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LEVEL 1 INSPECTION & TESTING ARMSTRONG ESTATE STAGE 53A, MOUNT DUNEED

Prepared for Creo Consultants Pty Ltd

Report Reference: GSSW2016.1 AA

Date: 19 February 2024

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PROJECT DETAILS

Project Reference	GSSW2016.1	Rev	AA
Project Title	Armstrong Estate Stage 53A		
Project Location	Mount Duneed	State	VIC
Date	19 February 2024		

CLIENT DETAILS

Prepared For (Client)	Creo Consultants Pty Ltd
Client Address	Level 7/176 Wellington Parade, East Melbourne VIC 3002

DISTRIBUTION

Original Held By	Ground Science South West Pty Ltd
One (1) Electronic Copy	Creo Consultants 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, RPEng
Senior Geotechnical Engineer

Table of Contents

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 Armstrong Estate Stage 53A 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 phase for Armstrong Estate Stage 53A. Ground Science was engaged to provide Level 1 Inspection and Testing services for the construction of these areas. Authorisation to proceed was provided by Creo 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'.

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 (Armstrong Estate - Stage 53A Layout Plan – 1 [No. 180016.53A R100 Rev 1]).

This report details the Level 1 earthworks process performed on site which commenced on 20 November 2023 and was completed on the 31 January 2024, requiring 24 full days and 5 half day of inspection and testing works.

3.2 PLACEMENT METHODOLOGY

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

- All existing loose surficial fill, topsoil, soft material, vegetation and materials containing significant organic matter were removed to expose the natural soil subgrade;
- Suitable fill material, sourced by the contractor and approved by Ground Science, was placed in loose horizontal layers not exceeding 300mm in thickness;
- The controlled fill material was compacted to achieve a target Dry Density Ratio of at least 95% Standard Compaction (AS 1289: 5.1.1, 5.4.1 or 5.7.1), based on our understanding that future building loads would be similar to residential type structures (i.e. non-commercial structural loading);
- The fill was moisture conditioned to within +/- 2% 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 2500m^2;
- 1 test per 500m^3 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

It is understood that the on-site contractor, Drapers Civil Contracting began removing all organics, topsoil and compressible (soft) soils between 13 November 2023 and 21 November 2023. Inspection of the prepared subgrade surface was carried out on 21 November 2023 by the representative geotechnician from Ground Science South West.

Site stripping was carried out progressively throughout the works, and commenced on lots 5301 to lot 5308. A proof roll using a 20 T water cart was performed over these lots with some isolated soft spots observed. These areas were removed in front of the representative geotechnician and proof rolled again, showing no deflection. 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 Ground Science South West;
- A proof roll using a 20 T 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.

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 and a nearby site located on Feehans Road, Mount Duneed. The material was carted across site in highway 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 gravelly CLAY (CH), high plasticity, brown, with sand, trace gravel, moist. Quality assurance tests were performed on the stockpiled fill material before placement. These tests include Particle Size Distribution and Atterberg Limits 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;

- Scraper;
- Bulldozer;
- Excavator;
- Water Cart;
- Padfoot Roller;
- Highway Truck.

During fill placement, the weather conditions ranged from sunny to rainy with temperatures typically ranging from 10 to 35 degrees Celsius.

The filling process was generally consistent throughout the project and involved the approved fill stockpiled adjacent to the fill placement zones. The material was spread using a grader 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 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. A sacrificial layer of material was placed by a compactor to protect the previously placed and tested layers. This material was removed when works recommenced and blended with the stockpile for moisture control and reuse.

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 91 in-situ density tests using a nuclear moisture-density gauge in accordance with Australian Standard (AS1289 5.8.1) together with 91 “Rapid HILF” Compaction tests (AS1289 5.7.1).

A summary of the field density and compaction control testing is presented in Appendix B. Field density and compaction control testing report sheets are presented in Appendix C. It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Two test areas (#75 & #77) failed to meet the required moisture condition. When these retests returned non-compliant test results, the whole layer was reworked, recompacted and retested (#78 & #79) with compliant test results achieved. No test areas failed to reach the required target density ratio.

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
Geotechnical Engineer

REVIEWED:

Gee Singh, RPEng
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.

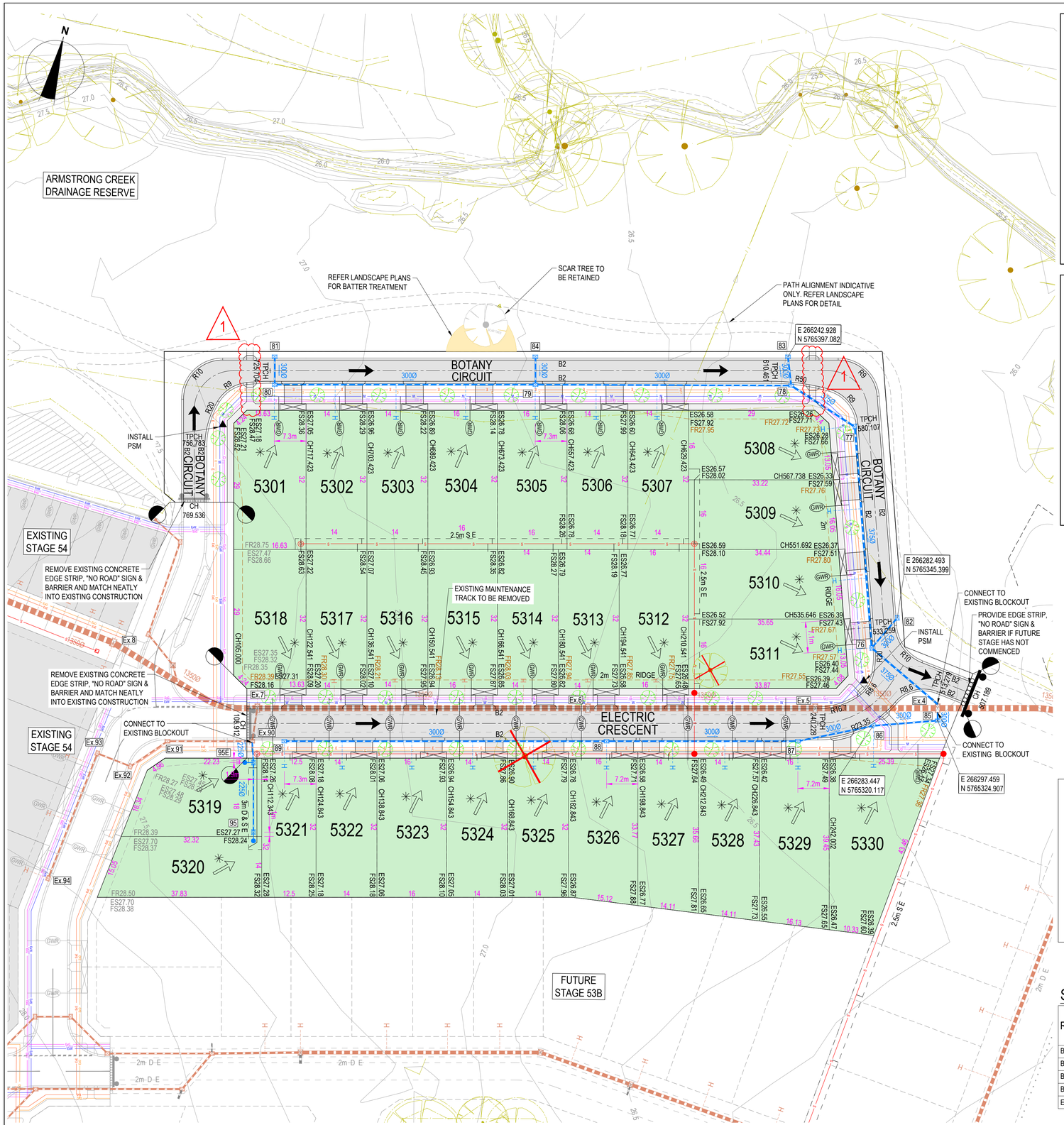
Any drawings or figures presented in this report should be considered only as pictorial evidence of our work. Therefore, unless otherwise stated, any dimensions should not be used for accurate calculations or dimensioning.

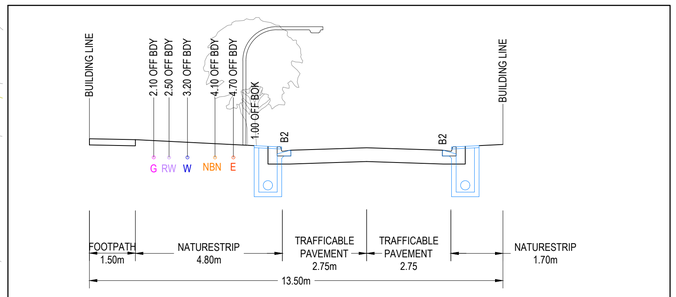
8. REFERENCES

- 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

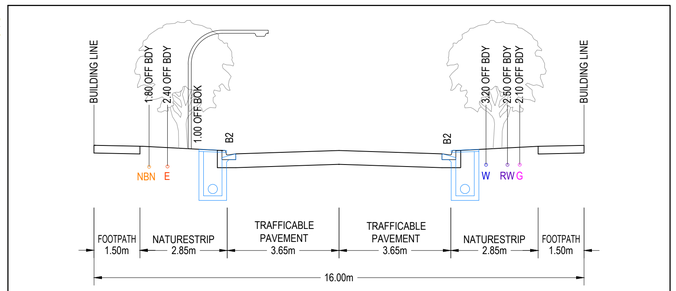
Armstrong Estate - Stage 53A Layout Plan [No. 180016.53A R100 REV 1]





13.5m ROAD RESERVE
TWO WAY CROSSFALL
BOTANY CIRCUIT

CROSS FALLS
PAVEMENT: 3.33%
FOOTPATH: 2.0-2.5%%
NATURE STRIP: 4.0%



16m ROAD RESERVE
TWO WAY CROSSFALL
ELECTRIC CRESCENT

CROSS FALLS
PAVEMENT: 3.33%
FOOTPATH: 2.0% - 2.5%
NATURE STRIP: 2.5% - 8%

CITY OF GREATER GEELONG TO STAMP HERE UPON APPROVAL

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

NOTES:

1. ALL VEHICLE AND PRAM CROSSING LAYBACKS, TO BE MINIMUM OF 1.0m FROM PITS.
2. ALL PRAM CROSSINGS TO BE A MINIMUM 2.0m FROM VEHICLE CROSSINGS.
3. ALL PRAM CROSSINGS TO BE DDA COMPLIANT.
4. VEHICLE EXCLUSION MEASURES BETWEEN ROAD RESERVE AND RESERVE TO FORM PART OF LANDSCAPE WORKS.
5. THE USE OF DIRECTIONAL AND HAZARD TACTILE PAVERS MUST ACCORD WITH SECTION 2.2.3.1 OF AS/NZS 1428.4:2002
6. SEWER MAINTENANCE HOLE CONVERTER SLAB OR CONE, TO BE ROTATED TO ENSURE COVER POSITION IS CENTRALLY LOCATED WITHIN FOOTPATH
7. CHAINAGES FOR SETOUT OF PROPERTY INLET POINTS, SERVICING FUTURE LOTS, ARE MEASURED FROM THE DOWNSTREAM PIT
8. CONTRACTOR TO LOCATE ALL EXISTING ASSETS PRIOR TO COMMENCEMENT OF WORKS. ANY DAMAGE TO EXISTING ASSETS TO BE RECTIFIED AT CONTRACTORS EXPENSE.
9. CONTRACTOR TO VERIFY DEPTH OF EXISTING SERVICES, PRIOR TO COMMENCEMENT OF CONSTRUCTION
10. LOTS WITH FRONTAGES OF 12.50m OR LESS ARE TO BE PROVIDED WITH CROSSOVERS OF MAXIMUM 3.50m WIDTH

LEGEND - LAYOUT PLAN

- STORMWATER DRAIN, PIT & PROPERTY INLET
- SWALE DRAIN
- SEWER & MAINTENANCE STRUCTURES
- HOUSE DRAIN
- SERVICE CONDUITS
- TACTILE PAVERS
- EXISTING ELECTRICITY (UNDERGROUND)
- EXISTING ELECTRICITY (OVERHEAD)
- EXISTING GAS
- EXISTING OPTIC FIBRE
- EXISTING TELSTRA
- EXISTING WATER
- EXISTING RECYCLED WATER
- EXISTING STORMWATER DRAIN
- EXISTING SEWER
- EXISTING HOUSE DRAIN
- EXISTING SWALE DRAIN
- EXISTING SURFACE LEVEL
- FINISHED BUILDING LINE LEVEL
- FINISHED RIDGE LINE LEVEL
- TOP OF RETAINING WALL
- BOTTOM OF RETAINING WALL
- RETAINING WALL
- PAVEMENT TREATMENT
- STRUCTURAL FILL > 200mm DEEP
- EX. 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
- BUILDING ENVELOPES

SERVICES OFFSET SCHEDULE

ROAD NAME	GAS		RECYCLED WATER		POTABLE WATER		OPTIC FIBRE		ELECTRICITY	
	SIDE	OFFSET	SIDE	OFFSET	SIDE	OFFSET	SIDE	OFFSET	SIDE	OFFSET
BOTANY CIRCUIT (LOT 5301 HEADING N)	W	2.10	W	2.50	W	3.20	W	4.10	W	4.70
BOTANY CIRCUIT (LOT 5301 HEADING W)	S	2.10	S	2.50	S	3.20	S	4.10	S	4.70
BOTANY CIRCUIT (LOT 5308 HEADING S)	E	2.10	E	2.50	E	3.20	E	4.10	E	4.70
BOTANY CIRCUIT (LOT 5330 HEADING W)	S	2.10	S	2.50	S	3.20	S	4.10	S	4.70
ELECTRIC CRESCENT	N	2.10	N	2.50	N	3.20	S	1.80	S	2.40

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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1:500 10 5 0 10 20 A1
1:1000 A3

REVISION	DATE	ISSUE DESCRIPTION	DRAWN	CHECKED	APPROVED
1	18/10/22	PRAM CROSSINGS ADDED	K.MCKELVIE	M.TROUNCE	T.PALIOS
0	13/08/21	ISSUED FOR CONSTRUCTION	K.MCKELVIE	M.TROUNCE	T.PALIOS
B	11/08/21	COUNCIL COMMENTS DATED 05/08/21	K.MCKELVIE	M.TROUNCE	T.PALIOS
A	25/05/21	ISSUED FOR APPROVAL	K.MCKELVIE	M.TROUNCE	T.PALIOS

CLIENT: villawood properties — Communities Designed for Living

creo CONSULTANTS
Suite 1, 2 Bloomsbury Street
Geelong, VIC, Australia 3220

PROJECT: ARMSTRONG MT DUNEED

DRAWING TITLE: ARMSTRONG ESTATE - STAGE 53A LAYOUT PLAN

STATUS: ISSUED FOR CONSTRUCTION

SCALE AT A1	DRAWN	DESIGNED
1:2000 @ A1	K.MCKELVIE	M.TROUNCE
PROJECT ENGINEER	PROJECT MANAGER	DATE FIRST ISSUE
M.TROUNCE	T.PALIOS	MAY 2021
PROJECT No.	DRAWING No.	REVISION
180016.53A	R100	1

APPENDIX A

Particle Size Distribution and Atterberg Limits Test Report Sheets

Material Test Report

Report Number: GSSW2031-14A
Issue Number: 1
Date Issued: 12/02/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2031
Project Name: ARMSTRONG ESTATE STAGE 53B
Project Location: MOUNT DUNEED
Work Request: 18344
Sample Number: 2031-S48A
Date Sampled: 29/01/2024
Dates Tested: 29/01/2024 - 09/02/2024
Sampling Method: AS 1289.1.2.1 6.2 - Sampling from stockpiles
Remarks: Combined sample made up from 4 randomly selected increments of the stockpile.
Sample Location: **Onsite Stockpile at lot 5338**
Material: CH - CLAY, with sand, trace gravel, mottled brown/grey/orange, medium plasticity, sand 28%, fine to coarse grained, gravel 9%
Material Source: Feehans Road

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

Accredited for compliance with ISO/IEC 17025 - Testing

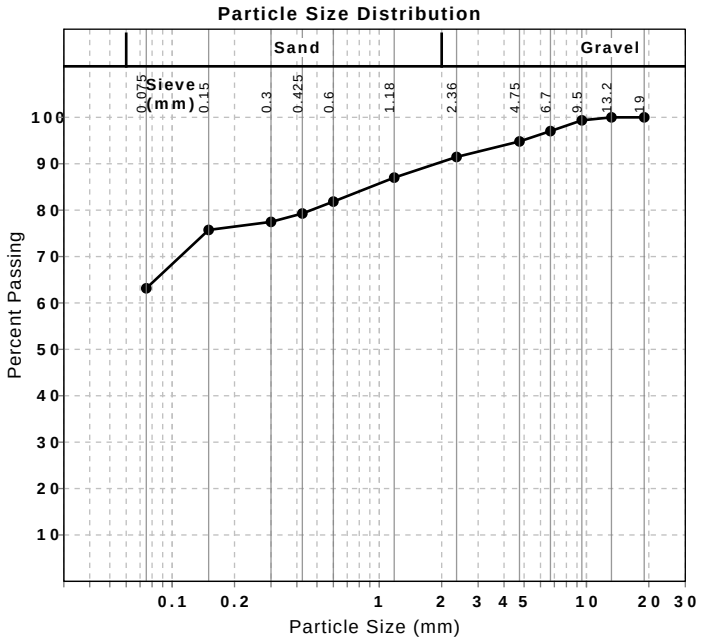
NATA
WORLD RECOGNISED ACCREDITATION

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	
19 mm	**100**			0		
13.2 mm	**100**			0		
9.5 mm	**99**			1		
6.7 mm	**97**			2		
4.75 mm	**95**			2		
2.36 mm	**91**			3		
1.18 mm	**87**			4		
0.6 mm	**82**			5		
0.425 mm	**79**			3		
0.3 mm	**77**			2		
0.15 mm	**76**			2		
0.075 mm	**63**			13		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	50		
Plastic Limit (%)	18		
Plasticity Index (%)	**32**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**12.0**		
Cracking Crumbling Curling	Cracking & Curling		



