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LEVEL 1 INSPECTION & TESTING HARRIOTT ESTATE STAGE 8A ARMSTRONG CREEK

Prepared for BILD Group Pty Ltd

Report Reference: GSSW1548.1 AA

Date: 12 August 2022

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PROJECT DETAILS

Project Reference	GSSW1548.1	Rev	AA
Project Title	Harriott Estate Stage 8A		
Project Location	Armstrong Creek	State	VIC
Date	12 August 2022		

CLIENT DETAILS

Prepared For (Client)	BILD Group Pty Ltd				
Client Address	133 Metrolink Cct, Campbellfield VIC 3061				

DISTRIBUTION

Original Held By	Ground Science South West Pty Ltd				
One (1) Electronic Copy	BILD Group Pty Ltd				

This document presents the results of the Level 1 Inspection and Testing performed by Ground Science South West for the aforementioned project, as the nominated project Geotechnical Inspection & Testing Authority (GITA). This report is detailed for the sole use of the intended recipient(s). Should you have any questions related to this report please do not hesitate to contact the undersigned.

AUTHOR:

Michael Knez

Geotechnical Engineer

REVIEWED:

Gee Singh, MIEAust (NER) Senior Geotechnical Engineer

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1. INTRODUCTION

This report presents the results of the inspection activities, compaction control and laboratory testing services performed by Ground Science South West Pty Ltd for the Harriott Estate Stage 8A project, located within Armstrong Creek, Victoria (the site).

2. PROJECT UNDERSTANDING

It is understood that the project involves the placement of fill as part of the bulk earthworks phase for Harriott Estate Stage 8A. Ground Science was engaged to provide Level 1 Inspection and Testing services for the construction of these areas. Authorisation to proceed was provided by BILD Group Pty Ltd (the 'Client'). GPR Consulting Pty Ltd prepared the civil drawings for the project.

Level 1 Inspection & Testing, as defined in AS3798 (2007) 'Guidelines on Earthworks for Commercial and Residential Developments' provides for full time inspection of the construction of controlled fill and compaction testing in accordance with AS1289 'Methods of Testing Soils for Engineering Purposes' and AS1726 (2017) 'Geotechnical Site Investigations'. Ground Science performed the role of the project Geotechnical Inspection & Testing Authority (GITA) with all Level 1 Inspection and Testing services described in this report undertaken by an experienced GITA site representative.

3. SCOPE OF WORK

3.1 AREAS OF WORK

Ground Science provided Level 1 Inspection and Testing services for the construction of fill in areas requiring greater than 200mm of fill to achieve finished levels. The areas requiring Level 1 Inspection & Testing are shown on the supplied construction drawing, on Figure 1, prepared by GPR Consulting Pty Ltd (Harriott at Armstrong Creek Stage 8A - Layout Plan [0352-08A-R02 Rev A]).

This report details the Level 1 earthworks process performed on site which commenced on 23rd of June 2022 and was completed on the 22nd of July 2022, requiring 6 full days and 1 half day of inspection and testing works.

3.2 PLACEMENT METHODOLOGY

A technical specification for the fill operations was not provided. The placement of controlled fill on the above-mentioned areas was carried out in accordance with Level 1 fill procedures as detailed in AS3798 (2007) 'Guidelines on Earthworks for Commercial and Residential Developments'. The following fill placement guideline was adopted for the works:

- All existing loose surficial fill, topsoil, soft material, vegetation and materials containing significant organic matter were removed to expose the natural soil subgrade;
- Suitable fill material, sourced by the contractor and approved by Ground Science, was placed in loose horizontal layers not exceeding 300mm in thickness;
- The controlled fill material was compacted to achieve a target Dry Density Ratio of at least 95% Standard Compaction (AS 1289: 5.1.1, 5.4.1 or 5.7.1), based on our understanding that future building loads would be similar to residential type structures (i.e. non-commercial structural loading);
- The fill was moisture conditioned to within +/- 3% of the standard optimum moisture content;
- The fill material was sorted and mixed to eliminate particles greater than 20% by volume, particles coarser than 37.5mm and no particle over 200mm in any dimension;
- The frequency of field density testing adopted for the project was generally in line with the requirements for large scale developments (Type 1), as detailed in AS3798 (2007), which nominates a frequency of not less than:

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- 1 test per layer or 200mm per 2500m²;
- 1 test per 500m³ distributed reasonably evenly throughout the full depth and area; or
- 3 tests per site visit; whichever requires the most tests.

4. INSPECTION AND TESTING

4.1 SUBGRADE PREPARATION

Site stripping was carried out prior to Ground Science South West's involvement in the project. It is understood that BILD Group removed all organics, topsoil and compressible (soft) soils between 13th and 16th of May 2022. Inspection of the newly prepared subgrade surface was carried out on 16th of May 2022 by the representative geotechnician from Ground Science South West. A proof roll with a 16 tonne water cart truck was performed and was noted to show minimum deflection. At the time of the inspection, the prepared subgrade was observed to be generally close of optimum moisture content. The prepared subgrade surface was then inspected and deemed suitable for subsequent works to proceed.

