CHADWICK GEOTECHNICS

REPORT

Level One Inspection and Testing Services

Meridian Central Estate Stage 26, Clyde
Lot's 2601 to 2617 and 2622 to Lot 2627

Prepared for:

Grosvenor Lodge Pty Ltd

September 2021

Our Ref: 3807351.026.v1

25 Metcalf Street, Dandenong South, Vic 3175, Australia
www.chadwickgeotechnics.com.au

Document Control

Title: Level One Inspection and Testing Services					
Date	Version	Description	Prepared by:	Reviewed by:	Authorised by:
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Distribution:

Grosvenor Lodge Pty Ltd	1 electronic copy
Chadwick Geotechnics Pty Ltd (FILE)	1 electronic copy

Table of contents

1 Introduction

As part of the construction of the Meridian Central Estate development in Clyde North, Chadwick Geotechnics Pty Ltd (Chadwick Geotechnics) has been engaged by Grosvenor Lodge Pty Ltd to provide Geotechnical Inspection and Testing Authority (GITA) services for the earthworks within Stage 26 of the Estate.

This report presents the earthworks supervision methods and density testing results for the residential lot's 2601 to 2617 and 2622 to Lot 2627 within the Stage 26 site. The earthworks were completed between 31 March 2021 and 14 April 2021.

The specification required the earthworks to be completed under Level 1 Supervision, that is, full-time Inspection and Testing of the earthworks. Chadwick Geotechnics were onsite for the duration of the earthworks program.

2 Project details

2.1 Location

The Meridian Central Estate is in Clyde North, the Stage 26 site is located North of Hardys Road and East of Stage 22 within the Meridian Central site. The stage is being developed as a residential development.

A site plan of the site is included in Appendix A.

2.2 Fill specification

A summary of the specification is shown below:

- All filling in excess of 300mm depth shall be constructed to specifications satisfying the requirements of AS 3798-2007 "Guidelines on Earthworks for Commercial and Residential Developments".
- All filling works shall be undertaken with supervision to the standard detailed as "Level 1 Inspection and Testing" in AS 3798-2007, such that the supervisor will issue a notice detailing that the works comply with the specifications and drawings.
- The fill soils to comply with the 'Suitable Material' in accordance with Section 4.4 of the AS3798-2007, and the following:
  - Maximum particle size of 150mm.
  - Particles over 37.5mm diameter not to exceed 20% of the material.
  - Organic soils, topsoil, silts, or soils containing organic matter, wood, plastics, metal or other deleterious materials are not acceptable.
- Subgrade to be proof rolled in presence of the Level 1 Inspector prior to the placement of engineered fill.
- Fill to be compacted in near horizontal layers.
- Compaction to achieve a ratio of at least 95% Standard MDD (maximum dry density).
- Frequency of testing to be in accordance with Table 8.1 of AS3798-2007.

2.3 Roles

The organisations and their roles are presented in Table 2.1 below.

Table 2.1 Project roles

Role	Organisation
Developer	Grosvenor Lodge Pty Ltd
Geotechnical Inspection and Testing Authority (GITA)	Chadwick Geotechnics Pty Ltd
Civil Designer / Superintendent	Beveridge Williams Pty Ltd
Earthworks Contractor	Brown Property Group Pty Ltd

2.4 Source of material

The material used on site was imported from locally sources.

2.5 General

The inspection and testing of earthworks have been carried out in accordance with AS3798-2007, 'Guidelines on earthworks for commercial and residential developments', with a frequency of field density tests as per a Type 1 project (large scale operation). Compaction control laboratory testing was undertaken within Chadwick Geotechnics NATA accredited laboratories in accordance with AS1289 'Methods of Testing Soils for Engineering Purposes'.

2.6 Subgrade inspection

Prior to fill being placed the subgrade was inspected. The inspections were performed in accordance with the Level 1 guidelines presented in AS 3798–2007 Section 5.5. The stripped surface was stripped to natural clay, and the area was found to be firm and free of vegetation and other deleterious material. All pre-existing uncontrolled fill was removed prior to the placement of engineered fill to achieve the design levels.

