



Level 1 Inspection & Testing

Armstrong Estate Stage 35B, Mount Duneed

Creo Civil Consultants Pty Ltd

27 August 2025

CTGSW Ref: GEO59-5_V1

27 August 2025

Creo Civil Consultants Pty Ltd

Level 1 Inspection & Testing Report

Armstrong Estate Stage 35B, Mount Duneed, Victoria

C&T Geotechnical South West has prepared this report to present the results of Level 1 Inspection & Testing completed for the project located at Armstrong Estate Stage 35B, in Mount Duneed.

Distribution

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For an on behalf of C&T Geotechnical South West

Author:



Michael Knez, Geotechnical Engineer
M 0447 770 505
E michael@ctgeotechsw.com.au
C&T Geotechnical South West

Technical Review:



Gee Singh (RPEng), Director
M 0404 879 558
E gee@ctgeotech.com.au
C&T Consulting Engineers

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1. INTRODUCTION

This report presents the results of the inspection activities, compaction control and laboratory testing services performed by C&T Geotechnical South West for the Armstrong Estate Stage 35B project, located in Mount Duneed, Victoria (the site).

2. PROJECT UNDERSTANDING

It is understood that the project involves the placement of fill as part of the bulk earthworks for Armstrong Estate Stage 35B. C&T Geotechnical South West was engaged to provide Level 1 Inspection and Testing services for the construction of these areas. Authorisation to proceed was provided by Creo Civil Consultants Pty Ltd (the 'Client').

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'.

C&T Geotechnical South West performed the role of the project Geotechnical Inspection & Testing Authority (GITA) with all Level 1 Inspection & Testing services described in this report undertaken by an experienced GITA site representative.

3. SCOPE OF WORK

3.1 AREAS OF WORK

This report presents Level 1 Inspection and Testing completed on the residential allotments. C&T Geotechnical South West provided Level 1 Inspection and Testing services for the construction of fill in areas requiring greater than 200 mm of fill to achieve finished surface levels. The areas requiring Level 1 Inspection & Testing are shown on the supplied construction drawing, on Figure 1 (Appendix A), prepared by Creo Civil Consultants Pty Ltd (Armstrong Estate Stage 35B – Earthworks Plan [180016.35B – R202 Rev A]).

C&T Geotechnical South West previously witnessed stormwater drain backfilling earthworks that took place inside the residential lots, and these works are detailed in the Level 1 Inspection and Testing report "Armstrong Estate Trench Backfill" (ref: GSSW2268-28 dated 3/07/2025).

This report details the Level 1 earthworks process performed on site which commenced on 22 November 2024 and was completed on 12 August 2025, requiring 7 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:

1. all existing loose surficial fill, topsoil, soft material, vegetation and materials containing significant organic matter were removed to expose the natural soil subgrade
2. suitable fill material, sourced by the contractor and approved by C&T Geotechnical South West, was placed in loose horizontal layers not exceeding 300 mm in thickness
3. 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)

4. the fill was moisture conditioned to within +/- 3 % of the standard optimum moisture content
5. the fill material was sorted and mixed to eliminate particles greater than 20 % by volume, particles coarser than 37.5 mm and no particle over 200 mm in any dimension
6. 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 200 mm per 2500 m²
 - 1 test per 500 m³ distributed reasonably evenly throughout the full depth and area; or
 - 3 tests per site visit; whichever requires the most tests.

4. INSPECTION & TESTING

4.1 SUBGRADE PREPARATION

Site stripping began on 22 November 2024 with the earthworks contractors removing all organics, topsoil, compressible (soft) soils, as witnessed by the representative geotechnician from C&T Geotechnical South West. Site stripping was carried out progressively throughout the works and commenced from lot 3551 to lot 3555.

Inspection of the prepared subgrade surface on the above lots was carried out on 22 November 2024 by the representative geotechnician from C&T Geotechnical South West. A proof roll using a moxy truck loaded to a weight of 40 tonnes was performed over these lots. At the time of the inspection, the prepared subgrade in this area was deemed acceptable and considered suitable for subsequent works to proceed.

Further inspections of the prepared subgrade surface were performed over the course of the works as stripping works progressed alongside placement of controlled fill on previously approved lots. The following methodology was adopted:

- the surface was visually inspected by the representative geotechnician from C&T Geotechnical South West
- a proof roll using a fully loaded moxy truck or water cart was performed over these lots;
- if soft spots were observed, these would be remedied by removing the material in the presence of the representative geotechnician and proof rolled again, until the area showed no deflection.

