



Australian Geotechnical Testing

Level One Inspection and Testing

Project No: AGTE230092

Project: LUL4

Suburb: Lucas Estate



Client: Wayne Horne Earthmoving

Date: 7th March 2023

Geotechnical	Pavement	Environmental	Residential	Design
Slope Stability Assessment	Land Capability Assessments	Erosion and Sediment Control Plan		
Retaining Walls	Level 1 Supervision	Earthworks Specification's	Percolation	

Adelaide | Brisbane | Ballarat | Melbourne | Warrnambool

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1 Introduction

Australian Geotechnical Testing (AGT) has been engaged by Wayne Horne Earthmoving to provide Level 1 Geotechnical Supervision for the LUL4 project. The Estate is located in Lucas.

This Level 1 report presents the results of supervision activities, compaction and moisture control, material placement and laboratory testing for ground works undertaken for the project. This report covers construction activities carried out from **7th December 2022 to 18th January 2023**.

2 Scope of Works

The scope of works involved the placement of on-site General Fill. Fill Material was placed in Level one fill areas, in accordance with **AS 3798-2007, *Guidelines on earthworks for commercial and residential developments and project specifications***. The level of FILL to be placed is less than 5m as per AS3798 Section 1.1.

The fill material is required as per AS3798 and the project specification to achieve:

- **95% Standard Maximum Dry Density (Compaction)**

General fill material used for the construction was locally sourced and predominantly comprising of Brown Silty Clay.

3 Inspections / Supervision

Full-time Level 1 supervision and inspection was undertaken including the supervision and inspections regarding the stripping and removal as per AS3798 Section 3 shall have removed:

- Organic soils, such as topsoils, severely root affected subsoils and peat;
- Contaminated soils are part of the brief;
- Materials which undergo volume change or loss of strength when disturbed and exposed to moisture;
- Silts, or materials that have deleterious engineering properties of silt;
- Other materials with properties that are unsuitable for the forming of structural fill;
- Fill that contains wood, metal plastic, boulders or other deleterious material, in sufficient proportions to affect the required performance of the fill.
- The maximum particle size of any rocks or other lumps, within the layer, has not exceeded two-thirds ($\frac{2}{3}$) of the compacted layer thickness.

The lots inspected were essentially homogeneous in relation to material type and moisture condition, rolling response and compaction technique and which has been used for the assessment of relative compaction of an area of work (AS3798 Section 1.2.8).

Prior to placement any existing filled ground, for which the conditions of the placement are not adequately documented have not been assumed to have been of either standard compaction or of the composition adequate to support fill or any loads has been removed (AS3798 Section 2).

4 Testing

The project was classified as **Residential**, thereby requiring a minimum compaction result of **95%** density ratio Standard Compaction for the **cohesive soils** (AS 1289 5.7.1 & 5.1.1) throughout the Level 1 Fill and in accordance with AS 3798-2007 – Table 5.2. The test was performed using a Nuclear Density Gauge for field density determination AS 1289.5.8.1.

As a minimum testing was undertaken either 3 tests per lot, 1 test per 2,500m² per layer, or 1 test per 500m³ throughout the placement of fill as per AS3798 Table 8.1.

The material was site derive Silty Clay fill. The material was placed in approximately 200mm loose layers, rolling effort with on-site Compactor (to seal of each layer of placed General Fill material) to a compacted 150mm layer that achieved 95% Standard Compaction which met Australian Standards specifications. This was considered the best method to achieve compaction using the plant and machinery available.

The NATA compaction reports verify the achievement of the minimum density requirement of 95% Standard Compaction throughout the full depth area, with each layer tested accordingly. All test results were provided to our client: Wayne Horne Earthmoving for inclusion within their internal quality system.

At the completion of the structural layers and material within 150mm of permanent subgrade level in cuttings, test rolling was undertaken, and the layers withstood test rolling without visible deformation or springing (AS 3798 Section 5.5).

The area covered by this Level 1 Supervision report is shown in the Site Plan (Refer to Appendix A). The results of the laboratory Testing are indicated in Appendix B.

5 Conclusion

On the completion of the earthworks and after analysing the materials used, it has been concluded that the filling procedure conducted by our client **Wayne Horne Earthmoving** **satisfied** the general requirements of AS 3798 regards to the placement of fill materials on a project under Level 1 Supervision and in accordance with the project specification as provided to AGT.