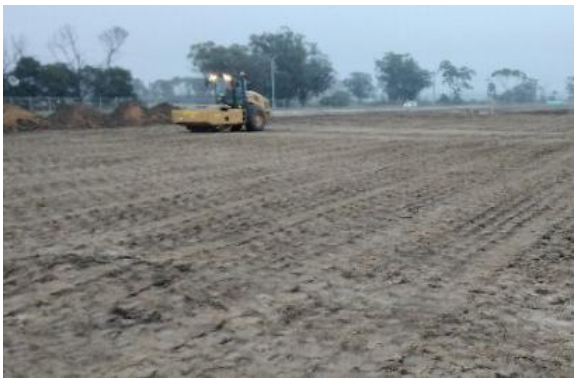
2.7 Earthwork supervision

Full time Level 1 inspection and testing of the Stage 26 filling operations commenced on 31 March 2021 and was completed on 15 April 2021. During this period Chadwick Geotechnics was on site all the time (except when there were no earthworks) and observed the earthworks, the placing of fill including the supply of material, conditioning of material (moisture conditioning and oversize removal), placement and compaction of the fill material.

All fill material was placed in lift sequences and Chadwick Geotechnics verified that the surface of the stripped subgrade and additional lifts were thoroughly scarified, and moisture conditioned prior to placement of additional layers to prevent delamination at the layer interface. See Photographs 2.1 and 2.2 below.

Photograph 2.1:

Earthwork sampling, March 2021



Photograph 2.2:

Material compaction, March 2021

2.8 Earthwork equipment

The fill was placed and compacted using vibrating Pad foot rollers. Water trucks with water cannons attached were used to moisture condition the soil materials. The layer thicknesses were controlled using earthwork machinery with built-in GPS systems.

2.9 Geotechnical sampling and testing

Field density and moisture content testing was carried out using a calibrated portable density and moisture gauge in accordance with AS 1289.5.8.1. The HILF rapid compaction test was used for peak converted wet density determinations in accordance with AS 1289.5.7.1. Test locations were recorded using hand held GPS units. A site plan showing the field density test locations is provided in Appendix A. A summary of Hilf density testing is presented in Appendix B and the Hilf density test reports are presented in Appendix C.

A total of 15 tests were performed across the Stage 26 area during the filling process.

The test results all passed the specification requirements for the project.

A summary of the Hilf density test reports is provided within Appendix B and all the test reports are provided within Appendix C, the controlled fill certificates are provided within Appendix D.

3 Conclusion

On the basis of our inspections and after considering all test results relating to the project, it is our opinion, so far as it is able to be determined, that:

- The materials used by the earthworks contractor met the geotechnical property requirements of the specification.
- The fill material placed was tested at a suitable frequency in accordance with AS 3798-2007- Table 8.1 and the results indicate the compacted material achieved the minimum density requirement of the specification.
- Given the consistent construction practices followed by the earthworks contractor, and as witnessed by Chadwick Geotechnics, combined with the satisfactory verification of test results achieved, it is inferred that areas of the site between test locations were performed to the same standard as those areas that have been tested.

It is our opinion that the earthworks undertaken have been performed in accordance with the requirements of Section 8.2 of AS3798-2007 - Level 1 Inspection and Testing.

4 Applicability

This report has been prepared for the exclusive use of our client Grosvenor Lodge Pty Ltd , with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Recommendations and opinions in this report are based on data from discrete investigation locations. The nature and continuity of subsoil away from these locations are inferred but it must be appreciated that actual conditions could vary from the assumed model.

Should you require any further information regarding this report, please do not hesitate to contact the undersigned on (03) 8796 7900.

Chadwick Geotechnics Pty Ltd

Report prepared by:	Authorised for Chadwick Geotechnics Pty Ltd by:
	