APPENDIX B

Field Density Test Report Summary Sheet

Project Summary Report

Report Date: 09/02/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Test Methods: AS 1289 5.7.1 STD & 5.8.1 & 2.1.1

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

Lot #	Sample #	Date Sampled	Location	Easting	Northing	Elevation (m)	Layer	Relative Compaction (%)	Moisture Variation (%)	Moisture Content (%)	Field Wet Density (t/m3)
**	2016-S1	20/11/2023	Northern Batter - refer to attached plan	266147	5765377	**	1	99.0	0.5	20.5	1.96
**	2016-S2	20/11/2023	Northern Batter - refer to attached plan	266230	5765406	**	1	96.5	0.5	19.8	1.98
**	2016-S3	20/11/2023	Northern Batter - refer to attached plan	266215	5765388	**	2	98.0	1.0	17.7	1.97
**	2016-S4	21/11/2023	Northern Batter - refer to attached plan	**	**	**	2	99.5	-0.5	19.6	2.02
**	2016-S5	22/11/2023	Botany Circuit Refer to attached plan	266265,	5765399 (Zone 55H), 23 m	**	1	98.5	2.0	20.1	1.94
**	2016-S6	22/11/2023	Botany Circuit Refer to attached plan	266279,	5765365 (Zone 55H), 24 m	**	1	104.5	2.0	18.1	2.06
**	2016-S7	22/11/2023	Botany Circuit Refer to attached plan	266237,	5765391 (Zone 55H), 23 m	**	3	99.5	-1.0	22.8	2.02
**	2016-S8	22/11/2023	Botany Circuit Refer to attached plan	266132,	5765366 (Zone 55H), 22 m	**	3	101.0	0.0	19.0	2.01
**	2016-S9	22/11/2023	Botany Circuit Refer to attached plan	266197	5765386 (Zone 55H), 24 m	**	4	99.5	1.0	19.5	2.00
**	2016-S10	22/11/2023	Botany Circuit Refer to attached plan	266162,	5765374 (Zone 55H), 24 m	**	4	101.5	1.0	17.7	2.02
**	2016-S11	23/11/2023	Refer to attached plan Lot 5301	266137,	5765350 (Zone 55H), 33 m	**	1	96.5	1.5	19.3	1.90
**	2016-S12	23/11/2023	Refer to attached plan Lot 5303	266166,	5765352 (Zone 55H), 30 m	**	1	99.0	2.0	18.8	1.95
**	2016-S13	23/11/2023	Refer to attached plan Lot 5305	266195,	5765358 (Zone 55H), 31 m	**	1	95.0	0.5	19.6	1.91
**	2016-S14	23/11/2023	Refer to attached plan Lot 5307	266223,	5765366 (Zone 55H), 29 m	**	1	98.0	2.0	18.8	1.95
**	2016-S15	23/11/2023	Refer to attached plan Lot 5308	266238,	5765376 (Zone 55H), 27 m	**	2	98.0	0.5	18.6	1.98
**	2016-S16	23/11/2023	Refer to attached plan Lot 5304	266175,	5765358 (Zone 55H), 26 m	**	2	95.5	2.0	18.1	1.92
**	2016-S17	24/11/2023	Lot 5305 Refer to attached plan	266195	5765358 (Zone 55H), 31 m	**	1	95.5	-0.5	19.5	1.96
**	2016-S18	24/11/2023	Lot 5306 Refer to attached plan	266214,	5765360 (Zone 55H), 25 m	**	1	97.5	-0.5	22.2	2.02
**	2016-S19	27/11/2023	Lot 5306 Refer to attached plan	**	**	**	2	103.5	1.5	18.2	2.07
**	2016-S20	27/11/2023	Lot 5304 Refer to attached plan	**	**	**	2	102.5	0.0	19.2	2.09
**	2016-S21	27/11/2023	Lot 5302 Refer to attached plan	**	**	**	2	99.5	0.5	20.0	2.00
**	2016-S22	28/11/2023	Lot 5308 Refer to attached plan	266229,	5765369 (Zone 55H), 26 m	**	3	95.0	0.0	18.2	1.97
**	2016-S23	28/11/2023	Lot 5304 Refer to attached plan	266177,	5765362 (Zone 55H), 29 m	**	3	96.0	0.0	17.3	1.98
**	2016-S24	28/11/2023	Botany Circuit Refer to attached plan	266268,	5765374 (Zone 55H), 27 m	**	2	99.0	-2.0	20.0	2.06
**	2016-S25	29/11/2023	Lot 5301 Refer to attached plan	266149,	5765357 (Zone 55H), 27 m	**	4	103.5	1.0	20.2	2.09
**	2016-S26	29/11/2023	Lot 5307 Refer to attached plan	266222,	5765369 (Zone 55H), 26 m	**	4	103.0	0.0	19.6	2.09
**	2016-S27	29/11/2023	Lot 5309 Refer to attached plan	266239,	5765358 (Zone 55H), 27 m	**	1	95.5	0.0	18.5	1.97
**	2016-S28	29/11/2023	Lot 5314 Refer to attached plan	266196,	5765332 (Zone 55H), 26 m	**	1	95.5	-0.5	19.3	1.98
**	2016-S29	29/11/2023	Lot 5315 Refer to attached plan	266183,	5765335 (Zone 55H), 28 m	**	2	97.0	-1.0	21.0	2.01
**	2016-S30	29/11/2023	Lot 5310 Refer to attached plan	266234,	5765352 (Zone 55H), 30 m	**	2	96.0	-1.0	20.3	1.99
**	2016-S31	30/11/2023	Lot 5313 Refer to attached plan	266218	5765338 (Zone 55H), 30 m	**	3	96.0	0.0	18.9	1.99
**	2016-S32	30/11/2023	Lot 5312 Refer to attached plan	266198	5765332 (Zone 55H), 29 m	**	3	98.0	-1.5	21.0	2.03
**	2016-S33	01/12/2023	Lot 5311 Refer to attached plan	266277.381E	5765325.57N 55H	**	4	98.5	0.5	20.2	1.99
**	2016-S34	01/12/2023	Lot 5313 Refer to attached plan	266218	5765338 (Zone 55H), 30 m	**	4	100.0	0.5	19.4	2.00

Lot #	Sample #	Date Sampled	Location	Easting	Northing	Elevation (m)	Layer	Relative Compaction (%)	Moisture Variation (%)	Moisture Content (%)	Field Wet Density (t/m3)
**	2016-S35	01/12/2023	Lot 5316 Refer to attached plan	266173.828E	5765329.69N 55H	**	1	99.0	1.0	18.6	1.98
**	2016-S36	01/12/2023	Lot 5312 Refer to attached plan	266220,	5765334 (Zone 55H), 31 m	**	4	99.0	0.5	19.8	1.99
**	2016-S37	04/12/2023	Lot 5316 Refer to attached plan	**	**	**	2	99.5	0.0	20.4	2.02
**	2016-S38	04/12/2023	Lot 5318 Refer to attached plan	**	**	**	3	102.5	2.0	18.3	2.05
**	2016-S39	04/12/2023	Lot 5312 Refer to attached plan	**	**	**	5	104.0	1.0	19.5	2.08
**	2016-S40	06/12/2023	Lot 5317 Refer to attached plan	266171,	5765332 (Zone 55H), 24 m	**	FSL	103.0	-0.5	20.7	2.08
**	2016-S41	06/12/2023	Lot 5317 edge Refer to attached plan	266153,	5765313 (Zone 55H), 28 m	**	1	97.5	0.5	19.4	2.00
**	2016-S42	06/12/2023	Lot 5315 edge Refer to attached plan	266183,	5765318 (Zone 55H), 29 m	**	1	105.5	1.5	19.1	2.12
**	2016-S43	07/12/2023	Refer to attached plan Botany Circuit	266116,	5765356 (Zone 55H), 28 m	**	1	99.0	-0.5	19.9	1.99
**	2016-S44	07/12/2023	Refer to attached plan Botany Circuit	266117,	5765341 (Zone 55H), 30 m	**	1	103.0	0.0	20.7	2.04
**	2016-S45	07/12/2023	Refer to attached plan Botany Circuit	266191,	5765381 (Zone 55H), 27 m	**	1	102.0	2.0	18.8	2.00
**	2016-S46	07/12/2023	Refer to attached plan Lot 5314	266153,	5765322 (Zone 55H), 29 m	**	2	99.5	0.0	16.8	2.03
**	2016-S47	07/12/2023	Refer to attached plan Lot 5318	266202,	5765322 (Zone 55H), 27 m	**	3	101.0	-0.5	17.5	2.05
**	2016-S48	08/12/2023	Refer to attached plan Lot 5313 edge	266231,	5765323 (Zone 55H), 29 m	**	1	103.0	-0.5	22.8	2.07
**	2016-S49	08/12/2023	Refer to attached plan Lot 5311 edge	266261,	5765332 (Zone 55H), 29 m	**	1	99.5	-0.5	20.1	2.02
**	2016-S50	08/12/2023	Refer to attached plan Botany Circuit	266294,	5765343 (Zone 55H), 26 m	**	1	99.5	-0.5	21.8	2.02
**	2016-S51	11/12/2023	Refer to attached plan Edge of Lot 5314	266207,	5765328 (Zone 55H), 26 m	**	2	103.5	2.0	20.8	2.00
**	2016-S52	11/12/2023	Refer to attached plan Edge of Lot 5315	266192	5765325 (Zone 55H), 26 m	**	3	102.0	0.5	21.2	2.03
**	2016-S53	11/12/2023	Refer to attached plan Edge of Lot 5312	266234,	5765333 (Zone 55H), 30 m	**	3	108.0	2.0	20.1	2.11
**	2016-S54	11/12/2023	Refer to attached plan Edge of Lot 5311	266258,	5765328 (Zone 55H), 15 m	**	4	103.0	0.0	23.1	2.02
**	2016-S55	11/12/2023	Refer to attached plan Edge of Lot 5318	266160,	5765305 (Zone 55H), 23 m	**	4	103.5	0.5	21.5	2.02
**	2016-S56	14/12/2023	Refer to attached plan Lot 5320	266135,	5765252 (Zone 55H), 33 m	**	1	101.0	-0.5	20.1	2.07
**	2016-S57	14/12/2023	Refer to attached plan Lot 5321	266163,	5765264 (Zone 55H), 27 m	**	1	103.5	1.5	18.8	2.06
**	2016-S58	14/12/2023	Refer to attached plan Lot 5322	266182,	5765263 (Zone 55H), 27 m	**	1	100.5	-0.5	18.5	2.04
**	2016-S59	16/12/2023	Refer to attached plan Lot 5319	266159,	5765274 (Zone 55H), 24 m	**	1	102.0	-0.5	21.0	2.05
**	2016-S60	16/12/2023	Refer to attached plan Lot 5323	266183,	5765280 (Zone 55H), 24 m	**	1	103.0	1.0	20.6	2.10
**	2016-S61	16/12/2023	Refer to attached plan Lot 5324	266228,	5765289 (Zone 55H), 24 m	**	1	100.5	2.0	17.5	2.02
**	2016-S62	16/12/2023	Refer to attached plan Lot 5328	266250,	5765283 (Zone 55H), 26 m	**	1	99.0	2.0	18.5	1.99
**	2016-S63	22/01/2024	Electric Crescent Refer to attached plan	266242,	5765306 (Zone 55H), 23 m	**	1	102.5	1.5	20.3	2.06
**	2016-S64	22/01/2024	Electric Crescent Refer to attached plan	266218,	5765306 (Zone 55H), 28 m	**	1	101.5	0.5	20.0	2.04
**	2016-S65	22/01/2024	Electric Crescent Refer to attached plan	266174,	5765292 (Zone 55H), 27 m	**	1	99.0	1.0	17.7	2.01
**	2016-S66	23/01/2024	Refer to attached plan Lot 5327	266238,	5765271 (Zone 55H), 27 m	**	2	96.5	0.5	19.4	2.00
**	2016-S67	23/01/2024	Refer to attached plan Lot 5326	266219,	5765274 (Zone 55H), 29 m	**	2	105.0	2.0	17.3	2.08
**	2016-S68	23/01/2024	Refer to attached plan Lot 5322	266170,	5765273 (Zone 55H), 31 m	**	2	101.0	0.0	21.4	2.08
**	2016-S69	24/01/2024	Refer to attached plan Electric Crescent	266170,	5765299 (Zone 55H), 29 m	**	2	103.0	2.0	19.8	2.01
**	2016-S70	24/01/2024	Refer to attached plan Electric Crescent	266208,	5765303 (Zone 55H), 31 m	**	2	106.0	2.0	16.2	2.05
**	2016-S71	24/01/2024	Refer to attached plan Electric Crescent	266241,	5765308 (Zone 55H), 30 m	**	2	106.5	2.0	15.1	2.06
**	2016-S72	24/01/2024	Refer to attached plan Lot 5330	266272	5765245 (Zone 55H), 31 m	**	1	101.5	1.5	21.8	1.98
**	2016-S73	24/01/2024	Refer to attached plan Lot 5330	266273	5765268 (Zone 55H), 29 m	**	1	101.0	1.0	21.0	1.96
**	2016-S74	24/01/2024	Refer to attached plan Lot 5329	266275	5765290 (Zone 55H), 33 m	**	1	102.5	0.5	21.8	2.00
**	2016-S75	24/01/2024	Refer to attached plan Lot 5326	266249	5765268 (Zone 55H), 36 m	**	3	104.5	3.5	18.9	1.98

Lot #	Sample #	Date Sampled	Location	Easting	Northing	Elevation (m)	Layer	Relative Compaction (%)	Moisture Variation (%)	Moisture Content (%)	Field Wet Density (t/m3)
**	2016-S76	24/01/2024	Refer to attached plan Lot 5325	266211	5765262 (Zone 55H), 35 m	**	3	103.5	2.0	18.4	1.99
**	2016-S77	24/01/2024	Refer to attached plan Lot 5323	266166	5765254 (Zone 55H), 37 m	**	3	105.5	3.5	20.5	1.97
**	2016-S78	25/01/2024	Refer to attached plan Electric Crescent	**	**	**	3	103.5	0.5	21.8	2.02
**	2016-S79	25/01/2024	Refer to attached plan Electric Crescent	**	**	**	3	108.0	2.0	21.0	2.14
**	2016-S80	25/01/2024	Refer to attached plan Electric Crescent	**	**	**	3	103.5	2.0	20.6	2.01
**	2016-S81	29/01/2024	Refer to attached plan Lot 5326	266249	5765268 (Zone 55H), 36 m	**	3	101.0	2.0	20.1	1.94
**	2016-S82	29/01/2024	Refer to attached plan Lot 5323	266166	5765254 (Zone 55H), 37 m	**	3	99.5	2.0	21.5	1.92
**	2016-S83	29/01/2024	Refer to attached plan Lot 5330	266284,	5765306 (Zone 55H), 31 m	**	2	98.5	0.5	24.6	1.89
**	2016-S84	29/01/2024	Refer to attached plan Electric Crescent	266241,	5765313 (Zone 55H), 26 m	**	FSL	100.5	1.0	22.0	1.98
**	2016-S85	29/01/2024	Refer to attached plan Electric Crescent	266194	5765298 (Zone 55H), 30 m	**	FSL	100.5	2.0	19.5	1.96
**	2016-S86	29/01/2024	Refer to attached plan Electric Crescent	266159,	5765288 (Zone 55H), 28 m	**	FSL	101.5	2.0	19.9	2.00
**	2016-S87	30/01/2024	Refer to attached plan Lot 5329	144.32973	38.22984S	**	3	103.5	0.5	20.5	2.00
**	2016-S88	31/01/2024	Refer to attached plan Lot 5330	266171,	5765119 (AGD66 Zone 55H), 27 m	**	4	97.0	0.0	19.8	1.93
**	2016-S89	31/01/2024	Refer to attached plan Lot 5322	266067,	5765079 (AGD66 Zone 55H), 27 m	**	4	99.0	2.0	19.4	1.93
**	2016-S90	31/01/2024	Refer to attached plan Lot 5325	266105,	5765074 (AGD66 Zone 55H),	**	4	98.5	0.0	22.8	1.91
**	2016-S91	31/01/2024	Refer to attached plan Lot 5329	266167,	5765118 (AGD66 Zone 55H), 27 m	**	5	102.5	0.0	20.5	2.04