Boulders were observed in the prepared subgrade surface in lots 3532 to 3550 and are inferred to be derived from the local geological deposits from the Newer Volcanics Group unit. Where possible, these boulders were removed as part of the site stripping works. Areas that contained boulders that were too large to be removed by the plant available on site were retained in place, and the area was included in proof rolling works to assess any soft soils / voids in the general area.

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 materials used for the project were sourced from cut areas onsite. The material was carted across site using moxy or highway trucks and stockpiled adjacent to the fill zones. C&T Geotechnical South West 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 gravelly CLAY (CL), with sand, brown, low plasticity, gravel 33 % fine to coarse, sand 23 % fine to coarse grained. Quality assurance tests were performed on the stockpiled fill material before placement. These tests include Particle Size Distribution (AS 1289 3.6.1) and Atterberg Limits (AS 1289 3.1.2, 3.2.1, 3.3.1 & 3.4.1) tests. The test report sheets are presented in Appendix A. C&T Geotechnical South West 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;

1. excavator
2. water cart
3. excavator
4. bulldozer
5. padfoot compactor
6. moxy truck
7. highway truck.

During fill placement, the weather conditions ranged from sunny to cloudy with temperatures typically ranging from 6 to 32 degrees Celsius.

The filling process was generally consistent throughout the project. The approved fill was carted across site in moxy or highway trucks and was stockpiled adjacent to the fill placement zones. The material was spread using a bulldozer or compactor into thin, loose layers. These layers were 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 compactor applying a minimum of 5 - 8 passes, per layer observed. The thin layers of fill were compacted to form a composite layer, measuring no

greater than 250 mm 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 & Testing was undertaken by experienced technicians from C&T Geotechnical South West who attended the site for the duration of the bulk earthworks and nominated the location of the in-situ density tests. Testing comprised a total of 26 in-situ density tests using a nuclear moisture-density gauge in accordance with Australian Standard (AS 1289 5.8.1) together with 26 “Rapid HILF” compaction tests (AS 1289 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. All test areas achieved the required compaction and moisture condition.

4.5 FINAL SURFACE LEVELS

Observations were made by a C&T Geotechnical South West 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. should be obtained from the contractor’s survey data.

5. COMPLIANCE

C&T Geotechnical South West field staff have undertaken Level 1 Inspection and Testing services of the construction of the controlled fill in the areas designated on Figure 1. C&T Geotechnical South West 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 C&T Geotechnical South West 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 & 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. C&T Geotechnical South West (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.

7. STATEMENT OF LIMITATIONS

This report has been prepared by C&T Geotechnical South West exclusively for the commissioning client and the project described. The scope of work was limited to the services outlined herein and does not include investigation of all possible site conditions or risks.

Findings, opinions, and recommendations are based on conditions observed during limited sampling, testing, and fieldwork at the time of investigation. Subsurface conditions may vary across the site, and changes can occur after the investigation. No warranty is given that conditions described are representative of the entire site or future conditions.

If site conditions encountered during works differ from those described, C&T Geotechnical South West must be contacted promptly for reassessment and advice. Reliance on this report without such consultation is at the user's risk.

Where information has been provided by the client or third parties, it is assumed to be correct unless otherwise stated. C&T Geotechnical South West accepts no liability for errors, omissions, or misinterpretations arising from such information.

The advice in this report is based on information available at the time of preparation. C&T Geotechnical South West has no ongoing obligation to update or revise this document unless separately engaged.

Plans, diagrams, and sketches included are for illustrative purposes only and should not be used for construction or detailed design without independent verification.

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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

Armstrong Estate Stage 35B – Earthworks Plan [180016.35B – R202 Rev A]



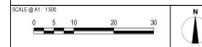
WARNING
Beware of Underground & Overhead Services
 The locations of underground & overhead services are approximate only & their exact position should be proven on site. No guarantee is given that all existing services are shown. Locate all underground services before commencement of works.
DIAL 1100 BEFORE YOU DIG
© 2024

REVISION	DATE	ISSUE DESCRIPTION	DRAWN	CHECKED	APPROVED
A	26/08/24	ISSUED FOR APPROVAL	K.MCKELVEE	J.RAMSAY	M.TROUNCE



PROJECT: **ARMSTRONG - STAGE 35B**
 DRAWING TITLE: **EARTHWORKS PLAN**

STATUS: **ISSUED FOR APPROVAL**
NOT FOR CONSTRUCTION



DESIGNED	PROJECT ENGINEER	
K.MCKELVEE	M.TROUNCE	
DRAWN	PROJECT MANAGER	
K.MCKELVEE	M.TROUNCE	
PROJECT NO.	DRAWING NO.	REVISION
180016.35B	R202	A