.....	.....
Robert Barden Project Manager	Tim Chadwick Project Director

10-Sep-21
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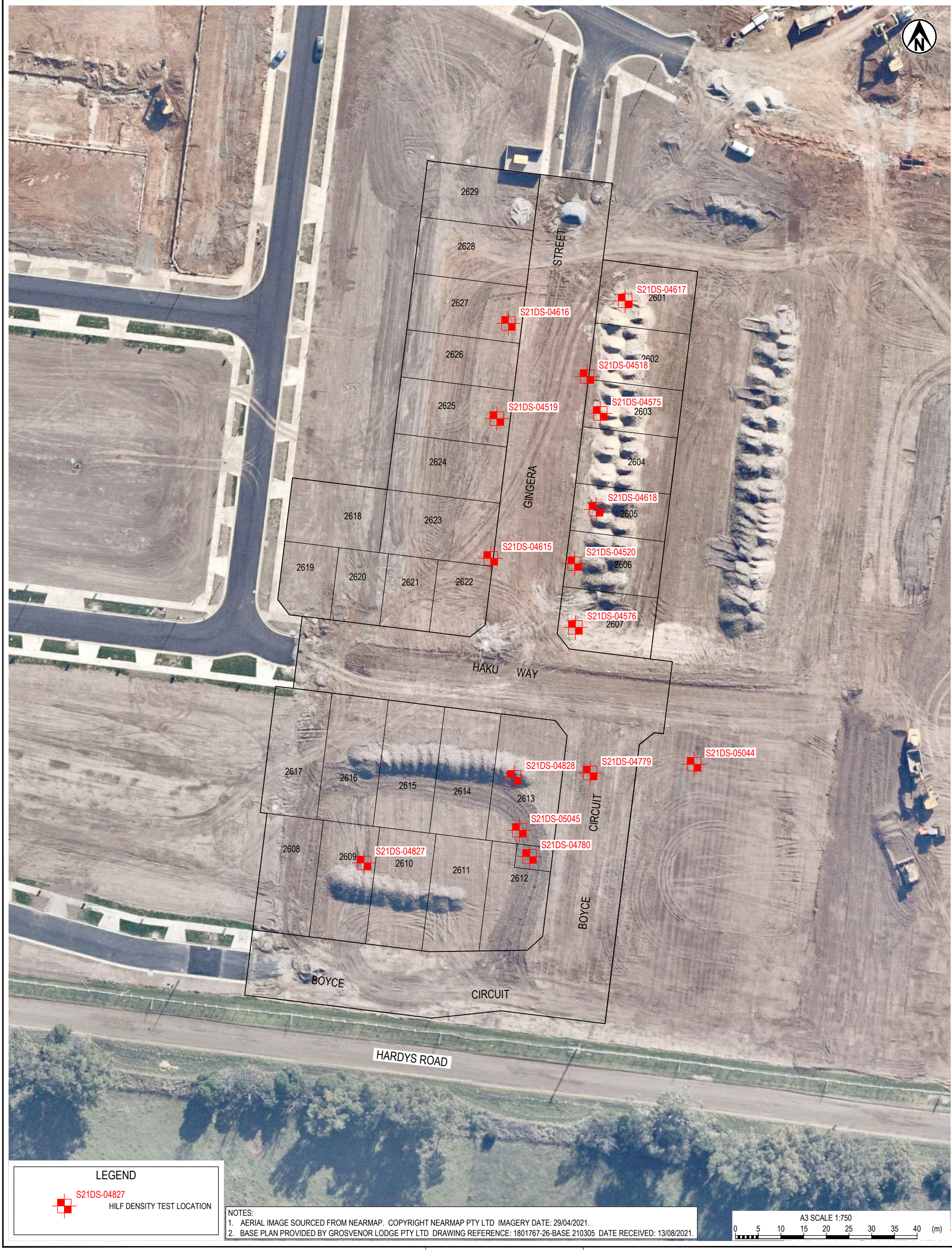
Appendix A: Site plan



LEGEND

S21DS-04827 HILF DENSITY TEST LOCATION

NOTES:
1. AERIAL IMAGE SOURCED FROM NEARMAP. COPYRIGHT NEARMAP PTY LTD IMAGERY DATE: 29/04/2021.
2. BASE PLAN PROVIDED BY GROSVENOR LODGE PTY LTD DRAWING REFERENCE: 1801767-26-BASE 210305 DATE RECEIVED: 13/08/2021.