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Sample Locations Plan

x - approximate test location

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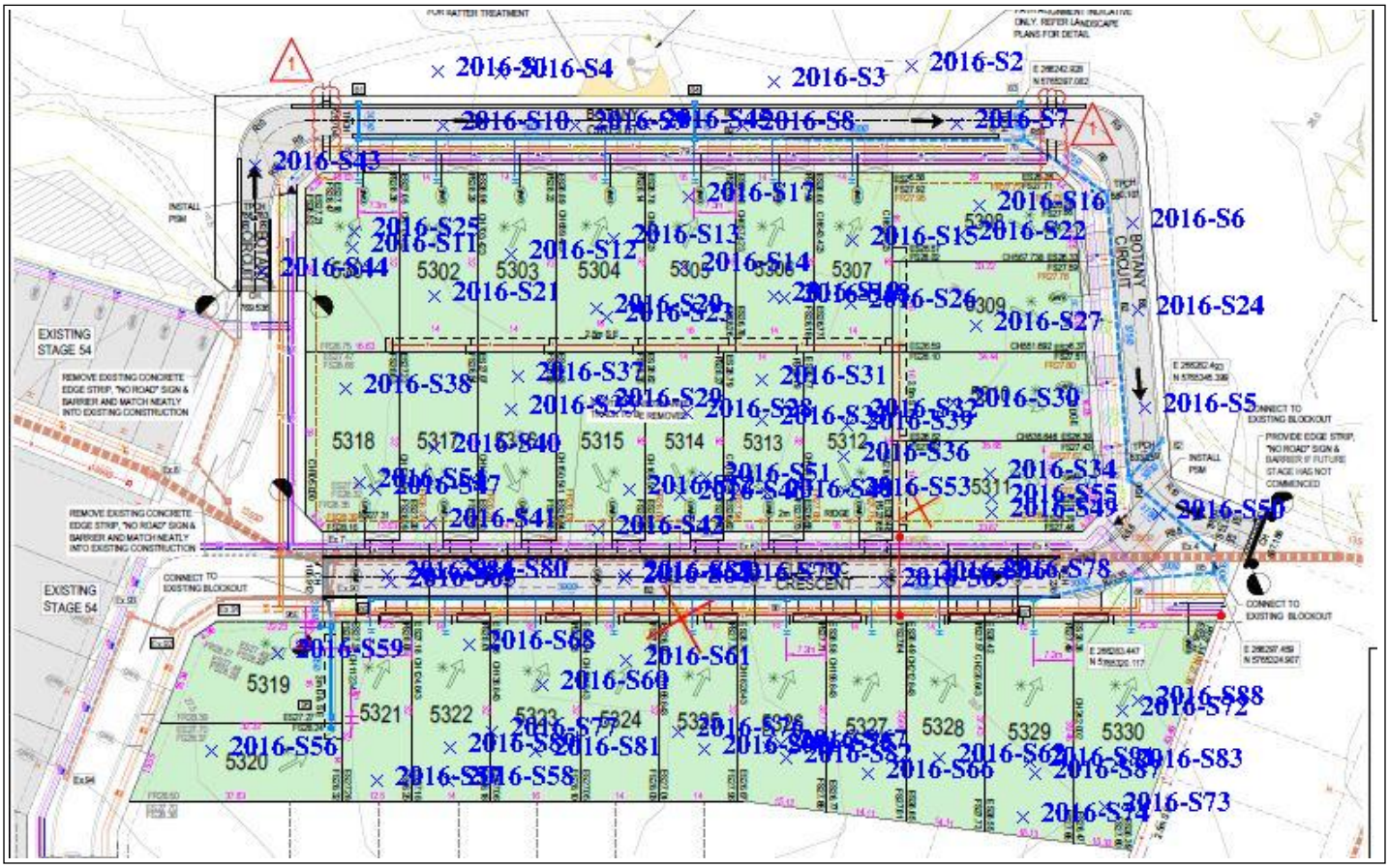
Geotechnical & Environmental Consultants



APPENDIX C

Field Density Test Report Sheets & Test Locations

Material Test Report

Report Number: GSSW2016-1
Issue Number: 1
Date Issued: 22/11/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17829
Date Sampled: 20/11/2023
Dates Tested: 20/11/2023 - 21/11/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Material: CLAY, with sand, trace gravel, medium to high plasticity
Material Source: On site material

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

Accredited for compliance with ISO/IEC 17025 - Testing

NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S1	2016-S2	2016-S3
Date Tested	20/11/2023	20/11/2023	20/11/2023
Time Tested	12:45	12:55	16:50
Test Request #/Location	Northern Batter - refer to attached plan	Northern Batter - refer to attached plan	Northern Batter - refer to attached plan
Easting	266147	266230	266215
Northing	5765377	5765406	5765388
Layer / Reduced Level	1	1	2
Thickness of Layer (mm)	250	250	250
Soil Description	CLAY, with sand, trace gravel, medium to high plasticity	CLAY, with sand, trace gravel, medium to high plasticity	CLAY, with sand, trace gravel, medium to 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	1.96	1.98	1.97
Field Moisture Content %	20.5	19.8	17.7
Field Dry Density (FDD) t/m^3	1.63	1.66	1.67
Peak Converted Wet Density t/m^3	1.98	2.06	2.01
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Moisture Variation (Wv) %	0.5	0.5	1.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**99.0**	**96.5**	**98.0**
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

x - approximate test location

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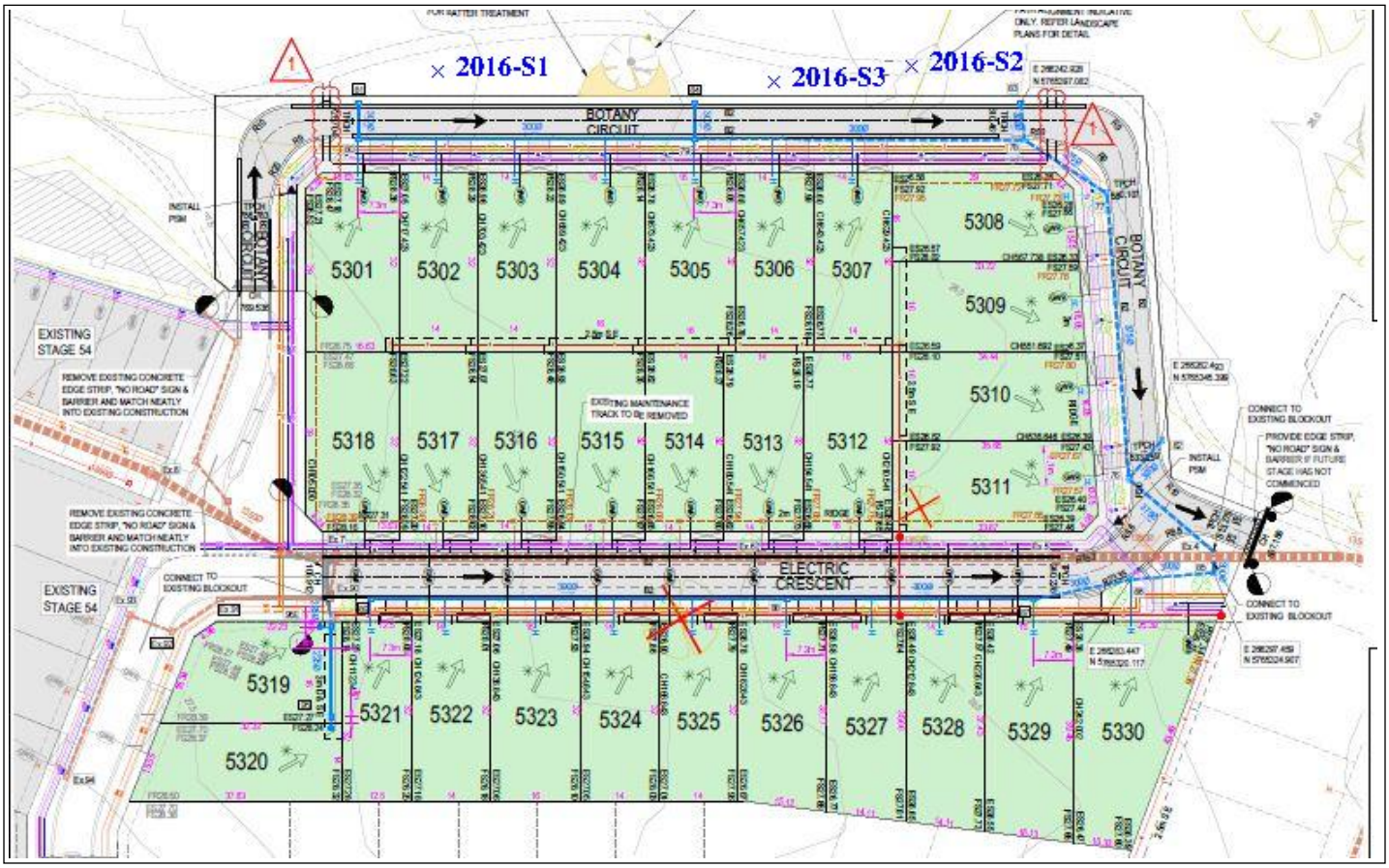
Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW2016-2
Issue Number: 1
Date Issued: 22/11/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17858
Date Sampled: 21/11/2023
Dates Tested: 21/11/2023 - 22/11/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Material: CLAY, with sand, trace gravel, medium to high plasticity
Material Source: On site material

Ground Science South West
Geotechnical & Environmental Consultants

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Phone: (03) 5282 1566
Email: chrism@groundscience.com.au

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NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S4		
Date Tested	21/11/2023		
Time Tested	11:00		
Test Request #/Location	Northern Batter - refer to attached plan		
Layer / Reduced Level	2		
Thickness of Layer (mm)	250		
Soil Description	CLAY, with sand, trace gravel, high plasticity		
Test Depth (mm)	225		
Sieve used to determine oversize (mm)	19.0		
Percentage of Wet Oversize (%)	0		
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0		
Field Wet Density (FWD) t/m^3	2.02		
Field Moisture Content %	19.6		
Field Dry Density (FDD) t/m^3	1.69		
Peak Converted Wet Density t/m^3	2.02		
Adjusted Peak Converted Wet Density t/m^3	**		
Adj. Optimum Moisture Content % (AS1289.5.4.1)	19.2		
Adj. Field Moisture Content % (AS1289.5.4.1)	19.6		
Moisture Ratio % (AS1289.5.4.1)	101.5		
Adjusted Moisture Ratio % (AS1289.5.4.1)	**		
Moisture Variation (Wv) %	-0.5		
Adjusted Moisture Variation %	**		
Hilf Density Ratio (%)	**99.5**		
Compaction Method	**Standard**		
Report 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

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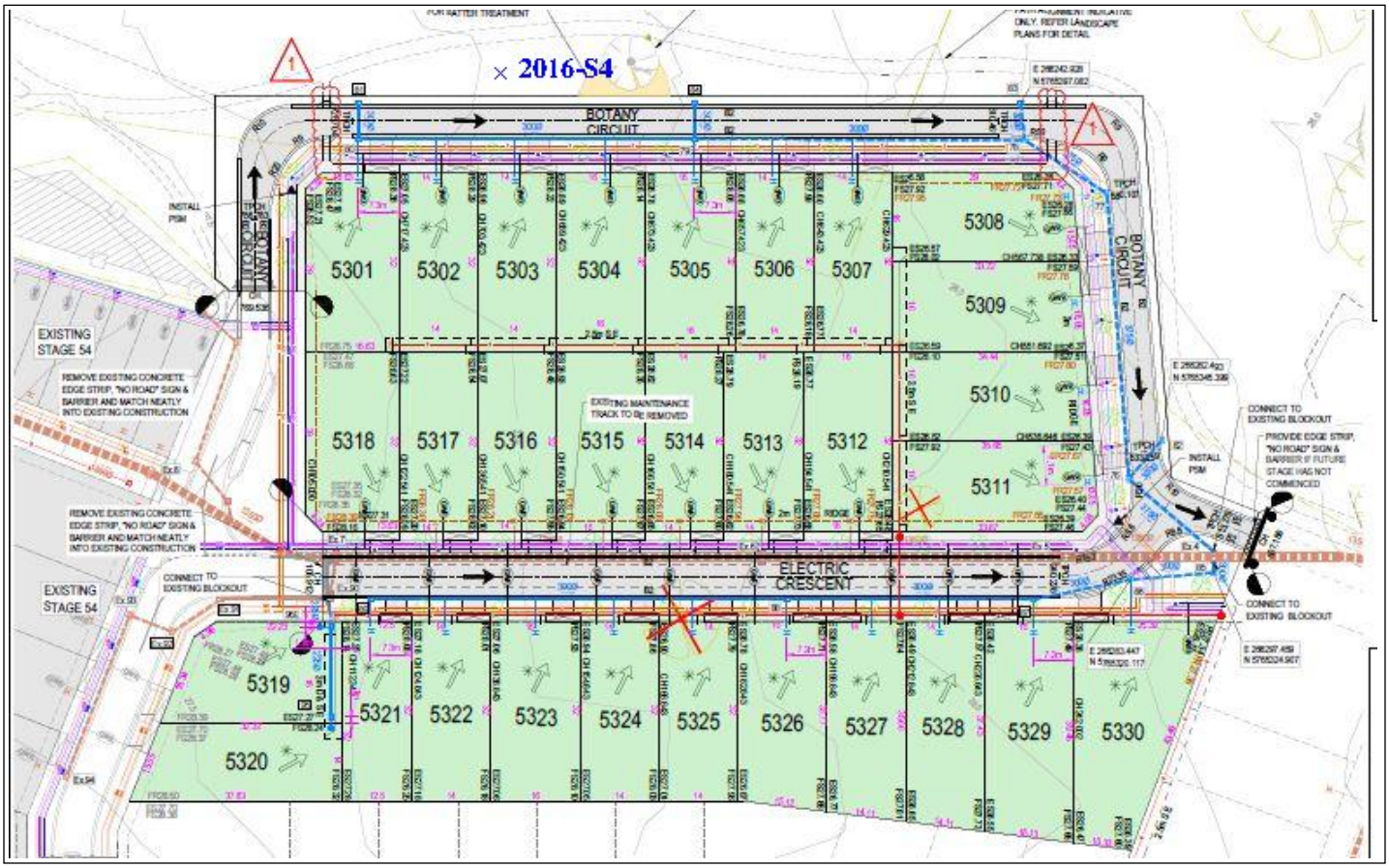
Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW2016-3
Issue Number: 1
Date Issued: 23/11/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17865
Date Sampled: 22/11/2023
Dates Tested: 22/11/2023 - 23/11/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 98% Standard Compaction & +/- 2% Moisture Variation
Material: CLAY, with sand, trace gravel, medium to high plasticity
Material Source: Onsite

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

Accredited for compliance with ISO/IEC 17025 - Testing

NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S5	2016-S6	2016-S7	2016-S8	2016-S9	2016-S10
Date Tested	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023	22/11/2023
Time Tested	08:00	08:10	09:30	09:40	14:14	14:22
Test Request #/Location	Botany Circuit Refer to attached plan	Botany Circuit Refer to attached plan	Botany Circuit Refer to attached plan	Botany Circuit Refer to attached plan	Botany Circuit Refer to attached plan	Botany Circuit Refer to attached plan
Easting	266265,	266279,	266237,	266132,	266197	266162,
Northing	5765399 (Zone 55H), 23 m	5765365 (Zone 55H), 24 m	5765391 (Zone 55H), 23 m	5765366 (Zone 55H), 22 m	5765386 (Zone 55H), 24 m	5765374 (Zone 55H), 24 m
Layer / Reduced Level	1	1	3	3	4	4
Thickness of Layer (mm)	250	250	150	150	150	150
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity
Test Depth (mm)	225	225	125	125	125	125
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	0
Field Wet Density (FWD) t/m^3	1.94	2.06	2.02	2.01	2.00	2.02
Field Moisture Content %	20.1	18.1	22.8	19.0	19.5	17.7
Field Dry Density (FDD) t/m^3	1.62	1.74	1.64	1.69	1.67	1.71
Peak Converted Wet Density t/m^3	1.97	1.96	2.03	1.99	2.01	1.98
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	22.0	20.1	21.8	18.8	20.3	18.6
Adj. Field Moisture Content % (AS1289.5.4.1)	20.1	18.1	22.8	19.0	19.5	17.7
Moisture Ratio % (AS1289.5.4.1)	91.0	90.0	104.0	101.0	96.0	95.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**	**	**
Moisture Variation (Wv) %	2.0	2.0	-1.0	0.0	1.0	1.0
Adjusted Moisture Variation %	**	**	**	**	**	**
Hilf Density Ratio (%)	**98.5**	**104.5**	**99.5**	**101.0**	**99.5**	**101.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**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

x - approximate test location

Ground Science South West
Geotechnical & Environmental Consultants

Material Test Report

Report Number: GSSW2016-4
Issue Number: 1
Date Issued: 24/11/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17876
Date Sampled: 23/11/2023
Dates Tested: 23/11/2023 - 24/11/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5301 to 5308
Material: CLAY, with sand, trace gravel, medium to high plasticity
Material Source: On site