Appendix A

Quality Assurance Particle Size Distribution & Atterberg Limits Tests Report Sheets

Material Test Report

Report Number: GEO59-2A
Issue Number: 1
Date Issued: 18/08/2025
Client: CREO CIVIL CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GEO59
Project Name: ARMSTRONG ESTATE STAGE 35B
Project Location: MOUNT DUNEED
Work Request: 24253
Sample Number: 59-S4
Date Sampled: 07/08/2025
Dates Tested: 07/08/2025 - 18/08/2025
Sampling Method: AS 1289.1.2.1 6.2 - Sampling from stockpiles
Sample Location: Onsite Stockpile
Material: CL - gravelly CLAY, with sand, brown, low plasticity, gravel
 33% fine to coarse, sand 23% fine to coarse grained.
Material Source: Reclaimed fill



C & T Geotechnical (South West)
 8 Freedman Street North Geelong Vic 3215
 Phone: (03) 5282 1566
 Email: Chrism@ctgeotechsw.com.au

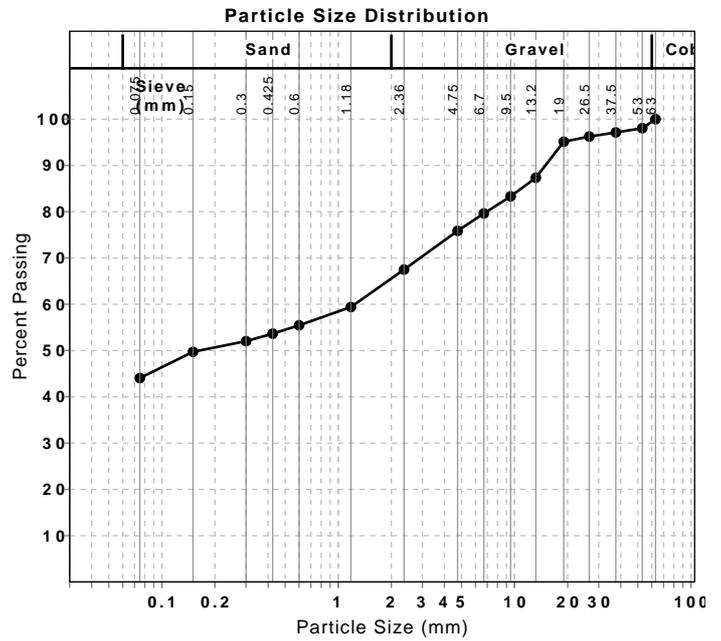
Accredited for compliance with ISO/IEC 17025 - Testing



B. Elliott

Approved Signatory: Brent Elliott
 Laboratory Manager
 NATA Accredited Laboratory Number: 20109

Particle Size Distribution (AS1289 3.6.1)				
Sieve	Passed %	Passing Limits	Retained %	Retained Limits
63 mm	100		0	
53 mm	98		2	
37.5 mm	97		1	
26.5 mm	96		1	
19 mm	95		1	
13.2 mm	87		8	
9.5 mm	83		4	
6.7 mm	80		4	
4.75 mm	76		4	
2.36 mm	67		8	
1.18 mm	59		8	
0.6 mm	55		4	
0.425 mm	54		2	
0.3 mm	52		2	
0.15 mm	50		2	
0.075 mm	44		6	



Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	31		
Plastic Limit (%)	14		
Plasticity Index (%)	17		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	7.0		
Cracking Crumbling Curling	Cracking		

Appendix B

Field Density Test Report Summary Sheets

Project Summary Report

Report Date: 13/08/2025
Client: CREO CIVIL CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2302
Project Name: ARMSTRONG ESTATE STAGE 35B
Project Location: MOUNT DUNED
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Test Methods: AS 1289 5.7.1 STD & 5.8.1 & 2.1.1 & 5.4.1



C & T Geotechnical (South West)
 8 Freedman Street North Geelong Vic 3215
 Phone: (03) 5282 1566
 Email: Chrism@ctgeotechsw.com.au

