

ABN: 51 612 825 313

10 Dowsett Street

South Geelong, Vic, 3220

(P) +61 3 5282 1566



LEVEL 1 INSPECTION & TESTING HARRIOTT ESTATE STAGE 1 ARMSTRONG CREEK

Prepared for Bitu-Mill Pty Ltd

Report Reference: GSSW1017.1 AA

Date: 24 November 2020

ABN: 51 612 825 313

10 Dowsett Street

South Geelong, Vic, 3220

(P) +61 3 5282 1566



PROJECT DETAILS

Project Reference	GSSW1017.1	Rev	AA
Project Title	Harriott Estate Stage 1		
Project Location	Armstrong Creek	State	VIC
Date	24 November 2020		

CLIENT DETAILS

Prepared For (Client)	Bitu-Mill Pty Ltd
Client Address	133 Metrolink Cct, Campbellfield VIC 3061

DISTRIBUTION

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One (1) Electronic Copy	Bitu-Mill 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
Graduate Geotechnical Engineer

REVIEWED:

Gee Singh
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 1 project, located within the 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 1. Ground Science was engaged to provide Level 1 Inspection and Testing services for the construction of these areas. Authorisation to proceed was provided by Bitu-Mill Pty Ltd (the 'Client'). Creo Consultants 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 Creo Consultants Pty Ltd (Harriott Estate - Stage 1 Layout Plan - 1).

This report details the Level 1 earthworks process performed on site which commenced on 2nd of October 2020 and was completed on the 28th of October 2020.

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 250mm 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:

- 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 involvement in the project. It is understood that Bitu-Mill removed all organics, topsoil and compressible (soft) soils on 30th of September 2020. Inspection of the prepared subgrade surface was carried out on 2nd of October, 2020 by the representative geotechnician from Ground Science South West. At the time of the inspection, the prepared subgrade was observed to be generally 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 onsite. The material was carted across 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 CLAY, trace sand, brown, medium to high plasticity, moist. Quality control tests were performed on the stockpiled fill material after placement. These tests include California Bearing Ratio and Triaxial Permeability tests. The test report sheets are presented in Appendix A. Ground Science did not perform any 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;
- Grader;
- Water Cart;
- Padfoot Compactor.

During fill placement, the weather conditions ranged from hot to rainy with temperatures typically ranging from 10 to 30 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 grader into thin loose layers. 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.

Rain was forecasted multiple times over the course of the works. This material was removed when works recommenced and blended with the stockpile for moisture control and reuse. During times of heavier than forecasted rain, affected layers were removed, blended with the stockpile before being replaced and retested.

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 34 in-situ density tests using a nuclear moisture-density gauge in accordance with Australian Standard (AS1289 5.8.1) together with 34 "Rapid HILF" Compaction tests (AS1289 5.7.1).

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. One test area (#17) failed to meet the required target density ratio. This area was subsequently reworked, recompacted and retested (#18) with compliant test results achieved. No areas failed to meet 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 in AS3798 (2007).

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 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 South West Pty Ltd**

AUTHOR:



Michael Knez
Graduate Geotechnical Engineer

REVIEWED:



Gee Singh
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.

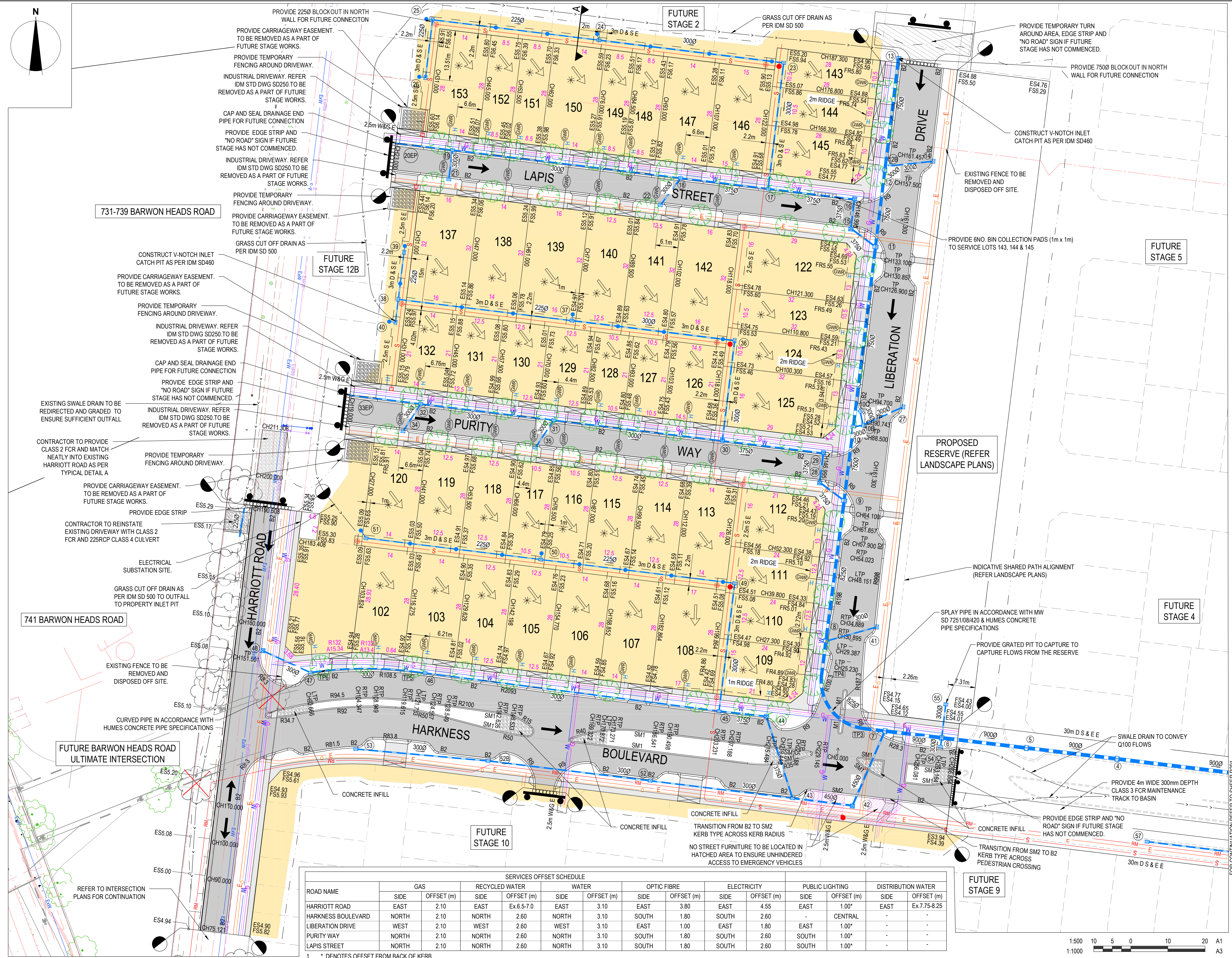
This document is COPYRIGHT- all rights reserved. No part of this document may be reproduced or copied in any form or by means without written permission by Ground Science Pty Ltd. All other property in this submission shall not pass until all fees for preparation have been settled. This submission is for the use only of the party to whom it is addressed and for no other purpose. No responsibility is accepted to any third party who may use or rely on the whole or any part of the content of this submission. No responsibility will be taken for this report if it is altered in any way, or not reproduced in full. This document remains the property of Ground Science Pty Ltd until all fees and monies have been paid in full.