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

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NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S11	2016-S12	2016-S13	2016-S14	2016-S15	2016-S16
Date Tested	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023
Time Tested	08:50	08:56	09:05	09:15	15:50	16:00
Test Request #/Location	Refer to attached plan Lot 5301	Refer to attached plan Lot 5303	Refer to attached plan Lot 5305	Refer to attached plan Lot 5307	Refer to attached plan Lot 5308	Refer to attached plan Lot 5304
Easting	266137,	266166,	266195,	266223,	266238,	266175,
Northing	5765350 (Zone 55H), 33 m	5765352 (Zone 55H), 30 m	5765358 (Zone 55H), 31 m	5765366 (Zone 55H), 29 m	5765376 (Zone 55H), 27 m	5765358 (Zone 55H), 26 m
Layer / Reduced Level	1	1	1	1	2	2
Thickness of Layer (mm)	250	250	250	250	250	250
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, 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	0
Field Wet Density (FWD) t/m^3	1.90	1.95	1.91	1.95	1.98	1.92
Field Moisture Content %	19.3	18.8	19.6	18.8	18.6	18.1
Field Dry Density (FDD) t/m^3	1.60	1.64	1.60	1.64	1.67	1.63
Peak Converted Wet Density t/m^3	1.97	1.97	2.01	1.99	2.01	2.01
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	21.0	20.6	20.2	20.8	19.2	20.0
Adj. Field Moisture Content % (AS1289.5.4.1)	19.3	18.8	19.6	18.8	18.6	18.1
Moisture Ratio % (AS1289.5.4.1)	92.0	91.0	97.5	90.5	97.0	90.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**	**	**
Moisture Variation (Wv) %	1.5	2.0	0.5	2.0	0.5	2.0
Adjusted Moisture Variation %	**	**	**	**	**	**
Hilf Density Ratio (%)	**96.5**	**99.0**	**95.0**	**98.0**	**98.0**	**95.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**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

x - approximate test location

Ground Science South West
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Material Test Report

Ground Science South West
Geotechnical & Environmental Consultants

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NATA
WORLD RECOGNISED ACCREDITATION

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

Report Number: **GSSW2016-5**
Issue Number: 1
Date Issued: 27/11/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17892
Date Sampled: 24/11/2023
Dates Tested: 24/11/2023 - 27/11/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5305 & 5306
Material: CLAY, with sand, trace gravel, medium to high plasticity
Material Source: Onsite

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	2016-S17	2016-S18	
Date Tested	24/11/2023	24/11/2023	
Time Tested	11:00	13:48	
Test Request #/Location	Lot 5305 Refer to attached plan	Lot 5306 Refer to attached plan	
Easting	266195	266214,	
Northing	5765358 (Zone 55H), 31 m	5765360 (Zone 55H), 25 m	
Layer / Reduced Level	1	1	
Thickness of Layer (mm)	250	250	
Soil Description	gravelly CLAY, medium to high plasticity	gravelly CLAY, medium to high plasticity	
Test Depth (mm)	225	225	
Sieve used to determine oversize (mm)	19.0	19.0	
Percentage of Wet Oversize (%)	0	0	
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	
Field Wet Density (FWD) t/m^3	1.96	2.02	
Field Moisture Content %	19.5	22.2	
Field Dry Density (FDD) t/m^3	1.64	1.65	
Peak Converted Wet Density t/m^3	2.05	2.08	
Adjusted Peak Converted Wet Density t/m^3	**	**	
Adj. Optimum Moisture Content % (AS1289.5.4.1)	19.1	21.9	
Adj. Field Moisture Content % (AS1289.5.4.1)	19.5	22.2	
Moisture Ratio % (AS1289.5.4.1)	102.5	101.0	
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	
Moisture Variation (Wv) %	-0.5	-0.5	
Adjusted Moisture Variation %	**	**	
Hilf Density Ratio (%)	**95.5**	**97.5**	
Compaction Method	**Standard**	**Standard**	
Report 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

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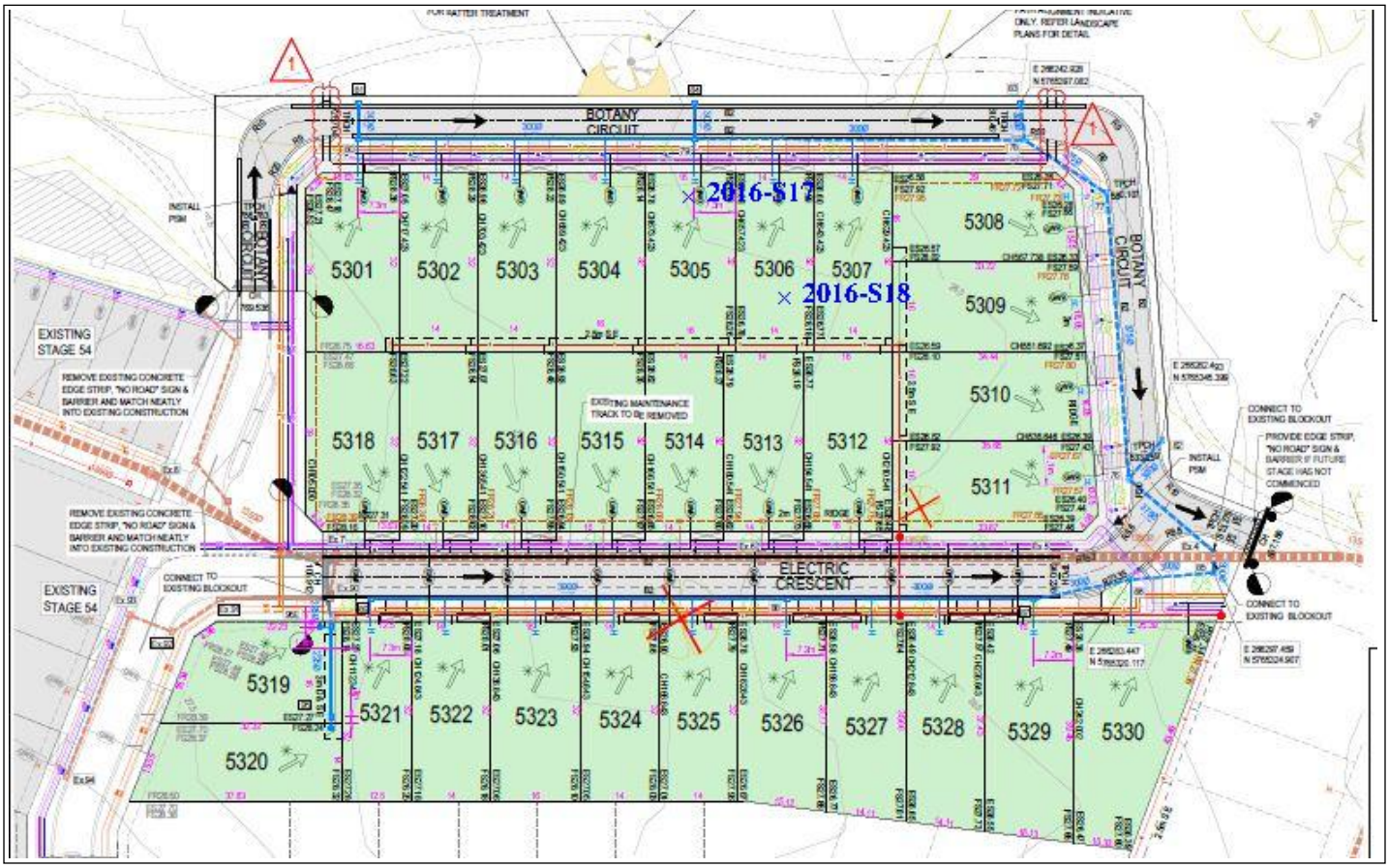

Material Test Report

Report Number: GSSW2016-6
Issue Number: 1
Date Issued: 29/11/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17907
Date Sampled: 27/11/2023
Dates Tested: 27/11/2023 - 28/11/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5301 to 5307
Material: CLAY, with sand, trace gravel, medium to high plasticity
Material Source: On site

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Geotechnical & Environmental Consultants

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NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S19	2016-S20	2016-S21
Date Tested	27/11/2023	27/11/2023	27/11/2023
Time Tested	14:55	15:05	16:00
Test Request #/Location	Lot 5306 Refer to attached plan	Lot 5304 Refer to attached plan	Lot 5302 Refer to attached plan
Layer / Reduced Level	2	2	2
Thickness of Layer (mm)	250	250	250
Soil Description	CLAY, with sand, trace gravel, medium to high plasticity	CLAY, with sand, trace gravel, medium to high plasticity	CLAY, with sand, trace gravel, medium to 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
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m^3	2.07	2.09	2.00
Field Moisture Content %	18.2	19.2	20.0
Field Dry Density (FDD) t/m^3	1.75	1.75	1.67
Peak Converted Wet Density t/m^3	2.01	2.04	2.02
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	19.8	19.3	20.4
Adj. Field Moisture Content % (AS1289.5.4.1)	18.2	19.2	20.0
Moisture Ratio % (AS1289.5.4.1)	92.0	99.5	98.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	1.5	0.0	0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**103.5**	**102.5**	**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

Sample Locations Plan

x - approximate test location

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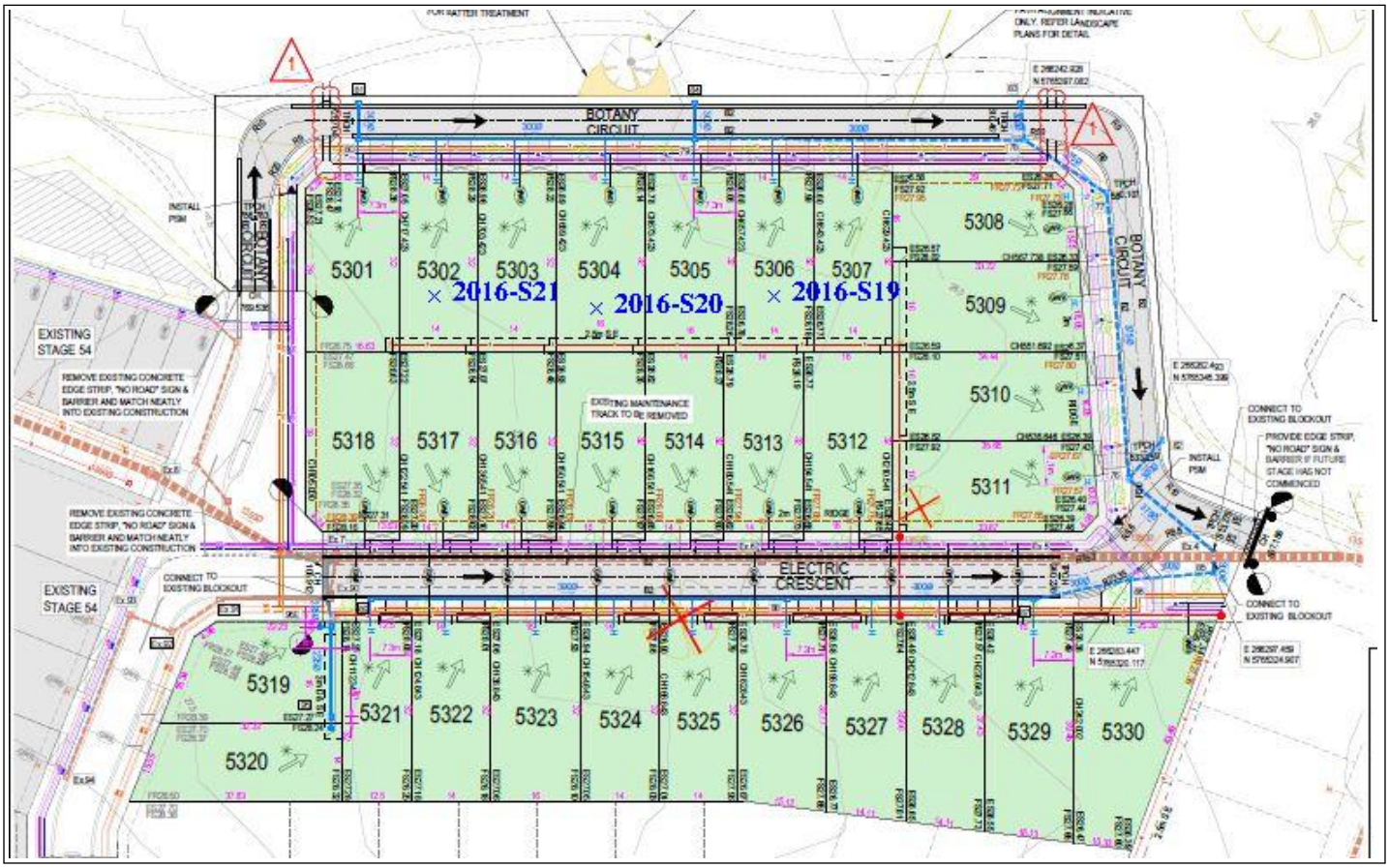

Material Test Report

Report Number: GSSW2016-7
Issue Number: 1
Date Issued: 29/11/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17914
Date Sampled: 28/11/2023
Dates Tested: 28/11/2023 - 29/11/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Site Selection: RC 316.10
Location: Lots 5301-5308 & Botany Circuit
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Onsite

Ground Science South West
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WORLD RECOGNISED ACCREDITATION

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	2016-S22	2016-S23	2016-S24
Date Tested	28/11/2023	28/11/2023	28/11/2023
Time Tested	10:30	10:40	12:09
Test Request #/Location	Lot 5308 Refer to attached plan	Lot 5304 Refer to attached plan	Botany Circuit Refer to attached plan
Easting	266229,	266177,	266268,
Northing	5765369 (Zone 55H), 26 m	5765362 (Zone 55H), 29 m	5765374 (Zone 55H), 27 m
Layer / Reduced Level	3	3	2
Thickness of Layer (mm)	250	250	250
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, 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 (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m^3	1.97	1.98	2.06
Field Moisture Content %	18.2	17.3	20.0
Field Dry Density (FDD) t/m^3	1.67	1.69	1.71
Peak Converted Wet Density t/m^3	2.08	2.06	2.07
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	18.2	17.5	17.8
Adj. Field Moisture Content % (AS1289.5.4.1)	18.2	17.3	20.0
Moisture Ratio % (AS1289.5.4.1)	100.0	99.0	112.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	0.0	0.0	-2.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**95.0**	**96.0**	**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

Sample Locations Plan

x - approximate test location

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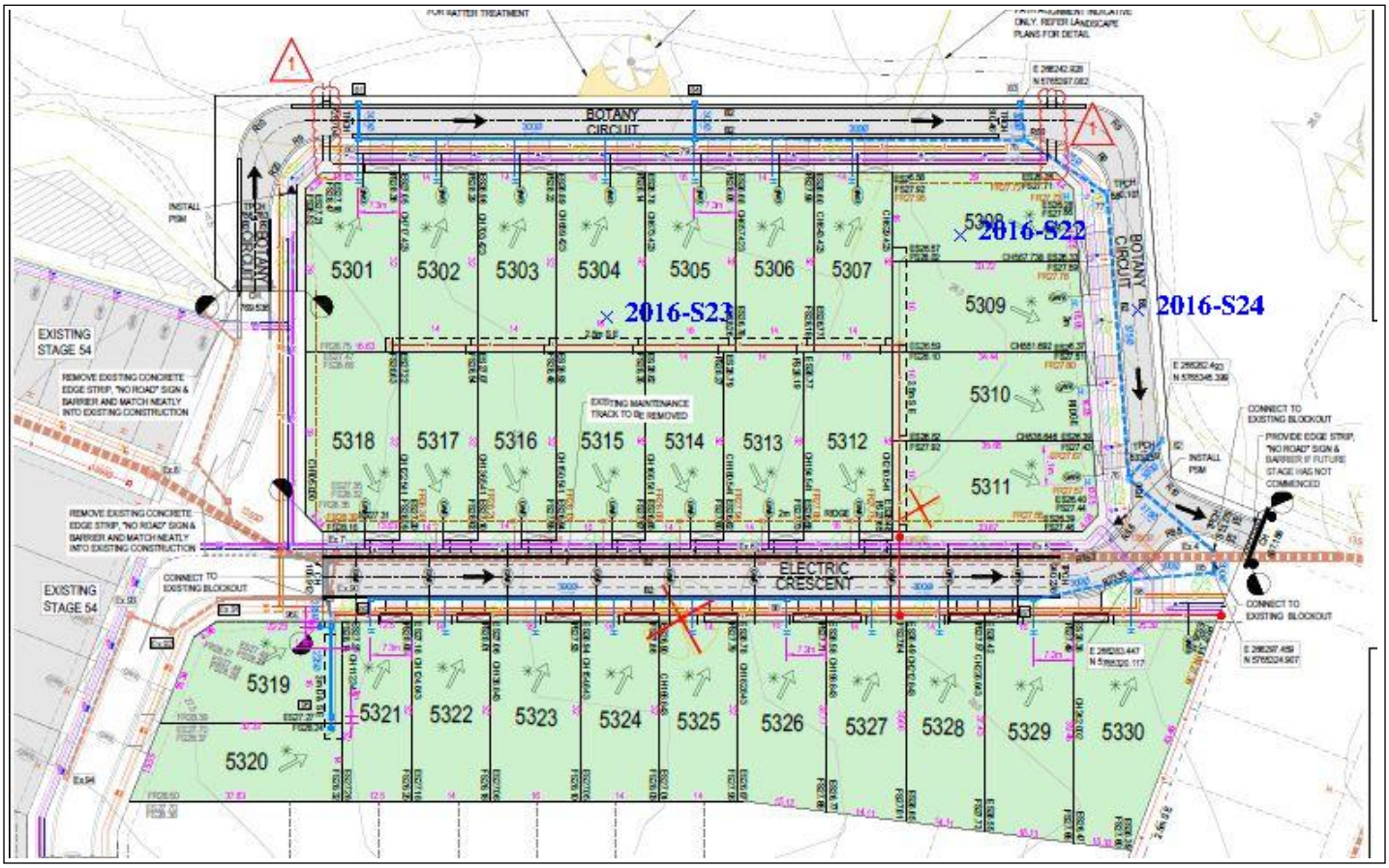