Lot #	Sample #	Date Sampled	Location	Easting	Northing	Elevation (m)	Layer	Relative Compaction (%)	Moisture Variation (%)	Moisture Content (%)	Field Wet Density (t/m3)
**	2302-S1	22/11/2024	Refer to attached plan Lot 3555	55H 265678	5765690	**	Layer 1	100.0	0.0	23.3	1.97
**	2302-S2	22/11/2024	Refer to attached plan Lot 3553	55H 265769	5765629	**	Layer 1	99.0	0.0	22.9	1.97
**	2302-S3	22/11/2024	Refer to attached plan Lot 3551	55H 265767	5765645	**	Layer 1	100.0	-0.5	25.3	1.95
**	2302-S4	22/11/2024	Refer to attached plan Lot 3554	55H 265769	5765619	**	Layer 2	98.5	-1.5	23.6	1.96
**	2302-S5	22/11/2024	Refer to attached plan Lot 3552	55H 265768	5765652	**	Layer 2	98.5	0.0	23.2	1.97
**	2302-S6	25/11/2024	Refer to attached plan Lot 3555	55H 265771	5765617	**	Layer 3	99.5	-2.0	23.4	1.97
**	2302-S7	25/11/2024	Refer to attached plan Lot 3553	55H 265766	5765642	**	Layer 3	100.5	0.0	23.2	1.97
**	2302-S8	25/11/2024	Refer to attached plan Lot 3551	55H 265765	5765662	**	Layer 3	99.0	-0.5	23.1	1.96
**	2302-S9	13/12/2024	Refer to attached plan Lot 3556	55H 265777	5675595	**	Layer 1	104.0	0.0	25.2	2.04
**	2302-S10	13/12/2024	Refer to attached plan Lot 3560	55H 265783	5765548	**	Layer 1	103.0	-2.0	26.3	2.02
**	2302-S11	13/12/2024	Refer to attached plan Lot 3557	55H 265773	5765582	**	Layer 2	99.0	0.0	20.8	2.00
**	2302-S12	13/12/2024	Refer to attached plan Lot 3559	55H 265780	5765568	**	Layer 2	101.0	0.0	22.1	2.03
**	2302-S13	13/12/2024	Refer to attached plan Lot 3558	55H 265784	5765569	**	Layer 3	97.5	-2.0	23.2	1.98
**	2302-S14	13/12/2024	Refer to attached plan Lot 3557	55H 265774	5765697	**	Layer 4	100.0	0.0	22.9	2.00

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Project Summary Report

Report Date: 14/08/2025
Client: CREO CIVIL CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GEO59
Project Name: ARMSTRONG ESTATE STAGE 35B
Project Location: MOUNT DUNED
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Test Methods: AS 1289 5.7.1 STD & 5.8.1 & 2.1.1 & 5.4.1



C & T Geotechnical (South West)
8 Freedman Street North Geelong Vic 3215
Phone: (03) 5282 1566
Email: Chrism@ctgeotechsw.com.au

Lot #	Sample #	Date Sampled	Location	Easting	Northing	Elevation (m)	Layer	Relative Compaction (%)	Moisture Variation (%)	Moisture Content (%)	Field Wet Density (t/m3)
**	59-S1	06/08/2025	Refer to attached plan Lot 3548	55H 265771	5765686	**	1	95.0	-1.5	22.1	1.97
**	59-S2	06/08/2025	Refer to attached plan Lot 3547	55H 265779	5765697	**	1	99.5	-1.5	20.5	1.95
**	59-S3	06/08/2025	Refer to attached plan Lot 3533	55H 265766	5765718	**	1	96.0	-1.5	23.7	1.96
**	59-S5	07/08/2025	Refer to attached plan Lot 3549	55H 265805	5765735	**	2	99.5	-1.0	18.6	2.08
**	59-S6	07/08/2025	Refer to attached plan Lot 3535/3536 backfilling pit	55H 265802	5765732	**	Subgrade level	104.5	0.0	19.6	2.14
**	59-S7	07/08/2025	Refer to attached plan Lot 3534	55H 265773	5765715	**	3	99.0	0.0	17.8	2.12
**	59-S8	08/08/2025	Refer to attached plan Lot 3545	55H 265795	5765702	**	1	98.0	-1.0	17.8	2.11
**	59-S9	08/08/2025	Refer to attached plan Lot 3536	55H 265799	5765720	**	2	96.0	0.0	17.7	2.05
**	59-S10	08/08/2025	Refer to attached plan Lot 3539	55H 265815	5765726	**	1	95.5	0.0	19.0	1.98
**	59-S11	12/08/2025	Refer to attached plan Lot 3544	55H 265801	5765747	**	3	103.0	-0.5	20.1	2.11
**	59-S12	12/08/2025	Refer to attached plan Lot 3536	55H 265805	5765729	**	3	98.5	0.5	18.3	2.06
**	59-S13	12/08/2025	Refer to attached plan Lot 3541	55H 265815	5765719	**	2	99.0	-1.5	21.5	2.08