8. REFERENCES

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

FIGURE 1

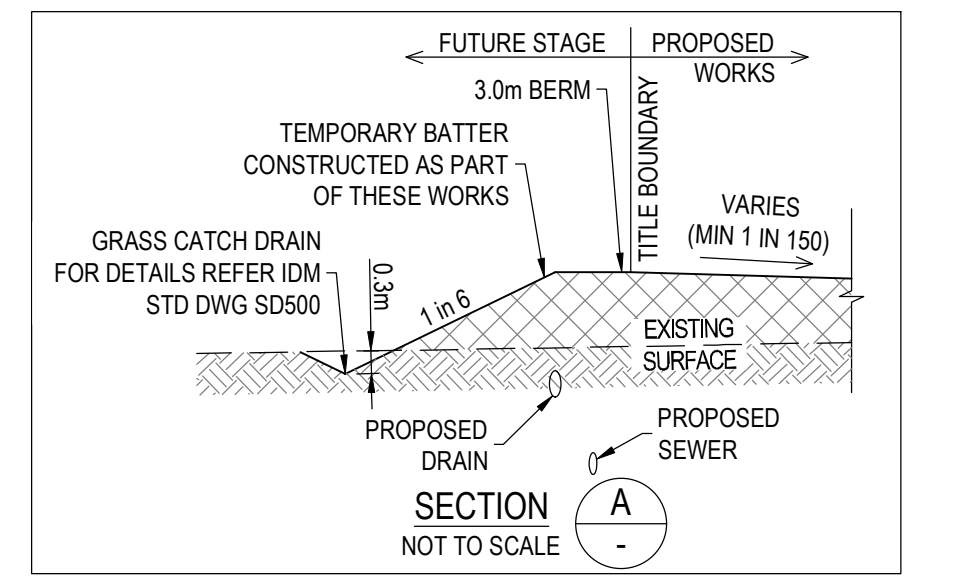
Harriott Estate - Stage 1 Layout Plan - 1



CITY OF GREATER GEELONG TO STAMP HERE UPON APPROVAL

LEGEND - LAYOUT PLAN

- STORMWATER DRAIN, PIT & PROPERTY INLET
- SWALE DRAIN
- SEWER & MAINTENANCE STRUCTURES
- HOUSE DRAIN
- SERVICE CONDUITS
- EXISTING ELECTRICITY (UNDERGROUND)
- EXISTING ELECTRICITY (OVERHEAD)
- EXISTING GAS
- EXISTING OPTIC FIBRE
- EXISTING TELSTRA
- EXISTING WATER
- EXISTING RECYCLED WATER
- EXISTING STORMWATER DRAIN
- EXISTING SEWER
- EXISTING SURFACE LEVEL
- FINISHED BUILDING LINE LEVEL
- FINISHED RIDGE LINE LEVEL
- PAVEMENT TREATMENT
- STRUCTURAL FILL > 200mm DEEP
- DIRECTION OF FALL
- OVERLAND FLOW
- ALLOTMENT TO BE GRADED EVENLY IN DIRECTION OF FALL TO LEVELS INDICATED
- CONCRETE EDGE STRIP WITH SUBSOIL DRAIN, "NO ROAD" SIGN & BARRIER
- LIMIT OF WORKS
- EXISTING TREE TO BE REMOVED
- PERMANENT SURVEY MARK
- TEMPORARY BENCH MARK
- PROPOSED DRIVEWAY



- NOTES:**
- ALL VEHICLE AND PRAM CROSSING LAYBACKS, TO BE MINIMUM OF 1.0m FROM PITS.
 - ALL PRAM CROSSINGS TO BE A MINIMUM 2.0m FROM VEHICLE CROSSINGS.
 - ALL PRAM CROSSINGS TO BE DDA COMPLIANT.
 - VEHICLE EXCLUSION MEASURES BETWEEN ROAD RESERVE AND RESERVE TO FORM PART OF LANDSCAPE WORKS.
 - THE USE OF DIRECTIONAL AND HAZARD TACTILE PAVERS MUST ACCORD WITH SECTION 2.2.3.1 OF AS/NZS 428.4:2002.
 - SEWER MAINTENANCE HOLE CONVERTER SLAB OR CONE, TO BE ROTATED TO ENSURE COVER POSITION IS CENTRALLY LOCATED WITHIN FOOTPATH.
 - CHAINAGES FOR SETOUT OF PROPERTY INLET POINTS, SERVICING FUTURE LOTS, ARE MEASURED FROM THE DOWNSTREAM PIT.
 - CONTRACTOR TO LOCATE ALL EXISTING ASSETS PRIOR TO COMMENCEMENT OF WORKS. ANY DAMAGE TO EXISTING ASSETS TO BE RECTIFIED AT CONTRACTORS EXPENSE.
 - CONTRACTOR TO VERIFY DEPTH OF EXISTING SERVICES, PRIOR TO COMMENCEMENT OF CONSTRUCTION.

NOTE: STREET TREE LOCATIONS SHOWN ARE INDICATIVE ONLY. ULTIMATE LOCATION IS TO BE PROVIDED/CONFIRMED BY LANDSCAPE ARCHITECTS

WARNING

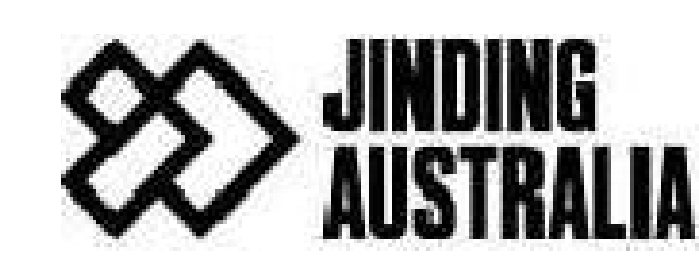
BEWARE OF UNDERGROUND & OVERHEAD SERVICES

The locations of underground & overhead services are approximate only & their exact position should be proven on site. No guarantee is given that all existing services are shown. Locate all underground services before commencement of works

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REVISION	DATE	ISSUE DESCRIPTION	DRAWN	CHECKED	APPROVED
0	07/08/20	CONSTRUCTION ISSUE	C.ROHDE	M.TROUNCE	T.PALIOS
D	07/07/20	AMENDED TO COUNCIL COMMENTS (06/07/20)	C.ROHDE	M.TROUNCE	T.PALIOS
C	05/06/20	TENDER ISSUE	C.ROHDE	M.TROUNCE	T.PALIOS
B	21/05/20	AMENDED TO COINCIDE WITH APPROVED FLPS (18/05/20)	C.ROHDE	M.TROUNCE	T.PALIOS
A	03/03/20	ISSUED FOR APPROVAL	C.ROHDE	M.TROUNCE	T.PALIOS



Level 7, 176 Wellington Parade
East Melbourne, VIC, Australia 3002



HARRIOTT ESTATE - STAGE 1
LAYOUT PLAN - 1

ISSUED FOR CONSTRUCTION

SCALE AT A1	DRAWN	DESIGNED
1:500 @ A1	C.ROHDE	C.ROHDE
PROJECT ENGINEER	PROJECT MANAGER	DATE FIRST ISSUE
M.TROUNCE	T.PALIOS	03/03/20
PROJECT No.	DRAWING No.	REVISION
170164.1	R200	0

APPENDIX A

California Bearing Ratio & Triaxial Permeability Test Report Sheets

Material Test Report

Report Number: GSSW1017-7
Issue Number: 1
Date Issued: 20/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)