Material Test Report

Report Number: GSSW2016-8
Issue Number: 1
Date Issued: 30/11/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17922
Date Sampled: 29/11/2023
Dates Tested: 29/11/2023 - 30/11/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5301-5314
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Onsite

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WORLD RECOGNISED ACCREDITATION

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

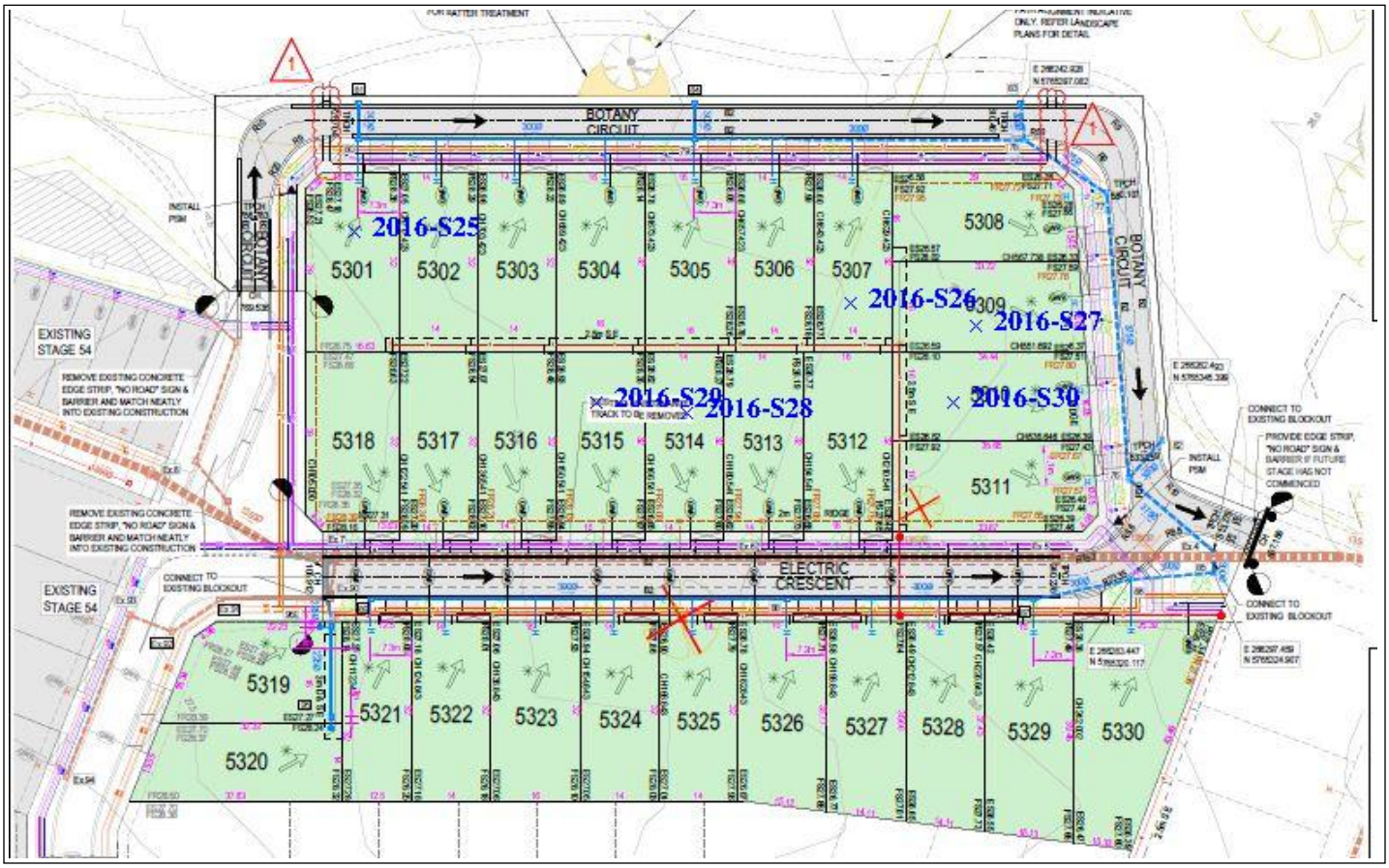
Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1						
Sample Number	2016-S25	2016-S26	2016-S27	2016-S28	2016-S29	2016-S30
Date Tested	29/11/2023	29/11/2023	29/11/2023	29/11/2023	29/11/2023	29/11/2023
Time Tested	08:30	08:40	09:30	09:37	13:40	13:52
Test Request #/Location	Lot 5301 Refer to attached plan	Lot 5307 Refer to attached plan	Lot 5309 Refer to attached plan	Lot 5314 Refer to attached plan	Lot 5315 Refer to attached plan	Lot 5310 Refer to attached plan
Easting	266149,	266222,	266239,	266196,	266183,	266234,
Northing	5765357 (Zone 55H), 27 m	5765369 (Zone 55H), 26 m	5765358 (Zone 55H), 27 m	5765332 (Zone 55H), 26 m	5765335 (Zone 55H), 28 m	5765352 (Zone 55H), 30 m
Layer / Reduced Level	4	4	1	1	2	2
Thickness of Layer (mm)	250	250	250	250	250	250
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, 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	0
Field Wet Density (FWD) t/m^3	2.09	2.09	1.97	1.98	2.01	1.99
Field Moisture Content %	20.2	19.6	18.5	19.3	21.0	20.3
Field Dry Density (FDD) t/m^3	1.74	1.75	1.67	1.66	1.66	1.65
Peak Converted Wet Density t/m^3	2.02	2.03	2.07	2.08	2.07	2.07
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	21.0	19.8	18.4	18.7	19.9	19.3
Adj. Field Moisture Content % (AS1289.5.4.1)	20.2	19.6	18.5	19.3	21.0	20.3
Moisture Ratio % (AS1289.5.4.1)	96.0	99.0	100.5	103.5	105.5	105.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**	**	**
Moisture Variation (Wv) %	1.0	0.0	0.0	-0.5	-1.0	-1.0
Adjusted Moisture Variation %	**	**	**	**	**	**
Hilf Density Ratio (%)	**103.5**	**103.0**	**95.5**	**95.5**	**97.0**	**96.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**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

x - approximate test location

Ground Science South West
Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW2016-9
Issue Number: 1
Date Issued: 01/12/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17934
Date Sampled: 30/11/2023
Dates Tested: 30/11/2023 - 01/12/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5313 & 5312
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Onsite

Ground Science South West
Geotechnical & Environmental Consultants

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NATA
WORLD RECOGNISED ACCREDITATION

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

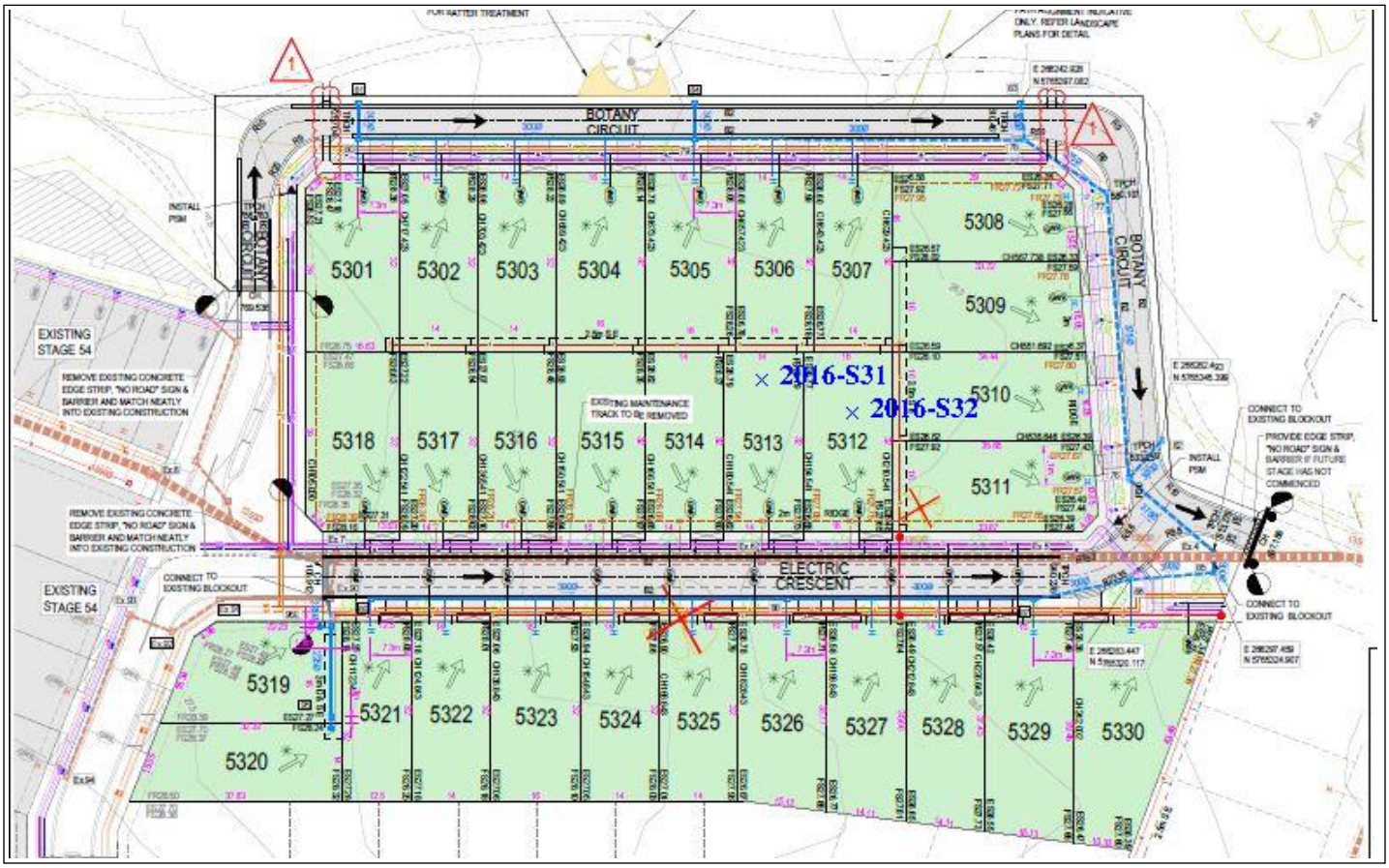
Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	2016-S31	2016-S32	
Date Tested	30/11/2023	30/11/2023	
Time Tested	08:00	08:33	
Test Request #/Location	Lot 5313 Refer to attached plan	Lot 5312 Refer to attached plan	
Easting	266218	266198	
Northing	5765338 (Zone 55H), 30 m	5765332 (Zone 55H), 29 m	
Layer / Reduced Level	3	3	
Thickness of Layer (mm)	250	250	
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	
Test Depth (mm)	225	225	
Sieve used to determine oversize (mm)	19.0	19.0	
Percentage of Wet Oversize (%)	0	0	
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	
Field Wet Density (FWD) t/m^3	1.99	2.03	
Field Moisture Content %	18.9	21.0	
Field Dry Density (FDD) t/m^3	1.67	1.68	
Peak Converted Wet Density t/m^3	2.07	2.08	
Adjusted Peak Converted Wet Density t/m^3	**	**	
Adj. Optimum Moisture Content % (AS1289.5.4.1)	18.7	19.2	
Adj. Field Moisture Content % (AS1289.5.4.1)	18.9	21.0	
Moisture Ratio % (AS1289.5.4.1)	101.0	109.5	
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	
Moisture Variation (Wv) %	0.0	-1.5	
Adjusted Moisture Variation %	**	**	
Hilf Density Ratio (%)	**96.0**	**98.0**	
Compaction Method	**Standard**	**Standard**	
Report 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: GSSW2016-10
Issue Number: 1
Date Issued: 05/12/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17943
Date Sampled: 01/12/2023
Dates Tested: 01/12/2023 - 04/12/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5309-5316
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Onsite

Ground Science South West
Geotechnical & Environmental Consultants

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Email: chrism@groundscience.com.au

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WORLD RECOGNISED ACCREDITATION

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	2016-S33	2016-S34	2016-S35	2016-S36
Date Tested	01/12/2023	01/12/2023	01/12/2023	01/12/2023
Time Tested	08:00	08:30	13:24	15:54
Test Request #/Location	Lot 5311 Refer to attached plan	Lot 5313 Refer to attached plan	Lot 5316 Refer to attached plan	Lot 5312 Refer to attached plan
Easting	266277.381E	266218	266173.828E	266220,
Northing	5765325.57N 55H	5765338 (Zone 55H), 30 m	5765329.69N 55H	5765334 (Zone 55H), 31 m
Layer / Reduced Level	4	4	1	4
Thickness of Layer (mm)	250	250	250	250
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity
Test Depth (mm)	225	225	225	225
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	**	**	**
Field Wet Density (FWD) t/m^3	1.99	2.00	1.98	1.99
Field Moisture Content %	20.2	19.4	18.6	19.8
Field Dry Density (FDD) t/m^3	1.65	1.67	1.67	1.66
Peak Converted Wet Density t/m^3	2.02	2.00	2.00	2.01
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	20.6	**	**	**
Adj. Field Moisture Content % (AS1289.5.4.1)	20.2	19.4	18.6	19.8
Moisture Ratio % (AS1289.5.4.1)	97.5	96.0	96.0	98.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**
Moisture Variation (Wv) %	0.5	0.5	1.0	0.5
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	**98.5**	**100.0**	**99.0**	**99.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	**	**

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

Sample Locations Plan

x - approximate test location

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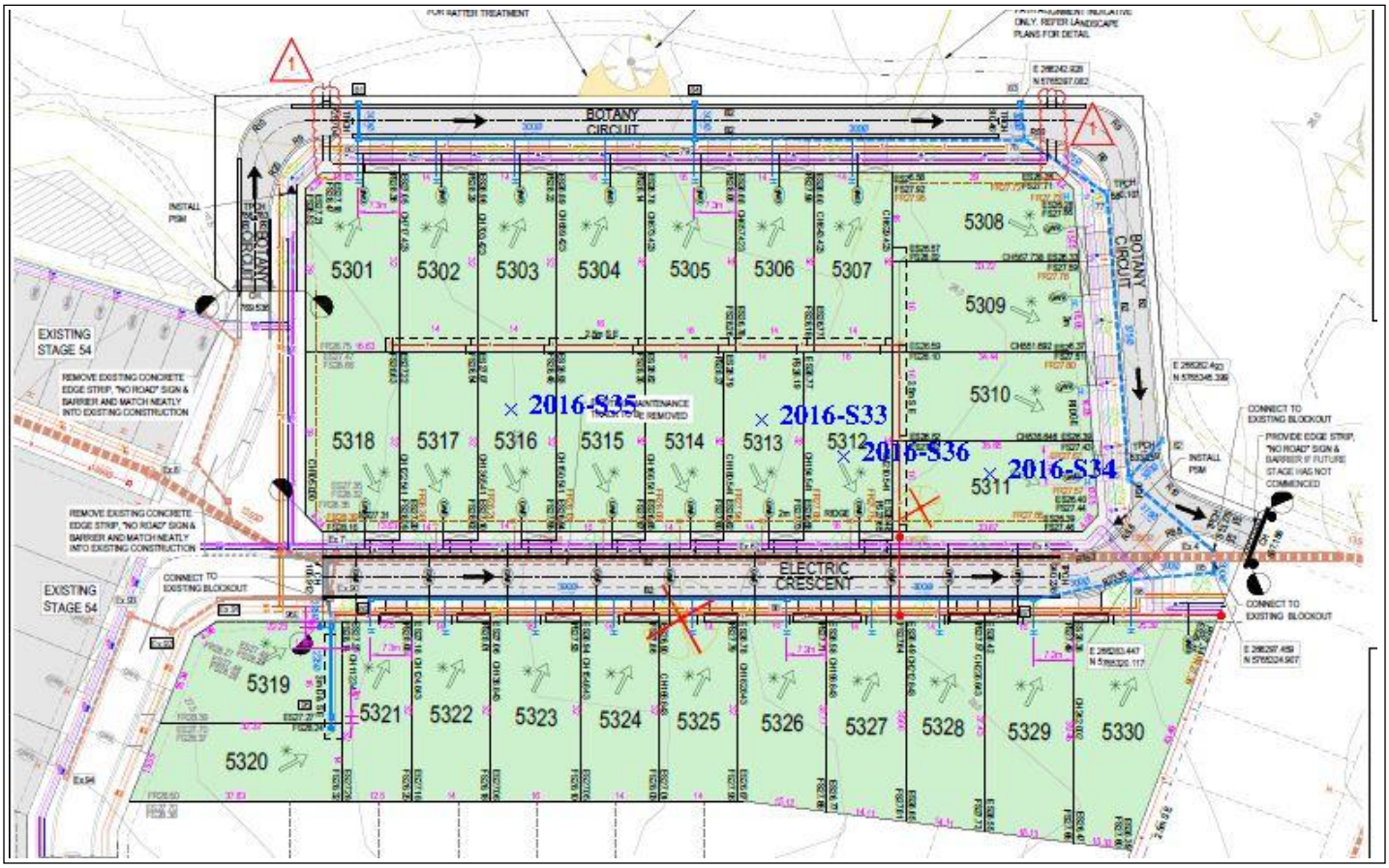

