ABN: 51 612 825 313

10 Dowsett Street

South Geelong, Vic, 3220

(P) +61 3 5282 1566

LEVEL 1 INSPECTION & TESTING ARMSTRONG ESTATE STAGE 52, MOUNT DUNEED

Prepared for Creo Consultants Pty Ltd

Report Reference: GSSW2145.1 AA

Date: 27 June 2024

ABN: 51 612 825 313

10 Dowsett Street

South Geelong, Vic, 3220

(P) +61 3 5282 1566

PROJECT DETAILS

Project Reference	GSSW2145.1	Rev	AA
Project Title	Armstrong Estate Stage 52		
Project Location	Mount Duneed	State	VIC
Date	27 June 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 52 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 52. 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 52 Layout Plan – 1 [No. 180016.52 R200 Rev 2]).

This report details the Level 1 earthworks process performed on site which commenced on 13 May 2024 and was completed on the 12 June 2024, requiring 16 full days and 2 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 the 13 November 2023 and the 29 November 2023. Inspection of the prepared subgrade surface was carried out on 29 November 2023 by the representative geotechnician from Ground Science South West.

Site stripping was carried out progressively throughout the works, and commenced from lot 5331 to lot 5336. A proof roll using a 14 T padfoot roller was performed over these lots. At the time of the inspection, the prepared subgrade in this area was deemed acceptable and considered suitable for subsequent works to proceed.

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

- The surface was visually inspected by the representative geotechnician from Ground Science South West;
- A proof roll using a 14 T pad foot compacter 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 from nearby sites located on Feehans Road and 470 Horseshoe Bend Road, in 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 (CI-CH), medium to 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;

- Grader;
- Bulldozer;
- Excavator;
- Water Cart;
- Padfoot Roller;
- Moxy Truck;
- 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 58 in-situ density tests using a nuclear moisture-density gauge in accordance with Australian Standard (AS1289 5.8.1) together with 58 “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. No test areas failed to reach the required target density ratio. No test areas failed to reach the required moisture condition.

4.5 FINAL SURFACE LEVELS

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

5. COMPLIANCE

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

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

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

6. UNDERSTANDING LEVEL 1 INSPECTION & TESTING

The purpose of performing Level 1 Inspection and Testing is to ensure compliance of the fill with the specification. The engagement of a Geotechnical Inspection Testing Authority (GITA) allows the contractor to perform their role in the construction of the filling operation while the GITA monitors the quality control process of the fill placement. The visual observations of thorough processes and work practices by the contractor allows the GITA to approve the subsequent placement of fill without having to wait for the completion of testing and the extended time it takes to get a test result back. The GITA will however, carry out random spot checks of the filling operations throughout the day's production as confirmation that the placement procedures and the fill moisture content is appropriate. At the end of a day's production the GITA will sign off the completed works as satisfactory. Any failed tests will result in that particular area of operation requiring rectification in the following mornings activities. This may be as simple as extra rolling with compaction plant if moisture conditioning is suitable. Sometimes these areas may be retested if the GITA feels it is necessary.

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

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

For & on behalf of
Ground Science South West Pty Ltd

AUTHOR:

Michael Knez
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 52 Layout Plan [No. 180016.52 R200 REV 2]

N

LEGEND - LAYOUT PLAN

- E — ELECTRICITY (UNDERGROUND)
- G — GAS
- O — OPTIC FIBRE
- T — TELSTRA
- W — WATER
- RW — RECYCLED WATER
- STORMWATER DRAIN, PIT & PROPERTY INLET
- SWALE DRAIN
- S — SEWER & MAINTENANCE STRUCTURES
- H — HOUSE DRAIN
- GW — SERVICE CONDUITS
- TACTILE PAVERS
- Ex E — EXISTING ELECTRICITY (UNDERGROUND)
- O/H E — EXISTING ELECTRICITY (OVERHEAD)
- Ex G — EXISTING GAS
- Ex O — EXISTING OPTIC FIBRE
- Ex T — EXISTING TELSTRA
- Ex W — EXISTING WATER
- Ex RW — EXISTING RECYCLED WATER
- EXISTING STORMWATER DRAIN
- Ex S — EXISTING SEWER
- EXISTING HOUSE DRAIN
- EXISTING SWALE DRAIN
- BUILDING ENVELOPES
- 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
- TOPSOIL STOCKPILE
- Q100 STORMWATER DRAIN

CITY OF GREATER GEELONG TO STAMP HERE UPON APPROVAL

EXISTING TOPSOIL STOCKPILE TO BE REMOVED/RELOCATED

NON STANDARD DRIVEWAY. REFER R700 FOR DETAIL

EXISTING STAGE 54

EXISTING STAGE 53B

MILKY WAY TERRACE

CONNECT TO EXISTING BLOCKOUT

REMOVE EDGE STRIP & "NO ROAD" SIGN & BARRIER & MATCH NEATLY INTO EXISTING CONSTRUCTION

E 266202.852
N 5765064.503

HABITAT ZONE 29 CONSERVATION

EXISTING HABITAT ZONE FENCING

TURNAROUND AREA TO BE MAINTAINED AS LONG AS POSSIBLE REMOVE EDGE STRIP & "NO ROAD" SIGN & BARRIER & MATCH NEATLY INTO EXISTING CONSTRUCTION

