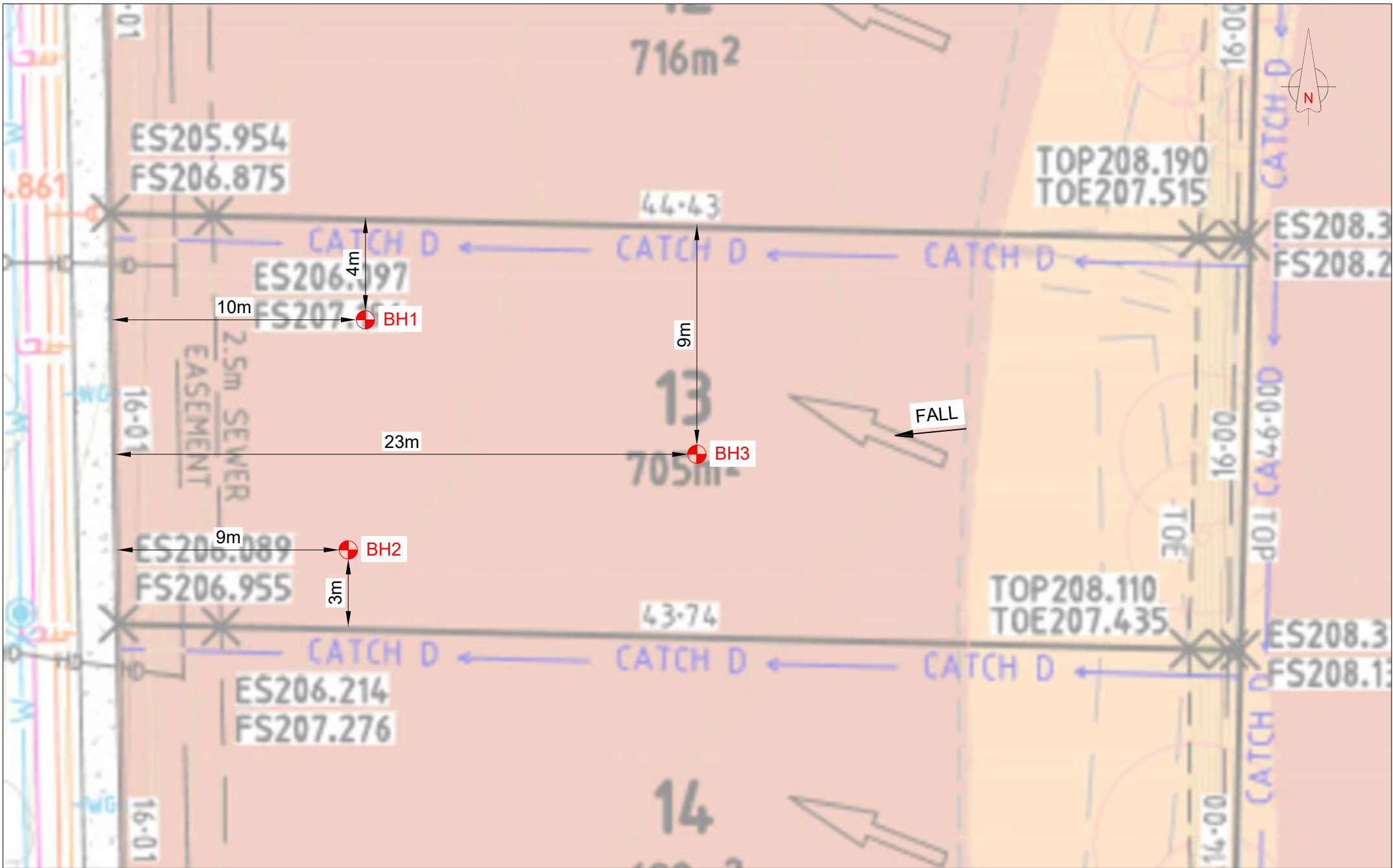
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 13, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-12  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**




13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-12
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 13, Sanctuary Garden Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.9	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2.2	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		3				<b>1 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig :	Honda SCR - Trailer Mount	Job Number :	23C 0406-12
Easting (m) :	Driller Supplier :	Geotechnical Testing Services	Client :	Lansell Homes
Northing (m) :	Logged By :	PB	Project :	Site Classification
Ground Elevation : Not Surveyed	Reviewed By :	CP	Location :	Lot 13, Sanctuary Garden Estate, Maiden Gully
Total Depth : 3 m BGL	Date :	11/10/0023	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2.1	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig :	Honda SCR - Trailer Mount	Job Number :	23C 0406-12
Easting (m) :	Driller Supplier :	Geotechnical Testing Services	Client :	Lansell Homes
Northing (m) :	Logged By :	PB	Project :	Site Classification
Ground Elevation : Not Surveyed	Reviewed By :	CP	Location :	Lot 13, Sanctuary Garden Estate, Maiden Gully
Total Depth : 3 m BGL	Date :	11/10/0023	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.9	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CL-CI	Silty to sandy CLAY (CL-CI) : stiff to very stiff, low to medium plasticity, orange brown, fine to coarse grained sand, dry.		D	St-VSt	
		2.3	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff to very stiff, low plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St-VSt	
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-	Possible boundary