A3 SCALE 1:750
0 5 10 15 20 25 30 35 40 (m)

CHADWICK GEOTECHNICS
www.chadwickgeotechnics.com.au

ORIGINAL IN COLOUR

PROJECT No.	3807351.026	
DESIGNED	VML	Aug.21
DRAWN	KMJA	Aug.21
CHECKED		
APPROVED	DATE	

CLIENT **GROSVENOR LODGE PTY LTD**
PROJECT **MERIDIAN ESTATE - STAGE 26**
TITLE LEVEL ONE HILF DENSITY TESTING
HILF DENSITY TEST LOCATION PLAN
UNDER REVISION 1
SCALE (A3) 1:750 FIG No. FIGURE 01 REV 1

T:\Dandenong\Geo Projects\3807351126 Stage 26\CAD\FIG\3807351.026-F01.dwg 2021-Aug-15 11:15:24 AM Plotted By: KATHRYN JACKSON

Appendix B: Hilf density test summary

CHADWICK GEOTECHNICS

3807351.026 - Meridian Estate Stage 26 - HILF Summary

Chadwick Geotechnics
25 Metcalf Street
Dandenong South VIC 3175

Report No	Sample No	Date	Test Number	Location [E]	Location [N]	RL	Density Ratio HILF test (≥95%)	Moisture Variation	Pass / Fail	Remarks
HDR:W21DS01146	S21DS-04518	31/03/2021	1	355476	5781275	34.205	97.50	OMC	Pass	
HDR:W21DS01146	S21DS-04519	31/03/2021	2	355456	5781266	33.935	99.50	OMC	Pass	
HDR:W21DS01146	S21DS-04520	31/03/2021	3	355473	5781234	34.110	95.00	OMC	Pass	
HDR:W21DS01175	S21DS-04615	2/04/2021	1	355455	5781235	34.108	101.00	2.5 dry	Pass	
HDR:W21DS01175	S21DS-04616	2/04/2021	2	355458	5781287	34.097	100.50	2.5 dry	Pass	
HDR:W21DS01175	S21DS-04617	2/04/2021	3	355484	5781292	34.36	99.50	OMC	Pass	
HDR:W21DS01175	S21DS-04618	2/04/2021	4	355478	5781246	34.45	100.00	0.5	Pass	
HDR:W21DS01162	S21DS-04575	5/04/2021	1	355479	5781267	34.58	104.00	0.5	Pass	
HDR:W21DS01162	S21DS-04576	5/04/2021	2	355473	5781220	34.40	105.00	0.5 dry	Pass	
HDR:W21DS01219	S21DS-04779	8/04/2021	1	355476	5781188	33.87	98.00	1.5 dry	Pass	
HDR:W21DS01219	S21DS-04780	8/04/2021	2	355463	5781170	34.28	101.00	2.0 dry	Pass	
HDR:W21DS01235	S21DS-04827	9/04/2021	1	355427	5781168	34.12	97.50	2.0 wet	Pass	
HDR:W21DS01235	S21DS-04828	9/04/2021	2	355460	5781187	34.41	95.50	OMC	Pass	
HDR:W21DS01293	S21DS-05044	15/04/2021	1	355499	5781190	34.83	98.50	OMC	Pass	
HDR:W21DS01293	S21DS-05045	15/04/2021	2	355461	5781176	34.500	96.50	OMC	Pass	

Appendix C: Hilf density testing reports

CHADWICK GEOTECHNICS

Dandenong South
ACN 143 009 330
25 Metcalf Street
DANDENONG SOUTH, VIC 3175

Ph: + 61 3 8796 7900
Fax: +61 3 9706 9431

Report No: HDR:W21DS01146
Issue No: 1

HILF Density Ratio Report

Client: Greenridge Properties Pty Ltd
Address: PO Box 3131
AUBURN VIC 3123
Project: Meridian Estate - Stage 26
Project No.: 3807351.026
Order No.: **CG Request No.:**
TRN: **Lot No.:**

Accredited for compliance with ISO/IEC 17025 – Testing

Accreditation Number: 12719
Site Number: 12712
Approved Signatory: J. Lamont (Dandenong Laboratory Manager)
Date of Issue: 10/09/2021

Sample Details

Location:
Client Request ID:
Specification Requirements: Minimum Hilf Density Ratio of 95% (+- 3% of OMC)
Field Test procedures: AS 1289.5.8.1
Laboratory Test procedures: AS 1289.5.7.1
Sampling Method: AS1289.1.2.1 Clause 6.4 (b)
Source: Onsite
Material: Gravelly Clay