INSTALL PSM

EXISTING FENCE TO BE REMOVED AND DISPOSED OFFSITE. EXISTING TENNIS COURT SURFACE AND GRAVEL BASE TO BE EXCAVATED TO A SOUND BASE, FILLED AND COMPACTED TO LEVEL 1 SUPERVISION TO THE SATISFACTION OF THE SUPERINTENDENT

PROVIDE 1.8m HIGH CAPPED TIMBER PALING FENCE INCLUDING 190 x 35 H4 TREATED PINE PLINTH, CONSTRUCTED IN ACCORDANCE WITH FENCING PROVISIONS OF ARMSTRONG DESIGN GUIDELINES

EXISTING SHED TO BE REMOVED AND DISPOSED OFFSITE INCLUDING DISCONNECTION OF ELECTRICITY

EXISTING THE CREEK ESTATE

SOVEREIGN DRIVE

HARMON PLACE

INLET DRIVE

INLET DRIVE

EXISTING STAGE 51

PROVIDE 6m x 1m BIN COLLECTION SERVICING LOTS 5216 - 5218

PIT TO BE PROVIDED WITH HEAVY DUTY, CLASS D, TRAFFICABLE COVER

EXCLUSION BOLLARDS (REFER LANDSCAPE PLANS)

INDUSTRIAL VEHICLE CROSSING DETAIL REFER IDM SD 250

SWING GATE REFER CGG702 & 703

E 266192.638
N 5765026.115

RESERVE

EXCLUSION BOLLARDS (REFER LANDSCAPE PLANS)

EXISTING FENCE TO BE REMOVED AND DISPOSED OFFSITE

PROVIDE 1.8m HIGH CAPPED TIMBER PALING FENCE INCLUDING 190 x 35 H4 TREATED PINE PLINTH, CONSTRUCTED IN ACCORDANCE WITH FENCING PROVISIONS OF ARMSTRONG DESIGN GUIDELINES. FENCE TO BE 5m OFFSET FROM FRONT BOUNDARY OF LOTS 5208, 5209, 5222 & 5223

EXISTING HAUL ROAD TO BE REMOVED AND DISPOSED OFFSITE

REFER R700 FOR OUTSTAND DETAIL

CONTRACTOR TO LOCATE EXISTING AND PROTECT/RELOCATE PRIVATE WATERMAIN PRIOR TO CONSTRUCTION OF SEWER/DRAIN

EXISTING SEPTIC TANK/SYSTEM TO BE REMOVED & DISPOSED OFFSITE AFTER CONNECTION TO RETICULATION SEWER IS LIVE TO EXISTING HOMESTEAD

FUTURE COUNCIL RESERVE (BY OTHERS)

EXISTING DWELLING (LOT 50)

EXISTING CROSSOVER TO BE REMOVED & DISPOSED OFFSITE & REPLACE WITH A NEW CROSSOVER

EXISTING DRAINAGE BETWEEN PIT 129 & 128 TO BE REMOVED AND DISPOSED OFFSITE

E 266368.450
N 5764936.772

ROWANDS STREET

MATCH NEATLY INTO EXISTING CONSTRUCTION

MATCH NEATLY INTO EXISTING CONSTRUCTION

EXISTING WATERMAIN TO BE REMOVED AND DISPOSED OFFSITE

WHITES ROAD

WHITES ROAD

CONTRACTOR TO PROVIDE AN AMS TO BARWON WATER FOR APPROVAL WHEN PROPOSED WORKS ARE WITHIN 3m OF ANY MAIN AND 300 OR GREATER IN DIAMETER