# Lot 15, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 15  
October 2023

# Lot 15, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 15	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 15, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 12<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the southwest and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural gravelly sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

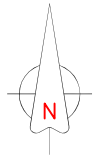
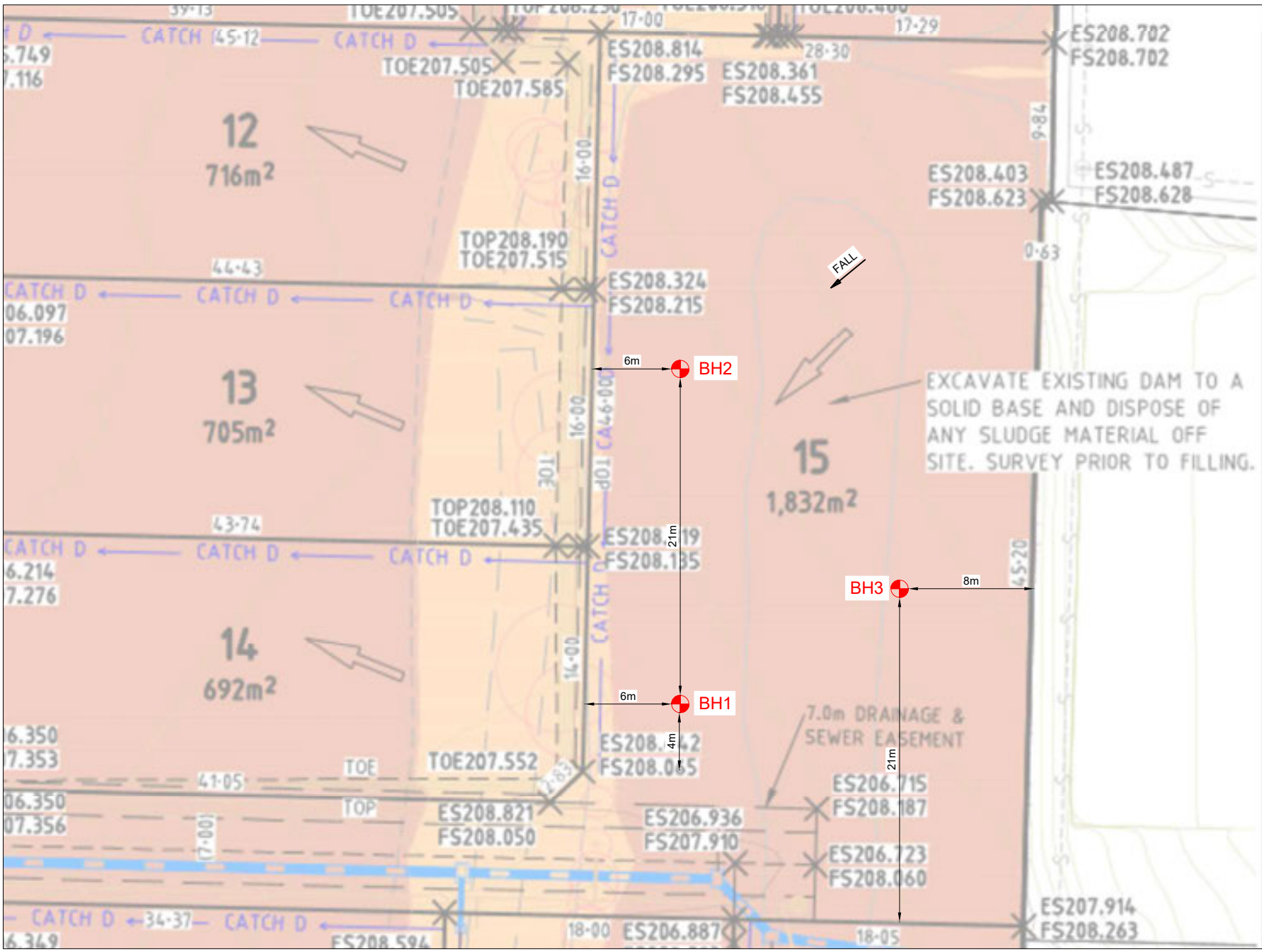
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 15, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-14  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-14
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 15, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 12/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.4	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine sized gravel, moist.		M	St	
		2								
		3								
						1 Terminated at 3 m				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM : Drill Rig : Honda SCR - Trailer Mount Job Number : 23C 0406-14  
 Easting (m) : 0 Driller Supplier : Geotechnical Testing Services Client : Lansell Homes  
 Northing (m) : 0 Logged By : PB Project : Site Classification  
 Ground Elevation : Not Surveyed Reviewed By : CP Location : Lot 15, Sanctuary Gardens Estate, Maiden Gully  
 Total Depth : 3 m BGL Date : 12/10/0023 Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.4	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, pale brown, fine to coarse grained sand, moist.		M	St	
		2.1	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St-VSt	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-14
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 15, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 12/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.2	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, pale brown, fine to coarse grained sand, moist.		M	St	
		2	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St-VSt	
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-?	Possible boundary

# Lot 15, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Lansell Homes

Report 23C 0406-Lot 15  
October 2023

# Lot 15, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Lansell Homes

### Revision

Revision	Authorised	Date
23C 0406-Lot 15	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Lansell Homes Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Lansell Homes commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 15, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 12<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the southwest and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural gravelly sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

