Viewpoint Estate Stage F1
Huntly

Earthworks Supervision Report for Dunlop & Pitson

Report 21C 0802
November, 2021

GTS
GEOTECHNICAL TESTING SERVICES

Viewpoint Estate Stage E2
Huntly

Earthworks Supervision Report

for

Dunlop & Pitson

Revision

Revision	Date	Authorised
21C 0802	29/11/2021	SEH

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1 INTRODUCTION

Dunlop & Pitson commissioned Geotechnical Testing Services (GTS) to undertake Level 1 Supervision and testing (AS3798-2007) for the earthworks for the residential subdivision Viewpoint Estate Stage F1, Huntly.

Level 1 Testing was generally performed in line with AS3798-2007 "Guidelines on Earthworks for Commercial and Residential Development" and provides inspection of the construction of controlled fill and compaction testing in accordance with AS1289 "Methods of Testing Soils for Engineering Purposes". The Level 1 testing was undertaken by Geotechnicians with supervision provided by a Geotechnical Engineer from GTS.

2 SCOPE OF WORKS

2.1 AREA OF WORK

Geotechnical Testing Services provided Level 1 inspection and testing of the engineered fill placed in Lots 541 to 552 and 557 to 560.

The depth of fill across the site varied from none to around 500mm with the approximate locations shown on the attached site plan. It is noted that sites with less than 300mm were not included in the controlled fill.

2.2 PLACEMENT SPECIFICATION

Whilst there was no earthworks specification compiled for this project, the placement of the fill and associated works generally followed the recommendations outlined in AS3798-2007 "Guidelines for Earthworks for Commercial and Residential Developments" and the construction specification.

In summary, the earthworks comply with the following:

- The layers for residential lots are to be compacted to at least 95% of the density ratio in accordance with AS1289 5.1.1 (or 5.7.1), based on Standard compaction.

In accordance with Table 8.1 of AS3798-2007, the filling may be considered a large scale (greater than 1500m^2) and therefore a minimum of 1 test per 2500m^2 or 3 tests per visit are required. It is noted that under this scale, not every lot required testing and the testing conducted meets the minimum requirements.

3 INSPECTION AND TESTING

Inspection of the excavated base was conducted by a Senior Geotechnical Engineer and it was observed that the unsuitable material (vegetation, topsoil/silt) had been removed with the base consisting of a Silty Clay material of variable strength (see GTS reference 21C 0802-1 included in the Appendix). As such, the base was ripped a minimum of 300mm, moisture conditioned (allowed to dry) and recompacted until a suitable base had formed. Following compaction of the base, a proof roll was conducted by a Senior Geotechnical Engineer, of which there was no visual deformation or springing under the truck tyres and was therefore deemed suitable.

Level 1 inspection and testing was undertaken by a geotechnician from GTS who nominated the timing and location of the in-situ density tests. The approximate location of each test is recorded on the test reports and attached fill plan.

Laboratory compaction testing was undertaken on a one to one basis at our Bendigo laboratory. A summary of the results of the compaction control testing is presented in a table below with the full NATA endorsed test reports included in the Appendix.

4 SUMMARY OF TEST RESULTS

A summary of the test results is included in the following table with full NATA accredited reports included in the Appendix.

Project No.	Sample No.	Test Date	Location	Reduced Level (mm)	Moisture Variation %O.M.C	Hilf Density Ratio %
1	B21-9671A	16/08/2021	Lot 549	-200	101.5	0.5 dry
2	B21-9671B	16/08/2021	Lot 550	-200	102.0	0.5 dry
3	B21-9671C	16/08/2021	Lot 551	-200	107.0	1.5 dry
4	B21-9671D	16/08/2021	Lot 552	-200	104.5	1.0 dry
5	B21-9687A	17/08/2021	Lot 549	FSL	103.5	2.5 dry
6	B21-9687B	17/08/2021	Lot 550	FSL	104.0	2.5 dry
7	B21-9687C	17/08/2021	Lot 551	FSL	100.0	2.5 dry
8	B21-9687D	17/08/2021	Lot 552	FSL	105.0	2.0 dry
9	B21-9697A	18/08/2021	Lot 545	-200	102.0	0.0
10	B21-9697B	18/08/2021	Lot 544	-200	101.0	0.5 dry
11	B21-9697C	18/08/2021	Lot 543	-200	101.5	0.0
12	B21-9725A	25/08/2021	Lot 547	FSL	103.0	1.0 dry
13	B21-9725B	25/08/2021	Lot 546	FSL	101.0	1.0 dry