EXISTING WARRALILY GRANGE ESTATE

EXISTING LIGHT POLE TO BE REMOVED AND DISPOSED OFFSITE. NEW POLES TO BE PLACED AT BACK OF KERB

EXISTING LIGHT POLE TO BE REMOVED AND DISPOSED OFFSITE. NEW POLES TO BE PLACED AT BACK OF KERB

HARPER BOULEVARD

CONNECT TO EXISTING PIT

EXISTING TAPER TO BE REMOVED AND DISPOSED OFFSITE

FUTURE CAC SITE

EXISTING LIGHT POLE TO BE REMOVED AND DISPOSED OFFSITE. NEW POLES TO BE PLACED AT BACK OF KERB

SEWER MAINTENANCE HOLE TO BE CONSTRUCTED OVER EXISTING SEWER

PIT TO BE PROVIDED WITH HEAVY DUTY, CLASS D, TRAFFICABLE COVER

EXISTING RURAL LPOD

FUTURE SCHOOL SITE

CONVERT EXISTING PIT TO SIDE ENTRY PIT BREAK INTO EXISTING PIT & MAKE GOOD CONNECTION

CONNECT EXISTING DN450 DRAIN TO PIT 128

PIT TO BE CONSTRUCTED OVER EXISTING PIPE

EXISTING TAPER TO BE REMOVED AND DISPOSED OFFSITE

E 266312.114
N 5764943.474

EXISTING ROCKWORK TO BE REMOVED AND DISPOSE OFFSITE. EXISTING SWALE TO BE EXCAVATED TO SOUND BASE, FILLED AND COMPACTED WITH SELECT MATERIAL TO THE SATISFACTION OF THE SUPERINTENDENT

EXISTING CROSSOVER CULVERT TO REMAIN AND CONNECTED TO PIT 129A

PITS TO BE PROVIDED WITH HEAVY DUTY, CLASS D, TRAFFICABLE COVER

PROVIDE 5m ENDPIPE @ IL26.10 WITH 1 IN 100 GRADE FOR FUTURE CONNECTION. ENDPIPE TO BE CAPPED PRIOR TO BACKFILLING

PROVIDE 5m ENDPIPE @ IL25.20 WITH 1 IN 100 GRADE FOR FUTURE CONNECTION. ENDPIPE TO BE CAPPED PRIOR TO BACKFILLING

NOTE:
EXISTING PITS 6 - 8 TO HAVE CONCRETE LID REPLACED WITH LIGHT WEIGHT FIBREGLASS TYPE, OR APPROVED EQUIVALENT

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

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

NOTE:
PROPOSED GWR CONDUITS TO BE BORED UNDER WHITES ROAD

SERVICES OFFSET SCHEDULE

ROAD NAME	GAS		RECYCLED WATER		POTABLE WATER		OPTIC FIBRE		ELECTRICITY	
	SIDE	OFFSET	SIDE	OFFSET	SIDE	OFFSET	SIDE	OFFSET	SIDE	OFFSET
HARMON PLACE	W	2.10	W	2.55	W	3.10	W	4.10	W	4.60
INLET DRIVE	S / W	2.10	S / W	2.55	S / W	3.10	N / E	1.80	N / E	2.40
MILKY WAY TERRACE	W	1.80	W	2.20	W	2.70	W	3.70	W	4.20
WHITES ROAD	S	Ex 3.10	S	Ex 3.90	S	Ex 4.60	N	Ex 2.80	N	Ex 3.50

WARNING
BEWARE OF UNDERGROUND & OVERHEAD SERVICES
The locations of underground & overhead services are approximate only & their exact position should be proven on site. No guarantee is given that all existing services are shown. Locate all underground services before commencement of works
DIAL 1100 BEFORE YOU DIG
www.1100.com.au

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

REVISION	DATE	ISSUE DESCRIPTION	DRAWN	CHECKED	APPROVED
2	24/04/24	COUNCIL COMMENTS	K.MCKELVIE	M.TROUNCE	M.TROUNCE
1	20/03/24	WHITES ROAD PARKING BAY & FOOTPATH ADDED	K.MCKELVIE	M.TROUNCE	M.TROUNCE
0	12/01/24	ISSUED FOR CONSTRUCTION	K.MCKELVIE	M.TROUNCE	M.TROUNCE
C	07/12/23	COUNCIL COMMENTS	K.MCKELVIE	M.TROUNCE	M.TROUNCE
B	28/11/23	COUNCIL COMMENTS	K.MCKELVIE	M.TROUNCE	M.TROUNCE
A	12/09/23	ISSUED FOR APPROVAL	I.HOGAN	M.TROUNCE	M.TROUNCE

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 - STAGE 52 LAYOUT PLAN**

STATUS: **ISSUED FOR CONSTRUCTION**

SCALE AT A1	DRAWN	DESIGNED
1:500 @ A1	I.HOGAN	I.HOGAN
PROJECT ENGINEER	PROJECT MANAGER	DATE FIRST ISSUE
M.TROUNCE	M.TROUNCE	MARCH 2023
PROJECT No.	DRAWING No.	REVISION
180016.52	R200	2