The fill meets the requirements for “structural fill for residential applications” in accordance with AS3798. The fill has been placed, compacted and tested in accordance with AS3798 and the fill meets the requirements for controlled fill in accordance with AS2870 (2011) “Residential Slabs and Footings”.

This report has been prepared for the benefit of our client with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement. No responsibility for this report will be taken by AGT if it is altered in any way, or not reproduced in full.

6 Applicability

The findings and conclusions contained in this Report are made based on site conditions that existed at the time this work was conducted. The conclusions presented in this report are relevant to the conditions of the site and the state of legislation currently enacted as at the date of this report.

Findings and conclusions are made assuming that the soil, groundwater, geological and chemical conditions detailed within this report are accurate and remain applicable to the site at the time of writing. The conclusions of this report may become invalid if filling or excavation occurs after the boreholes and test pits referred to in this report were drilled or excavated. No other warranties are made or intended.

AGT has used a degree of skill and care ordinarily exercised by reputable members of our profession practicing in the same or similar locality.

AGT does not make any representation or warranty that the conclusions in this report will be applicable in the future as there may be changes in the condition of the site, applicable legislation or other factors that would affect the conclusions contained in this report. This report has been prepared exclusively for use by our client. This report cannot be reproduced without the written authorisation of AGT and then can only be reproduced in its entirety.



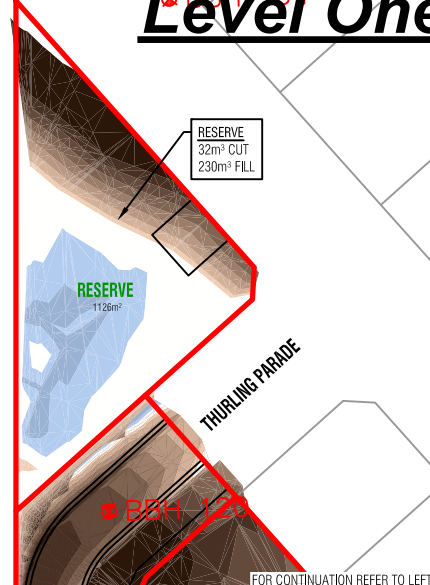
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Appendix A – Site Plan