Project No.	Sample No.	Test Date	Location	Reduced Level (mm)	Moisture Variation %O.M.C	Hilf Density Ratio %
14	B21-9725C	25/08/2021	Lot 545	FSL	102.5	0.5 dry
15	B21-9725D	25/08/2021	Lot 544	FSL	99.0	0.5 dry
16	B21-9725E	25/08/2021	Lot 543	FSL	108.5	1.5 dry
17	B21-9840A	09/09/2021	Lot 560	-300	109.0	2.0 dry
18	B21-9858A	13/09/2021	Lot 558	FSL	107.0	2.0 dry
19	B21-9858B	13/09/2021	Lot 559	FSL	103.5	3.0 dry
20	B21-9858D	13/09/2021	Lot 557	FSL	108.0	3.0 dry

5 STATEMENT OF COMPLIANCE

GTS personnel have provided Level 1 inspection and testing services during the placement of material for the filling in Lots 541 to 552 and 557 to 560. The placement of fill and construction techniques adopted was observed throughout the project.

Based on observations made by GTS personnel and the results of field and laboratory tests, we consider that the fill has been placed and compacted and is considered to be engineered or controlled fill. Therefore, subject to residential site classifications, the controlled fill material is deemed a suitable founding medium for future residential buildings. It is noted that topsoil material may be spread across the sites following completion of these earthworks and that this topsoil material is not considered controlled fill.