The above stripped subgrade was visually assessed using tactile methods described in AS1726 (2017) and approved by the GITA representative throughout the project.

4.2 CONSTRUCTION MATERIALS

The fill material used in this project was nominated by the on-site contractor. All the materials used for the project was sourced from Fyansford Tip. The material was carted to site in dump trucks and stockpiled adjacent to the fill zones. Ground Science performed an assessment of the fill source to identify the following material characteristics:

- Material suitability as an engineering property;
- Cohesiveness:
- Free of building debris and vegetative matter;
- Free of oversize rock particles.

Visual assessments on the above-mentioned properties were conducted on-site and the fill material used was considered acceptable for use on this project. The nominated fill products were visually assessed to comprise of sandy CLAY, low to medium plasticity, brown, sand fine to coarse grained, moist. Ground Science did not perform any quality assurance, quality control, chemical or environmental analysis on the above fill material.

The fill source was assessed to range from dry to close of the optimum moisture content. Portions of the fill material that were found to be dry were moisture conditioned using a water cart prior to compaction. All fill materials were generally considered suitable for use as engineered fill.

4.3 FILL CONSTRUCTION

The contractor had the following plant available on site during the construction period for use in the fill placement;

- Bulldozer;
- Scraper;
- Water Cart;
- Padfoot Compactor.

During fill placement, the weather conditions were cloudy to rain with temperatures typically ranging from 5 to 17 degrees Celsius.



The filling process was generally consistent throughout the project and involved the approved fill stockpiled adjacent to the fill placement zones. The material was spread using a scraper or bulldozer into thin loose layers. These layers were then moisture conditioned by a water cart, applying a minimum of 1-2 passes to bring the placed material close to optimum moisture content. Each layer was compacted using a padfoot roller applying a minimum of 5-8 passes, per layer observed. The thin layers of fill were compacted to form a composite layer, measuring 200mm thick, prior to undertaking the field density testing. This process was adopted for the fill placement works.

4.4 RESULTS OF COMPACTION CONTROL TESTING

Level 1 Inspection and Testing was undertaken by experienced technicians from Ground Science who attended the site for the duration of the construction phase and nominated the location of the in-situ density tests. Testing comprised a total of 21 in-situ density tests using a nuclear moisture-density gauge in accordance with Australian Standard (AS1289 5.8.1) together with 21 "Rapid HILF" Compaction tests (AS1289 5.7.1).

A summary of the field density and compaction control testing is presented in Appendix A. Field density and compaction control testing report sheets are presented in Appendix B. It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. No test areas failed to meet the required target density ratio or the required moisture condition.

4.5 FINAL SURFACE LEVELS

Observations were made by a Ground Science staff member that filling had been complete up to the nominated finished levels designated on Figure 1 as per confirmation provided from the contractor's site foreman. We understand that the observed final levels are the constructed finished surface levels of the controlled fill. The overall fill depths are estimated using onsite visual tactile methods and may not be a true representation of fill depths given that conditions on site may change over time. True fill depths should be obtained from the contractor's survey data.

5. COMPLIANCE

Ground Science Staff have undertaken Level 1 Inspection and Testing services of the construction of the controlled fill in the areas designated on Figure 1. Ground Science field staff have also observed that the prepared subgrade provided an adequate base for the subsequent placement of controlled fill.

Based on observations made by Ground Science staff and the results of density tests, we consider that the controlled fill placed has been constructed in accordance with the guidelines provided by the technical specification provided in AS3798 (2007) and AS2870 (2011).

It should be noted that the final fill layers may be subjected to adverse weather conditions resulting in either surface softening or drying and cracking over time; regardless of the compactive efforts and moisture conditioning applied during the works. The integrity of the top 200mm to 300mm of the fill will deteriorate with time and should be taken into account by the foundation engineer prior to the construction of dwellings or buildings. The levels nominated in this report are a guide to amounts of fill placed and do not necessarily reflect an accurate survey of the fill levels.

6. UNDERSTANDING LEVEL 1 INSPECTION & TESTING

The purpose of performing Level 1 Inspection and Testing is to ensure compliance of the fill with the specification. The engagement of a Geotechnical Inspection Testing Authority (GITA) allows the contractor to perform their role in the construction of the filling operation while the GITA monitors the quality control process of the fill placement. The visual observations of thorough processes and work practices by the contractor allows the GITA to approve the subsequent placement of fill without having to wait for the completion of testing and the extended time it takes to get a test result back. The GITA will however, carry out random spot checks of the filling operations throughout the day's production as confirmation that the placement procedures and the fill moisture content is appropriate. At the end of a day's production the GITA will sign off the completed works as satisfactory. Any failed tests will result

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in that particular area of operation requiring rectification in the following mornings activities. This may be as simple as extra rolling with compaction plant if moisture conditioning is suitable. Sometimes these areas may be retested if the GITA feels it is necessary.