APPENDIX A

Particle Size Distribution and Atterberg Limits Test Report Sheets

Material Test Report

Ground Science South West
Geotechnical & Environmental Consultants

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

Accredited for compliance with ISO/IEC 17025 - Testing

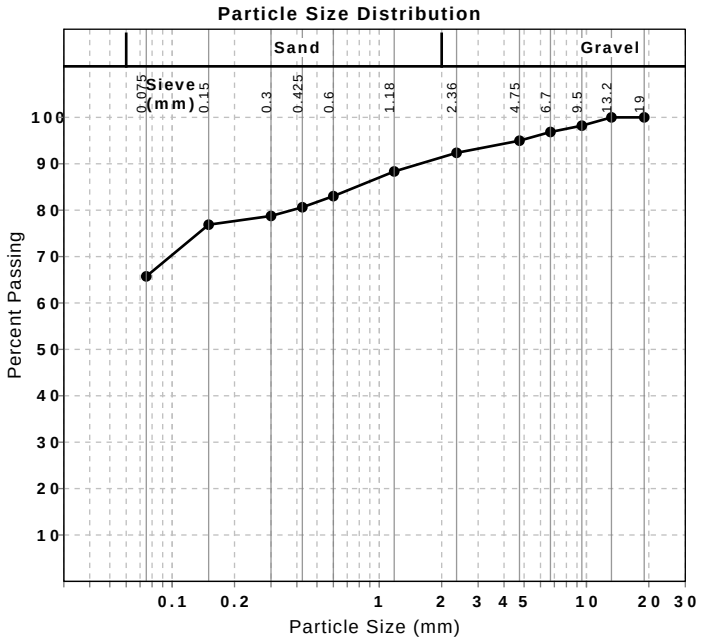
Approved Signatory: Brent Elliott
Laboratory Manager
NATA Accredited Laboratory Number: 20109

Report Number: **GSSW2145-5A**
Issue Number: 1
Date Issued: 27/05/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19626
Sample Number: 2145-S17
Date Sampled: 17/05/2024
Dates Tested: 17/05/2024 - 24/05/2024
Sampling Method: AS 1289.1.2.1 6.2 - Sampling from stockpiles
Sample Location: **Onsite Stockpile**
Material: CLAY, with sand, trace gravel, high plasticity, sand 26% fine to coarse grained, gravel 8% fine to medium
Material Source: Feehans Road Mount Duneed

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	**98**			2		
6.7 mm	**97**			1		
4.75 mm	**95**			2		
2.36 mm	**92**			3		
1.18 mm	**88**			4		
0.6 mm	**83**			5		
0.425 mm	**81**			2		
0.3 mm	**79**			2		
0.15 mm	**77**			2		
0.075 mm	**66**			11		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	53		
Plastic Limit (%)	17		
Plasticity Index (%)	**36**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**13.0**		
Cracking Crumbling Curling	Cracking & Curling		



Material Test Report

Report Number: **GSSW2145-13**
Issue Number: 1
Date Issued: 07/06/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19705
Sample Number: 2145-S27
Date Sampled: 27/05/2024
Dates Tested: 27/05/2024 - 04/06/2024
Sampling Method: AS 1289.1.2.1 6.2 - Sampling from stockpiles
Sample Location: **Onsite Stockpile E: 55H 268210, N: 5764446**
Material: CLAY, with sand, trace gravel, medium plasticity
Material Source: 470 Horseshoe Bend Road, Armstrong Creek

Ground Science South West
Geotechnical & Environmental Consultants

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

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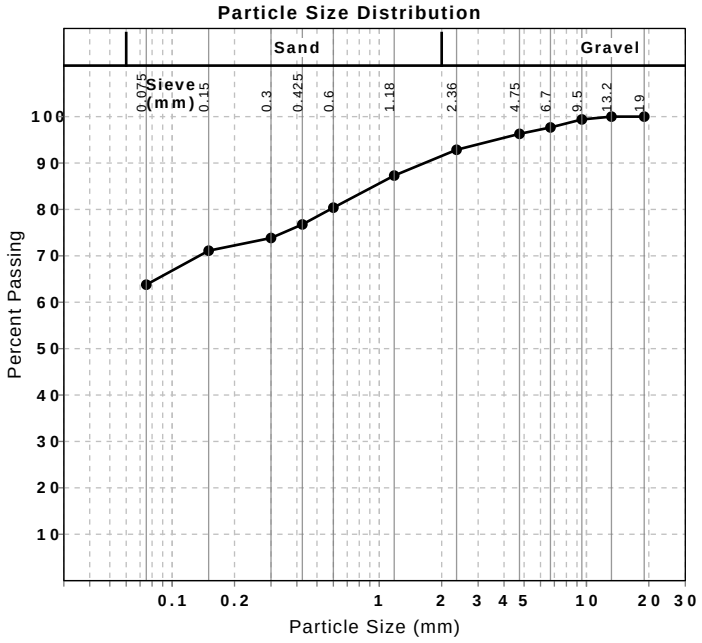
Approved Signatory: Brent Elliott
Laboratory Manager
NATA Accredited Laboratory Number: 20109

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	**98**			2		
4.75 mm	**96**			1		
2.36 mm	**93**			3		
1.18 mm	**87**			6		
0.6 mm	**80**			7		
0.425 mm	**77**			4		
0.3 mm	**74**			3		
0.15 mm	**71**			3		
0.075 mm	**64**			7		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	47		
Plastic Limit (%)	15		
Plasticity Index (%)	**32**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**11.5**		
Cracking Crumbling Curling	Curling		