Material Test Report

Report Number: GSSW2016-11
Issue Number: 1
Date Issued: 06/12/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17950
Date Sampled: 04/12/2023
Dates Tested: 04/12/2023 - 05/12/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5310-5318
Material: CLAY, with sand, trace gravel, medium to high plasticity
Material Source: On site

Ground Science South West
Geotechnical & Environmental Consultants

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NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S37	2016-S38	2016-S39
Date Tested	04/12/2023	04/12/2023	04/12/2023
Time Tested	07:47	10:40	16:00
Test Request #/Location	Lot 5316 Refer to attached plan	Lot 5318 Refer to attached plan	Lot 5312 Refer to attached plan
Layer / Reduced Level	2	3	5
Thickness of Layer (mm)	250	250	250
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, 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 (%)	0	0	0
Field Wet Density (FWD) t/m^3	2.02	2.05	2.08
Field Moisture Content %	20.4	18.3	19.5
Field Dry Density (FDD) t/m^3	1.68	1.73	1.74
Peak Converted Wet Density t/m^3	2.03	2.00	2.00
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Moisture Variation (Wv) %	0.0	2.0	1.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**99.5**	**102.5**	**104.0**
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

x - approximate test location

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Material Test Report

Report Number: GSSW2016-12
Issue Number: 1
Date Issued: 08/12/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17972
Date Sampled: 06/12/2023
Dates Tested: 06/12/2023 - 07/12/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5311-5316 edges
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Onsite

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Geotechnical & Environmental Consultants

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WORLD RECOGNISED ACCREDITATION

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

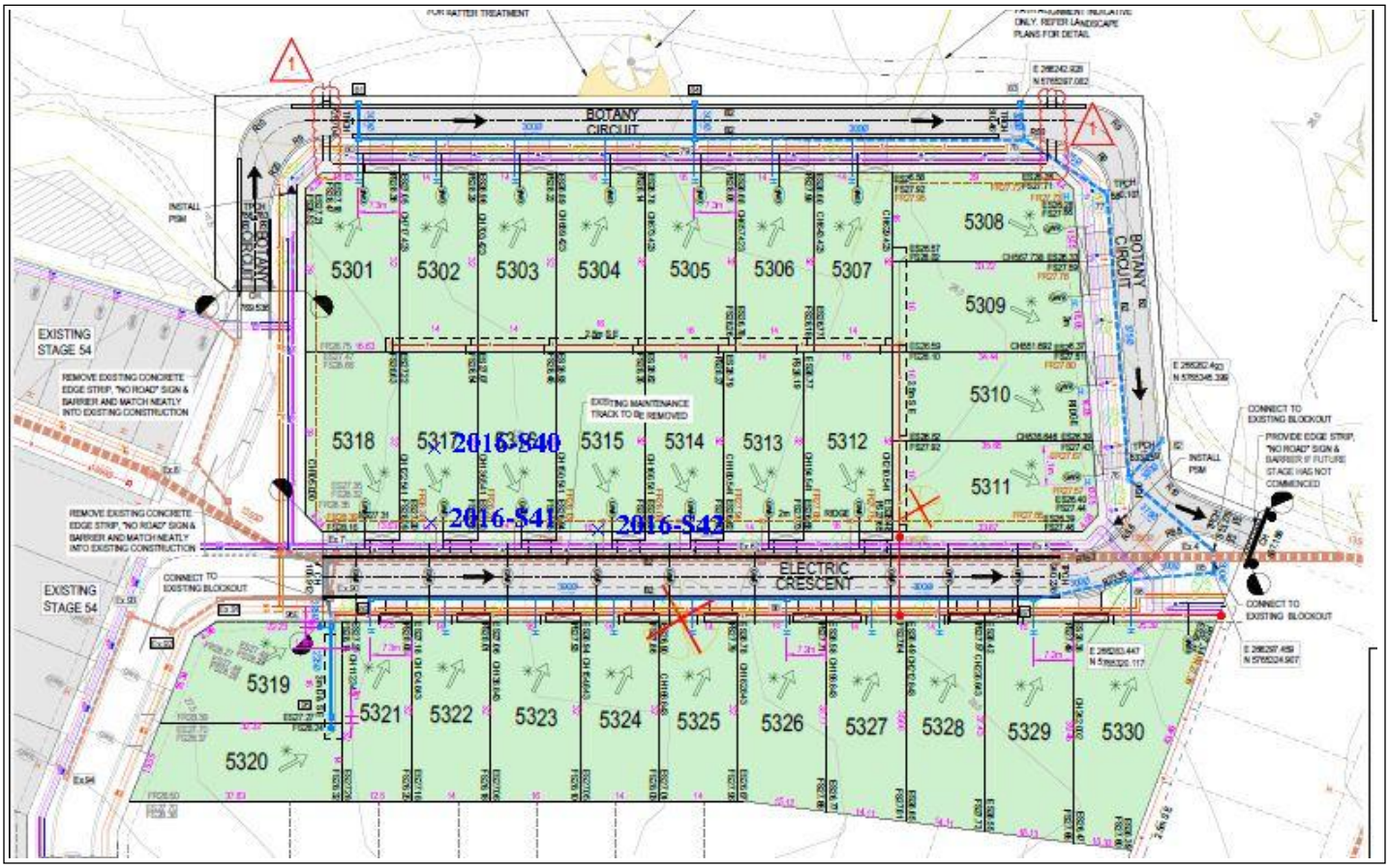
Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	2016-S40	2016-S41	2016-S42
Date Tested	06/12/2023	06/12/2023	06/12/2023
Time Tested	15:19	15:40	15:47
Test Request #/Location	Lot 5317 Refer to attached plan	Lot 5317 edge Refer to attached plan	Lot 5315 edge Refer to attached plan
Easting	266171,	266153,	266183,
Northing	5765332 (Zone 55H), 24 m	5765313 (Zone 55H), 28 m	5765318 (Zone 55H), 29 m
Layer / Reduced Level	FSL	1	1
Thickness of Layer (mm)	150	250	250
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity
Test Depth (mm)	125	225	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	2.00	2.12
Field Moisture Content %	20.7	19.4	19.1
Field Dry Density (FDD) t/m^3	1.72	1.68	1.78
Peak Converted Wet Density t/m^3	2.02	2.05	2.00
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	20.4	20.1	20.8
Adj. Field Moisture Content % (AS1289.5.4.1)	20.7	19.4	19.1
Moisture Ratio % (AS1289.5.4.1)	101.5	96.5	91.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-0.5	0.5	1.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**103.0**	**97.5**	**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

Sample Locations Plan

x - approximate test location

Ground Science South West
Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW2016-13
Issue Number: 1
Date Issued: 11/12/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 17988
Date Sampled: 07/12/2023
Dates Tested: 07/12/2023 - 08/12/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Botany Circuit & Lots 5314-5318
Material: sandy, clayey GRAVEL, medium plasticity
Material Source: Onsite

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NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S43	2016-S44	2016-S45	2016-S46	2016-S47
Date Tested	07/12/2023	07/12/2023	07/12/2023	07/12/2023	07/12/2023
Time Tested	13:00	14:00	14:11	14:20	15:22
Test Request #/Location	Refer to attached plan Botany Circuit	Refer to attached plan Botany Circuit	Refer to attached plan Botany Circuit	Refer to attached plan Lot 5314	Refer to attached plan Lot 5318
Easting	266116,	266117,	266191,	266153,	266202,
Northing	5765356 (Zone 55H), 28 m	5765341 (Zone 55H), 30 m	5765381 (Zone 55H), 27 m	5765322 (Zone 55H), 29 m	5765322 (Zone 55H), 27 m
Layer / Reduced Level	1	1	1	2	3
Thickness of Layer (mm)	250	150	150	250	250
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity
Test Depth (mm)	225	125	125	225	225
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0	0	0
Field Wet Density (FWD) t/m^3	1.99	2.04	2.00	2.03	2.05
Field Moisture Content %	19.9	20.7	18.8	16.8	17.5
Field Dry Density (FDD) t/m^3	1.66	1.69	1.68	1.74	1.75
Peak Converted Wet Density t/m^3	2.01	1.98	1.96	2.05	2.03
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	19.4	20.9	21.0	16.9	16.9
Adj. Field Moisture Content % (AS1289.5.4.1)	19.9	20.7	18.8	16.8	17.5
Moisture Ratio % (AS1289.5.4.1)	102.5	99.0	89.5	99.5	103.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**	**
Moisture Variation (Wv) %	-0.5	0.0	2.0	0.0	-0.5
Adjusted Moisture Variation %	**	**	**	**	**
Hilf Density Ratio (%)	**99.0**	**103.0**	**102.0**	**99.5**	**101.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**
Report Remarks	**	Requires 98% Standard Compaction & +/- 2% Moisture Variation	Requires 98% Standard Compaction & +/- 2% Moisture Variation	**	**

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

Sample Locations Plan

x - approximate test location

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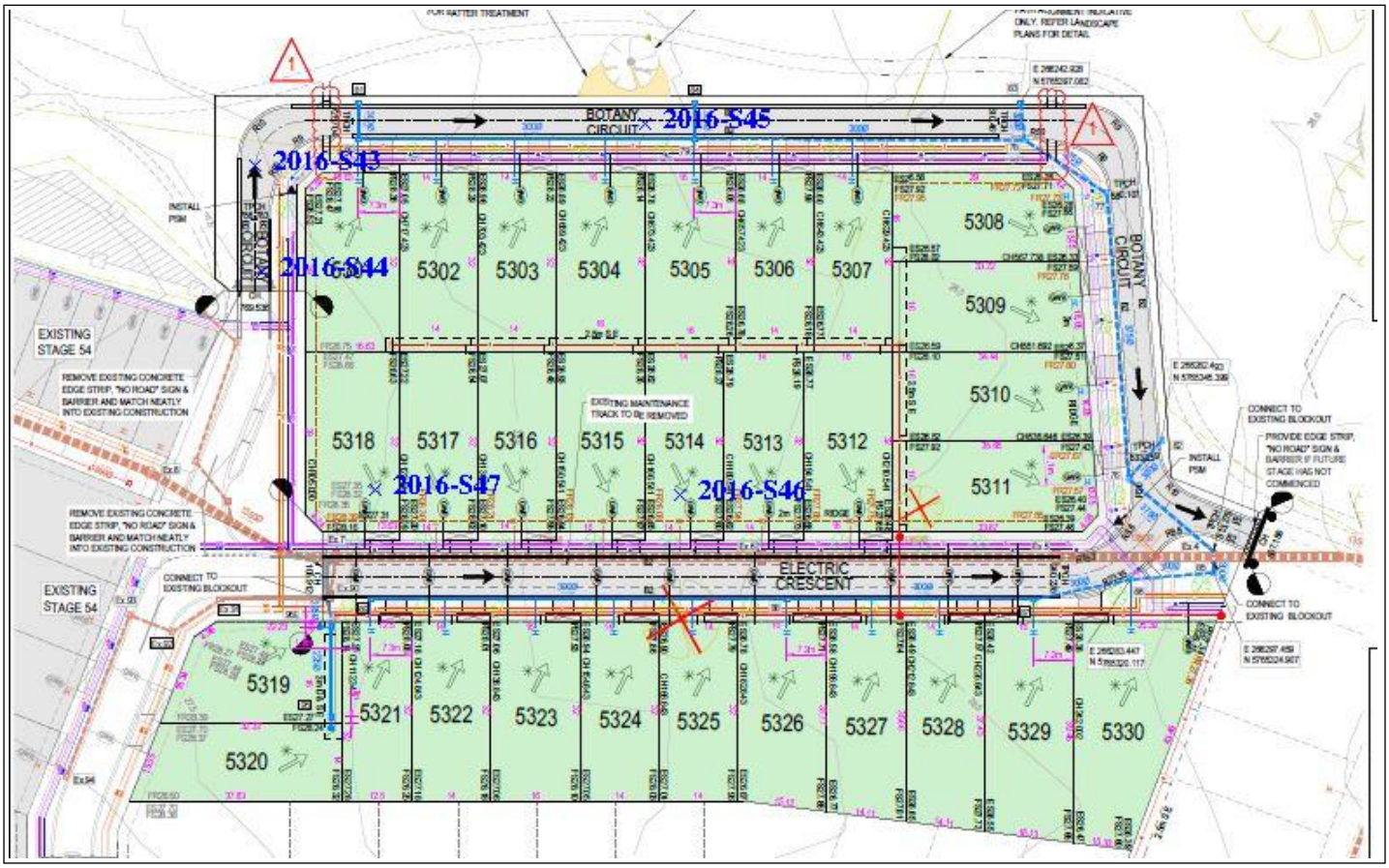

Material Test Report

Report Number: GSSW2016-14
Issue Number: 1
Date Issued: 12/12/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 18009
Date Sampled: 08/12/2023
Dates Tested: 08/12/2023 - 11/12/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5313-5311 & Botany Circuit
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Onsite

Ground Science South West
Geotechnical & Environmental Consultants

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NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S48	2016-S49	2016-S50
Date Tested	08/12/2023	08/12/2023	08/12/2023
Time Tested	11:40	11:50	12:02
Test Request #/Location	Refer to attached plan Lot 5313 edge	Refer to attached plan Lot 5311 edge	Refer to attached plan Botany Circuit
Easting	266231,	266261,	266294,
Northing	5765323 (Zone 55H), 29 m	5765332 (Zone 55H), 29 m	5765343 (Zone 55H), 26 m
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	250	250	250
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, 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 (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m^3	2.07	2.02	2.02
Field Moisture Content %	22.8	20.1	21.8
Field Dry Density (FDD) t/m^3	1.69	1.68	1.66
Peak Converted Wet Density t/m^3	2.01	2.02	2.02
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	22.3	19.6	21.3
Adj. Field Moisture Content % (AS1289.5.4.1)	22.8	20.1	21.8
Moisture Ratio % (AS1289.5.4.1)	102.5	102.0	102.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-0.5	-0.5	-0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**103.0**	**99.5**	**99.5**
Compaction Method	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	Requires 98% Standard Compaction & +/- 2% Moisture Variation

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

Sample Locations Plan

x - approximate test location

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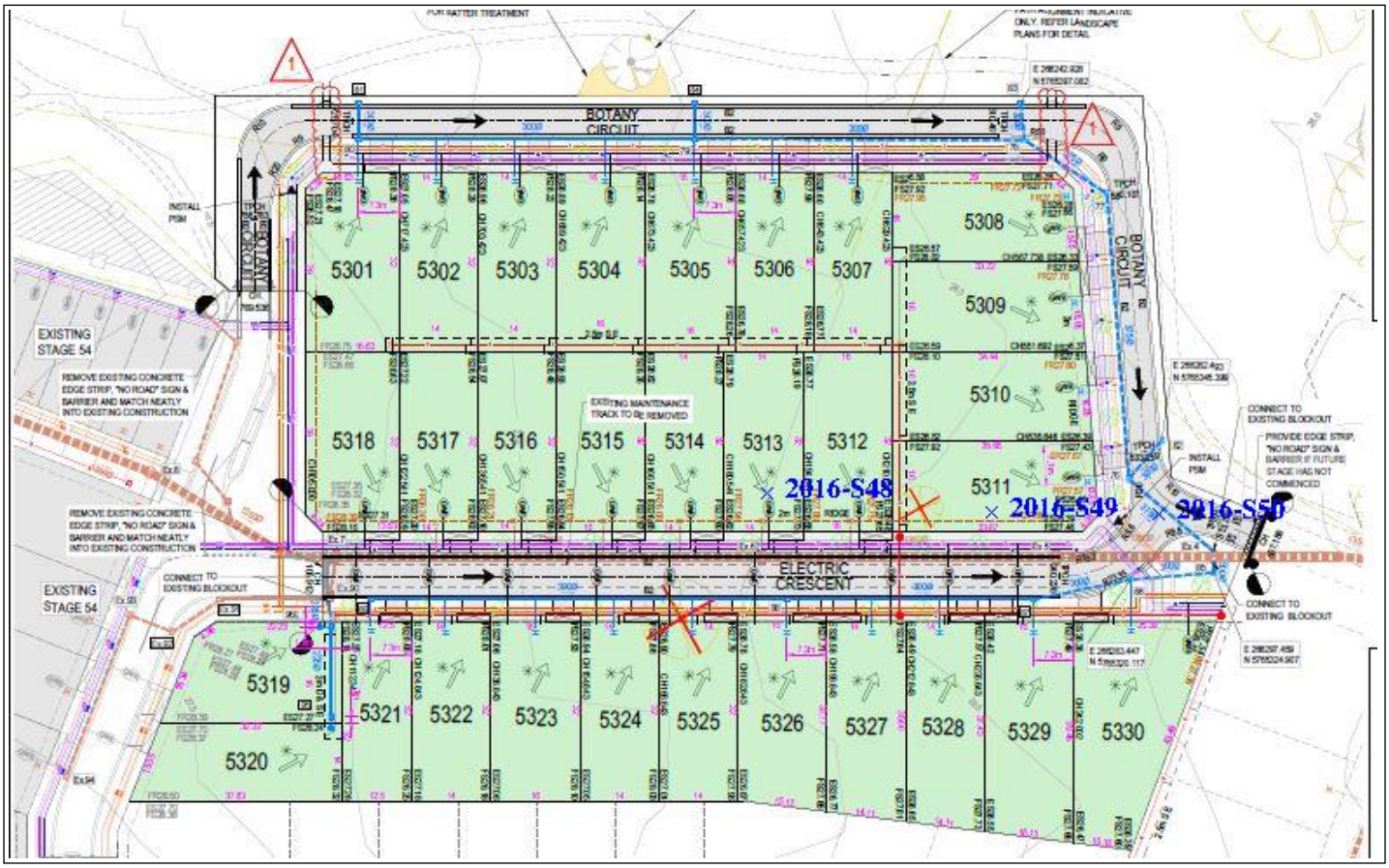
Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW2016-15
Issue Number: 1
Date Issued: 13/12/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 18017
Date Sampled: 11/12/2023
Dates Tested: 11/12/2023 - 12/12/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5311-5318
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Onsite