Ground Science South West

Geotechnical & Environmental Consultants

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

Phone: (03) 5282 1566

Email: chrism@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7815
Sample Number: 1017-S7
Date Sampled: 03/10/2020
Dates Tested: 03/10/2020 - 16/10/2020
Sampling Method: AS 1289.1.2.1 6.5.1 - Sampling from hand excavated pit or trench
Sample Location: Wet Lands E: 55H 0270508, N: 5765367, Depth: Insitu
Material: CLAY, trace sand, brown, medium to high plasticity, moist



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Chris Mamalis

Laboratory Manager

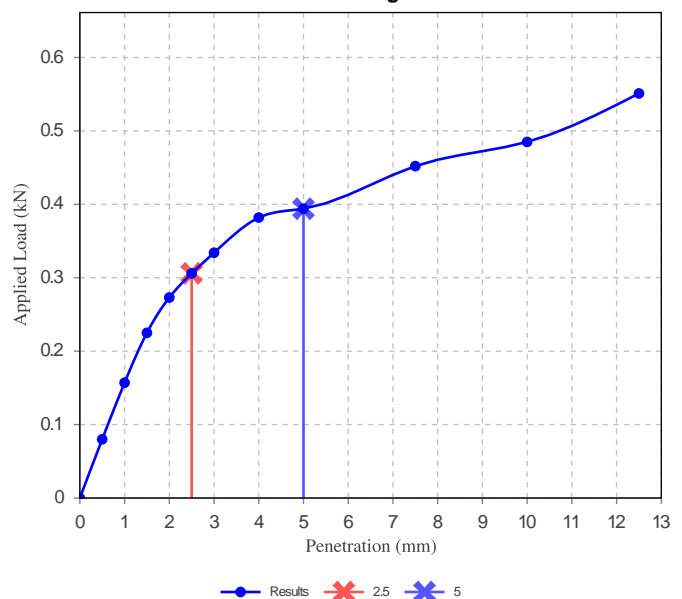
NATA Accredited Laboratory Number: 20109

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	2.5		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.61		
Optimum Moisture Content (%)	23.5		
Laboratory Density Ratio (%)	98.5		
Laboratory Moisture Ratio (%)	98.5		
Dry Density after Soaking (t/m^3)	1.52		
Field Moisture Content (%)			
Moisture Content at Placement (%)	23.1		
Moisture Content Top 30mm (%)	30.9		
Moisture Content Rest of Sample (%)	23.9		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	171.6		
Swell (%)	3.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		
Sample remoulded as per Vic Roads Code of Practice RC 500.16			

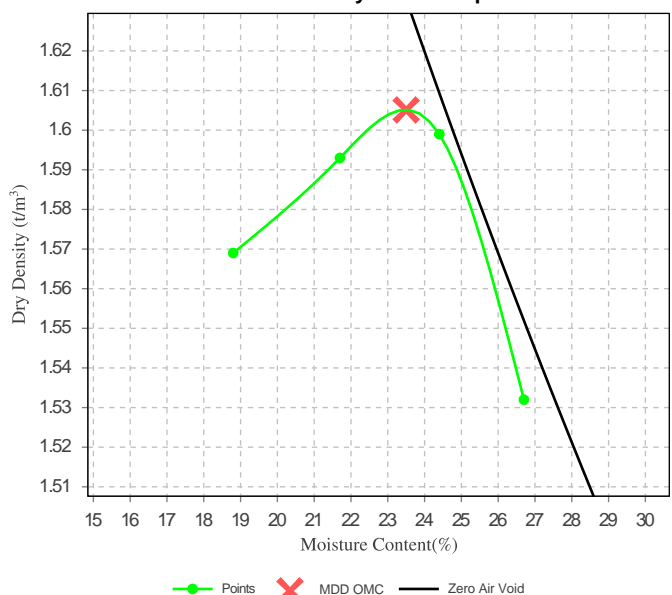
Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1)	
Mould Type	1 LITRE MOULD A
Compaction	Standard
Maximum Dry Density (t/m^3)	1.61
Optimum Moisture Content (%)	23.5
Oversize Sieve (mm)	19
Oversize Material Wet (%)	0
Method used to Determine Plasticity	Visual Assessment
Curing Hours	120.5

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	24.2

California Bearing Ratio



Moisture Density Relationship



Material Test Report

Report Number: GSSW1017-7
Issue Number: 1
Date Issued: 20/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)



Ground Science South West

Geotechnical & Environmental Consultants

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

Phone: (03) 5282 1566

Email: chrism@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7815
Sample Number: 1017-S8
Date Sampled: 03/10/2020
Dates Tested: 03/10/2020 - 16/10/2020
Sampling Method: AS 1289.1.2.1 6.5.1 - Sampling from hand excavated pit or trench
Sample Location: Wetlands E: 55H 0270503, N: 5765350, Depth: Insitu
Material: CLAY, trace sand, brown, medium to high plasticity, moist



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Chris Mamalis

Laboratory Manager

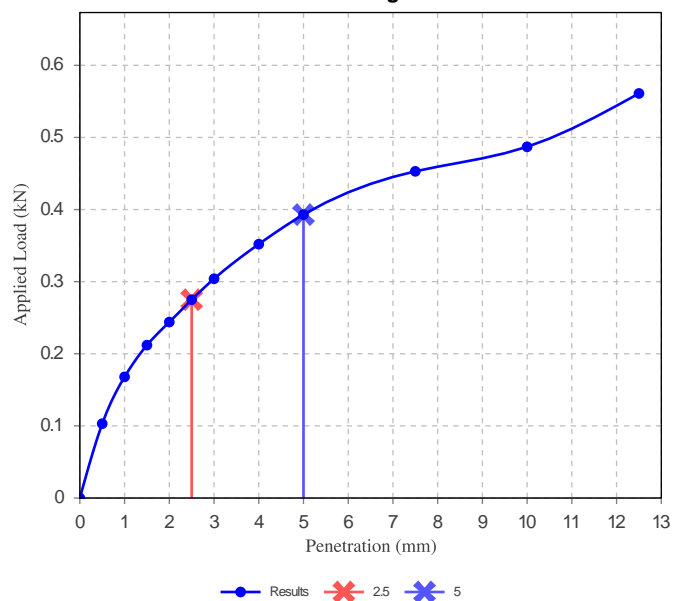
NATA Accredited Laboratory Number: 20109

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	2.0		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.53		
Optimum Moisture Content (%)	24.5		
Laboratory Density Ratio (%)	97.5		
Laboratory Moisture Ratio (%)	102.5		
Dry Density after Soaking (t/m^3)	1.44		
Field Moisture Content (%)			
Moisture Content at Placement (%)	25.0		
Moisture Content Top 30mm (%)	36.9		
Moisture Content Rest of Sample (%)	26.5		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	170.9		
Swell (%)	3.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		
Sample remoulded as per Vic Roads Code of Practice RC 500.16			