LUL4 Test Locations Level One Supervision



BBH 163

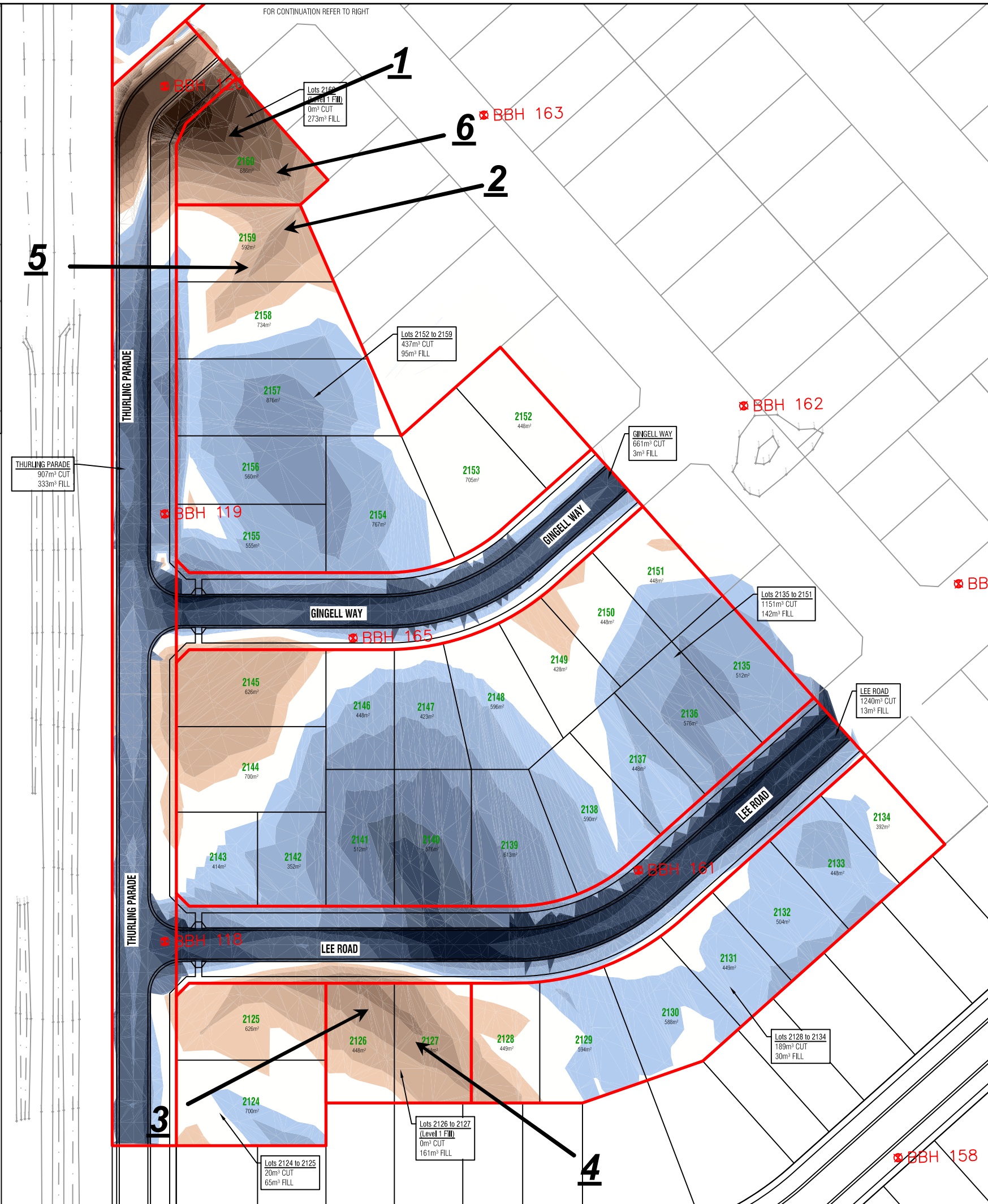
FILL LEGEND

DEPTH OF FILL	
-3.000+ TO -1.200	[Color swatch]
-1.200 TO -0.700	[Color swatch]
-0.700 TO -0.600	[Color swatch]
-0.600 TO -0.500	[Color swatch]
-0.500 TO -0.400	[Color swatch]
-0.400 TO -0.300	[Color swatch]
-0.300 TO -0.200	[Color swatch]
-0.200 TO -0.100	[Color swatch]
-0.100 TO -0.050	[Color swatch]
0.050 TO 0.100	[Color swatch]
0.100 TO 0.200	[Color swatch]
0.200 TO 0.300	[Color swatch]
0.300 TO 0.400	[Color swatch]
0.400 TO 0.500	[Color swatch]
0.500 TO 0.600	[Color swatch]
0.600 TO 0.700	[Color swatch]
0.700 TO 1.200	[Color swatch]
1.200 TO 3.000+	[Color swatch]

BOREHOLE LOGS

BOREHOLE	SILT (mm)	CLAY (mm)	ROCK
118	200 mm	1700 mm	YES
119	400 mm	1200mm	YES
120	200 mm	900 mm	YES
161	400 mm	2000 mm	NO
164	800 mm	0 mm	YES
165	600 mm	1200 mm	YES

BOREHOLE LOGS NOTES:
 ** POSSIBLE FLOATER
 1. SILT QUANTITY INCLUDES GRAVELLY CLAY
 2. ROCK CLASSIFIED AS BASALT
 3. DEPTHS SHOWN ARE FROM SURVEYED SURFACE TO BOTTOM OF LAYER



General Notes
 1. ALL VOLUMES ARE SHOWN FROM SURVEYED SURFACE TO DESIGN SURFACE OR UNDERSIDE OF BOXING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM THE VOLUMES SHOWN.