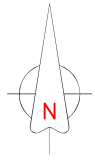
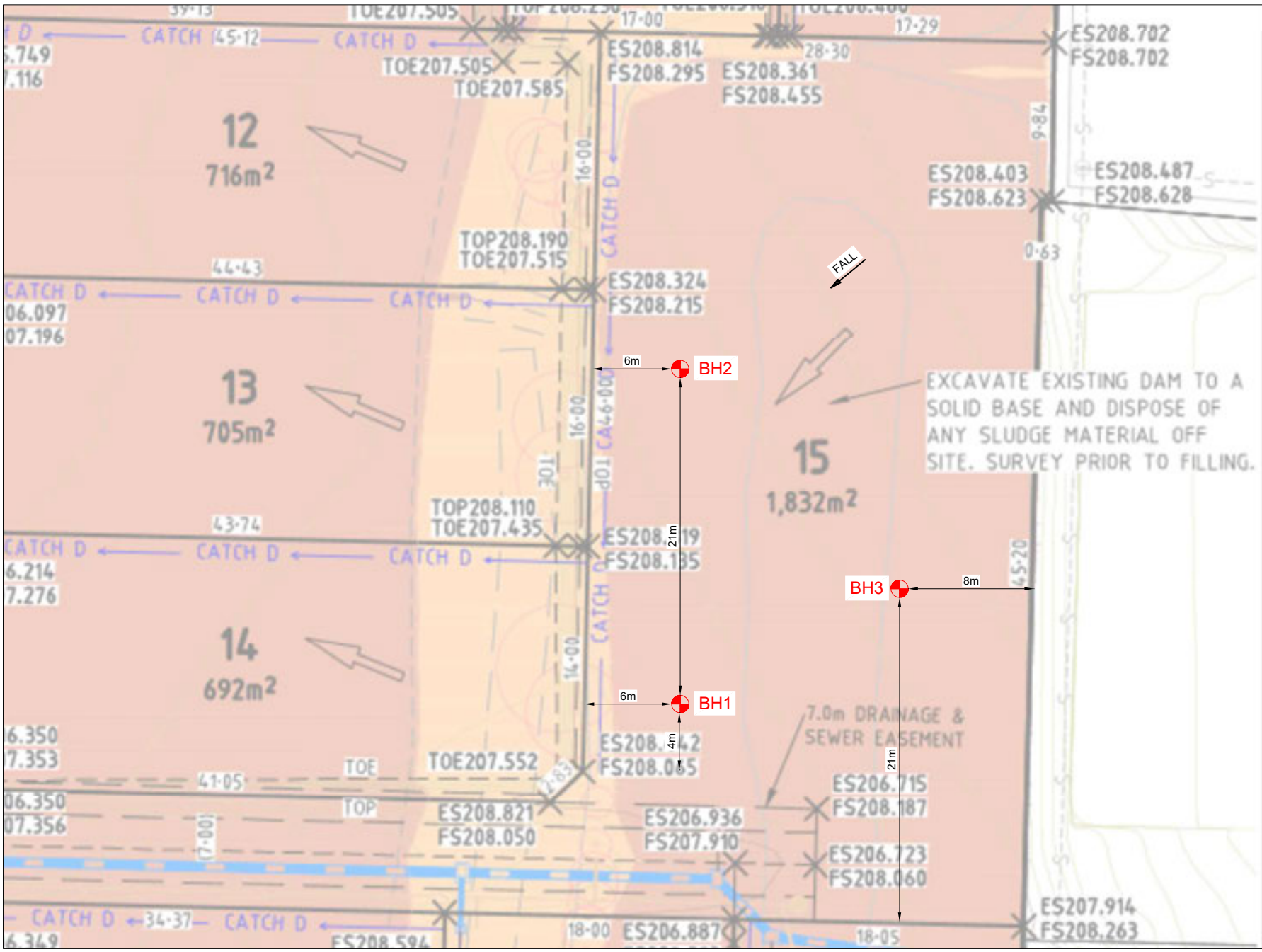
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 15, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-14  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-14
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 15, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 12/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.4	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, brown, fine to coarse grained sand, trace fine sized gravel, moist.		M	St	
		2								
		3								
						1 Terminated at 3 m				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM : Drill Rig : Honda SCR - Trailer Mount Job Number : 23C 0406-14  
 Easting (m) : 0 Driller Supplier : Geotechnical Testing Services Client : Lansell Homes  
 Northing (m) : 0 Logged By : PB Project : Site Classification  
 Ground Elevation : Not Surveyed Reviewed By : CP Location : Lot 15, Sanctuary Gardens Estate, Maiden Gully  
 Total Depth : 3 m BGL Date : 12/10/0023 Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.4	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, pale brown, fine to coarse grained sand, moist.		M	St	
		2.1	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St-VSt	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-14
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 15, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 12/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1.2	Natural		CI	Silty to sandy CLAY (CI) : stiff, medium plasticity, pale brown, fine to coarse grained sand, moist.		M	St	
		2	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, moist to dry.		M-D	St-VSt	
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
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	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-	Possible boundary

# Lot 16, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 16  
October 2023

# Lot 16, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 16	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 16, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 11<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the west and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural gravelly sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets that requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