Material Test Report

Report Number: **GSSW2145-13**
Issue Number: 1
Date Issued: 07/06/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19705
Sample Number: 2145-S28
Date Sampled: 27/05/2024
Dates Tested: 27/05/2024 - 04/06/2024
Sampling Method: AS 1289.1.2.1 6.2 - Sampling from stockpiles
Sample Location: **Onsite Stockpile E: 55H 268131, N: 5764485**
Material: CLAY, with sand, trace gravel, medium plasticity
Material Source: 470 Horseshoe Bend Road, Armstrong Creek

Ground Science South West
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Ground Science South West Pty Ltd
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Phone: (03) 5282 1566
Email: chrism@groundsciencesw.com.au

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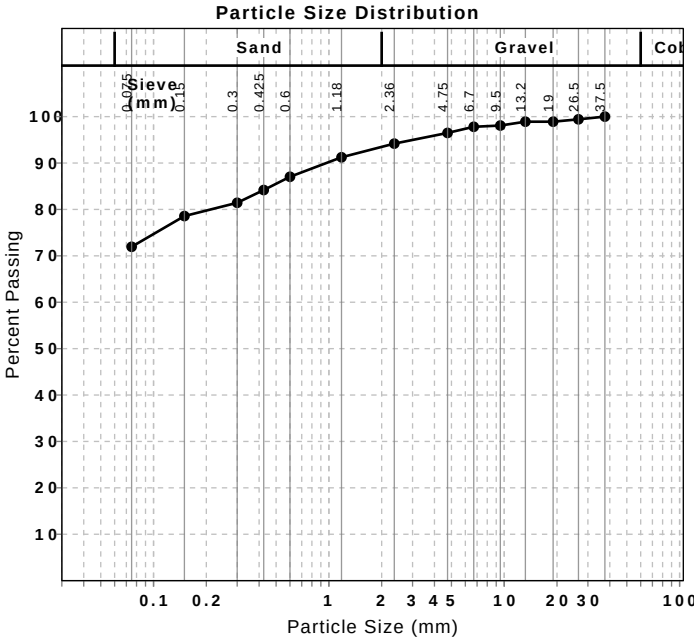
Approved Signatory: Brent Elliott
Laboratory Manager
NATA Accredited Laboratory Number: 20109

Particle Size Distribution (AS1289 3.6.1)						
Sieve	Passed %	Passing Limits		Retained %	Retained Limits	
37.5 mm	**100**			0		
26.5 mm	**99**			1		
19 mm	**99**			1		
13.2 mm	**99**			0		
9.5 mm	**98**			1		
6.7 mm	**98**			0		
4.75 mm	**96**			1		
2.36 mm	**94**			2		
1.18 mm	**91**			3		
0.6 mm	**87**			4		
0.425 mm	**84**			3		
0.3 mm	**81**			3		
0.15 mm	**79**			3		
0.075 mm	**72**			7		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	47		
Plastic Limit (%)	15		
Plasticity Index (%)	**32**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**11.0**		
Cracking Crumbling Curling	Curling		



APPENDIX B

Field Density Test Report Sheets & Test Locations

Project Summary Report

Report Date: 22/06/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Test Methods: AS 1289 5.7.1 STD & 5.8.1 & 2.1.1 & 5.4.1