Moisture Variation Note:

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

Appendix C

Field Density Test Report Sheets & Test Locations

Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW2302-1
Issue Number: 1
Date Issued: 26/11/2024
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2302
Project Name: ARMSTRONG ESTATE STAGE 35B
Project Location: MOUNT DUNEED
Work Request: 21810
Date Sampled: 22/11/2024
Dates Tested: 22/11/2024 - 25/11/2024
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, trace gravel, dark brown, high plasticity
Material Source: Reclaimed Fill

Ground Science South West Pty Ltd
 8 Freedman Street North Geelong Vic 3215

Phone: (03) 5282 1566

Email: chrism@groundsciencesw.com.au

Accredited for compliance with ISO/IEC 17025 - Testing



B Elliott

Approved Signatory: Brent Elliott

Laboratory Manager

NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	2302-S1	2302-S2	2302-S3	2302-S4	2302-S5
Date Tested	22/11/2024	22/11/2024	22/11/2024	22/11/2024	22/11/2024
Time Tested	10:11	10:18	10:26	14:28	14:33
Test Request #/Location	Refer to attached plan Lot 3555	Refer to attached plan Lot 3553	Refer to attached plan Lot 3551	Refer to attached plan Lot 3554	Refer to attached plan Lot 3552
Easting	55H 265678	55H 265769	55H 265767	55H 265769	55H 265768
Northing	5765690	5765629	5765645	5765619	5765652
Layer / Reduced Level	Layer 1	Layer 1	Layer 1	Layer 2	Layer 2
Thickness of Layer (mm)	250	250	250	250	250
Soil Description	sandy CLAY, trace gravel, dark brown, high plasticity	sandy CLAY, trace gravel, dark brown, high plasticity	sandy CLAY, trace gravel, dark brown, high plasticity	sandy CLAY, trace gravel, dark brown, high plasticity	sandy CLAY, trace gravel, dark brown, high plasticity
Test Depth (mm)	225	225	225	225	225
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	1	1	2
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	1	1	2
Field Wet Density (FWD) t/m ³	1.97	1.97	1.95	1.96	1.97
Field Moisture Content %	23.3	22.9	25.3	23.6	23.2
Field Dry Density (FDD) t/m ³	1.60	1.60	1.56	1.59	1.61
Peak Converted Wet Density t/m ³	1.97	1.98	**	**	**
Adjusted Peak Converted Wet Density t/m ³	**	**	1.95	1.99	2.00
Adj. Optimum Moisture Content % (AS1289.5.4.1)	23.3	22.7	24.5	22.0	22.8
Adj. Field Moisture Content % (AS1289.5.4.1)	23.3	22.9	25.2	23.5	22.7
Moisture Ratio % (AS1289.5.4.1)	100.0	101.0	**	**	**
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	103.0	107.0	99.5
Moisture Variation (Wv) %	0.0	0.0	**	**	**
Adjusted Moisture Variation %	**	**	-0.5	-1.5	0.0
Hilf Density Ratio (%)	100.0	99.0	100.0	98.5	98.5
Compaction Method	Standard	Standard	Standard	Standard	Standard
Remarks	**	**	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW2302-2
Issue Number: 1
Date Issued: 27/11/2024
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2302
Project Name: ARMSTRONG ESTATE STAGE 35B
Project Location: MOUNT DUNEED
Work Request: 21827
Date Sampled: 25/11/2024
Dates Tested: 25/11/2024 - 26/11/2024
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, trace gravel, dark brown, high plasticity
Material Source: Reclaimed Fill

Ground Science South West Pty Ltd
 8 Freedman Street North Geelong Vic 3215
 Phone: (03) 5282 1566
 Email: chrism@groundsciencesw.com.au