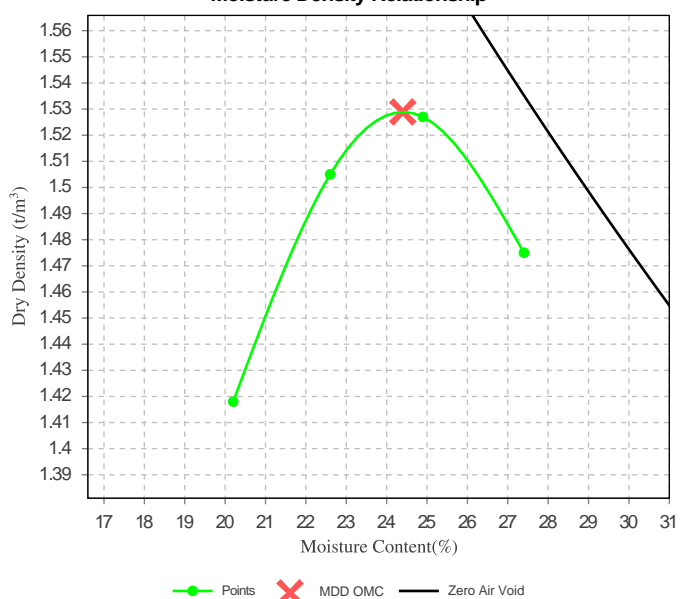
Dry Density - Moisture Relationship (AS 1289 5.1.1 & 2.1.1)	
Mould Type	1 LITRE MOULD A
Compaction	Standard
Maximum Dry Density (t/m^3)	1.53
Optimum Moisture Content (%)	24.5
Oversize Sieve (mm)	19
Oversize Material Wet (%)	0
Method used to Determine Plasticity	Visual Assessment
Curing Hours	119.9

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	27.7

California Bearing Ratio



Moisture Density Relationship





Ground Science

A C N 105 704 078

13 Brock Street Thomastown VIC, P 03 9464 4617 Email reception@groundscience.com.au



PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

Client :	BITU MILL (CAMPBELLFIELD, VIC)		Job No.	GS5117/1
Project:	HARRIOTT ESTATE STAGE 1		Report No.	DM
Location:	ARMSTRONG CREEK		Test date:	13/10/2020
			Page:	1

Sample identification		# 77
Borehole / test pit		GSSW1017-S7 / WetLands E: 55H 0270508, N: 5765367
Depth, m		Insitu

Sample diameter	mm	71.63
Sample height	mm	71.58
Specimen wet density	t/m3	1.950
Specimen dry density	t/m3	1.58
Moisture content	%	23.2
Cell pressure	kPa	500
Inlet pressure	kPa	460
Outlet pressure	kPa	440
Mean effective stress	kPa	50
Hydraulic head	kPa	20
Saturation	%	96
PERMEABILITY	m/sec	2.E-11
Water type	de-aired - filtered	
Specimen description	CLAY, medium to high plasticity, brown, trace sand	
Notes:	Sample remoulded to a target of 98% SMDD @ OMC MDD = 1.61 t/m3 OMC = 23.5 % Density Ratio = 98.5 %	

Comments	Sampled by Client, tested as received. MDD & OMC supplied by Client.
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 <p>ACCREDITED FOR TECHNICAL COMPETENCE</p>	NATA Accredited Laboratory No. 15055 Accredited for compliance with ISO/IEC 17025 - Testing	Date of issue 20/10/2020 Ernie Gmehling Approved Signatory	
--	--	--	---



Ground Science

A C N 105 704 078

13 Brock Street Thomastown VIC, P 03 9464 4617 Email reception@groundscience.com.au



PERMEABILITY - CONSTANT HEAD (Triaxial method) AS1289 6.7.3

Client :		BITU MILL (CAMPBELLFIELD, VIC)	Job No.	GS5117/1
Project:		HARRIOTT ESTATE STAGE 1	Report No.	DN
Location:		ARMSTRONG CREEK	Test date:	13/10/2020
			Page:	1

Sample identification		# 78
Borehole / test pit		GSSW1017-S8 / WetLands E: 55H 0270503, N: 5765350
Depth, m		Insitu

Sample diameter	mm	71.63
Sample height	mm	71.69
Specimen wet density	t/m3	1.865
Specimen dry density	t/m3	1.50
Moisture content	%	24.1
Cell pressure	kPa	560
Inlet pressure	kPa	520
Outlet pressure	kPa	500
Mean effective stress	kPa	50
Hydraulic head	kPa	20
Saturation	%	100
PERMEABILITY	m/sec	2.E-11
Water type		de-aired - filtered
Specimen description		CLAY, medium to high plasticity, brown, trace sand
Notes:		Sample remoulded to a target of 98% SMDD @ OMC MDD = 1.53 t/m3 OMC = 24.5 % Density Ratio = 98.5 %

Comments	Sampled by Client, tested as received. MDD & OMC supplied by Client.
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 <p>ACCREDITED FOR TECHNICAL COMPETENCE</p>	NATA Accredited Laboratory No. 15055 Accredited for compliance with ISO/IEC 17025 - Testing	Date of issue 20/10/2020 Ernie Gmehling Approved Signatory	
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APPENDIX B

Field Density Test Report Sheets & Test Locations

Material Test Report

Report Number: GSSW1017-1
Issue Number: 1
Date Issued: 05/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)



Ground Science South West

Geotechnical & Environmental Consultants

Ground Science South West Pty Ltd
10 Dowsett Street South Geelong Vic 3220
Phone: (03) 5282 1566
Email: tomas@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7808
Date Sampled: 02/10/2020
Dates Tested: 02/10/2020 - 05/10/2020
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 102 - 137
Material: CLAY, brown, medium to high plasticity
Material Source: Onsite



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Tomas Wheadon
Field & Laboratory Technician
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	1017-S1	1017-S2	1017-S3
Date Tested	02/10/2020	02/10/2020	02/10/2020
Time Tested	10:15	11:45	16:20
Test Request #/Location	Harriott Estate Stage 1 Lot 102	Harriott Estate Stage 1 Lot 120	Harriott Estate Stage 1 Lot 137
Easting	55H 0269826	55H 0270145	55H 0270165
Northing	5789070	5765526	576553
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	200	200	200
Soil Description	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity
Test Depth (mm)	175	175	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	1.98	2.09	1.98
Field Moisture Content %	28.9	27.0	27.0
Field Dry Density (FDD) t/m ³	1.54	1.64	1.56
Peak Converted Wet Density t/m ³	1.95	1.98	1.97
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	-3.0	-0.5	0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	101.0	105.5	100.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW1017-2
Issue Number: 1
Date Issued: 05/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)



Ground Science South West

Geotechnical & Environmental Consultants

Ground Science South West Pty Ltd
10 Dowsett Street South Geelong Vic 3220
Phone: (03) 5282 1566
Email: tomas@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7814
Date Sampled: 03/10/2020
Dates Tested: 03/10/2020 - 05/10/2020
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: Lot 103 - Lot 138
Material: CLAY, brown, medium to high plasticity
Material Source: Onsite



Accredited for compliance with ISO/IEC 17025 - Testing

Tomas Wheadon

Approved Signatory: Tomas Wheadon
Field & Laboratory Technician
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	1017-S4	1017-S5	1017-S6
Date Tested	03/10/2020	03/10/2020	03/10/2020
Time Tested	10:52	11:40	12:27
Test Request #/Location	Harriott Estate Stage 1 Lot 103	Harriott Estate Stage 1 Lapis Street	Harriott Estate Stage 1 Lot 138
Easting	55H 0270168	55H 0270171	55H 0270192
Northing	5765476	5765619	5765600
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	200	200	200
Soil Description	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity
Test Depth (mm)	175	175	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	1.99	1.99	1.99
Field Moisture Content %	28.6	29.4	24.1
Field Dry Density (FDD) t/m ³	1.55	1.54	1.61
Peak Converted Wet Density t/m ³	1.98	1.94	1.89
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	0.0	-0.5	-0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	100.5	102.5	105.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW1017-3
Issue Number: 1
Date Issued: 06/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)