Sample Data

Sample ID	S21DS-04518	S21DS-04519	S21DS-04520			
Field Sample ID	1	2	3			
Date Tested	31/03/2021	31/03/2021	31/03/2021			
E:	1652.540	1632.700	1649.815			
N:	436.458	427.188	395.233			
EL:	34.205	33.935	34.110			
Lot:	2602	2625	2606			
Layer:	1	1	1			
Field and Laboratory Data						
Depth of Test (mm)	175	175	175			
Depth of Layer (mm)	200	200	200			
AS Sieve Size (mm)	19.0	19.0	19.0			
Oversize Wet (%)	0	0	0			
Field Wet Density (t/m³)	2.05	2.04	2.00			
Peak Converted Wet Density (t/m³)	2.10	2.06	2.10			
Compactive Effort	Standard	Standard	Standard			
Moisture Variation (%)	0.0	0.0	0.0			
Hilf Density Ratio (%)	**97.5**	**99.5**	**95.0**			

Comments

CHADWICK GEOTECHNICS

Dandenong South
ACN 143 009 330
25 Metcalf Street
DANDENONG SOUTH, VIC 3175

Ph: + 61 3 8796 7900
Fax: +61 3 9706 9431

Report No: HDR:W21DS01175
Issue No: 1

HILF Density Ratio Report

Client: Greenridge Properties Pty Ltd
Address: PO Box 3131
AUBURN VIC 3123
Project: Meridian Estate - Stage 26
Project No.: 3807351.026
Order No.: **CG Request No.:**
TRN: **Lot No.:**

Accredited for compliance with ISO/IEC 17025 – Testing

Accreditation Number: 12719
Site Number: 12712
Approved Signatory: M. Longfield (Senior Technician)
Date of Issue: 12/04/2021

Sample Details

Location:
Client Request ID:
Specification Requirements: Minimum Hilf Density Ratio of 95% (+- 3% of OMC)
Field Test procedures: AS 1289.5.8.1
Laboratory Test procedures: AS 1289.5.7.1
Sampling Method: AS1289.1.2.1 Clause 6.4 (b)
Source: Onsite
Material: Rocky Clay

Sample Data

Sample ID	S21DS-04615	S21DS-04616	S21DS-04617	S21DS-04618		
Field Sample ID	1	2	3	4		
Date Tested	2/04/2021	2/04/2021	2/04/2021	2/04/2021		
E:	1631.347	1635.231	1660.927	1654.551		
N:	396.410	448.151	453.129	407.213		
EL:	34.108	34.097	34.359	34.451		
Lot:	2623	2628	2601	2605		
Layer:	2	2	2	2		
Field and Laboratory Data						
Depth of Test (mm)	175	175	175	175		
Depth of Layer (mm)	200	200	200	200		
AS Sieve Size (mm)	19.0	19.0	19.0	19.0		
Oversize Wet (%)	0	0	0	0		
Field Wet Density (t/m³)	1.99	2.00	2.03	2.06		
Peak Converted Wet Density (t/m³)	1.97	1.99	2.04	2.05		
Compactive Effort	Standard	Standard	Standard	Standard		
Moisture Variation (%)	2.5 dry	2.5 dry	0.0	0.5 wet		
Hilf Density Ratio (%)	**101.0**	**100.5**	**99.5**	**100.0**		

Comments

CHADWICK GEOTECHNICS

Dandenong South
ACN 143 009 330
25 Metcalf Street
DANDENONG SOUTH, VIC 3175

Ph: + 61 3 8796 7900
Fax: +61 3 9706 9431

Report No: HDR:W21DS01162
Issue No: 1

HILF Density Ratio Report

Client: Greenridge Properties Pty Ltd
Address: PO Box 3131
AUBURN VIC 3123
Project: Meridian Estate - Stage 26
Project No.: 3807351.026
Order No.: **CG Request No.:**
TRN: **Lot No.:**

Accredited for compliance with ISO/IEC 17025 – Testing

Accreditation Number: 12719
Site Number: 12712
Approved Signatory: M. Longfield (Senior Technician)
Date of Issue: 12/04/2021