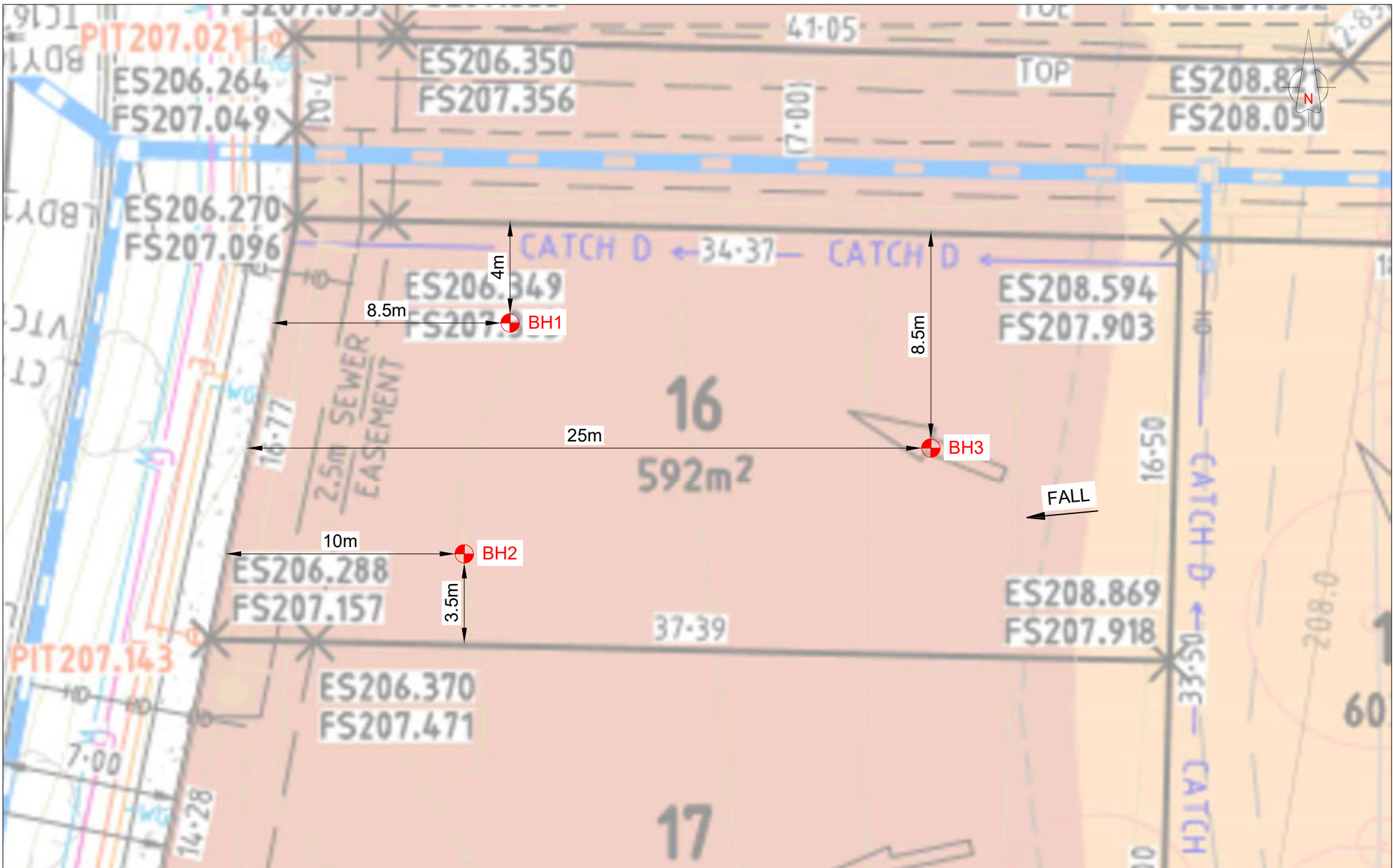
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 16, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-15  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-15
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 16, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, fine to coarse grained sand, dry.		D	St-VSt	
		2.2	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		3				1 Terminated at 3 m				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-15
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 16, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, fine to coarse grained sand, dry.		D	St-VSt	
		2.2	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-15
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 16, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.8	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CL-CI	Silty to sandy CLAY (CL-CI) : stiff to very stiff, low to medium plasticity, orange brown, fine to coarse grained sand, dry.		D	St-VSt	
		2	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff to very stiff, low plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D	St-VSt	
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
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Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
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Term	Density Index (%)
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### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
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### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
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### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
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### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-?	Possible boundary

# Lot 17, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 17  
October 2023

# Lot 17, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 17	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



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Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 17, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 11<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the west and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural gravelly sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

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Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