Ground Science South West

Geotechnical & Environmental Consultants

Ground Science South West Pty Ltd
10 Dowsett Street South Geelong Vic 3220
Phone: (03) 5282 1566
Email: tomas@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7818
Date Sampled: 05/10/2020 9:00
Dates Tested: 05/10/2020 - 06/10/2020
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 104 - 118
Material: CLAY, brown, medium to high plasticity
Material Source: Onsite



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Tomas Wheadon
Field & Laboratory Technician
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	1017-S9	1017-S10	1017-S11
Date Tested	05/10/2020	05/10/2020	05/10/2020
Time Tested	14:36	14:49	16:37
Test Request #/Location	Harriott Estate Stage 1 Lot 118	Harriott Estate Stage 1 Lot 104	Harriott Estate Stage 1 Lot 107
Easting	55H 0270175	55H 0270173	55H 0270197
Northing	5765524	5765512	5765506
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	200	200	200
Soil Description	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity
Test Depth (mm)	175	175	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	1.86	1.97	1.92
Field Moisture Content %	27.0	28.4	30.7
Field Dry Density (FDD) t/m ³	1.46	1.54	1.47
Peak Converted Wet Density t/m ³	1.91	1.92	1.94
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	0.0	0.5	-3.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	97.0	102.5	99.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW1017-4
Issue Number: 1
Date Issued: 08/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)



Ground Science South West

Geotechnical & Environmental Consultants

Ground Science South West Pty Ltd
 10 Dowsett Street South Geelong Vic 3220
 Phone: (03) 5282 1566
 Email: tomas@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7843
Date Sampled: 07/10/2020
Dates Tested: 07/10/2020 - 08/10/2020
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 106 - 114
Material: CLAY, brown, medium to high plasticity
Material Source: Onsite



Accredited for compliance with ISO/IEC 17025 - Testing

Tomas Wheadon

Approved Signatory: Tomas Wheadon
 Field & Laboratory Technician
 NATA Accredited Laboratory Number: 20109

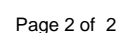
Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	1017-S12	1017-S13	1017-S14
Date Tested	07/10/2020	07/10/2020	07/10/2020
Time Tested	13:05	14:30	14:42
Test Request #/Location	Harriott Estate Stage 1 Lot 106	Harriott Estate Stage 1 Lot 107	Harriott Estate Stage 1 Lot 114
Easting	55H 0270218	55H 0270241	55H 0270246
Northing	5765479	5765479	5765512
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	200	200	200
Soil Description	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity
Test Depth (mm)	175	175	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	2.15	2.13	1.96
Field Moisture Content %	23.1	23.7	25.2
Field Dry Density (FDD) t/m ³	1.75	1.72	1.57
Peak Converted Wet Density t/m ³	2.04	1.99	1.97
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	-0.5	0.0	0.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	105.0	107.5	99.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

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

Geotechnical & Environmental Consultants



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW1017-5
Issue Number: 1
Date Issued: 14/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)

Ground Science South West Pty Ltd
10 Dowsett Street South Geelong Vic 3220
Phone: (03) 5282 1566
Email: tomas@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7863
Date Sampled: 12/10/2020
Dates Tested: 12/10/2020 - 13/10/2020
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 129 - 139
Material: CLAY, brown, medium to high plasticity
Material Source: Onsite



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Tomas Wheadon
Field & Laboratory Technician
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	1017-S15	1017-S16	1017-S17
Date Tested	12/10/2020	12/10/2020	12/10/2020
Time Tested	14:30	15:00	15:38
Test Request #/Location	Harriott Estate Stage 1 Lot 138	Harriott Estate Stage 1 Lot 139	Harriott Estate Stage 1 Lot 129
Easting	55H 0270165	55H 0270190	55H 0270198
Northing	5765574	5765570	5766554
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	200	200	200
Soil Description	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity
Test Depth (mm)	175	175	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	1.87	1.95	1.81
Field Moisture Content %	19.7	19.2	24.9
Field Dry Density (FDD) t/m ³	1.56	1.64	1.45
Peak Converted Wet Density t/m ³	1.97	2.01	1.93
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	2.0	2.5	-0.5
Adjusted Moisture Variation %	**	**	**
Hill Density Ratio (%)	95.0	97.0	93.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW1017-6
Issue Number: 1
Date Issued: 14/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)



Ground Science South West

Geotechnical & Environmental Consultants

Ground Science South West Pty Ltd
 10 Dowsett Street South Geelong Vic 3220
 Phone: (03) 5282 1566
 Email: tomas@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7870
Date Sampled: 13/10/2020
Dates Tested: 13/10/2020 - 14/10/2020
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 126 - 142
Material: CLAY, brown, medium to high plasticity
Material Source: Onsite



Accredited for compliance with ISO/IEC 17025 - Testing

Tomas Wheadon

Approved Signatory: Tomas Wheadon
 Field & Laboratory Technician
 NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	1017-S18	1017-S19	1017-S20	1017-S21
Date Tested	13/10/2020	13/10/2020	13/10/2020	13/10/2020
Time Tested	14:20	14:30	14:45	14:57
Test Request #/Location	Harriott Estate Stage 1 Lot 129 (Retest of 1017-S17)	Harriott Estate Stage 1 Lot 126	Harriott Estate Stage 1 Lot 142	Harriott Estate Stage 1 Lot 141
Easting	55H 0270198	55H 0270259	55H 0270250	55H 0270238
Northing	5766554	5765554	5765574	5765575
Layer / Reduced Level	1	1	1	1
Thickness of Layer (mm)	200	200	200	200
Soil Description	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity
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	1.94	2.01	1.94	2.01
Field Moisture Content %	19.3	22.4	20.0	23.0
Field Dry Density (FDD) t/m ³	1.63	1.64	1.62	1.63
Peak Converted Wet Density t/m ³	2.03	1.92	1.93	1.92
Adjusted Peak Converted Wet Density t/m ³	**	**	**	**
Moisture Variation (Wv) %	2.5	2.0	3.0	2.5
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	96.0	105.0	100.5	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

Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW1017-8
Issue Number: 1
Date Issued: 20/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)



Ground Science South West

Geotechnical & Environmental Consultants

Ground Science South West Pty Ltd
10 Dowsett Street South Geelong Vic 3220
Phone: (03) 5282 1566
Email: tomas@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7912
Date Sampled: 19/10/2020
Dates Tested: 19/10/2020 - 20/10/2020
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 152 - 150
Material: CLAY, brown, medium to high plasticity
Material Source: Onsite



Accredited for compliance with ISO/IEC 17025 - Testing

Tomas Wheadon

Approved Signatory: Tomas Wheadon
Field & Laboratory Technician
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	1017-S22	1017-S23	1017-S24
Date Tested	19/10/2020	19/10/2020	19/10/2020
Time Tested	14:00	14:10	14:20
Test Request #/Location	Harriott Estate 1 Lot 152	Harriott Estate 1 Lot 151	Harriott Estate 1 Lot 150
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	200	200	200
Soil Description	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity	CLAY, brown, medium to high plasticity
Test Depth (mm)	175	175	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	2.05	2.04	2.02
Field Moisture Content %	23.2	19.6	19.3
Field Dry Density (FDD) t/m ³	1.66	1.70	1.70
Peak Converted Wet Density t/m ³	2.00	2.14	2.09
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	0.0	0.0	0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	102.5	95.5	97.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW1017-9
Issue Number: 1
Date Issued: 22/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)