Sample Details

Location:
Client Request ID:
Specification Requirements: Minimum Hilf Density Ratio of 95% (+- 3% of OMC)
Field Test procedures: AS 1289.5.8.1
Laboratory Test procedures: AS 1289.5.7.1
Sampling Method: AS1289.1.2.1 Clause 6.4 (b)
Source: Onsite
Material: Rocky Clay/Silt

Sample Data

Sample ID	S21DS-04575	S21DS-04576				
Field Sample ID	1	2				
Date Tested	5/04/2021	5/04/2021				
E:	1655.449	1649.983				
N:	428.333	381.201				
EL:	34.580	34.402				
Lot:	2603	2607				
Layer:	FSL	FSL				
Field and Laboratory Data						
Depth of Test (mm)	175	175				
Depth of Layer (mm)	200	200				
AS Sieve Size (mm)	19.0	19.0				
Oversize Wet (%)	0	0				
Field Wet Density (t/m³)	2.04	2.06				
Peak Converted Wet Density (t/m³)	1.96	1.96				
Compactive Effort	Standard	Standard				
Moisture Variation (%)	0.5 dry	0.5 dry				
Hilf Density Ratio (%)	**104.0**	**105.0**				

Comments

CHADWICK GEOTECHNICS

Think Act Safe Be

Dandenong South
ACN 143 009 330
25 Metcalf Street
DANDENONG SOUTH, VIC 3175

Ph: + 61 3 8796 7900
Fax: +61 3 9706 9431

Report No: HDR:W21DS01219
Issue No: 1

HILF Density Ratio Report

Client: Greenridge Properties Pty Ltd
Address: PO Box 3131
AUBURN VIC 3123
Project: Meridian Estate - Stage 26
Project No.: 3807351.026
Order No.: **CG Request No.:**
TRN: **Lot No.:**

Accredited for compliance with ISO/IEC 17025 – Testing

Accreditation Number: 12719
Site Number: 12712
Approved Signatory: M. Longfield (Senior Technician)
Date of Issue: 12/04/2021

Sample Details

Location:	Clyde North
Client Request ID:	
Specification Requirements:	Minimum Hilf Density Ratio of 95%
Field Test procedures:	AS 1289.5.8.1
Laboratory Test procedures:	AS 1289.5.7.1
Sampling Method:	AS1289.1.2.1 Clause 6.4 (b)
Source:	Onsite
Material:	Gravelly Clay

Sample Data

Sample ID	S21DS-04779	S21DS-04780				
Field Sample ID	1	2				
Date Tested	8/04/2021	8/04/2021				
E:	165.322	1639.891				
N:	349..141	330.727				
Elv:	33.871	34.276				
Lot:	2615	2612				
Layer:	1	1				

Field and Laboratory Data

Depth of Test (mm)	175	175				
Depth of Layer (mm)	200	200				
AS Sieve Size (mm)	19.0	19.0				
Oversize Wet (%)	0	0				
Field Wet Density (t/m³)	2.01	2.01				
Peak Converted Wet Density (t/m³)	2.05	1.98				
Compactive Effort	Standard	Standard				
Moisture Variation (%)	1.5 dry	2.0 dry				
Hilf Density Ratio (%)	**98.0**	**101.0**				

Comments

CHADWICK GEOTECHNICS

Dandenong South
ACN 143 009 330
25 Metcalf Street
DANDENONG SOUTH, VIC 3175

Ph: + 61 3 8796 7900
Fax: +61 3 9706 9431

Report No: HDR:W21DS01235
Issue No: 1

HILF Density Ratio Report

Client: Greenridge Properties Pty Ltd
Address: PO Box 3131
AUBURN VIC 3123
Project: Meridian Estate - Stage 26
Project No.: 3807351.026
Order No.: **CG Request No.:**
TRN: **Lot No.:**

Accredited for compliance with ISO/IEC 17025 – Testing

Accreditation Number: 12719
Site Number: 12712
Approved Signatory: M. Robinson (Team Leader)
Date of Issue: 12/04/2021

Sample Details

Location:	Clyde North
Client Request ID:	
Specification Requirements:	Minimum Hilf Density Ratio of 95%
Field Test procedures:	AS 1289.5.8.1
Laboratory Test procedures:	AS 1289.5.7.1
Sampling Method:	AS1289.1.2.1 Clause 6.4 (b)
Source:	Onsite
Material:	Gravelly Clay