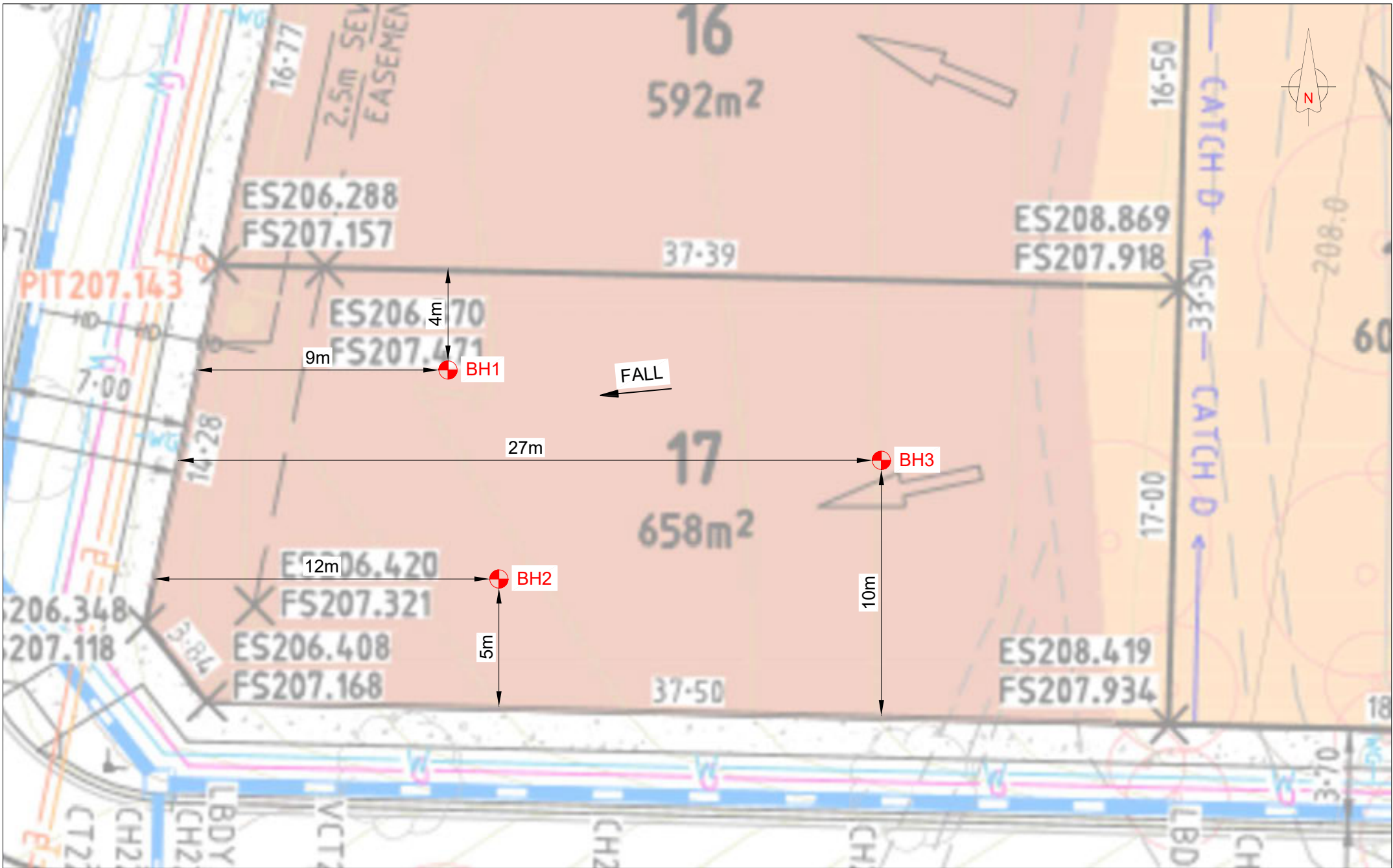
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 17, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-16  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-16
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 17, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2.2	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		3				1 Terminated at 3 m				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-16
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 17, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CI	Silty to sandy CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, fine to coarse grained sand, trace fine sized gravel, dry.		D	St-VSt	
		2.3	Natural		CL	Silty to sandy to gravelly CLAY (CL) : stiff, low plasticity, brown, fine sized gravel, fine to coarse grained sand, dry.		D	St	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-16
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 17, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 11/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.8	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CL-CI	Silty to sandy CLAY (CL-CI) : stiff to very stiff, low to medium plasticity, orange brown, fine to coarse grained sand, dry.		D	St-VSt	
		2.1	Natural		CL	Silty to sandy to gravelly CLAY (CL) : low plasticity, brown, fine to medium sized gravel, fine to coarse grained sand, dry.		D		
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

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	Fine	2.36 – 6mm
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	Medium	200 – 600 micron
	Fine	75 – 200 micron
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Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
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### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
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### Minor Components

Term	Field Guide	Proportion of Minor Component In:
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### Method

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### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
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*	Not observed
	Observed water level (date shown)
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### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-?	Possible boundary

# Lot 18, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 18  
October 2023

# Lot 18, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 18	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 18, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 12<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the southwest and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