Ground Science South West

Geotechnical & Environmental Consultants

Ground Science South West Pty Ltd
10 Dowsett Street South Geelong Vic 3220
Phone: (03) 5282 1566
Email: chrism@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7936
Date Sampled: 20/10/2020 7:00
Dates Tested: 20/10/2020 - 22/10/2020
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: 128, 129 & 130
Material: CLAY, high plasticity (FILL)
Material Source: Imported Locally



Accredited for compliance with ISO/IEC 17025 - Testing

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	1017-S25	1017-S26	1017-S27
Date Tested	20/10/2020	20/10/2020	20/10/2020
Time Tested	15:45	16:00	16:13
Test Request #/Location	Harriott Estate Stage 1 Lot 130	Harriott Estate Stage 1 Lot 129	Harriott Estate Stage 1 Lot 128
Easting	55H 0270190	55H 0270213	55H 0270227
Northing	5765559	5765552	5765550
Layer / Reduced Level	2	2	2
Thickness of Layer (mm)	200	200	200
Soil Description	CLAY, high plasticity (FILL)	CLAY, high plasticity (FILL)	CLAY, high plasticity (FILL)
Test Depth (mm)	175	175	175
Sieve used to determine oversize (mm)	**	19.0	19.0
Percentage of Wet Oversize (%)	0	2	0
Field Wet Density (FWD) t/m ³	1.92	1.92	2.00
Field Moisture Content %	17.6	18.4	19.7
Field Dry Density (FDD) t/m ³	1.64	1.62	1.67
Peak Converted Wet Density t/m ³	1.98	**	1.96
Adjusted Peak Converted Wet Density t/m ³	**	2.00	**
Moisture Variation (Wv) %	1.5	**	-0.5
Adjusted Moisture Variation %	**	0.5	**
Hilf Density Ratio (%)	97.5	96.5	102.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

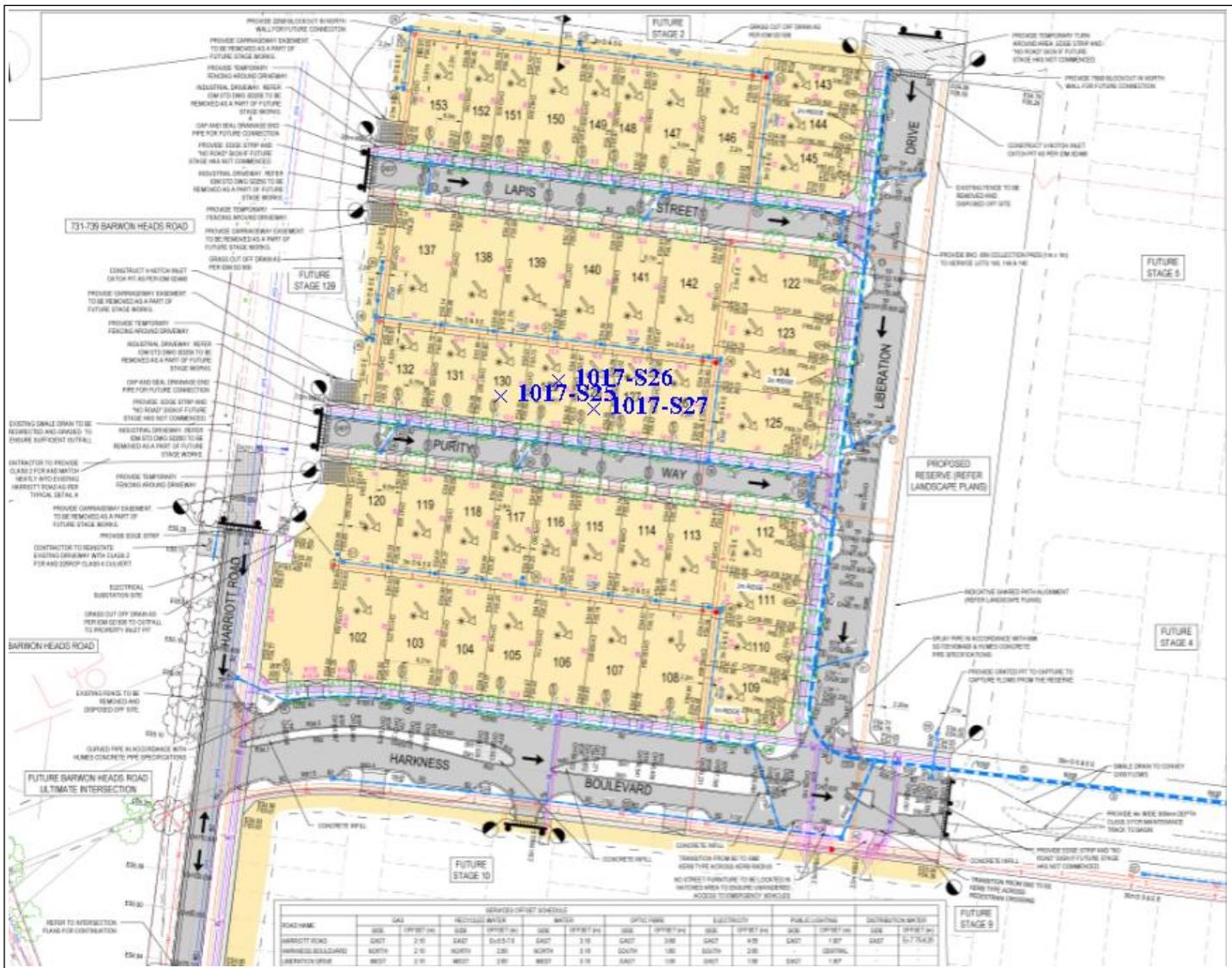
Positive values = test is dry of OMC

Negative values = test is wet of OMC

Sample Locations Plan



Ground Science South West
Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW1017-10
Issue Number: 1
Date Issued: 26/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)



Ground Science South West

Geotechnical & Environmental Consultants

Ground Science South West Pty Ltd
10 Dowsett Street South Geelong Vic 3220
Phone: (03) 5282 1566
Email: tomas@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7950
Date Sampled: 22/10/2020
Dates Tested: 22/10/2020 - 26/10/2020
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: 122, 142, 141
Material: CLAY, high plasticity (FILL)
Material Source: Imported Locally



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Tomas Wheadon
Field & Laboratory Technician
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	1017-S31	1017-S32	1017-S33
Date Tested	22/10/2020	22/10/2020	22/10/2020
Time Tested	14:08	15:20	15:32
Test Request #/Location	Harriott Estate Stage 1 Lot 122	Harriott Estate Stage 1 Lot 142	Harriott Estate Stage 1 Lot 141
Easting	55H 0270279	55H 0270269	55H 0270244
Northing	5765574	5765579	5765579
Layer / Reduced Level	2	2	2
Thickness of Layer (mm)	250	250	250
Soil Description	CLAY, high plasticity (FILL)	CLAY, high plasticity (FILL)	CLAY, high plasticity (FILL)
Test Depth (mm)	225	225	225
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	1.95	2.06	2.06
Field Moisture Content %	15.3	18.0	18.5
Field Dry Density (FDD) t/m ³	1.69	1.74	1.74
Peak Converted Wet Density t/m ³	1.93	1.97	1.92
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	2.5	2.5	1.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	101.0	104.0	107.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