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B Elliott

Approved Signatory: Brent Elliott
 Laboratory Manager
 NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	2302-S6	2302-S7	2302-S8
Date Tested	25/11/2024	25/11/2024	25/11/2024
Time Tested	13:34	13:42	13:50
Test Request #/Location	Refer to attached plan Lot 3555	Refer to attached plan Lot 3553	Refer to attached plan Lot 3551
Easting	55H 265771	55H 265766	55H 265765
Northing	5765617	5765642	5765662
Layer / Reduced Level	Layer 3	Layer 3	Layer 3
Thickness of Layer (mm)	250	250	250
Soil Description	sandy CLAY, trace gravel, dark brown, high plasticity	sandy CLAY, trace gravel, dark brown, high plasticity	sandy CLAY, trace gravel, dark brown, 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	3	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	3	0
Field Wet Density (FWD) t/m ³	1.97	1.97	1.96
Field Moisture Content %	23.4	23.2	23.1
Field Dry Density (FDD) t/m ³	1.59	1.61	1.59
Peak Converted Wet Density t/m ³	1.98	**	1.98
Adjusted Peak Converted Wet Density t/m ³	**	1.96	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	21.5	22.4	22.4
Adj. Field Moisture Content % (AS1289.5.4.1)	23.4	22.5	23.1
Moisture Ratio % (AS1289.5.4.1)	109.0	**	103.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	100.5	**
Moisture Variation (Wv) %	-2.0	**	-0.5
Adjusted Moisture Variation %	**	0.0	**
Hilf Density Ratio (%)	99.5	100.5	99.0
Compaction Method	Standard	Standard	Standard
Remarks	**	**	**

Moisture Variation Note:

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

Sample Locations Plan

x - approximate test location



Ground Science South West

Geotechnical & Environmental Consultants



Material Test Report



Ground Science South West

Geotechnical & Environmental Consultants

Report Number: GSSW2302-3
Issue Number: 1
Date Issued: 17/12/2024
Client: CREO CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2302
Project Name: ARMSTRONG ESTATE STAGE 35B
Project Location: MOUNT DUNEED
Work Request: 22010
Date Sampled: 13/12/2024
Dates Tested: 13/12/2024 - 16/12/2024
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, trace gravel, dark brown, high plasticity
Material Source: Reclaimed fill

Ground Science South West Pty Ltd
 8 Freedman Street North Geelong Vic 3215
 Phone: (03) 5282 1566
 Email: chrism@groundsciencesw.com.au

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B Elliott

Approved Signatory: Brent Elliott
 Laboratory Manager
 NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1						
Sample Number	2302-S9	2302-S10	2302-S11	2302-S12	2302-S13	2302-S14
Date Tested	13/12/2024	13/12/2024	13/12/2024	13/12/2024	13/12/2024	13/12/2024
Time Tested	08:52	09:03	11:10	11:17	13:03	15:54
Test Request #/Location	Refer to attached plan Lot 3556	Refer to attached plan Lot 3560	Refer to attached plan Lot 3557	Refer to attached plan Lot 3559	Refer to attached plan Lot 3558	Refer to attached plan Lot 3557
Easting	55H 265777	55H 265783	55H 265773	55H 265780	55H 265784	55H 265774
Northing	5675595	5765548	5765582	5765568	5765569	5765697
Layer / Reduced Level	Layer 1	Layer 1	Layer 2	Layer 2	Layer 3	Layer 4
Thickness of Layer (mm)	250	250	250	250	250	250
Soil Description	sandy CLAY, trace gravel, dark brown, high plasticity	sandy CLAY, trace gravel, dark brown, high plasticity	sandy CLAY, trace gravel, dark brown, high plasticity	sandy CLAY, trace gravel, dark brown, high plasticity	sandy CLAY, trace gravel, dark brown, high plasticity	sandy CLAY, trace gravel, dark brown, high plasticity
Test Depth (mm)	225	225	225	225	225	225
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	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0	0	**	0
Field Wet Density (FWD) t/m ³	2.04	2.02	2.00	2.03	1.98	2.00
Field Moisture Content %	25.2	26.3	20.8	22.1	23.2	22.9
Field Dry Density (FDD) t/m ³	1.63	1.60	1.65	1.66	1.61	1.62
Peak Converted Wet Density t/m ³	1.96	1.97	2.02	2.01	2.03	2.00
Adjusted Peak Converted Wet Density t/m ³	**	**	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	25.0	24.4	21.0	21.8	**	23.0
Adj. Field Moisture Content % (AS1289.5.4.1)	25.2	26.3	20.8	22.1	23.2	22.9
Moisture Ratio % (AS1289.5.4.1)	101.0	107.5	99.0	101.0	109.5	99.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**	**	**
Moisture Variation (Wv) %	0.0	-2.0	0.0	0.0	-2.0	0.0
Adjusted Moisture Variation %	**	**	**	**	**	**
Hilf Density Ratio (%)	104.0	103.0	99.0	101.0	97.5	100.0
Compaction Method	Standard	Standard	Standard	Standard	Standard	Standard
Remarks	**	**	**	**	**	**