It is noted that the fill in BH1 and 3 is likely the old dam bank and was deemed to have suitable strength, had been down for a long time with no signs of leaking or deterioration from the initial site inspection. As such, this fill is considered a suitable founding medium.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in

descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***





**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-17
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 18, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 12/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.5	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CI	Silty CLAY (CI) : stiff to very stiff, medium plasticity, orange brown, trace fine sized gravel, trace fine to coarse grained sand, dry.		D	St-VSt	
		1.8	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, brown, fine to coarse grained sand, dry.		D	St-VSt	
		3				<b>1 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig :	Honda SCR - Trailer Mount	Job Number :	23C 0406-17
Easting (m) :	Driller Supplier :	Geotechnical Testing Services	Client :	Lansell Homes
Northing (m) :	Logged By :	PB	Project :	Site Classification
Ground Elevation : Not Surveyed	Reviewed By :	CP	Location :	Lot 18, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date :	12/10/0023	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, pale brown, fine to coarse grained sand, dry.		D	St-VSt	
		1.8	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, orange brown, fine to coarse grained sand, dry.		D	St-VSt	
		2								
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig :	Honda SCR - Trailer Mount	Job Number :	23C 0406-17
Easting (m) : 0.0	Driller Supplier :	Geotechnical Testing Services	Client :	Lansell Homes
Northing (m) : 0.0	Logged By :	PB	Project :	Site Classification
Ground Elevation : Not Surveyed	Reviewed By :	CP	Location :	Lot 18, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date :	12/10/0023	Loc Comment :	

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, pale brown, fine to coarse grained sand, dry.		D	St-VSt	
		1.7	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, orange brown, fine to coarse grained sand, dry.		D	St-VSt	
		2								
		3				<b>3 Terminated at 3 m</b>				

## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

### Classification Symbol & Soil Name

Classification of material and its description is based on the Unified Classification System as referenced in AS1726 – 1993 Geotechnical Site Investigations, Appendix A. A summary of the more common terms is included within.

### Particle Size Descriptive Terms

Name	Subdivision	Size
Boulders		>200mm
Cobbles		63 – 200mm
Gravel	Coarse	20 – 63mm
	Medium	6 – 20mm
	Fine	2.36 – 6mm
Sand	Coarse	0.6 – 2.36mm
	Medium	200 – 600 micron
	Fine	75 – 200 micron
Silt		2 – 75 micron
Clay		< 2 micron

### Consistency of Cohesive Soils

Term	Undrained shear strength, $s_u$ (kPa)	Field Guide
Very Soft (VS)	<12	A finger can be pushed well into the soil with little effort
Soft (S)	12 – 25	A finger can be pushed into the soil to about 25mm depth
Firm (F)	25 – 50	The soil can be indented about 5mm with the thumb
Stiff (St)	50 – 100	The surface of the soil can be indented with the thumb
Very Stiff (VSt)	100 – 200	The surface of the soil can be indented by thumb nail
Hard (H)	>200	The surface of the soil can be marked only with the thumbnail
Friable (F)	-	Crumbles or powders when scraped by thumbnail

### Density of Granular Soils

Term	Density Index (%)
Very Loose (VL)	< 15
Loose (L)	15 – 35
Medium Dense (MD)	35 – 65
Dense (D)	65 – 85
Very Dense (VD)	> 85

### Minor Components

Term	Field Guide	Proportion of Minor Component In:
Trace of	Presence just detectable by feel or eye	Coarse grained soils: <5% Fine grained soils: <15%
Some	Presence easily detectable by feel or eye	Coarse grained soils: 5-12% Fine grained soils: 15-30%

### Moisture Condition

Dry (D)	Looks & feels dry. Cohesive soils are usually hard, powdery or friable. Granular soils run freely through the hand.
Moist (M)	Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere. Free water does not form.
Wet (W)	As for moist, but with free water forming on hands when remoulded.




### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
R	Refer to report for details

### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
<b>DCP</b>	Dynamic Cone Penetrometer test (blows/100mm)

### Notes, Samples, Tests

<b>U63</b>	Undisturbed sample, 63mm diameter
<b>D</b>	Disturbed sample
<b>N*</b>	Standard Penetration Test, (*) Sample Figure = results

### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-?	Possible boundary

# Lot 19, Sanctuary Gardens Estate Maiden Gully

Geotechnical Investigation for  
Halifax Properties

Report 23C 0406-Lot 19  
October 2023

# Lot 19, Sanctuary Gardens Estate Maiden Gully

## Geotechnical Investigation for Halifax Properties

### Revision

Revision	Authorised	Date
23C 0406-Lot 19	SEH	17/10/2023

### Distribution (this version only)

Recipient	Format	Date
GTS	On file	17/10/2023
Halifax Properties Attn: Chris Smith  Cc: Total Property Development Attn: Brendan Macfarlane	Email PDF chris@lansellhomes.com.au  brendan@totalpd.com.au	17/10/2023



## 1 INTRODUCTION

Total Property Development on behalf of Halifax Properties commissioned Geotechnical Testing Services (GTS) to conduct a geotechnical investigation for the proposed development at Lot 19, Sanctuary Gardens Estate, Maiden Gully.

The investigation has been conducted for the purpose of assessing general subsurface conditions at the site and consequently assigning a Site Classification in accordance with *AS2870 – 2011 Residential Slabs and Footings*.

## 2 INVESTIGATION

The investigation was conducted on the 12<sup>th</sup> of October 2023 using a trailer mounted drill rig to drill 3 boreholes to depths of 3.0 metres within the designated area. The soil profiles and borehole locations are presented at the end of this report.

At the time of this investigation, the type of development proposed is understood by GTS to be a new residential building. If the actual construction varies from this, then changes may be necessary to this classification report.

## 3 SITE CONDITION

The site has a slight fall to the southwest and is currently vacant. At the time of the investigation, the surface of the site was dry to moist and lacked grass cover. There are no trees across the lot. There was no visual evidence of surface cracking or surface rock. No groundwater seepage was encountered over the investigated depths.