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Geotechnical & Environmental Consultants
Ground Science South West Pty Ltd
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Lot #	Sample #	Date Sampled	Location	Easting	Northing	Elevation (m)	Layer	Relative Compaction (%)	Moisture Variation (%)	Moisture Content (%)	Field Wet Density (t/m3)
**	2145-S1	13/05/2024	Refer to attached plan Lot 5212	266103,	5764989 (Zone 55H), 34 m	**	1	100.5	-1.5	21.6	2.08
**	2145-S2	13/05/2024	Refer to attached plan Lot 5213	266088,	5764993 (Zone 55H), 36 m	**	1	100.5	-1.0	18.9	2.08
**	2145-S3	13/05/2024	Refer to attached plan Lot 5214	266070,	5764993 (Zone 55H), 37 m	**	1	98.5	0.5	18.3	2.03
**	2145-S4	14/05/2024	Refer to attached plan Lot 5215	266066,	5764988 (Zone 55H), 20 m	**	2	97.0	1.5	15.6	2.00
**	2145-S5	14/05/2024	Refer to attached plan Lot 5211	266112,	5765011 (Zone 55H), 37 m	**	2	95.0	0.0	18.6	1.97
**	2145-S6	14/05/2024	Refer to attached plan Lot 5220	266120,	5764990 (Zone 55H), 35 m	**	2	97.5	0.5	18.4	2.01
**	2145-S7	15/05/2024	Refer to attached plan Lot 5222	266152,	5765011 (Zone 55H), 34 m	**	2	100.0	1.0	17.2	2.03
**	2145-S8	15/05/2024	Refer to attached plan Lot 5210	266136,	5764989 (Zone 55H), 37 m	**	1	101.5	0.5	18.6	2.10
**	2145-S9	15/05/2024	Refer to attached plan Lot 5210	266136,	5764989 (Zone 55H), 37 m	**	2	99.5	0.5	18.5	2.08
**	2145-S10	15/05/2024	Refer to attached plan Lot 5210	266136,	5764989 (Zone 55H), 37 m	**	3	99.5	0.5	15.6	2.07
**	2145-S11	15/05/2024	Refer to attached plan Lot 5209	266143,	5765002 (Zone 55H), 39 m	**	3	100.0	0.5	16.2	2.11
**	2145-S12	15/05/2024	Refer to attached plan Lot 5219	266130,	5765018 (Zone 55H), 35 m	**	3	101.0	0.5	16.8	2.10
**	2145-S13	15/05/2024	Refer to attached plan Lot 5221	266128,	5765010 (Zone 55H), 30 m	**	3	102.0	1.0	18.5	2.04
**	2145-S14	16/05/2024	Refer to attached plan Lot 5206	266218,	5764983 (Zone 55H), 35 m	**	1	99.5	0.5	18.3	2.02
**	2145-S15	16/05/2024	Refer to attached plan Lot 5208	266197,	5764989 (Zone 55H), 37 m	**	2	101.5	0.5	18.5	2.04
**	2145-S16	16/05/2024	Refer to attached plan Lot 5223	266201,	5765007 (Zone 55H), 34 m	**	3	100.0	0.0	17.8	2.10
**	2145-S18	17/05/2024	Refer to attached plan Lot 5225 edge	266211,	5765009 (Zone 55H), 35 m	**	2	104.0	2.0	17.4	2.07
**	2145-S19	17/05/2024	Refer to attached plan Lot 5207	266243,	5764983 (Zone 55H), 38 m	**	2	102.5	2.0	18.2	2.05
**	2145-S20	17/05/2024	Refer to attached plan Lot 5205	266217,	5764981 (Zone 55H), 38 m	**	2	103.0	-0.5	22.0	2.07
**	2145-S21	17/05/2024	Refer to attached plan Lot 5231	266165,	5765057 (Zone 55H), 37 m	**	FSL (insitu subgrade)	100.0	2.0	13.6	2.11
**	2145-S22	17/05/2024	Refer to attached plan Lot 5230	266175,	5765065 (Zone 55H), 34 m	**	FSL (insitu subgrade)	100.5	5.0	11.6	1.89
**	2145-S23	21/05/2024	Refer to attached plan Lot 5205	266209,	5764992 (Zone 55H), 21 m	**	3	103.0	1.0	22.7	2.01
**	2145-S24	21/05/2024	Refer to attached plan Lot 5207	266241,	5764973 (Zone 55H), 34 m	**	3	104.0	2.0	22.8	1.98
**	2145-S25	21/05/2024	Refer to attached plan Lot 5224 edge	266233,	5765017 (Zone 55H), 33 m	**	1	108.0	2.0	22.9	2.05
**	2145-S26	21/05/2024	Refer to attached plan Lot 5205 edge	266259,	5764978 (Zone 55H), 32 m	**	2	106.0	2.0	22.8	2.05
**	2145-S29	28/05/2024	Refer to attached plan Lot 5228	266251,	5765025 (Zone 55H), 36 m	**	1	96.0	0.0	21.5	1.91
**	2145-S30	28/05/2024	Refer to attached plan Lot 5226	266232,	5765023 (Zone 55H), 30 m	**	1	100.0	1.0	19.8	2.04
**	2145-S31	28/05/2024	Refer to attached plan Lot 5204	266261,	5764975 (Zone 55H), 33 m	**	1	95.0	2.5	17.5	1.93
**	2145-S32	29/05/2024	Refer to attached plan Lot 5229	266294,	5765010 (Zone 55H), 32 m	**	Layer 2	98.5	2.0	18.9	1.96
**	2145-S33	29/05/2024	Refer to attached plan Lot 5220	266291,	5764987 (Zone 55H), 35 m	**	Layer 2	101.0	2.0	18.4	1.99
**	2145-S34	29/05/2024	Refer to attached plan Lot 5227	266264,	5765023 (Zone 55H), 30 m	**	Layer 2	99.5	0.0	18.9	2.04
**	2145-S35	30/05/2024	Refer to attached plan Lot 5225	266255,	5765021 (Zone 55H), 42 m	**	3	102.5	2.5	19.5	2.04
**	2145-S36	30/05/2024	Refer to attached plan Lot 5223	266227,	5765020 (Zone 55H), 32 m	**	3	103.0	1.5	18.7	2.07
**	2145-S37	30/05/2024	Refer to attached plan Lot 5203	266278,	5764974 (Zone 55H), 32 m	**	3	97.5	0.0	18.8	2.02
**	2145-S38	31/05/2024	Refer to attached plan Inlet Drive	266304,	5764987 (Zone 55H), 33 m	600mm BFSL	1	98.0	0.5	18.5	2.01
**	2145-S39	31/05/2024	Refer to attached plan Lot 5201	266302,	5764964 (Zone 55H), 35 m	**	1	97.5	0.0	22.9	1.98
**	2145-S40	31/05/2024	Refer to attached plan Lot 5201	266312,	5764965 (Zone 55H), 36 m	**	2	98.5	0.5	20.0	2.00
**	2145-S41	31/05/2024	Refer to attached plan Inlet Drive	266305,	5764995 (Zone 55H), 33 m	400mm BFSL	2	97.0	0.5	17.9	2.02