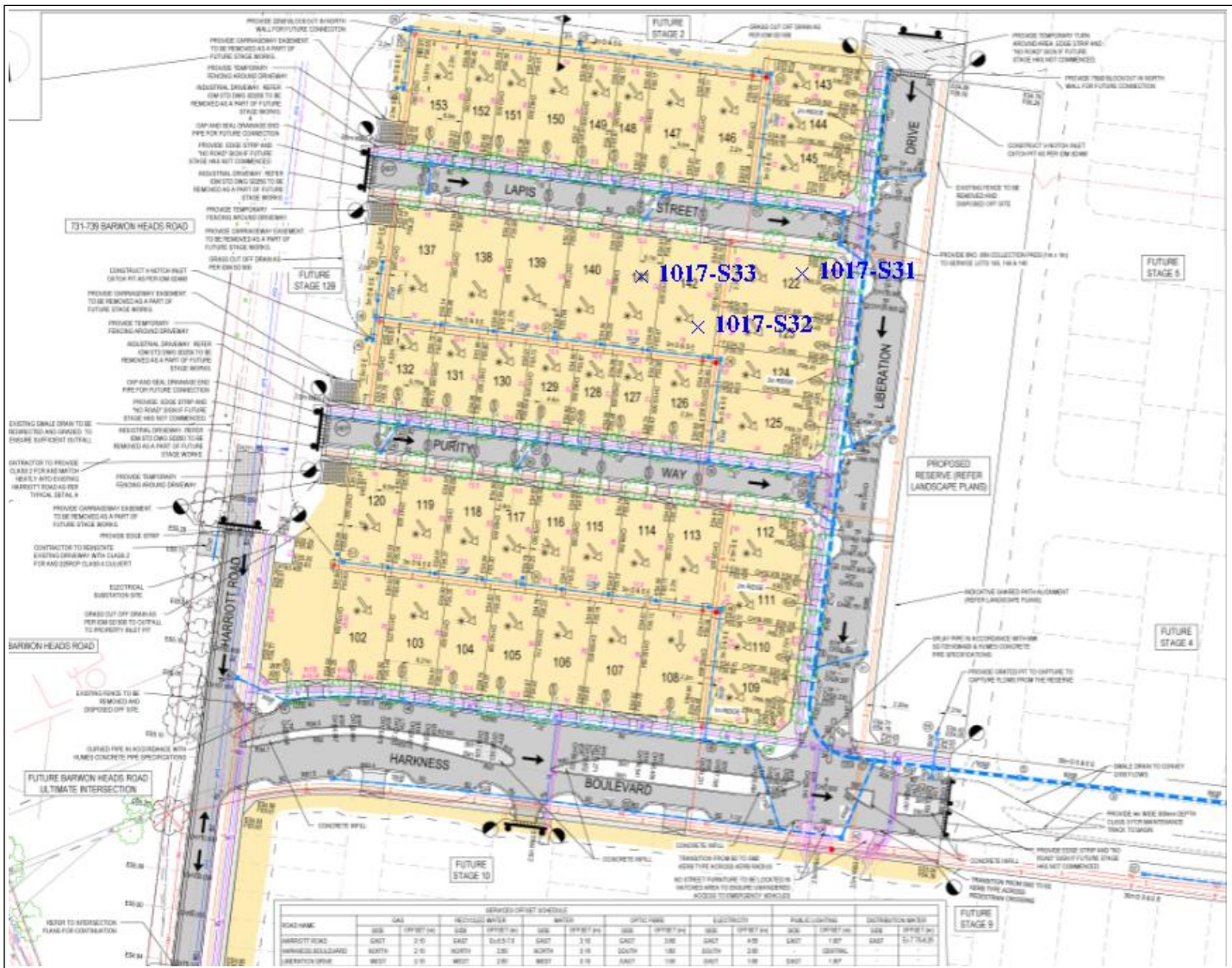
Moisture Variation Note:

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

Sample Locations Plan



Ground Science South West
Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW1017-11
Issue Number: 1
Date Issued: 26/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)



Ground Science South West

Geotechnical & Environmental Consultants

Ground Science South West Pty Ltd
10 Dowsett Street South Geelong Vic 3220
Phone: (03) 5282 1566
Email: chrism@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7942
Date Sampled: 21/10/2020 7:00
Dates Tested: 21/10/2020 - 26/10/2020
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 128 - 130
Material: CLAY, high plasticity, brown (FILL)
Material Source: Imported Locally



Accredited for compliance with ISO/IEC 17025 - Testing

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	1017-S28	1017-S29	1017-S30
Date Tested	21/10/2020	21/10/2020	21/10/2020
Time Tested	15:16	15:42	16:00
Test Request #/Location	Lot-130	Lot-129	Lot-128
Easting	55H 027008	55H 0270255	55H 0270333
Northing	5765660	576553	5765551
Layer / Reduced Level	2	2	2
Thickness of Layer (mm)	250	250	250
Soil Description	CLAY, high plasticity	CLAY, high plasticity	CLAY, high plasticity
Test Depth (mm)	225	225	225
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	1.91	1.94
Field Moisture Content %	21.0	19.4	18.6
Field Dry Density (FDD) t/m ³	1.65	1.60	1.63
Peak Converted Wet Density t/m ³	1.89	1.87	1.91
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	2.5	3.0	2.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	106.0	102.0	101.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