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Geotechnical & Environmental Consultants

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WORLD RECOGNISED ACCREDITATION

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	2016-S51	2016-S52	2016-S53	2016-S54	2016-S55
Date Tested	11/12/2023	11/12/2023	11/12/2023	11/12/2023	11/12/2023
Time Tested	08:00	10:30	10:40	16:00	16:07
Test Request #/Location	Refer to attached plan Edge of Lot 5314	Refer to attached plan Edge of Lot 5315	Refer to attached plan Edge of Lot 5312	Refer to attached plan Edge of Lot 5311	Refer to attached plan Edge of Lot 5318
Easting	266207,	266192	266234,	266258,	266160,
Northing	5765328 (Zone 55H), 26 m	5765325 (Zone 55H), 26 m	5765333 (Zone 55H), 30 m	5765328 (Zone 55H), 15 m	5765305 (Zone 55H), 23 m
Layer / Reduced Level	2	3	3	4	4
Thickness of Layer (mm)	250	250	250	250	250
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, 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	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0	0	0
Field Wet Density (FWD) t/m^3	2.00	2.03	2.11	2.02	2.02
Field Moisture Content %	20.8	21.2	20.1	23.1	21.5
Field Dry Density (FDD) t/m^3	1.66	1.67	1.76	1.64	1.66
Peak Converted Wet Density t/m^3	1.93	1.99	1.95	1.96	1.95
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	22.8	21.5	22.3	23.3	21.9
Adj. Field Moisture Content % (AS1289.5.4.1)	20.8	21.2	20.1	23.1	21.5
Moisture Ratio % (AS1289.5.4.1)	91.5	98.5	90.0	99.0	98.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**	**
Moisture Variation (Wv) %	2.0	0.5	2.0	0.0	0.5
Adjusted Moisture Variation %	**	**	**	**	**
Hilf Density Ratio (%)	**103.5**	**102.0**	**108.0**	**103.0**	**103.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	**	**	**

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

Sample Locations Plan

x - approximate test location

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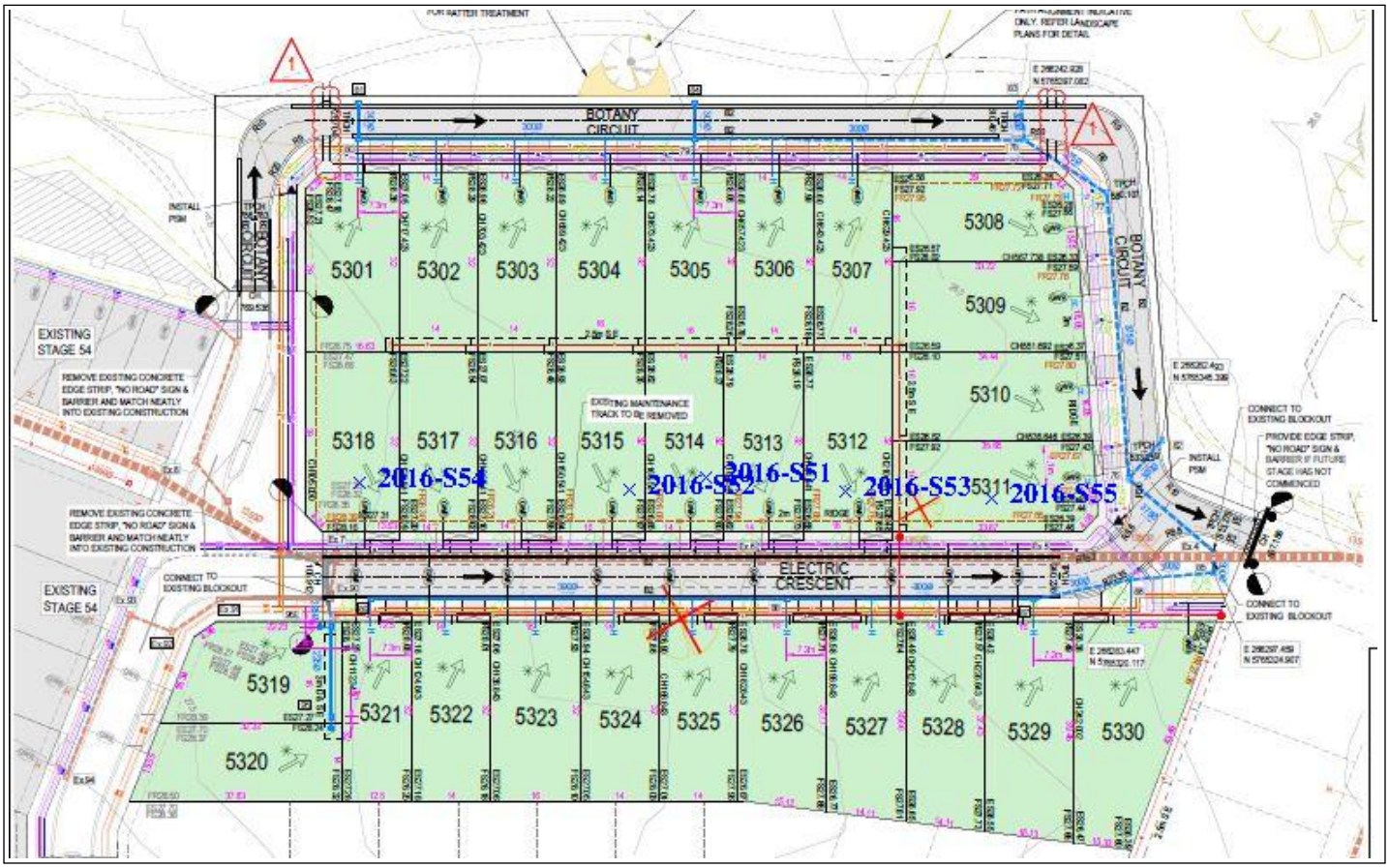

Material Test Report

Report Number: GSSW2016-16
Issue Number: 1
Date Issued: 18/12/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 18062
Date Sampled: 15/12/2023
Dates Tested: 15/12/2023 - 15/12/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5319-5328
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Onsite

Ground Science South West
Geotechnical & Environmental Consultants

Ground Science South West Pty Ltd
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Email: chrism@groundscience.com.au

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NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S56	2016-S57	2016-S58
Date Tested	14/12/2023	14/12/2023	14/12/2023
Time Tested	16:50	16:56	17:03
Test Request #/Location	Refer to attached plan Lot 5320	Refer to attached plan Lot 5321	Refer to attached plan Lot 5322
Easting	266135,	266163,	266182,
Northing	5765252 (Zone 55H), 33 m	5765264 (Zone 55H), 27 m	5765263 (Zone 55H), 27 m
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	250	250	250
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, 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 (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m^3	2.07	2.06	2.04
Field Moisture Content %	20.1	18.8	18.5
Field Dry Density (FDD) t/m^3	1.73	1.73	1.72
Peak Converted Wet Density t/m^3	2.05	1.99	2.03
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	19.5	20.5	17.8
Adj. Field Moisture Content % (AS1289.5.4.1)	20.1	18.8	18.5
Moisture Ratio % (AS1289.5.4.1)	103.0	92.0	103.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-0.5	1.5	-0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**101.0**	**103.5**	**100.5**
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

x - approximate test location

Ground Science South West
Geotechnical & Environmental Consultants

Material Test Report

Report Number: GSSW2016-17
Issue Number: 1
Date Issued: 18/12/2023
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 18102
Date Sampled: 16/12/2023
Dates Tested: 16/12/2023 - 18/12/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5319-5339
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Onsite

Ground Science South West
Geotechnical & Environmental Consultants

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NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S59	2016-S60	2016-S61	2016-S62
Date Tested	16/12/2023	16/12/2023	16/12/2023	16/12/2023
Time Tested	09:15	09:25	09:40	12:30
Test Request #/Location	Refer to attached plan Lot 5319	Refer to attached plan Lot 5323	Refer to attached plan Lot 5324	Refer to attached plan Lot 5328
Easting	266159,	266183,	266228,	266250,
Northing	5765274 (Zone 55H), 24 m	5765280 (Zone 55H), 24 m	5765289 (Zone 55H), 24 m	5765283 (Zone 55H), 26 m
Layer / Reduced Level	1	1	1	1
Thickness of Layer (mm)	250	250	250	250
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity
Test Depth (mm)	225	225	225	225
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0	0
Field Wet Density (FWD) t/m^3	2.05	2.10	2.02	1.99
Field Moisture Content %	21.0	20.6	17.5	18.5
Field Dry Density (FDD) t/m^3	1.70	1.75	1.72	1.68
Peak Converted Wet Density t/m^3	2.01	2.04	2.02	2.01
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	20.4	21.5	19.6	20.7
Adj. Field Moisture Content % (AS1289.5.4.1)	21.0	20.6	17.5	18.5
Moisture Ratio % (AS1289.5.4.1)	103.0	96.0	89.5	89.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**
Moisture Variation (Wv) %	-0.5	1.0	2.0	2.0
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	**102.0**	**103.0**	**100.5**	**99.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	**	**

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

Sample Locations Plan

x - approximate test location

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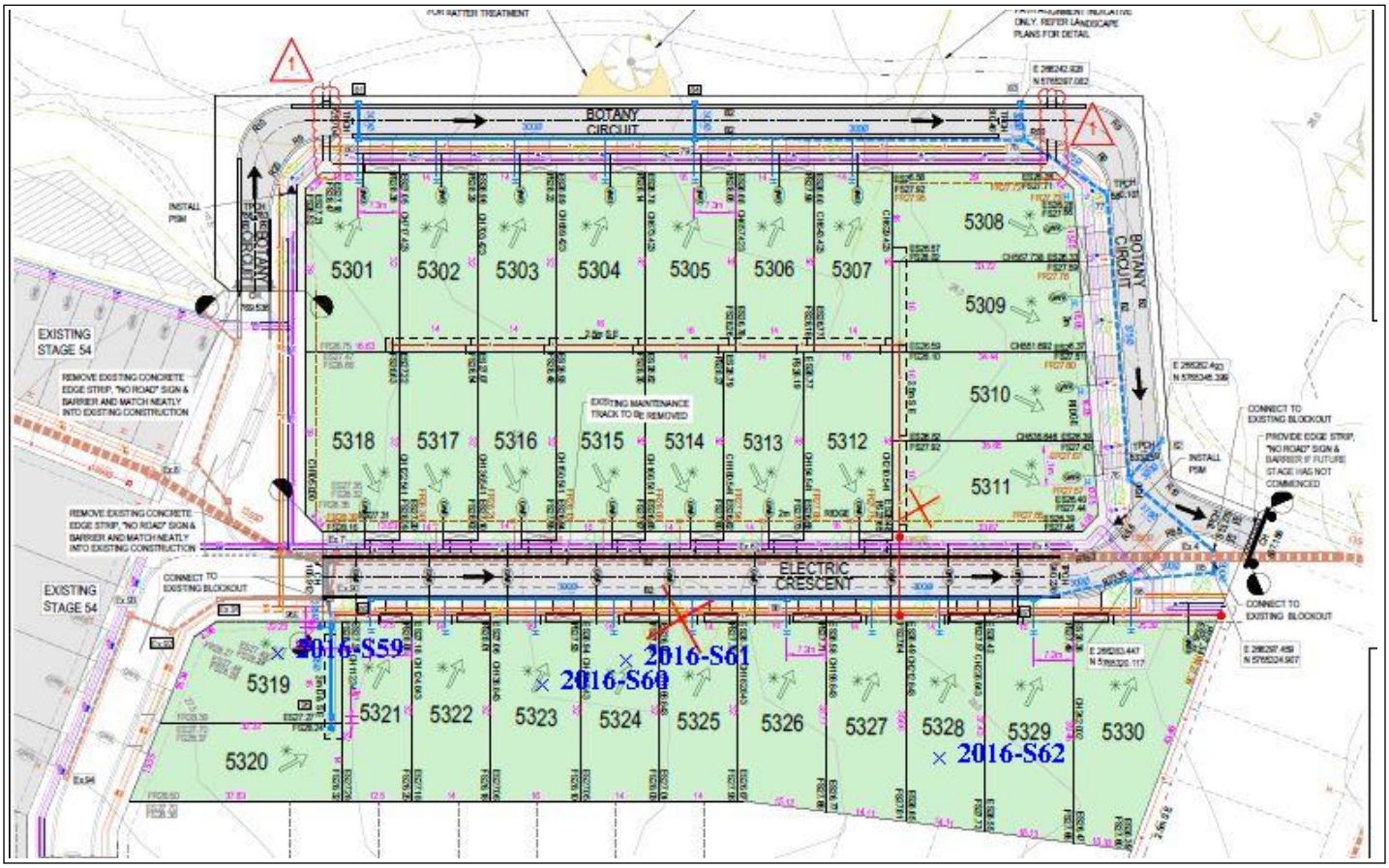

Material Test Report

Report Number: GSSW2016-18
Issue Number: 1
Date Issued: 24/01/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 18278
Date Sampled: 22/01/2024
Dates Tested: 22/01/2024 - 23/01/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2.5% Moisture Variation
Location: Electric Crescent
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Feehans Road, Mount Duneed

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NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S63	2016-S64	2016-S65
Date Tested	22/01/2024	22/01/2024	22/01/2024
Time Tested	15:30	15:40	15:47
Test Request #/Location	Electric Crescent Refer to attached plan	Electric Crescent Refer to attached plan	Electric Crescent Refer to attached plan
Easting	266242,	266218,	266174,
Northing	5765306 (Zone 55H), 23 m	5765306 (Zone 55H), 28 m	5765292 (Zone 55H), 27 m
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	250	250	250
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, 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 (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m^3	2.06	2.04	2.01
Field Moisture Content %	20.3	20.0	17.7
Field Dry Density (FDD) t/m^3	1.71	1.70	1.70
Peak Converted Wet Density t/m^3	2.01	2.01	2.02
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	21.8	20.6	18.5
Adj. Field Moisture Content % (AS1289.5.4.1)	20.3	20.0	17.7
Moisture Ratio % (AS1289.5.4.1)	93.0	97.5	95.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	1.5	0.5	1.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**102.5**	**101.5**	**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

Sample Locations Plan

x - approximate test location

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Material Test Report

Report Number: GSSW2016-19
Issue Number: 1
Date Issued: 25/01/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 18299
Date Sampled: 23/01/2024
Dates Tested: 23/01/2024 - 24/01/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lot 5327, 5326, 5322
Material: sandy CLAY, trace gravel, high plasticity
Material Source: Feehans Rd. Mount Duneed

Ground Science South West
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WORLD RECOGNISED ACCREDITATION