Prepared by

Jackson Blakemore BE (Hons)
Geotechnical Engineer

Reviewed by

Shane Hampton BE (Hons), MIEAust
Principal Geotechnical Engineer

APPENDIX

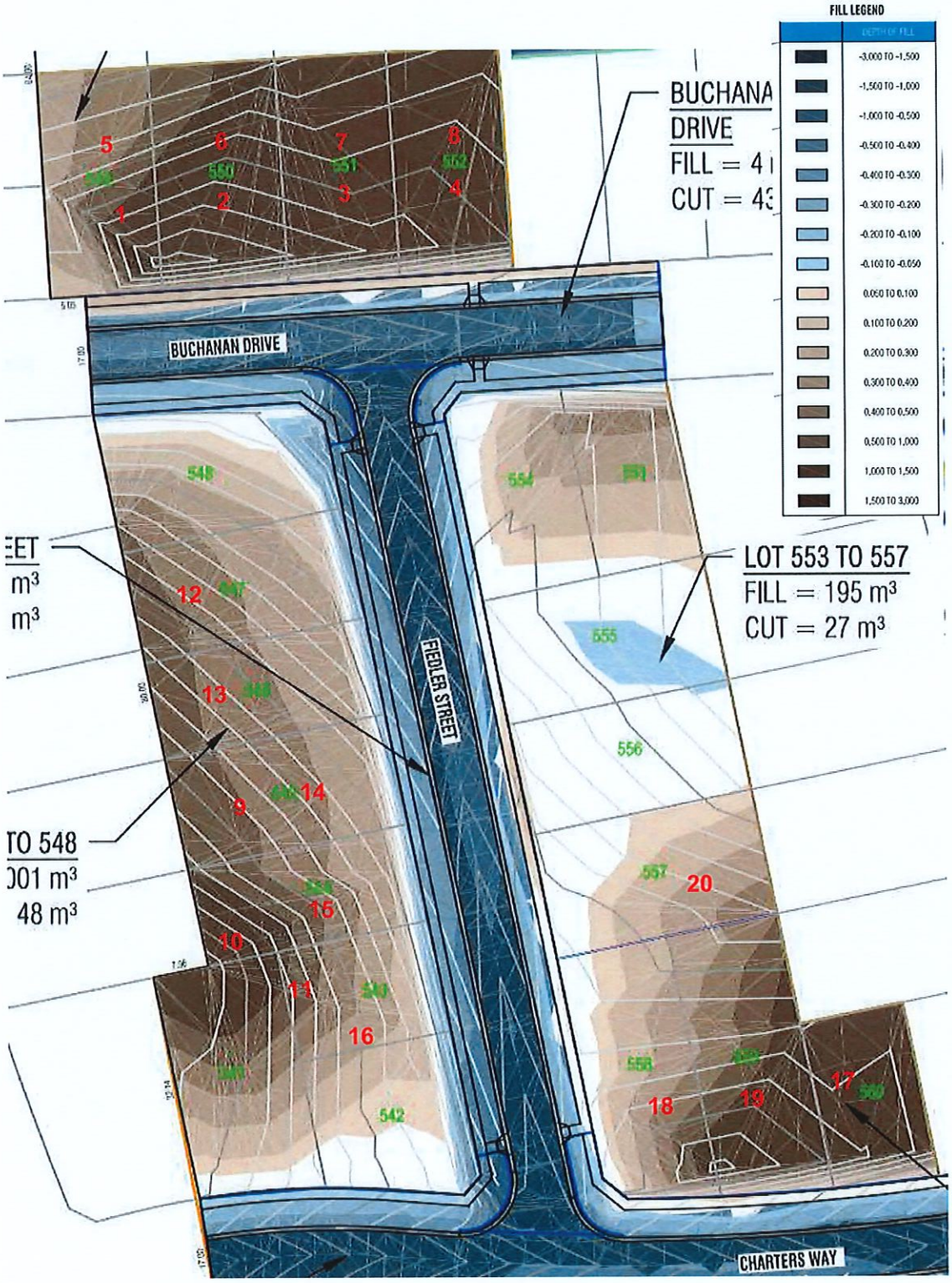

Fig 1 Site Plan

Material Test Report

Report Number: P18615-51
Issue Number: 1
Date Issued: 16/08/2021
Client: Dunlop & Pitson Pty Ltd
24 Jewell Court , Bendigo VIC 3550
Project Number: P18615
Project Name: View Point Estate
Project Location: Stage F1
Work Request: 9671
Date Sampled: 16/08/2021
Dates Tested: 16/08/2021 - 16/08/2021
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Site Selection: Selected by Client
Material Source: Test Location

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
13 Alstonvale Court East Bendigo VIC 3550
Phone: (03) 5441 4881
Email: joshl@gts.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Josh Lagodzki
NATA Accredited Laboratory Number: 19506

Compaction Control AS 1289 5.7.1 & 5.8.1				
Sample Number	B21-9671A	B21-9671B	B21-9671C	B21-9671D
Date Tested	16/08/2021	16/08/2021	16/08/2021	16/08/2021
Time Tested	07:47	07:49	07:54	07:56
Test Request #/Location	House Blocks Lot 549	House Blocks Lot 550	House Blocks Lot 551	House Blocks Lot 552
Chainage (m)	Centre	Centre	Centre	Centre
Location Offset (m)	**	**	**	**
Layer / Reduced Level	-200	-200	-200	-200
Thickness of Layer (mm)	300	300	300	300
Soil Description	Silty Sandy Clay	Silty Sandy Clay	Silty Sandy Clay	Silty Sandy Clay
Test Depth (mm)	250	250	250	250
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	0
Field Wet Density (FWD) t/m^3	2.30	2.30	2.32	2.33
Field Dry Density (FDD) t/m^3	**	**	**	**
Peak Converted Wet Density t/m^3	2.26	2.25	2.17	2.23
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**
Moisture Variation (Wv) %	0.5	0.5	1.5	1.0
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	**101.5**	**102.0**	**107.0**	**104.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	**	**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: P18615-52
Issue Number: 1
Date Issued: 18/08/2021
Client: Dunlop & Pitson Pty Ltd
24 Jewell Court , Bendigo VIC 3550
Project Number: P18615
Project Name: View Point Estate
Project Location: Stage F1
Work Request: 9687
Date Sampled: 17/08/2021
Dates Tested: 17/08/2021 - 18/08/2021
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Site Selection: Selected by Client
Material Source: Test Location

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
13 Alstonvale Court East Bendigo VIC 3550
Phone: (03) 5441 4881
Email: joshl@gts.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Josh Lagodzki
NATA Accredited Laboratory Number: 19506

Compaction Control AS 1289 5.7.1 & 5.8.1				
Sample Number	B21-9687A	B21-9687B	B21-9687C	B21-9687D
Date Tested	17/08/2021	17/08/2021	17/08/2021	17/08/2021
Time Tested	15:16	15:20	15:25	15:28
Test Request #/Location	Stage F1 House Blocks	Stage F1 House Blocks	Stage F1 House Blocks	Stage F1 House Blocks
Chainage (m)	Lot 549	Lot 550	Lot 551	Lot 552
Location Offset (m)	Rear Centre	Rear Centre	Rear Centre	Rear Centre
Layer / Reduced Level	FSL	FSL	FSL	FSL
Thickness of Layer (mm)	200	200	200	200
Soil Description	Gravelly Silty Clay	Gravelly Silty Clay	Gravelly Silty Clay	Gravelly Silty Clay
Test Depth (mm)	175	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	0
Field Wet Density (FWD) t/m^3	2.24	2.19	2.11	2.20
Field Dry Density (FDD) t/m^3	**	**	**	**
Peak Converted Wet Density t/m^3	2.16	2.11	2.11	2.10
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**
Moisture Variation (Wv) %	2.5	2.5	2.5	2.0
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	**103.5**	**104.0**	**100.0**	**105.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	**	**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: P18615-53
Issue Number: 1
Date Issued: 19/08/2021
Client: Dunlop & Pitson Pty Ltd
24 Jewell Court , Bendigo VIC 3550
Project Number: P18615
Project Name: View Point Estate
Project Location: View Point Estate, Huntly
Work Request: 9697
Date Sampled: 18/08/2021
Dates Tested: 18/08/2021 - 18/08/2021
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Site Selection: Selected by Client
Material Source: Test Location