Moisture Variation Note:

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

Sample Locations Plan

x - approximate test location



Ground Science South West

Geotechnical & Environmental Consultants



Material Test Report

Report Number: GEO59-1
Issue Number: 1
Date Issued: 08/08/2025
Client: CREO CIVIL CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GEO59
Project Name: ARMSTRONG ESTATE STAGE 35B
Project Location: MOUNT DUNEED
Work Request: 24239
Date Sampled: 06/08/2025
Dates Tested: 06/08/2025 - 07/08/2025
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
Location: Lot 3533/3549 to lot 3535/3545
Material: sandy CLAY, trace gravel, high plasticity
Material Source: Reclaimed fill



C & T Geotechnical (South West)
 8 Freedman Street North Geelong Vic 3215
 Phone: (03) 5282 1566
 Email: Chrism@ctgeotechsw.com.au

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B Elliott

Approved Signatory: Brent Elliott
 Laboratory Manager
 NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	59-S1	59-S2	59-S3
Date Tested	06/08/2025	06/08/2025	06/08/2025
Time Tested	13:01	13:12	14:01
Test Request #/Location	Refer to attached plan Lot 3548	Refer to attached plan Lot 3547	Refer to attached plan Lot 3533
Easting	55H 265771	55H 265779	55H 265766
Northing	5765686	5765697	5765718
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	200	200	200
Soil Description	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, 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
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m ³	1.97	1.95	1.96
Field Moisture Content %	22.1	20.5	23.7
Field Dry Density (FDD) t/m ³	1.61	1.62	1.58
Peak Converted Wet Density t/m ³	2.07	1.97	2.04
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	20.7	19.2	22.0
Adj. Field Moisture Content % (AS1289.5.4.1)	22.1	20.5	23.7
Moisture Ratio % (AS1289.5.4.1)	107.0	106.5	107.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-1.5	-1.5	-1.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	95.0	99.5	96.0
Compaction Method	Standard	Standard	Standard
Remarks	**	**	**

Moisture Variation Note:

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

Material Test Report

Report Number: GEO59-2
Issue Number: 1
Date Issued: 11/08/2025
Client: CREO CIVIL CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GEO59
Project Name: ARMSTRONG ESTATE STAGE 35B
Project Location: MOUNT DUNEED
Work Request: 24253
Date Sampled: 07/08/2025
Dates Tested: 07/08/2025 - 08/08/2025
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
Location: Lot 3533/3549 to lot 3535/3545
Material: sandy CLAY, trace gravel, high plasticity
Material Source: Reclaimed fill



C & T Geotechnical (South West)
 8 Freedman Street North Geelong Vic 3215
 Phone: (03) 5282 1566
 Email: Chrism@ctgeotechsw.com.au

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B Elliott

Approved Signatory: Brent Elliott
 Laboratory Manager
 NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	59-S5	59-S6	59-S7
Date Tested	07/08/2025	07/08/2025	07/08/2025
Time Tested	09:36	13:08	14:54
Test Request #/Location	Refer to attached plan Lot 3549	Refer to attached plan Lot 3535/3536 backfilling pit	Refer to attached plan Lot 3534
Easting	55H 265805	55H 265802	55H 265773
Northing	5765735	5765732	5765715
Layer / Reduced Level	2	Subgrade level	3
Thickness of Layer (mm)	250	325	250
Soil Description	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity
Test Depth (mm)	225	300	225
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m ³	2.08	2.14	2.12
Field Moisture Content %	18.6	19.6	17.8
Field Dry Density (FDD) t/m ³	1.76	1.79	1.80
Peak Converted Wet Density t/m ³	2.09	2.05	2.14
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	17.7	19.7	17.9
Adj. Field Moisture Content % (AS1289.5.4.1)	18.6	19.6	17.8
Moisture Ratio % (AS1289.5.4.1)	105.0	99.5	99.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-1.0	0.0	0.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	99.5	104.5	99.0
Compaction Method	Standard	Standard	Standard
Remarks	**	**	**

Moisture Variation Note:

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

Sample Locations Plan

x - approximate test location



Material Test Report

Report Number: GEO59-3
Issue Number: 1
Date Issued: 13/08/2025
Client: CREO CIVIL CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GEO59
Project Name: ARMSTRONG ESTATE STAGE 35B
Project Location: MOUNT DUNEED
Work Request: 24275
Date Sampled: 08/08/2025
Dates Tested: 08/08/2025 - 11/08/2025
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
Location: Lot 3535 to 3546
Material: sandy CLAY, trace gravel, high plasticity
Material Source: Reclaimed fill