While AS3798 (2007) is a guideline on the minimum requirements of filling on commercial and residential developments, some projects require a more detailed project specification to deal with site specific issues. While moisture conditioning of fill sources aids in the ease with which compaction is achieved, it is not necessarily a physical characteristic that determines if the placed fill is acceptable. In some situations, the moisture requirement is an extremely important function of the final constructed product. In these situations, a specific project specification should apply to the project as detailed by the designing geotechnical engineer. These are typical of clay liners for wetlands, dams, landfill liners and caps and an array of other engineering situations. Creating a consolidated platform of which is similar to equivalent surrounding natural conditions is the primary aim of level one processes, preventing the occurrence of differential ground movements to footing structures.

Level 1 Inspection & Testing requires full time inspection and testing of the fill placement undertaken on a site. Ground Science (project GITA), are notified daily (or at the completion of each day's work) by the project foreman where subsequent days of fill placement under Level 1 is to occur. On projects that rely upon the importation of a fill source, there can be delays in the receipt of sufficient materials to warrant fill placement works which may result in periods of time where a GITA representative is not required on site. It is the contractor's responsibility to notify the GITA when works proceed and their attendance on site is required again. A GITA relies upon the integrity of the contractor to advise when site attendance is required and makes all reasonable visual attempts to assess if the works are the same as the previous days attendance.

For & on behalf of Ground Science Pty Ltd

AUTHOR:

Michael Knez Geotechnical Engineer **REVIEWED:**

Gee Singh, MIEAust (NER) Senior Geotechnical Engineer



7. LIMITATIONS

This type of investigation (as per our commission) is not designed or capable of locating all soil conditions, (which can vary even over short distances). The advice given in this report is based on the assumption that the test results are representative of the overall soil conditions. However, it should be noted that actual conditions in some parts of the Site might differ from those found. If further sampling reveals soil conditions significantly different from those shown in our findings, Ground Science must be consulted. Maintenance and upkeep of finished fill placement must be regularly monitored as exposure to extended weather periods/other elements may cause surface drying which may lead to cracking. Conversely, excessive exposure to moisture may cause heaving/softening in the soils.

It is recognised that the passage of time affects the information and assessment provided in this document. Ground Science's assessment is based on information that existed at the time of the preparation of this document. It is understood that the services provided allowed Ground Science to form no more than an opinion of the actual site conditions observed during sampling and observations of the site visit and cannot be used to assess the effects of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

The scope and the period of Ground Science services are described in the proposal and are subject to restrictions and limitations. Ground Science did not perform a complete assessment of all possible conditions or circumstances that may exist at the Site. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Ground Science in regards to it.

Where data has been supplied by the client or a third party, it is assumed that the information is correct unless otherwise stated. No responsibility is accepted by Ground Science for incomplete or inaccurate data supplied by others.

Any drawings or figures presented in this report should be considered only as pictorial evidence of our work. Therefore, unless otherwise stated, any dimensions should not be used for accurate calculations or dimensioning.

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8. REFERENCES

- AS3798 (2007) Guidelines on Earthworks for Residential and Commercial Developments.
- AS2870 (2011) Residential Slabs and Footings.
- AS1289 Methods of Testing Soils for Engineering Purposes.
- AS1726 (2017): Geotechnical Site Investigations

FIGURE 1

Harriott at Armstrong Creek Stage 8A - Layout Plan [0352-08A-R02 Rev A]



	SERVICES OFFSET SCHEDULE									
STREET NAME	ROAD RESERVE	BACK OF KERB	SEWER	SEWER RISING MAIN	GAS	NON DRINKING WATER	DRINKING WATER	COMMUNICATIONS	ELECTRICITY	LIGHT POLES
ACHELOUS PLACE	12.00	3.50 W / 4.50 E	Ex 1.00 E	-	Ex 2.10 E	Ex 2.60 E	Ex 3.10 E	Ex 1.85 W	Ex 2.60 W	-
AEOLUS STREET	16.00	4.35	Ex 1.00 S	-	2.10 S	2.60 S	3.10 S	1.85 N	2.60 N	3.45 N
DORIS PLACE	12.00	3.50 W / 4.50 E	Ex 1.00 E	-	Ex 2.10 E	Ex 2.60 E	Ex 3.10 E	Ex 1.65 W	Ex 2.60 W	-
EGRET PLACE	12.00	3.50 W / 4.50 E	Ex 1.00 E	-	Ex 2.10 E	Ex 2.60 E	Ex 3.10 E	Ex 1.85 W	Ex 2.60 W	-
EURYBIA PLACE	12.00	3.50 W / 4.50 E	Ex 1.00 E	-	Ex 2.10 E	Ex 2,60 E	Ex 3.10 E	Ex 1,85 W	Ex 2,60 W	-
HARKNESS BOULEVARD	30.00	4.85	Ex 1.00 N & S	Ex 3.60 S	2.10 N	2.60 N	3.10 N	1.80 S	2.60 S	3.95 S
TRANQUILITY CIRCUIT	16.00	4.35	Ex 1.00 W & E	-	Ex 2.10 E	Ex 2.60 E	Ex 3.10 E	Ex 1.85 W	Ex 2.60 W	Ex 3.45 W
VOLANT DRIVE	16.00	435	Ev 1 00 W & E	_	Ev 2 10 E	Ev 2 60 E	Ev 3.10 E	Ev 1.85 W	Ev 2.45 W	Ev 3.45 W

BEWARE OF UNDERGE	ROUND
The locations of underground servi	ces are
their exact position should	d he nr

BEWARE OF UNDERGROUND SERVICES

the locations of underground services are approximate only and their exact position should be proven on site.