Sample Data

Sample ID	S21DS-04827	S21DS-04828				
Field Sample ID	1	2				
Date Tested	9/04/2021	9/04/2021				
Lot No:	2609	2613				
E:	1603.462	1636.500				
N:	329.311	348.169				
Elv:	34.120	34.411				
Field and Laboratory Data						
Depth of Test (mm)	175	175				
Depth of Layer (mm)	200	200				
Field Wet Density (t/m³)	2.06	1.96				
Peak Converted Wet Density (t/m³)	2.11	2.05				
Compactive Effort	Standard	Standard				
Moisture Variation (%)	2.0 wet	0.0				
Hilf Density Ratio (%)	**97.5**	**95.5**				

Comments

CHADWICK GEOTECHNICS

Dandenong South
ACN 143 009 330
25 Metcalf Street
DANDENONG SOUTH, VIC 3175

Ph: + 61 3 8796 7900
Fax: +61 3 9706 9431

Report No: HDR:W21DS01293
Issue No: 1

HILF Density Ratio Report

Client: Greenridge Properties Pty Ltd
Address: PO Box 3131
AUBURN VIC 3123
Project: Meridian Estate - Stage 26
Project No.: 3807351.026
Order No.: **CG Request No.:**
TRN: **Lot No.:**

Accredited for compliance with ISO/IEC 17025 – Testing

Accreditation Number: 12719
Site Number: 12712
Approved Signatory: M. Longfield (Senior Technician)
Date of Issue: 21/05/2021

Sample Details

Location:
Client Request ID:
Specification Requirements:
Field Test procedures: AS 1289.5.8.1
Laboratory Test procedures: AS 1289.5.7.1
Sampling Method: AS1289.1.2.1 Clause 6.4 (b)
Source: Onsite
Material: Clay

Sample Data

Sample ID	S21DS-05044	S21DS-05045				
Field Sample ID	1	2				
Date Tested	15/04/2021	15/04/2021				
E:	1676.09	1637.64				
N:	351.05	336.50				
RL:	34.83	34.50				
Layer:	3	3				
Field and Laboratory Data						
Depth of Test (mm)	175	175				
Depth of Layer (mm)	200	200				
AS Sieve Size (mm)	19.0	19.0				
Oversize Wet (%)	0	0				
Field Wet Density (t/m³)	2.06	2.02				
Peak Converted Wet Density (t/m³)	2.09	2.10				
Compactive Effort	Standard	Standard				
Moisture Variation (%)	0.0	0.0				
Hilf Density Ratio (%)	**98.5**	**96.5**				

Comments

Appendix D: Controlled Fill certificate

CONTROLLED FILL CERTIFICATE - LEVEL 1 INSPECTION & TESTING

PROJECT	: Lot No: 2601 to 2617 and 2622 to 2627 Meridian Central Estate Stage 26	Chadwick Geotechnics REF: 3807351.026.v1
CLIENT	: Grosvenor Lodge Pty Ltd PO Box 4136 DANDENONG SOUTH VIC 3164	DATE : September 2021

SUMMARY

Chadwick Geotechnics Pty Ltd conducted Level 1 inspection and testing, in accordance with Section 8.2 Level 1 inspection and Testing *AS3798-2007, Guidelines on earthworks for commercial and residential developments,* during the filling of the site.

So far as it is able to be determined, the fill was placed in accordance with the Specification that required a minimum density ratio of 95% of HILF Density (AS1289.5.7.1) to be achieved.

LIMITATIONS

This Certificate has been commissioned for the filling of the area mentioned above. No responsibility or liability will be accepted for the use of this report for any purpose other than that for which Chadwick Geotechnics Pty Ltd was engaged, specifically for Level 1 Inspection and Testing of the structural fill (excluding top soil).

This report is based on the conditions present and factors affecting the soil at the time of inspection (31 March 2021 to the 15 April 2021). No responsibility or liability will be accepted and Chadwick Geotechnics Pty Ltd is indemnified to the full extent permitted by law in respect of the use of this Certificate where there has been a change in the nature of the project, or in the site conditions since the site testing.

CHADWICK GEOTECHNICS PTY LTD

Robert Barden
Project Manager

Timothy Chadwick
Project Director

CHADWICK
GEOTECHNICS