Lot #	Sample #	Date Sampled	Location	Easting	Northing	Elevation (m)	Layer	Relative Compaction (%)	Moisture Variation (%)	Moisture Content (%)	Field Wet Density (t/m3)
**	2145-S42	31/05/2024	Refer to attached plan Lot 5225	266239	5764988 (Zone 55H), 24 m	**	4	97.0	0.0	16.7	1.97
**	2145-S43	31/05/2024	Refer to attached plan Inlet Drive	266275	5765033 (Zone 55H), 30 m	200mm BFSL	3	101.5	-0.5	17.8	2.12
**	2145-S44	31/05/2024	Refer to attached plan Inlet Drive	266297,	5764968 (Zone 55H), 33 m	200mm BFSL	3	100.0	-0.5	19.8	2.05
**	2145-S45	31/05/2024	Refer to attached plan Inlet Drive	266302	5765024 (Zone 55H), 35m	Top of subgrade	FSL	98.5	-1.0	17.9	2.03
**	2145-S46	03/06/2024	Refer to attached plan Lot 5230	**	**	**	FSL	99.0	1.0	19.9	2.01
**	2145-S47	03/06/2024	Refer to attached plan Lot 5201	**	**	**	3	100.0	0.0	20.1	2.08
**	2145-S50	03/06/2024	Refer to attached plan Inlet Drive (retest of S41)	266306	5764991 55H	**	2	104.5	1.0	21.1	2.08
**	2145-S48	03/06/2024	Refer to attached plan Lot 5226	**	**	**	4	101.0	0.0	20.0	2.12
**	2145-S49	03/06/2024	Refer to attached plan Lot 5229	**	**	**	4	105.0	1.0	21.9	2.10
**	2145-S51	05/06/2024	Refer to attached plan Lot 5201	266312,	5764966 (Zone 55H), 33 m	**	4	98.5	0.0	19.0	2.05
**	2145-S52	05/06/2024	Refer to attached plan Inlet Drive	266301,	5764981 (Zone 55H), 29 m	**	FSL	99.0	0.5	18.0	2.08
**	2145-S53	05/06/2024	See attached plan Inlet Drive	266298,	5764967 (Zone 55H), 32 m	**	FSL	104.0	1.0	20.5	2.07
**	2145-S54	06/06/2024	Refer to attached plan Lot 5201	266303,	5764959 (Zone 55H), -0 m	**	4	95.0	0.5	17.2	1.98
**	2145-S55	06/06/2024	Refer to attached plan Lot 5201	266319,	5764956 (Zone 55H), 32 m	**	4	100.5	0.5	17.5	2.07
**	2145-S56	06/06/2024	Refer to attached plan Lot 5201	266321,	5764982 (Zone 55H), 32 m	**	4	99.0	0.5	17.5	2.08
**	2145-S57	12/06/2024	Lot 5215 Nature Strip area	266053,	5764982 (Zone 55H), 31 m	**	FSL (3)	101.0	0.0	17.5	2.12
**	2145-S58	12/06/2024	Lot 5213 Nature Strip area	266086,	5764979 (Zone 55H), 35 m	**	FSL (3)	98.5	0.0	17.2	2.03
**	2145-S59	12/06/2024	Lot 5211 Nature Strip area	266114,	5764973 (Zone 55H), 35 m	**	FSL (3)	98.5	0.0	17.1	2.02