SAFETY FIRST
 SAFETY STARTS WITH YOU

Rev	Amendment	Initials	Date
4			
3			
2	Issued for Contract	DG	21/12/21
1	Issued for Checking	DG	20/12/21



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Project
**LUCAS ESTATE
 RESIDENTIAL SUBDIVISION
 STAGE L4
 LUCAS**

Authority
 Ballarat City Council - (03) 5320 5500

Drawing Title
EARTHWORKS PLAN

Status
**PRELIMINARY
 NOT FOR CONSTRUCTION**

Designer: D.Georgalas
 Checker: J.Kelty
 Scale (A1): 1:500
 Scale (A3): 1:1000
 HOR: 0 5 10 15 20 25
 VER

Sheet Number
1 of 1

Drawing Number
LUL4-CD-701
 Revision
2

Appendix B – Laboratory Testing

Material Test Report

Report Number: AGT60191-1
Issue Number: 1
Date Issued: 10/12/2022
Client: Wayne Horne Earthmoving
 3 Trewin Street, Wendouree VIC 3355
Project Number: AGT60191
Project Name: LUL4 - Lucas
Project Location: Lucas
Work Request: 1196
Date Sampled: 07/12/2022
Dates Tested: 07/12/2022 - 09/12/2022
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard
Site Selection: Selected by Client
Location: LUL4-Lucas Estate, Lucas
Material: (CH) silty CLAY- Brown
Material Source: Onsite



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Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Paul Francis
 Laboratory Manager - Ballarat
 NATA Accredited Laboratory Number: 20457

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	60191-1	60191-2	
Date Tested	07/12/2022	07/12/2022	
Time Tested	**	**	
Test Request #/Location	LUL4 Lucas Level One Lot 2160	LUL4 Lucas Level One Lot 2159	
Latitude	-37.5427712	-37.5427712	
Longitude	143.7681225	143.7681225	
Layer / Reduced Level	600 below FSL	300 below FSL	
Thickness of Layer (mm)	150	150	
Soil Description	(CH) silty CLAY- Brown	(CH) silty CLAY- Brown	
Test Depth (mm)	125	125	
Sieve used to determine oversize (mm)	19.0	19.0	
Percentage of Wet Oversize (%)	**	**	
Field Wet Density (FWD) t/m ³	2.08	2.04	
Field Moisture Content %	22.0	21.7	
Field Dry Density (FDD) t/m ³	1.70	1.68	
Peak Converted Wet Density t/m ³	2.07	2.05	
Adjusted Peak Converted Wet Density t/m ³	**	**	
Moisture Variation (Wv) %	0.5	0.5	
Adjusted Moisture Variation %	**	**	
Hilf Density Ratio (%)	100.5	99.5	
Compaction Method	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: AGT60191-2
Issue Number: 1
Date Issued: 24/01/2023
Client: Wayne Horne Earthmoving
 3 Trewin Street, Wendouree VIC 3355
Project Number: AGT60191
Project Name: LUL4 - Lucas
Project Location: Lucas
Work Request: 1254
Date Sampled: 18/01/2023
Dates Tested: 19/01/2023 - 19/01/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard
Site Selection: Selected by Client
Location: LUL4, Lucas
Material: (CH) silty CLAY- Brown
Material Source: Onsite



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Approved Signatory: Paul Francis
 Laboratory Manager - Ballarat
 NATA Accredited Laboratory Number: 20457

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	60191-3	60191-4	60191-5	60191-6
Date Tested	18/01/2023	18/01/2023	18/01/2023	18/01/2023
Time Tested	10:10	10:20	10:30	10:40
Test Request #/Location	LUL4, Lucas Estate Lot 2126	LUL4, Lucas Estate Lot 2127	LUL4, Lucas Estate Lot 2159	LUL4, Lucas Estate Lot 2160
Latitude	-37.4714	-37.54436	-37.54305	-37.54307
Longitude	143.64562	143.76717	143.76879	143.76897
Layer / Reduced Level	FSL	300 below FSL	FSL	FSL
Thickness of Layer (mm)	150	150	150	150
Soil Description	(CH) silty CLAY- Brown	(CH) silty CLAY- Brown	(CH) silty CLAY- Brown	(CH) silty CLAY- Brown
Test Depth (mm)	125	125	125	125
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	**	**	**	**
Field Wet Density (FWD) t/m ³	1.91	1.98	2.11	2.09
Field Moisture Content %	17.1	19.6	19.3	14.4
Field Dry Density (FDD) t/m ³	1.63	1.66	1.77	1.83
Peak Converted Wet Density t/m ³	1.99	2.03	2.13	2.10
Adjusted Peak Converted Wet Density t/m ³	**	**	**	**
Moisture Variation (Wv) %	-1.0	0.0	1.5	1.5
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	96.0	97.5	99.0	99.5
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

Appendix C – Site Photos