No guarantee is given that all existing services are shown.

coate all underground services before commencement of works.

DIAL 1100 BEFORE YOU DIG

WARNING

Rev	Amendment	Des/Dft	App'd	Date	Legend			Т
Α	Initial Issue	GP/DP	MG	27/03/22	Existing Drainage — H — Ex D —	Drainage − H → □	Existing Surface Level at Title 135.1	12
					Existing Sewer	Main Drainage — H → □	Finished Surface at Title FS135.1	12
					Existing Gas ——Ex G ——	Sewer S—S	Level at Top/Toe of Batter/Ridge FT135.1	12
					Existing Electricity U/G ——Ex E——	Swale Drain	Centreline Chainage CH50.37	70
					Existing Electricity O/H —— O/H E ——	Gas & Water Conduits GW	Sleeper Retaining Wall	220
					Existing Communications —— Ex T ——	Direction of Lot Fall	Rock Retaining Wall	-
					Existing Drinking Water ——Ex DW——	Direction of Overland Flow	PSM/TBM	٦
					Existing Non Drinking Water — Ex NDW—	Allotment to be Evenly Graded 🕌	Structural Fill > 200mm	
					Existing Swale Drain	Vehicle Crossings	Concrete Infill	.> -







© GPR Consulting Ptv Ltd

Council	City of Grea	Scale @ A1: 1:500				
Project	Harriott at Arn Stag	0 5	10 15 20	25		
Title	Layou	Drawing No.	2-08A-R	02		
Designed:	G.Pratt	Authorised:	M.Graham	Sheet		Rev
Drafted:	D.Pratt	Date:	March 2022	02	of 11	Α

APPENDIX A

Field Density Test Report Summary Sheet

Project Summary Report

Report Date: 08/08/2022

Client: BILD GROUP (CAMPBELLFIELD, VIC)

Project Number: GSSW1548

Project Name: HARRIOT ESTATE STAGE 8A

Project Location: ARMSTRONG CREEK

Specification: 95% Standard Compaction & +/- 3% Moisture Variation

Test Methods: AS 1289 5.7.1 STD & 5.8.1 & 2.1.1



Ground Science South West Pty Ltd 10 Dowsett Street South Geelong Vic 3220 Phone: (03) 5282 1566

Email: chrism@groundscience.com.au

Lot #	Sample #	Date Sampled	Location	Location		Elevation (m)	Layer	Relative Compaction (%)	Moisture Variation (%)	Moisture Content (%)	Field Wet Density (t/m3)
Lots 811 - 823	1548-S1	23/06/2022	Lot #812	**	**	**	1	102.5	2.0	11.6	2.11
Lots 811 - 823	1548-S2	23/06/2022	Lot #818	**	**	**	1	106.5	2.0	10.4	2.13
Lots 811 - 823	1548-S3	23/06/2022	Lot #822	**	**	**	1	97.5	2.5	10.9	1.96
Lots 817 - 823	1548-S4	24/06/2022	Lot #821	**	**	**	2	101.5	2.5	11.3	1.96
Lots 817 - 823	1548-S5	24/06/2022	Lot #818	**	**	**	2	98.5	2.0	12.5	1.95
Lots 817 - 823	1548-S6	24/06/2022	Lot #823	**	**	**	2	99.5	3.0	9.8	1.95
811 - 816	1548-S7	27/06/2022	Lot #815	**	**	**	2	105.0	3.0	12.5	2.00
811 - 816	1548-S8	27/06/2022	Lot #813	**	**	**	2	98.0	2.5	12.5	1.84
811 - 816	1548-S9	27/06/2022	Lot #811	**	**	**	2	101.0	3.0	13.3	2.00
**	1548-S10	28/06/2022	Lot #823	**	**	**	3	97.0	3.0	13.2	1.94
**	1548-S11	28/06/2022	Lot #820	**	**	**	3	96.0	2.5	16.6	1.88
**	1548-S12	28/06/2022	Lot #816	**	**	**	3	95.0	2.0	17.5	1.94
**	1548-S13	20/07/2022	Lot #806	**	**	**	1	100.5	0.0	19.6	2.00
**	1548-S14	20/07/2022	Lot #808	**	**	**	1	97.0	-0.5	25.1	1.88
**	1548-S15	20/07/2022	Lot #802	**	**	**	1	106.5	2.0	18.3	2.02
**	1548-S16	20/07/2022	Lot #807	**	**	**	2	101.0	2.0	13.0	2.01
**	1548-S17	20/07/2022	Lot #805	**	**	**	2	100.5	2.5	15.2	1.97
**	1548-S18	20/07/2022	Lot #802	**	**	**	2	105.0	2.0	14.3	2.07
**	1548-S19	22/07/2022	Lot #804	**	**	**	3	95.5	0.0	21.3	1.89
**	1548-S20	22/07/2022	Lot #807	**	**	**	3	98.0	0.0	19.3	2.01
**	1548-S21	22/07/2022	Lot #820	**	**	**	3	105.5	0.5	19.1	2.12