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	2016-S66	2016-S67	2016-S68
Date Tested	23/01/2024	23/01/2024	23/01/2024
Time Tested	15:10	15:20	15:27
Test Request #/Location	Refer to attached plan Lot 5327	Refer to attached plan Lot 5326	Refer to attached plan Lot 5322
Easting	266238,	266219,	266170,
Northing	5765271 (Zone 55H), 27 m	5765274 (Zone 55H), 29 m	5765273 (Zone 55H), 31 m
Layer / Reduced Level	2	2	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 (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m^3	2.00	2.08	2.08
Field Moisture Content %	19.4	17.3	21.4
Field Dry Density (FDD) t/m^3	1.68	1.78	1.71
Peak Converted Wet Density t/m^3	2.07	1.98	2.06
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	19.8	19.3	21.6
Adj. Field Moisture Content % (AS1289.5.4.1)	19.4	17.3	21.4
Moisture Ratio % (AS1289.5.4.1)	97.5	89.5	99.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	0.5	2.0	0.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**96.5**	**105.0**	**101.0**
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

x - approximate test location

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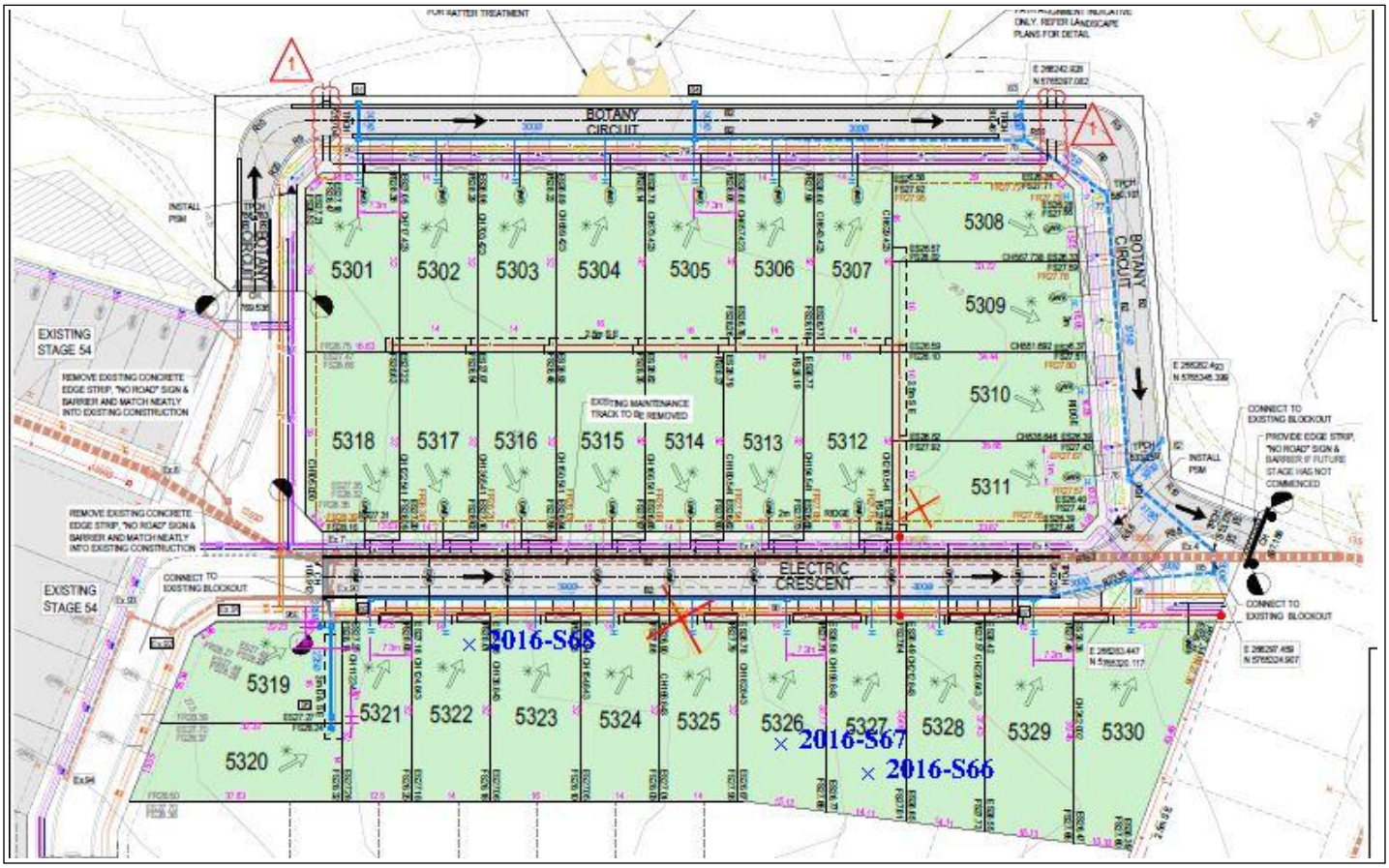

Material Test Report

Report Number: GSSW2016-20A
Issue Number: 1
Date Issued: 29/01/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 18314
Date Sampled: 24/01/2024
Dates Tested: 24/01/2024 - 25/01/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5323-5330
Material: sandy CLAY, trace gravel, high plasticity
Material Source: Feehans Rd. Mount Duneed

Ground Science South West
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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	2016-S72	2016-S73	2016-S74	2016-S75	2016-S76	2016-S77
Date Tested	24/01/2024	24/01/2024	24/01/2024	24/01/2024	24/01/2024	24/01/2024
Time Tested	12:00	12:09	12:16	16:00	16:10	16:20
Test Request #/Location	Refer to attached plan Lot 5330	Refer to attached plan Lot 5330	Refer to attached plan Lot 5329	Refer to attached plan Lot 5326	Refer to attached plan Lot 5325	Refer to attached plan Lot 5323
Easting	266272	266273	266275	266249	266211	266166
Northing	5765245 (Zone 55H), 31 m	5765268 (Zone 55H), 29 m	5765290 (Zone 55H), 33 m	5765268 (Zone 55H), 36 m	5765262 (Zone 55H), 35 m	5765254 (Zone 55H), 37 m
Layer / Reduced Level	1	1	1	3	3	3
Thickness of Layer (mm)	250	250	250	250	250	250
Soil Description	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, 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	0
Field Wet Density (FWD) t/m^3	1.98	1.96	2.00	1.98	1.99	1.97
Field Moisture Content %	21.8	21.0	21.8	18.9	18.4	20.5
Field Dry Density (FDD) t/m^3	1.62	1.62	1.64	1.66	1.68	1.63
Peak Converted Wet Density t/m^3	1.95	1.94	1.96	1.89	1.92	1.87
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	23.6	21.8	22.2	22.4	20.6	24.0
Adj. Field Moisture Content % (AS1289.5.4.1)	21.8	21.0	21.8	18.9	18.4	20.5
Moisture Ratio % (AS1289.5.4.1)	92.5	96.0	98.5	84.5	89.0	85.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**	**	**
Moisture Variation (Wv) %	1.5	1.0	0.5	3.5	2.0	3.5
Adjusted Moisture Variation %	**	**	**	**	**	**
Hilf Density Ratio (%)	**101.5**	**101.0**	**102.5**	**104.5**	**103.5**	**105.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**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

x - approximate test location

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Material Test Report

Report Number: GSSW2016-21
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Sample numbers amended. No change to results*
Date Issued: 09/02/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 18337
Date Sampled: 25/01/2024
Dates Tested: 25/01/2024 - 29/01/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 98% Standard Compaction & +/- 2% Moisture Variation
Location: Electric Crescent
Material: sandy CLAY, trace gravel, high plasticity
Material Source: Feehans Rd. Mount Duneed

Ground Science South West
Geotechnical & Environmental Consultants

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NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S78	2016-S79	2016-S80
Date Tested	25/01/2024	25/01/2024	25/01/2024
Time Tested	14:15	14:20	14:26
Test Request #/Location	Refer to attached plan Electric Crescent	Refer to attached plan Electric Crescent	Refer to attached plan Electric Crescent
Layer / Reduced Level	3	3	3
Thickness of Layer (mm)	150	150	150
Soil Description	sandy CLAY, trace gravel, high plasticity	Gravelly CLAY, with sand, medium to high PI	sandy CLAY, trace gravel, high plasticity
Test Depth (mm)	125	125	125
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	**	**
Field Wet Density (FWD) t/m^3	2.02	2.14	2.01
Field Moisture Content %	21.8	21.0	20.6
Field Dry Density (FDD) t/m^3	1.66	1.78	1.67
Peak Converted Wet Density t/m^3	1.96	**	1.94
Adjusted Peak Converted Wet Density t/m^3	**	1.98	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	22.4	22.5	**
Adj. Field Moisture Content % (AS1289.5.4.1)	21.8	20.5	20.6
Moisture Ratio % (AS1289.5.4.1)	97.0	**	90.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	91.0	**
Moisture Variation (Wv) %	0.5	**	2.0
Adjusted Moisture Variation %	**	2.0	**
Hilf Density Ratio (%)	**103.5**	**108.0**	**103.5**
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

x - approximate test location

Ground Science South West
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Material Test Report

Report Number: GSSW2016-22A
Issue Number: 1
Date Issued: 31/01/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 18343
Date Sampled: 29/01/2024
Dates Tested: 29/01/2024 - 30/01/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 98% Standard Compaction & +/- 2% Moisture Variation
Location: Lot 5326 & 5323, Lot 5330
Material: sandy CLAY, trace gravel, high plasticity
Material Source: Feehans Rd. Mount Duneed

Ground Science South West
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WORLD RECOGNISED ACCREDITATION

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	2016-S81	2016-S82	2016-S83
Date Tested	29/01/2024	29/01/2024	29/01/2024
Time Tested	15:00	15:10	15:20
Test Request #/Location	Refer to attached plan Electric Crescent	Refer to attached plan Electric Crescent	Refer to attached plan Electric Crescent
Easting	266241,	266194	266159,
Northing	5765313 (Zone 55H), 26 m	5765298 (Zone 55H), 30 m	5765288 (Zone 55H), 28 m
Layer / Reduced Level	FSL	FSL	FSL
Thickness of Layer (mm)	150	150	150
Soil Description	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity
Test Depth (mm)	125	125	125
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	1.98	1.96	2.00
Field Moisture Content %	22.0	19.5	19.9
Field Dry Density (FDD) t/m^3	1.62	1.64	1.67
Peak Converted Wet Density t/m^3	1.97	1.96	1.96
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	23.1	21.7	22.2
Adj. Field Moisture Content % (AS1289.5.4.1)	22.0	19.5	19.9
Moisture Ratio % (AS1289.5.4.1)	95.5	90.0	89.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	1.0	2.0	2.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**100.5**	**100.5**	**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

x - approximate test location

Ground Science South West
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Material Test Report

Report Number:	**GSSW2016-23**
Issue Number:	*2 - This version supersedes all previous issues*
Reissue Reason:	*Sample number amended. No change to result*
Date Issued:	09/02/2024
Client:	CREO CONSULTANTS PTY LTD Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number:	GSSW2016
Project Name:	ARMSTRONG ESTATE STAGE 53A
Project Location:	MOUNT DUNEED
Work Request:	18352
Date Sampled:	30/01/2024
Dates Tested:	30/01/2024 - 31/01/2024
Sampling Method:	AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification:	95% Standard Compaction & +/- 2% Moisture Variation
Location:	Lot 5329
Material:	sandy CLAY, trace gravel, high plasticity
Material Source:	Feehans Rd. Mount Duneed

Ground Science South West
Geotechnical & Environmental Consultants

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WORLD RECOGNISED ACCREDITATION

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	2016-S87		
Date Tested	30/01/2024		
Time Tested	10:10		
Test Request #/Location	Refer to attached plan Lot 5329		
Easting	144.32973		
Northing	38.22984S		
Layer / Reduced Level	3		
Thickness of Layer (mm)	250		
Soil Description	sandy CLAY, trace gravel, high plasticity		
Test Depth (mm)	225		
Sieve used to determine oversize (mm)	19.0		
Percentage of Wet Oversize (%)	0		
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0		
Field Wet Density (FWD) t/m^3	2.00		
Field Moisture Content %	20.5		
Field Dry Density (FDD) t/m^3	1.66		
Peak Converted Wet Density t/m^3	1.94		
Adjusted Peak Converted Wet Density t/m^3	**		
Adj. Optimum Moisture Content % (AS1289.5.4.1)	20.9		
Adj. Field Moisture Content % (AS1289.5.4.1)	20.5		
Moisture Ratio % (AS1289.5.4.1)	98.0		
Adjusted Moisture Ratio % (AS1289.5.4.1)	**		
Moisture Variation (Wv) %	0.5		
Adjusted Moisture Variation %	**		
Hilf Density Ratio (%)	**103.5**		
Compaction Method	**Standard**		
Report Remarks	**		

Moisture Variation Note:

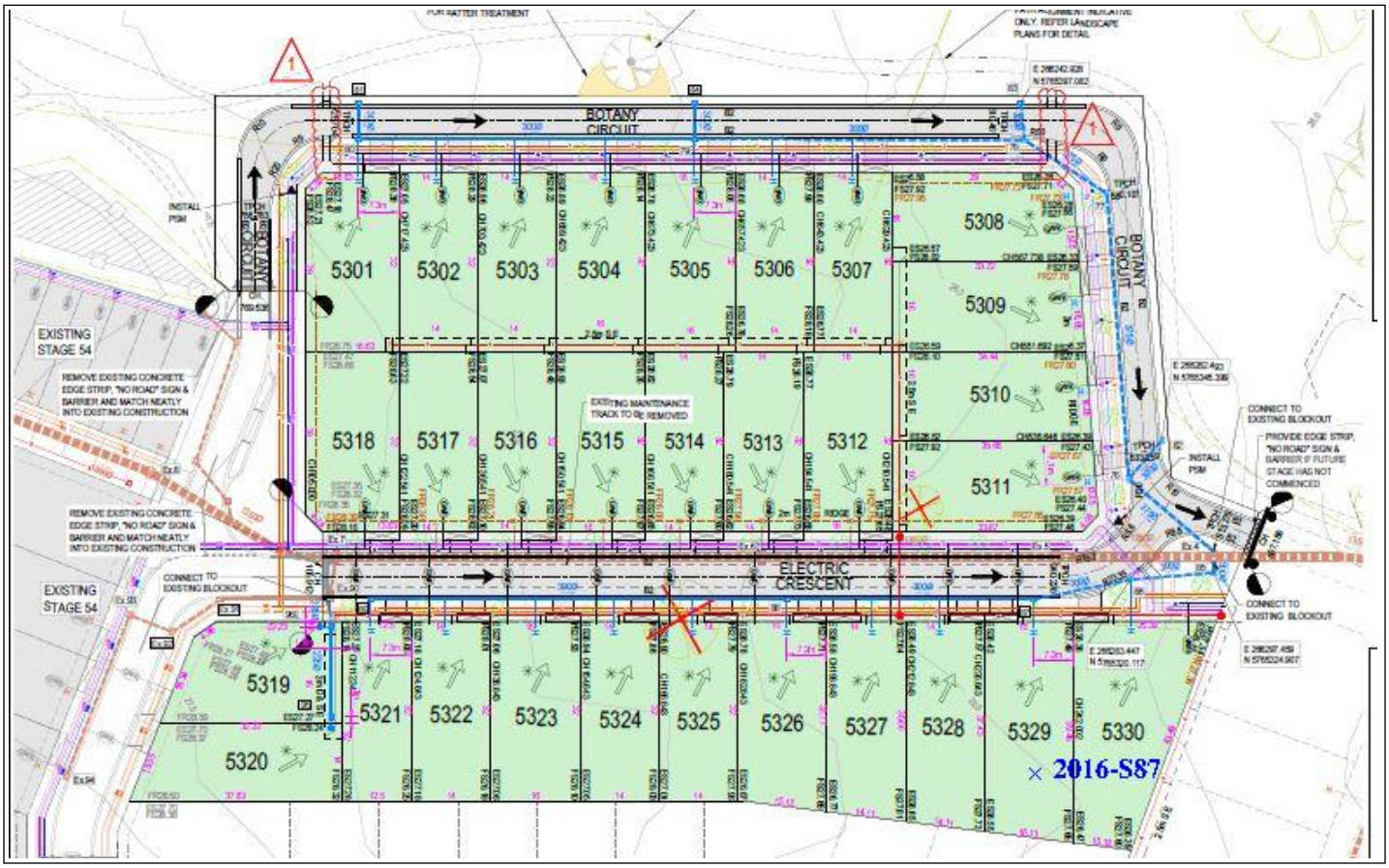
Positive values = test is dry of OMC

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: GSSW2016-24
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Sample numbers amended. No change to results*
Date Issued: 09/02/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2016
Project Name: ARMSTRONG ESTATE STAGE 53A
Project Location: MOUNT DUNEED
Work Request: 18368
Date Sampled: 31/01/2024
Dates Tested: 31/01/2024 - 01/02/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 2% Moisture Variation
Location: Lots 5322-5330
Material: sandy CLAY, trace gravel, high plasticity
Material Source: Feehans Rd. Mount Duneed

Ground Science South West
Geotechnical & Environmental Consultants

Ground Science South West Pty Ltd
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Email: chrism@groundscience.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

NATA
WORLD RECOGNISED ACCREDITATION

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	2016-S88	2016-S89	2016-S90	2016-S91
Date Tested	31/01/2024	31/01/2024	31/01/2024	31/01/2024
Time Tested	09:15	13:15	13:24	17:15
Test Request #/Location	Refer to attached plan Lot 5330	Refer to attached plan Lot 5322	Refer to attached plan Lot 5325	Refer to attached plan Lot 5329
Easting	266171,	266067,	266105,	266167,
Northing	5765119 (AGD66 Zone 55H), 27 m	5765079 (AGD66 Zone 55H), 27 m	5765074 (AGD66 Zone 55H),	5765118 (AGD66 Zone 55H), 27 m
Layer / Reduced Level	4	4	4	5
Thickness of Layer (mm)	250	250	250	250
Soil Description	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity	sandy CLAY, trace gravel, high plasticity
Test Depth (mm)	225	225	225	225
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0	0
Field Wet Density (FWD) t/m^3	1.93	1.93	1.91	2.04
Field Moisture Content %	19.8	19.4	22.8	20.5
Field Dry Density (FDD) t/m^3	1.61	1.62	1.55	1.70
Peak Converted Wet Density t/m^3	1.99	1.95	1.93	2.00
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	20.1	21.6	22.7	20.4
Adj. Field Moisture Content % (AS1289.5.4.1)	19.8	19.4	22.8	20.5
Moisture Ratio % (AS1289.5.4.1)	99.0	89.5	100.5	100.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**
Moisture Variation (Wv) %	0.0	2.0	0.0	0.0
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	**97.0**	**99.0**	**98.5**	**102.5**
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

Sample Locations Plan

x - approximate test location

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APPENDIX D

Site Photographs


PORTER HIRE


TurfOne


GRAMPIANS
GRAMPIANS
HM300


Sycle