Full details of the soil conditions are presented in the borehole logs.

## 4 SITE CLASSIFICATION

After allowing due consideration to the site geology, soil conditions, drainage, controlled fill (GTS Report 23C 0426), vegetation including trees and known details of the proposed development, the site has been classified as **Class M-D**.

Class M-D sites have an expected characteristic surface movement ( $y_s$ ) of 20 to 40mm.

Foundations designed in accordance with this classification are to be subject to the overriding conditions of Section 5.

## 5 DISCUSSION

Particular attention should be paid to the design of footings as required by *AS2870 – 2011*.

In addition to the normal founding requirements arising from the above classification, particular conditions at the site dictate that the founding medium and minimum depth below existing surface levels for all footings should be as follows:

- **CONTROLLED FILL:** Gravelly Sandy Silty CLAY, medium plasticity, brown, fine to coarse sand, fine gravel, stiff.  
At depth below 0.1 metres in the region of BHs 1 to 3.

An allowable bearing pressure of 100kPa is available for edge beams, strips and stump footings founded in the controlled fill and natural gravelly sandy silty clays. All foundations should extend a minimum of 100mm into the above foundation material.

Blinding concrete (minimum strength 15MPa) may be used to bring the excavations up to design levels. The base of all footing excavations must be free of tree roots.

The proposed development should be located a minimum distance of 0.75 x the mature height of all trees. This distance should be increased by 50% for groups or lines of trees. If this distance is impeded, then the size and distance from the development of the tree(s) needs to be taken into account when designing the foundation.

## 6 IMPORTANT NOTES ABOUT THIS REPORT

- The site classification presented in Section 4 assumes that the current natural drainage and infiltration conditions at the site will not be markedly affected by the proposed site development work. Care should therefore be taken to ensure that surface water is not permitted to collect adjacent to the structure and that significant changes to seasonal soil moisture equilibria do not develop as a result of service trench construction or tree root action.
- Attention is drawn to Appendix B of AS2870 and CSIRO document *BTF 18 – Foundation Maintenance and Footing Performance: A Homeowner's Guide* as a guide to maintenance requirement for the proposed structure.
- This is not a comprehensive investigation nor is it economic or practical to determine every subsurface feature on the site. Although this investigation indicates that soil conditions are relatively uniform across the site, it is recommended that the base of all footing excavations be inspected to ensure that the founding medium meets the requirements referenced herein with respect to type and strength of founding materials. If further variations in descriptions in soil types, colour or depths are discovered during construction, this office should be notified immediately so that potential influence on the footings may be assessed.

- The soil colours provided in the borehole logs attached may vary with soil moisture content and individual interpretation, therefore colour alone should not be used to identify these soils.
- Strength characteristics of soils often exhibit a large variation between wet and dry conditions. Soil characteristics of a soil profile are given on the soil conditions at the time of the investigation.
- In the event of significant earthworks being undertaken on the site after this investigation, this report may require an amendment if appropriate.

Should you have any further queries concerning these results, please do not hesitate to contact GTS on 03 5441 4881.