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
13 Alstonvale Court East Bendigo VIC 3550
Phone: (03) 5441 4881
Email: joshl@gts.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Josh Lagodzki
NATA Accredited Laboratory Number: 19506

Compaction Control AS 1289 5.7.1 & 5.8.1			
Sample Number	B21-9697A	B21-9697B	B21-9697C
Date Tested	18/08/2021	18/08/2021	18/08/2021
Time Tested	12:10	12:11	12:18
Test Request #/Location	Block 545	Block 544	Block 543
Chainage (m)	Center of Block	Center of Block	Center of Block
Location Offset (m)	Center of Block	Center of Block	Center of Block
Layer / Reduced Level	-200	-200	-200
Thickness of Layer (mm)	200	300	200
Soil Description	Sandy Silty Clay	Sandy Silty Clay	Sandy Silty Clay
Test Depth (mm)	175	250	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Field Wet Density (FWD) t/m^3	2.17	2.13	2.21
Field Dry Density (FDD) t/m^3	**	**	**
Peak Converted Wet Density t/m^3	2.13	2.11	2.17
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Moisture Variation (Wv) %	0.0	0.5	0.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**102.0**	**101.0**	**101.5**
Compaction Method	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: P18615-54
Issue Number: 1
Date Issued: 26/08/2021
Client: Dunlop & Pitson Pty Ltd
24 Jewell Court , Bendigo VIC 3550
Project Number: P18615
Project Name: View Point Estate
Project Location: Stage F1
Work Request: 9725
Date Sampled: 25/08/2021
Dates Tested: 25/08/2021 - 26/08/2021
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Site Selection: Selected by Client
Material Source: Test Location

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
13 Alstonvale Court East Bendigo VIC 3550
Phone: (03) 5441 4881
Email: joshl@gts.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Josh Lagodzki
NATA Accredited Laboratory Number: 19506

Compaction Control AS 1289 5.7.1 & 5.8.1					
Sample Number	B21-9725A	B21-9725B	B21-9725C	B21-9725D	B21-9725E
Date Tested	25/08/2021	25/08/2021	25/08/2021	25/08/2021	25/08/2021
Time Tested	13:08	13:14	13:17	13:21	13:24
Test Request #/Location	Stage F1 House Blocks	Stage F1 House Blocks	Stage F1 House Blocks	Stage F1 House Blocks	Stage F1 House Blocks
Chainage (m)	Lot 547	Lot 546	Lot 545	Lot 544	Lot 543
Location Offset (m)	Centre	Centre	Centre	Centre	Centre
Layer / Reduced Level	FSL	FSL	FSL	FSL	FSL
Thickness of Layer (mm)	200	200	200	200	200
Soil Description	Gravelly Silty Clay	Gravelly Silty Clay	Gravelly Silty Clay	Gravelly Silty Clay	Gravelly Silty Clay
Test Depth (mm)	150	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	0	0
Field Wet Density (FWD) t/m^3	2.20	2.15	2.21	2.16	2.24
Field Dry Density (FDD) t/m^3	**	**	**	**	**
Peak Converted Wet Density t/m^3	2.14	2.13	2.16	2.18	2.07
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**	**
Moisture Variation (Wv) %	1.0	1.0	0.5	0.5	1.5
Adjusted Moisture Variation %	**	**	**	**	**
Hilf Density Ratio (%)	**103.0**	**101.0**	**102.5**	**99.0**	**108.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	**	**	**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: P18615-55
Issue Number: 1
Date Issued: 10/09/2021
Client: Dunlop & Pitson Pty Ltd
24 Jewell Court , Bendigo VIC 3550
Project Number: P18615
Project Name: View Point Estate
Project Location: Stage F1
Work Request: 9840
Date Sampled: 09/09/2021
Dates Tested: 09/09/2021 - 10/09/2021
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Site Selection: Selected by Client
Material Source: Test Location

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
13 Alstonvale Court East Bendigo VIC 3550
Phone: (03) 5441 4881
Email: joshl@gts.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Josh Lagodzki
NATA Accredited Laboratory Number: 19506