Moisture Variation Note:

Positive values = test is dry of OMC Negative values = test is wet of OMC

Project: GSSW1548 Report Date: 08/08/2022

Report Number: GSSW1548-1

Issue Number:

Date Issued: 27/06/2022

Client: BILD GROUP (CAMPBELLFIELD, VIC)

Project Number: GSSW1548

Project Name: HARRIOT ESTATE STAGE 8A

Project Location: ARMSTRONG CREEK

Work Request: 12778

Dates Tested: 23/06/2022 - 27/06/2022

Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or

pavement - compacted

Specification: 95% Standard Compaction & +/- 3% Moisture Variation

Lot Number: Lots 811 - 823

Material: Sandy CLAY with gravel, pale brown/orange, low - medium

plasticity.

Material Source: Fyansford Tip



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Email: chrism@groundscience.com.au



Approved Signatory: Chris Mamalis

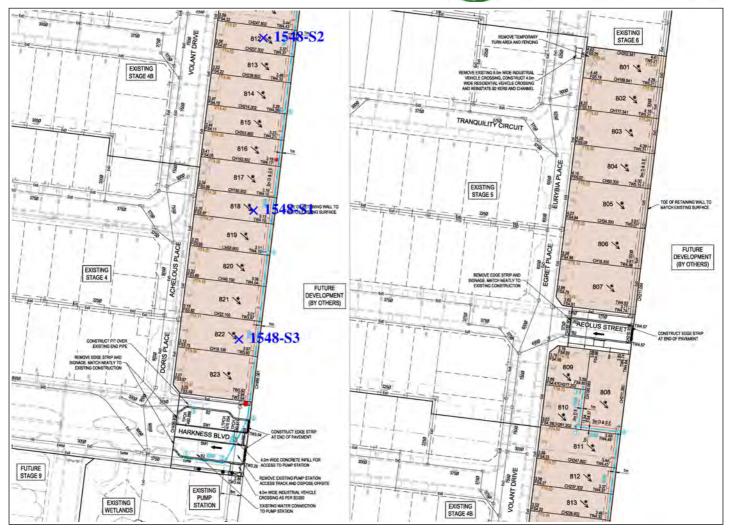
Laboratory Manager NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1							
Sample Number	1548-S1	1548-S2	1548-S3				
Date Tested	23/06/2022	23/06/2022	23/06/2022				
Time Tested	12:31	12:46	12:59				
Test Request #/Location	Lot #812	Lot #818	Lot #822				
Layer / Reduced Level	1	1	1				
Thickness of Layer (mm)	300	300	300				
Soil Description	Sandy CLAY with gravel, pale brown/orange, L-M PI	Sandy CLAY with gravel, pale brown/orange, L-M PI	Sandy CLAY with gravel, pale brown/orange, L-M PI				
Test Depth (mm)	275	275	275				
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	2.11	2.13	1.96				
Field Moisture Content %	11.6	10.4	10.9				
Field Dry Density (FDD) t/m ³	1.89	1.93	1.76				
Peak Converted Wet Density t/m ³	2.06	2.01	2.01				
Adjusted Peak Converted Wet Density t/m3	**	**	**				
Moisture Variation (Wv) %	2.0	2.0	2.5				
Adjusted Moisture Variation %	**	**	**				
Hilf Density Ratio (%)	102.5	106.5	97.5				
Compaction Method	Standard	Standard	Standard				
Report Remarks	**	**	**				

Moisture Variation Note:

Report Number: GSSW1548-1





Report Number: GSSW1548-2

Issue Number:

Date Issued: 28/06/2022

Client: BILD GROUP (CAMPBELLFIELD, VIC)

Project Number: GSSW1548

Project Name: HARRIOT ESTATE STAGE 8A

Project Location: ARMSTRONG CREEK

Work Request: 12797 Date Sampled: 24/06/2022

Dates Tested: 24/06/2022 - 27/06/2022

Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or

pavement - compacted

95% Standard Compaction & +/- 3% Moisture Variation Specification:

Lots 817 - 823 Lot Number:

Material: Sandy CLAY with gravel, pale brown/orange, low - medium

plasticity.