**Prepared by**



**Corey Palmer** BE (Hons) GradIEAust

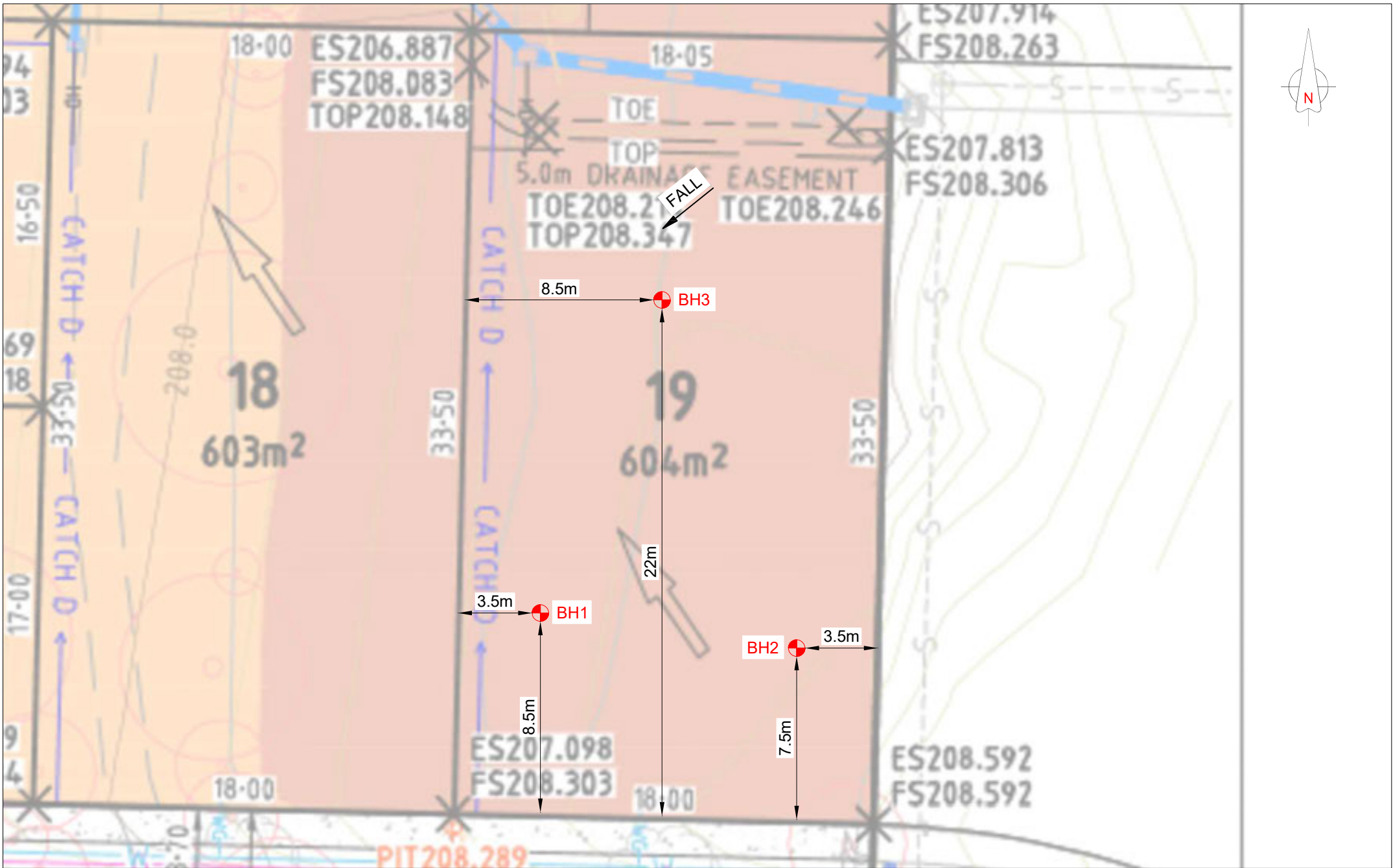
***Graduate Geotechnical Engineer***

**Reviewed by**



**Shane Hampton** BE (Hons), MIEAust

***Principal Geotechnical Engineer***



**GEOTECHNICAL INVESTIGATION**  
 APPROXIMATE LOCATIONS  
 NOT TO SCALE

**CLIENT:** LANSELL HOMES  
**PROJECT:** LOT 19, SANCTUARY GARDENS ESTATE, MAIDEN GULLY

GTS REF: 23C 0406-18  
 CLIENT REF:  
 DRAWN BY: CP  
 DATE: 17 OCTOBER 2023



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550

Phone: 03 5441 4881

**Geotechnical Log - Borehole**

1

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-18
Easting (m) : 0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 19, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 12/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.9	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, pale brown, fine to coarse grained sand, dry.		D	St-VSt	
		2.1	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, orange brown, fine to coarse grained sand, dry.		D	St-VSt	
		3				1 Terminated at 3 m				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**2**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-18
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 19, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 12/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		0.8	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, pale brown, fine to coarse grained sand, dry.		D	St-VSt	
		1.5	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, orange brown, fine to coarse grained sand, dry.		D	St-VSt	
		3				<b>2 Terminated at 3 m</b>				



**GTS - Bendigo**

13 Alstonvale Court East Bendigo VIC 3550  
 Phone: 03 5441 4881

**Geotechnical Log - Borehole**

**3**

UTM :	Drill Rig : Honda SCR - Trailer Mount	Job Number : 23C 0406-18
Easting (m) : 0.0	Driller Supplier : Geotechnical Testing Services	Client : Lansell Homes
Northing (m) : 0.0	Logged By : PB	Project : Site Classification
Ground Elevation : Not Surveyed	Reviewed By : CP	Location : Lot 19, Sanctuary Gardens Estate, Maiden Gully
Total Depth : 3 m BGL	Date : 12/10/0023	Loc Comment :

Drilling Method	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Weathering	Moisture	Consistency/Density	Testing
100mm SFA		1	Controlled Fill		CI	Silty to sandy to gravelly CLAY (CI) : stiff, medium plasticity, brown, fine sized gravel, fine to coarse grained sand, moist to dry.		M-D	St	
		1	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, pale brown, fine to coarse grained sand, dry.		D	St-VSt	
		1.5	Natural		CL	Silty to sandy CLAY (CL) : stiff to very stiff, low plasticity, orange brown, fine to coarse grained sand, dry.		D	St-VSt	
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## DESCRIPTIVE TERMS BOREHOLE/EXCAVATION LOG

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### Minor Components

Term	Field Guide	Proportion of Minor Component In:
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### Moisture Condition

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### Method

<b>S</b> Auger Screwing	<b>W</b> Washboring
<b>D</b> Auger Drilling	<b>N</b> Natural Exposure
<b>R</b> Roller/tricone	<b>E</b> Existing Excavation

### Support

<b>B</b> Blade/bucket	<b>*</b> Nil
<b>C</b> Coring	<b>C</b> Casing
<b>H</b> Hammer Drill	<b>M</b> Mud/polymer

### Water

*	Not observed
	Observed water level (date shown)
	Observed water inflow
	Observed water outflow
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### Structures, Additional Observations

<b>PP</b>	Pocket Penetrometer test (kPa)
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### Surface

_____	Known boundary
-----	Probably boundary
-?-?-?-?-?-	Possible boundary