C & T Geotechnical (South West)
 8 Freedman Street North Geelong Vic 3215
 Phone: (03) 5282 1566
 Email: Chrism@ctgeotechsw.com.au

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B Elliott

Approved Signatory: Brent Elliott
 Laboratory Manager
 NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	59-S8	59-S9	59-S10
Date Tested	08/08/2025	08/08/2025	08/08/2025
Time Tested	10:23	13:51	15:10
Test Request #/Location	Refer to attached plan Lot 3545	Refer to attached plan Lot 3536	Refer to attached plan Lot 3539
Easting	55H 265795	55H 265799	55H 265815
Northing	5765702	5765720	5765726
Layer / Reduced Level	1	2	1
Thickness of Layer (mm)	250	250	200
Soil Description	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity
Test Depth (mm)	225	225	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	1	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	1	0
Field Wet Density (FWD) t/m ³	2.11	2.05	1.98
Field Moisture Content %	17.8	17.7	19.0
Field Dry Density (FDD) t/m ³	1.79	1.75	1.66
Peak Converted Wet Density t/m ³	2.16	**	2.07
Adjusted Peak Converted Wet Density t/m ³	**	2.14	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	16.9	17.6	18.8
Adj. Field Moisture Content % (AS1289.5.4.1)	17.8	17.5	19.0
Moisture Ratio % (AS1289.5.4.1)	105.5	**	101.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	99.5	**
Moisture Variation (Wv) %	-1.0	**	0.0
Adjusted Moisture Variation %	**	0.0	**
Hilf Density Ratio (%)	98.0	96.0	95.5
Compaction Method	Standard	Standard	Standard
Remarks	**	**	**

Moisture Variation Note:

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

Material Test Report

Report Number: GEO59-4
Issue Number: 1
Date Issued: 14/08/2025
Client: CREO CIVIL CONSULTANTS PTY LTD
 Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GEO59
Project Name: ARMSTRONG ESTATE STAGE 35B
Project Location: MOUNT DUNEED
Work Request: 24304
Date Sampled: 12/08/2025
Dates Tested: 12/08/2025 - 13/08/2025
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
Location: Lot 3535 to 3546
Material: sandy CLAY, trace gravel, high plasticity
Material Source: Reclaimed fill



C & T Geotechnical (South West)
 8 Freedman Street North Geelong Vic 3215
 Phone: (03) 5282 1566
 Email: Chrism@ctgeotechsw.com.au

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B. Elliott

Approved Signatory: Brent Elliott
 Laboratory Manager
 NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	59-S11	59-S12	59-S13
Date Tested	12/08/2025	12/08/2025	12/08/2025
Time Tested	10:26	10:33	10:42
Test Request #/Location	Refer to attached plan Lot 3544	Refer to attached plan Lot 3536	Refer to attached plan Lot 3541
Easting	55H 265801	55H 265805	55H 265815
Northing	5765747	5765729	5765719
Layer / Reduced Level	3	3	2
Thickness of Layer (mm)	250	250	250
Soil Description	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity
Test Depth (mm)	225	225	225
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	1	2	1
Percentage of Dry Oversize (%) (AS1289.5.4.1)	1	2	1
Field Wet Density (FWD) t/m ³	2.11	2.06	2.08
Field Moisture Content %	20.1	18.3	21.5
Field Dry Density (FDD) t/m ³	1.76	1.75	1.71
Peak Converted Wet Density t/m ³	**	**	**
Adjusted Peak Converted Wet Density t/m ³	2.05	2.09	2.10
Adj. Optimum Moisture Content % (AS1289.5.4.1)	19.3	18.3	19.8
Adj. Field Moisture Content % (AS1289.5.4.1)	19.9	18.0	21.3
Moisture Ratio % (AS1289.5.4.1)	**	**	**
Adjusted Moisture Ratio % (AS1289.5.4.1)	103.0	98.5	108.0
Moisture Variation (Wv) %	**	**	**
Adjusted Moisture Variation %	-0.5	0.5	-1.5
Hilf Density Ratio (%)	103.0	98.5	99.0
Compaction Method	Standard	Standard	Standard
Remarks	**	**	**

Moisture Variation Note:

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

Sample Locations Plan

x - approximate test location



Appendix D
Site Photographs





