Material Source: Fyansford Tip



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Phone: (03) 5282 1566

Email: chrism@groundscience.com.au



Approved Signatory: Chris Mamalis

Laboratory Manager

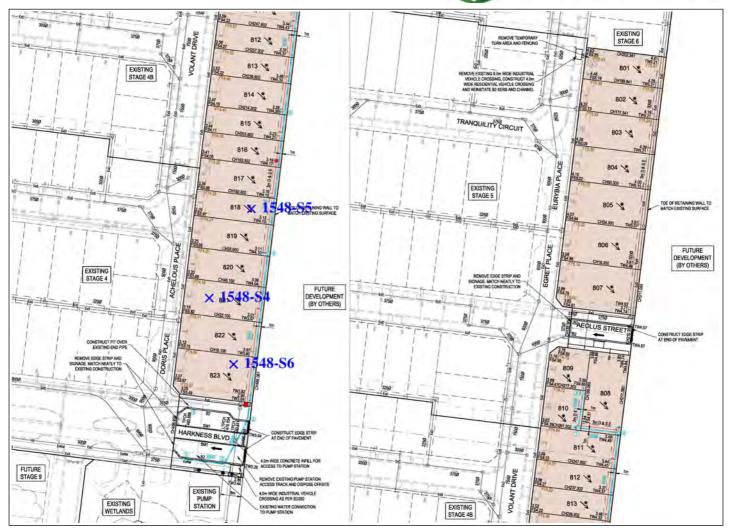
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1							
Sample Number	1548-S4	1548-S5	1548-S6				
Date Tested	24/06/2022	24/06/2022	24/06/2022				
Time Tested	14:24	14:36	14:52				
Test Request #/Location	Lot #821	Lot #818	Lot #823				
Layer / Reduced Level	2	2	2				
Thickness of Layer (mm)	300	300	300				
Soil Description	Sandy CLAY with gravel, pale brown/orange, L-M Pl	Sandy CLAY with gravel, pale brown/orange, L-M Pl	Sandy CLAY with gravel, pale brown/orange, L-M Pl				
Test Depth (mm)	275	275	275				
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	1.96	1.95	1.95				
Field Moisture Content %	11.3	12.5	9.8				
Field Dry Density (FDD) t/m ³	1.76	1.73	1.77				
Peak Converted Wet Density t/m ³	1.94	1.98	1.95				
Adjusted Peak Converted Wet Density t/m ³	**	**	**				
Moisture Variation (Wv) %	2.5	2.0	3.0				
Adjusted Moisture Variation %	**	**	**				
Hilf Density Ratio (%)	101.5	98.5	99.5				
Compaction Method	Standard	Standard	Standard				
Report Remarks	**	**	**				

Moisture Variation Note:

Report Number: GSSW1548-2





Report Number: GSSW1548-3

Issue Number:

Date Issued: 28/06/2022

Client: BILD GROUP (CAMPBELLFIELD, VIC)

Project Number: GSSW1548

Project Name: HARRIOT ESTATE STAGE 8A

Project Location: ARMSTRONG CREEK

Work Request: 12818 Date Sampled: 27/06/2022

Dates Tested: 27/06/2022 - 28/06/2022

Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or

pavement - compacted

95% Standard Compaction & +/- 3% Moisture Variation Specification:

Lot Number:

Material: Sandy CLAY trace gravel, pale brown/orange, low to medium

plasticity.

Material Source: Fyansford Tip



Ground Science South West Pty Ltd 10 Dowsett Street South Geelong Vic 3220

Phone: (03) 5282 1566

Email: chrism@groundscience.com.au

Accredited for compliance with ISO/IEC 17025 - Testing NATA WORLD RECOGNISED
ACCREDITATION

Approved Signatory: Chris Mamalis

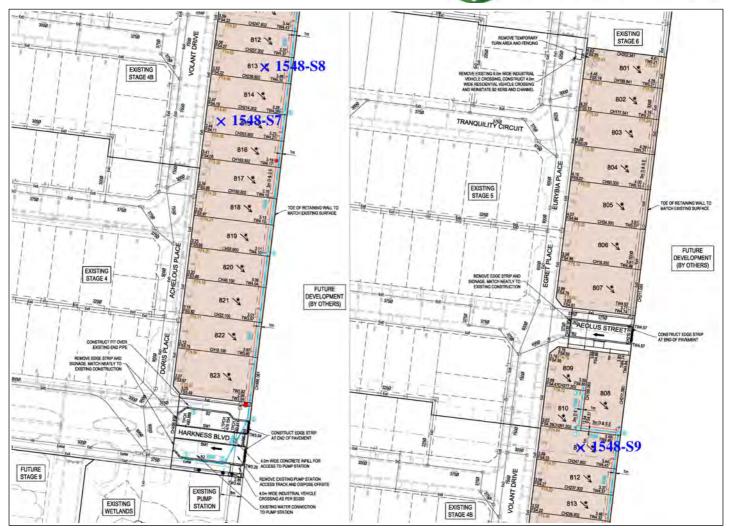
Laboratory Manager NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8	.1 & 2.1.1		
Sample Number	1548-S7	1548-S8	1548-S9
Date Tested	27/06/2022	27/06/2022	27/06/2022
Time Tested	15:20	15:40	16:00
Test Request #/Location	Lot #815	Lot #813	Lot #811
Layer / Reduced Level	2	2	2
Thickness of Layer (mm)	300	300	300
Soil Description	Sandy CLAY trace gravel, pale brown/orange, L-M PI	Sandy CLAY trace gravel, pale brown/orange, L-M PI	Sandy CLAY trace gravel, pale brown/orange, L-M PI
Test Depth (mm)	275	275	275
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	2.00	1.84	2.00
Field Moisture Content %	12.5	12.5	13.3
Field Dry Density (FDD) t/m ³	1.78	1.64	1.76
Peak Converted Wet Density t/m ³	1.90	1.88	1.97
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	3.0	2.5	3.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	105.0	98.0	101.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Report Number: GSSW1548-3





Report Number: GSSW1548-4

Issue Number:

Date Issued: 30/06/2022

Client: BILD GROUP (CAMPBELLFIELD, VIC)

Project Number: GSSW1548

Project Name: HARRIOT ESTATE STAGE 8A

Project Location: ARMSTRONG CREEK

Work Request: 12840 Date Sampled: 28/06/2022

Dates Tested: 28/06/2022 - 29/06/2022

Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or

pavement - compacted

95% Standard Compaction & +/- 3% Moisture Variation Specification:

Sandy CLAY with gravel, trace silt, pale brown/orange, low to Material:

medium plastisity, dry to moist

Material Source: Fyansford Tip



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Email: chrism@groundscience.com.au



Approved Signatory: James Howell

Senior Construction Materials

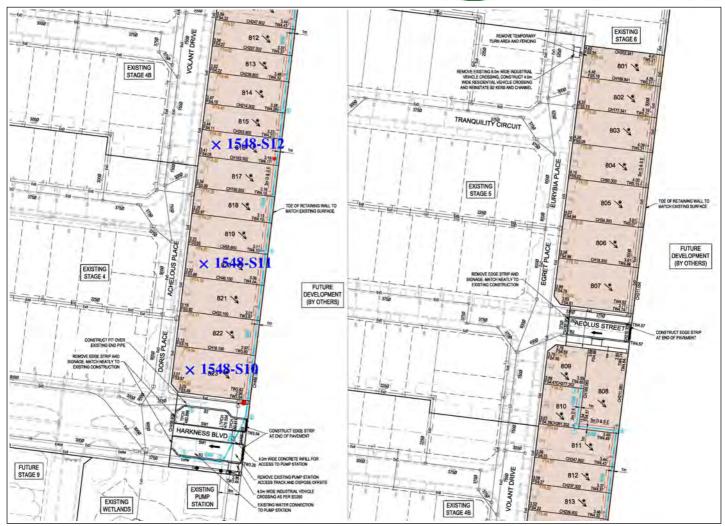
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8	3.1 & 2.1.1			
Sample Number	1548-S10	1548-S11	1548-S12	
Date Tested	28/06/2022	28/06/2022	28/06/2022	
Time Tested	14:51	15:01	15:17	
Test Request #/Location	Lot #823	Lot #820	Lot #816	
Layer / Reduced Level	3	3	3	
Thickness of Layer (mm)	300	300	300	
Soil Description	Sandy CLAY with gravel, trace silt, pale brown/orange, low to medium plastisity, dry to moist	Sandy CLAY with gravel, trace silt, pale brown/orange, low to medium plastisity, dry to moist	Sandy CLAY with gravel, trace silt, pale brown/orange, low to medium plastisity, dry to moist	
Test Depth (mm)	275	275	275	
Sieve used to determine oversize (mm)	19.0	19.0	19.0	
Percentage of Wet Oversize (%)	**	0	0	
Field Wet Density (FWD) t/m ³	1.94	1.88	1.94	
Field Moisture Content %	13.2	16.6	17.5	
Field Dry Density (FDD) t/m ³	1.72	1.61	1.65	
Peak Converted Wet Density t/m ³	2.00	1.95	2.05	
Adjusted Peak Converted Wet Density t/m ³	**	**	**	
Moisture Variation (Wv) %	3.0	2.5	2.0	
Adjusted Moisture Variation %	**	**	**	
Hilf Density Ratio (%)	97.0	96.0	95.0	
Compaction Method	Standard	Standard	Standard	
Report Remarks	**	**	**	

Moisture Variation Note:

Report Number: GSSW1548-4





Report Number: GSSW1548-5

Issue Number:

Date Issued: 21/07/2022

Client: BILD GROUP (CAMPBELLFIELD, VIC)

Project Number: GSSW1548

Project Name: HARRIOT ESTATE STAGE 8A

Project Location: ARMSTRONG CREEK

Work Request: 13072 Date Sampled: 20/07/2022

Dates Tested: 20/07/2022 - 21/07/2022

Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or

pavement - compacted

95% Standard Compaction & +/- 3% Moisture Variation Specification:

Material: Sandy CLAY with gravel, pale brown/orange, low - medium

Material Source: Geelong College



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Approved Signatory: James Howell