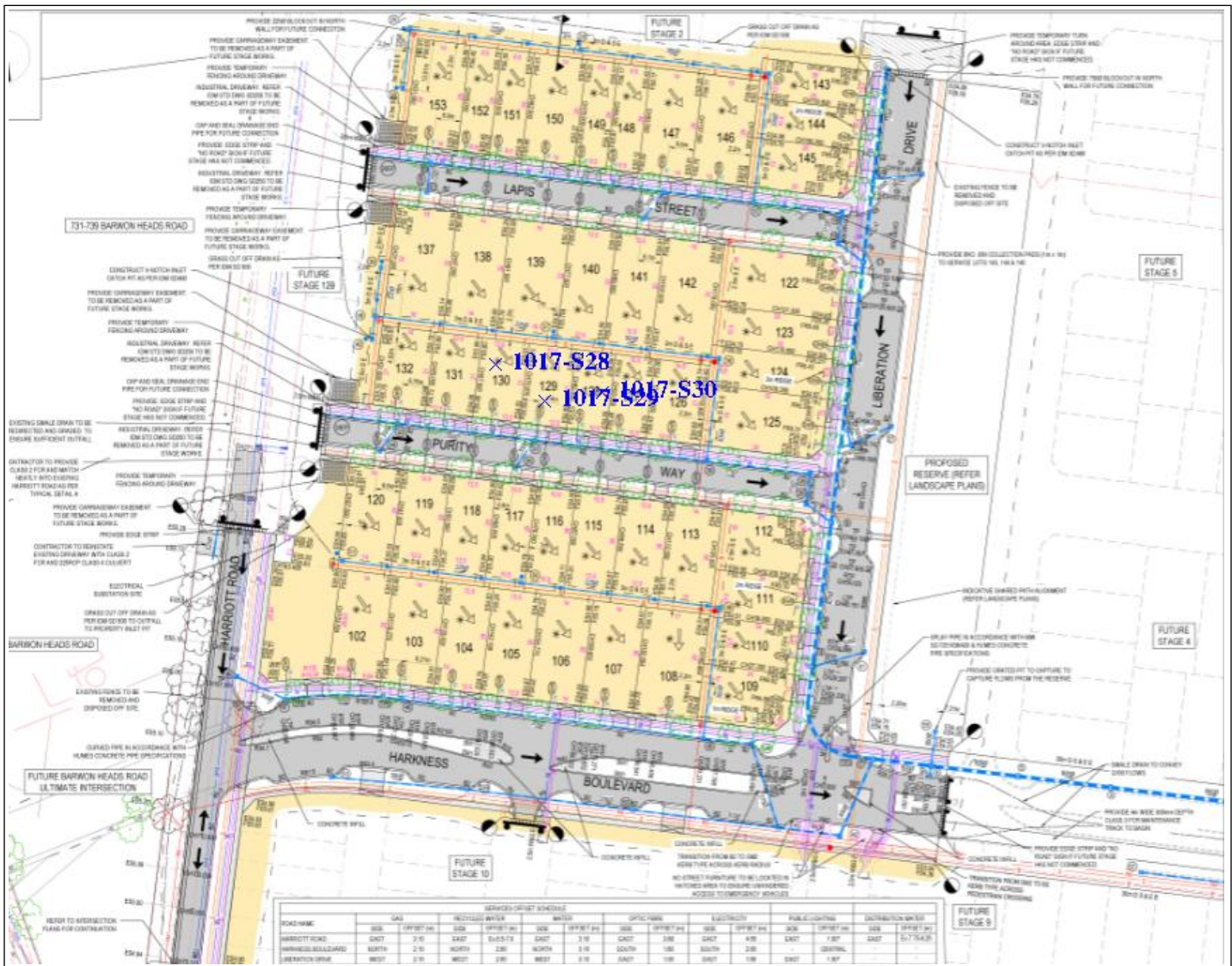
Positive values = test is dry of OMC

Negative values = test is wet of OMC

Sample Locations Plan



Ground Science South West
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Material Test Report

Report Number: GSSW1017-12
Issue Number: 1
Date Issued: 30/10/2020
Client: BITU MILL (CAMPBELLFIELD, VIC)



Ground Science South West

Geotechnical & Environmental Consultants

Ground Science South West Pty Ltd
10 Dowsett Street South Geelong Vic 3220
Phone: (03) 5282 1566
Email: tomas@groundscience.com.au

Project Number: GSSW1017
Project Name: HARRIOTT ESTATE STAGE 1
Project Location: ARMSTRONG CREEK
Work Request: 7982
Date Sampled: 27/10/2020
Dates Tested: 27/10/2020 - 28/10/2020
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 113 - 115
Material: CLAY, high plasticity (FILL)
Material Source: Imported Locally



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Tomas Wheadon
Field & Laboratory Technician
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	1017-S34	1017-S35	1017-S36
Date Tested	27/10/2020	27/10/2020	27/10/2020
Time Tested	16:01	16:20	16:39
Test Request #/Location	Harriott Estate Stage 1 Lot 113	Harriott Estate Stage 1 Lot 114	Harriott Estate Stage 1 Lot 115
Easting	55H 0290662	55H 0270207	55H 0270191
Northing	5804040	5765506	5765509
Layer / Reduced Level	2	2	2
Thickness of Layer (mm)	250	250	250
Soil Description	CLAY, high plasticity (FILL)	CLAY, high plasticity (FILL)	CLAY, high plasticity (FILL)
Test Depth (mm)	225	225	225
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	1.99	2.03
Field Moisture Content %	18.9	19.2	22.6
Field Dry Density (FDD) t/m ³	1.69	1.67	1.65
Peak Converted Wet Density t/m ³	2.06	2.05	2.00
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Moisture Variation (Wv) %	-2.5	-2.5	-1.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	97.5	97.0	101.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

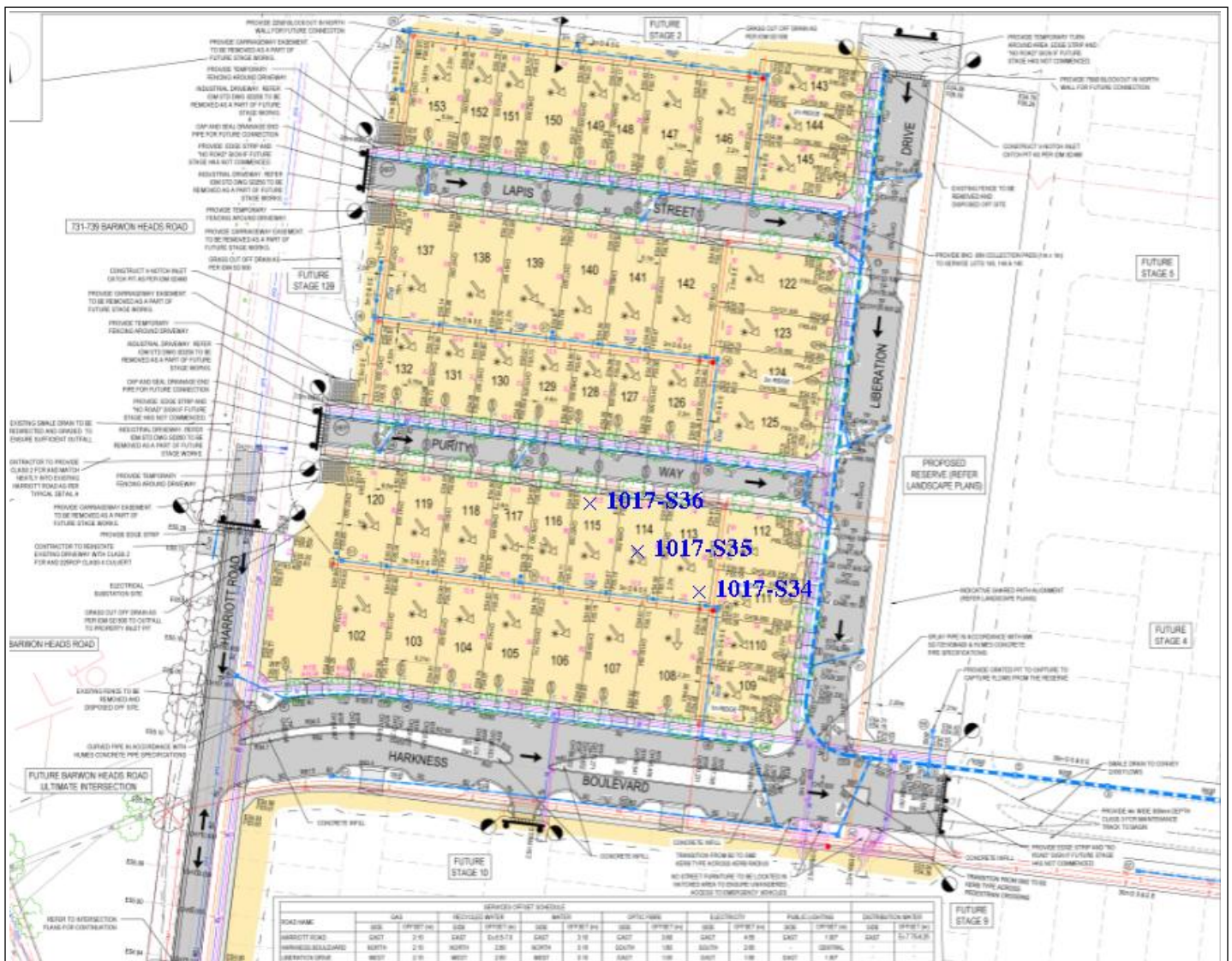
Negative values = test is wet of OMC

Sample Locations Plan



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APPENDIX C

Site Photographs





