Compaction Control AS 1289 5.7.1 & 5.8.1			
Sample Number	B21-9840A		
Date Tested	09/09/2021		
Time Tested	11:35		
Test Request #/Location	Stage F1 House Block		
Chainage (m)	Lot 560		
Location Offset (m)	Front Centre		
Layer / Reduced Level	-300		
Thickness of Layer (mm)	300		
Soil Description	Gravelly Silty Clay		
Test Depth (mm)	250		
Sieve used to determine oversize (mm)	19.0		
Percentage of Wet Oversize (%)	0		
Field Wet Density (FWD) t/m^3	2.26		
Field Dry Density (FDD) t/m^3	**		
Peak Converted Wet Density t/m^3	2.08		
Adjusted Peak Converted Wet Density t/m^3	**		
Moisture Variation (Wv) %	2.0		
Adjusted Moisture Variation %	**		
Hilf Density Ratio (%)	**109.0**		
Compaction Method	**Standard**		
Report Remarks	**		

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: P18615-56
Issue Number: 1
Date Issued: 13/09/2021
Client: Dunlop & Pitson Pty Ltd
24 Jewell Court , Bendigo VIC 3550
Project Number: P18615
Project Name: View Point Estate
Project Location: Stage F1
Work Request: 9858
Date Sampled: 13/09/2021
Dates Tested: 13/09/2021 - 13/09/2021
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Site Selection: Selected by Client
Material Source: Test Location

Geotechnical Testing Services (Southern)
Bendigo Soil and Concrete Testing Laboratory
13 Alstonvale Court East Bendigo VIC 3550
Phone: (03) 5441 4881
Email: joshl@gts.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Josh Lagodzki
NATA Accredited Laboratory Number: 19506

Compaction Control AS 1289 5.7.1 & 5.8.1				
Sample Number	B21-9858A	B21-9858B	B21-9858C	B21-9858D
Date Tested	13/09/2021	13/09/2021	13/09/2021	13/09/2021
Time Tested	12:06	12:12	12:15	12:21
Test Request #/Location	Stage F1 House Blocks	Stage F1 House Blocks	Stage F1 House Blocks	Stage F1 House Blocks
Chainage (m)	Lot 558	Lot 559	Lot 590	Lot 557
Location Offset (m)	Centre	Centre	Rear Centre	Rear Centre
Layer / Reduced Level	FSL	FSL	FSL	FSL
Thickness of Layer (mm)	300	300	300	300
Soil Description	Gravelly Silty Clay	Gravelly Silty Clay	Gravelly Silty Clay	Gravelly Silty Clay
Test Depth (mm)	250	250	250	250
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	0
Field Wet Density (FWD) t/m^3	2.18	2.14	2.26	2.24
Field Dry Density (FDD) t/m^3	**	**	**	**
Peak Converted Wet Density t/m^3	2.04	2.06	2.10	2.07
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**
Moisture Variation (Wv) %	2.0	3.0	1.5	3.0
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	**107.0**	**103.5**	**108.0**	**108.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	**	**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

GTS
GEOTECHNICAL TESTING SERVICES
www.gts.com.au
info@gts.com.au
ABN 73 989 392 150

Ref: 21C00802-1
11 August 2021

Dunlop & Pitson
Attn: Darren Pitson

RE:

Stage F1 Viewpoint Estate, Huntly

Dunlop & Pitson commissioned Geotechnical Testing Services to undertake a site inspection as part of the Level 1 Supervision for the earthworks at Stage F1 Viewpoint Estate, Huntly.

The site inspection was conducted by a Senior Geotechnical Engineer on 5th August 2021. It was observed that the topsoil had been stripped in 2 sections in preparation for the placement of fill. It was observed that the exposed base was moving/deforming under load (see photograph P1) and appears to be due to the high moisture content of the clay material. As such, it was not suitable for the placement of fill material at that stage.

To be able to continue work in the short term, it was advised that the dry material could be blended in to the top 200mm, then compacted. However, there was no suitable dry material available.

As such, with the following few days appearing to be of suitable weather, it was recommended to allow the site to dry back over this time, then rip and mix the drier surface material through over a depth of around 200mm and recompact with a pad foot roller.

It is noted that this method may need to be repeated pending the moisture content of the material (possibly wetter sections) and how much the near surface material dries back due to the weather.

Following ripping, mixing and compaction, the base should be inspected by GTS prior to placing fill material.

Should you have any further queries, please contact the undersigned in our Bendigo office.

Regards,

Shane Hampton (BE(Hons)) MIEAust
Principal Geotechnical Engineer
0437 496 215

Attachments: Photographs

P1: Stage F1 with unsuitable surface

P2: Closer view of surface material and deformation under load to due moisture content