Senior Construction Materials

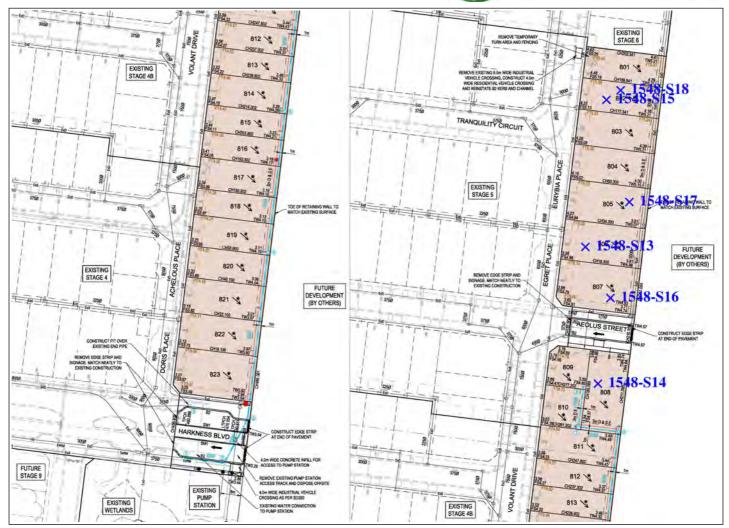
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1						
Sample Number	1548-S13	1548-S14	1548-S15	1548-S16	1548-S17	1548-S18
Date Tested	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Time Tested	10:03	10:16	10:28	13:44	13:52	13:59
Test Request #/Location	Lot #806	Lot #808	Lot #802	Lot #807	Lot #805	Lot #802
Layer / Reduced Level	1	1	1	2	2	2
Thickness of Layer (mm)	300	300	300	300	300	300
Soil Description	Sandy CLAY with gravel, pale brown/orange, low - medium plasticity.					
Test Depth (mm)	275	275	275	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	9	0	5
Field Wet Density (FWD) t/m ³	2.00	1.88	2.02	2.01	1.97	2.07
Field Moisture Content %	19.6	25.1	18.3	13.0	15.2	14.3
Field Dry Density (FDD) t/m ³	1.68	1.50	1.70	1.78	1.71	1.81
Peak Converted Wet Density t/m ³	2.00	1.94	1.89	**	1.95	**
Adjusted Peak Converted Wet Density t/m ³	**	**	**	1.99	**	1.98
Moisture Variation (Wv) %	0.0	-0.5	2.0	**	2.5	**
Adjusted Moisture Variation %	**	**	**	2.0	**	2.0
Hilf Density Ratio (%)	100.5	97.0	106.5	101.0	100.5	105.0
Compaction Method	Standard	Standard	Standard	Standard	Standard	Standard
Report Remarks	**	**	**	**	**	**

Moisture Variation Note:

Report Number: GSSW1548-5





Report Number: GSSW1548-6

Issue Number:

Date Issued: 26/07/2022

Client: BILD GROUP (CAMPBELLFIELD, VIC)

Project Number: GSSW1548

Project Name: HARRIOT ESTATE STAGE 8A

Project Location: ARMSTRONG CREEK

Work Request: 13097 Date Sampled: 22/07/2022

Dates Tested: 22/07/2022 - 25/07/2022

Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or

pavement - compacted

Specification: 95% Standard Compaction & +/- 3% Moisture Variation

Material: Sandy CLAY with gravel, pale brown/orange, low - medium

Material Source: Geelong College



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Email: chrism@groundscience.com.au



Approved Signatory: James Howell

Senior Construction Materials

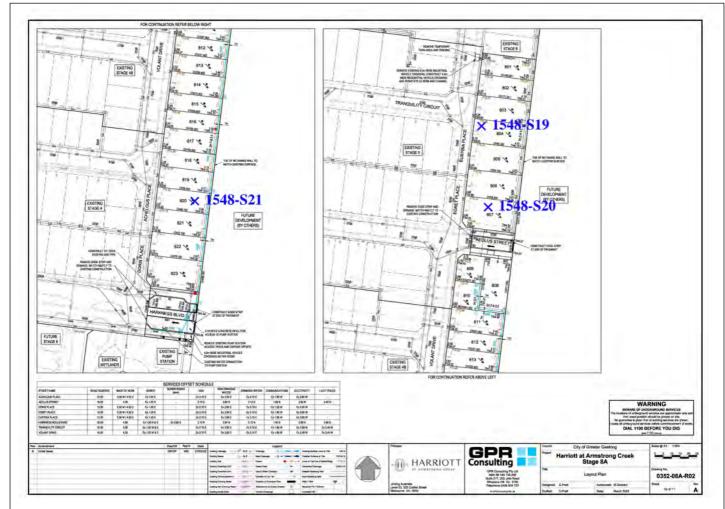
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8	.1 & 2.1.1			
Sample Number	1548-S19	1548-S20	1548-S21	
Date Tested	22/07/2022	22/07/2022	22/07/2022	
Time Tested	14:59	15:13	15:28	
Test Request #/Location	Lot #804	Lot #807	Lot #820	
Layer / Reduced Level	3	3	3	
Thickness of Layer (mm)	300	300	300	
Soil Description	Sandy CLAY with gravel, pale brown/orange, low - medium plasticity.	low - medium brown/orange, low - medium brown		
Test Depth (mm)	275	275	275	
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	1.89	2.01	2.12	
Field Moisture Content %	21.3	19.3	19.1	
Field Dry Density (FDD) t/m ³	1.56	1.69	1.78	
Peak Converted Wet Density t/m ³	1.98	2.06	2.01	
Adjusted Peak Converted Wet Density t/m ³	**	**	**	
Moisture Variation (Wv) %	0.0	0.0	0.5	
Adjusted Moisture Variation %	**	**	**	
Hilf Density Ratio (%)	95.5	98.0	105.5	
Compaction Method	Standard	Standard	Standard	
Report Remarks	**	**	**	

Moisture Variation Note:

Report Number: GSSW1548-6





APPENDIX C

Site Photographs

