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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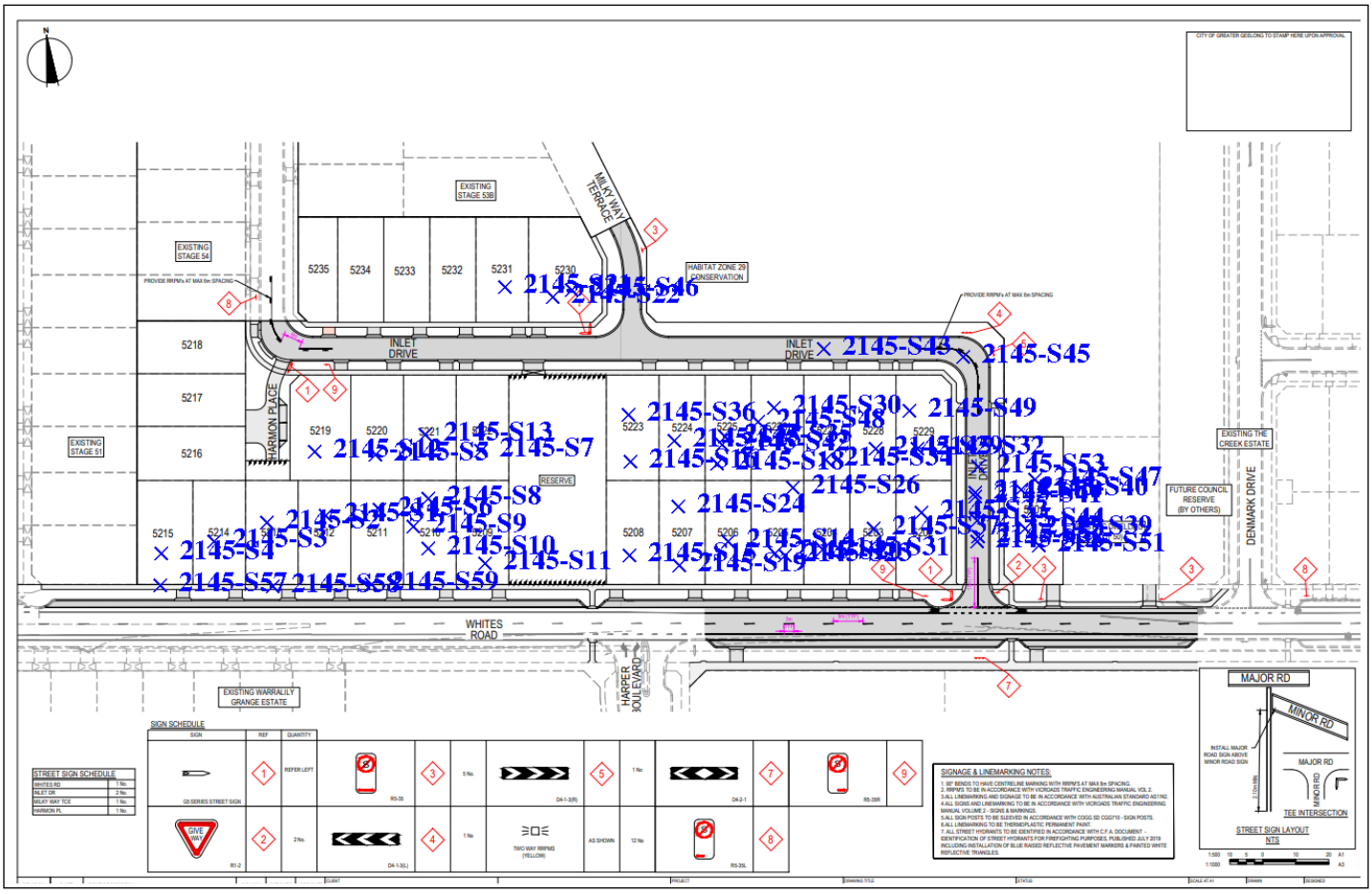

APPENDIX C

Site Photographs

Material Test Report

Report Number: GSSW2145-1
Issue Number: 1
Date Issued: 15/05/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19537
Date Sampled: 13/05/2024
Dates Tested: 13/05/2024 - 14/05/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5215 to 5209 and Lot 5219 to 5222
Material: clayey SAND/sandy CLAY, fine to coarse grained, medium plasticity
Material Source: Site Won Fill

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Geotechnical & Environmental Consultants

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

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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	2145-S1	2145-S2	2145-S3
Date Tested	13/05/2024	13/05/2024	13/05/2024
Time Tested	16:30	16:40	16:50
Test Request #/Location	Refer to attached plan Lot 5212	Refer to attached plan Lot 5213	Refer to attached plan Lot 5214
Easting	266103,	266088,	266070,
Northing	5764989 (Zone 55H), 34 m	5764993 (Zone 55H), 36 m	5764993 (Zone 55H), 37 m
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	200	200	200
Soil Description	clayey SAND/sandy CLAY, M PI	clayey SAND/sandy CLAY, M PI	clayey SAND/sandy CLAY, M PI
Test Depth (mm)	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m^3	2.08	2.08	2.03
Field Moisture Content %	21.6	18.9	18.3
Field Dry Density (FDD) t/m^3	1.71	1.75	1.72
Peak Converted Wet Density t/m^3	2.07	2.07	2.06
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	20.0	18.0	18.6
Adj. Field Moisture Content % (AS1289.5.4.1)	21.6	18.9	18.3
Moisture Ratio % (AS1289.5.4.1)	108.0	105.0	98.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-1.5	-1.0	0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**100.5**	**100.5**	**98.5**
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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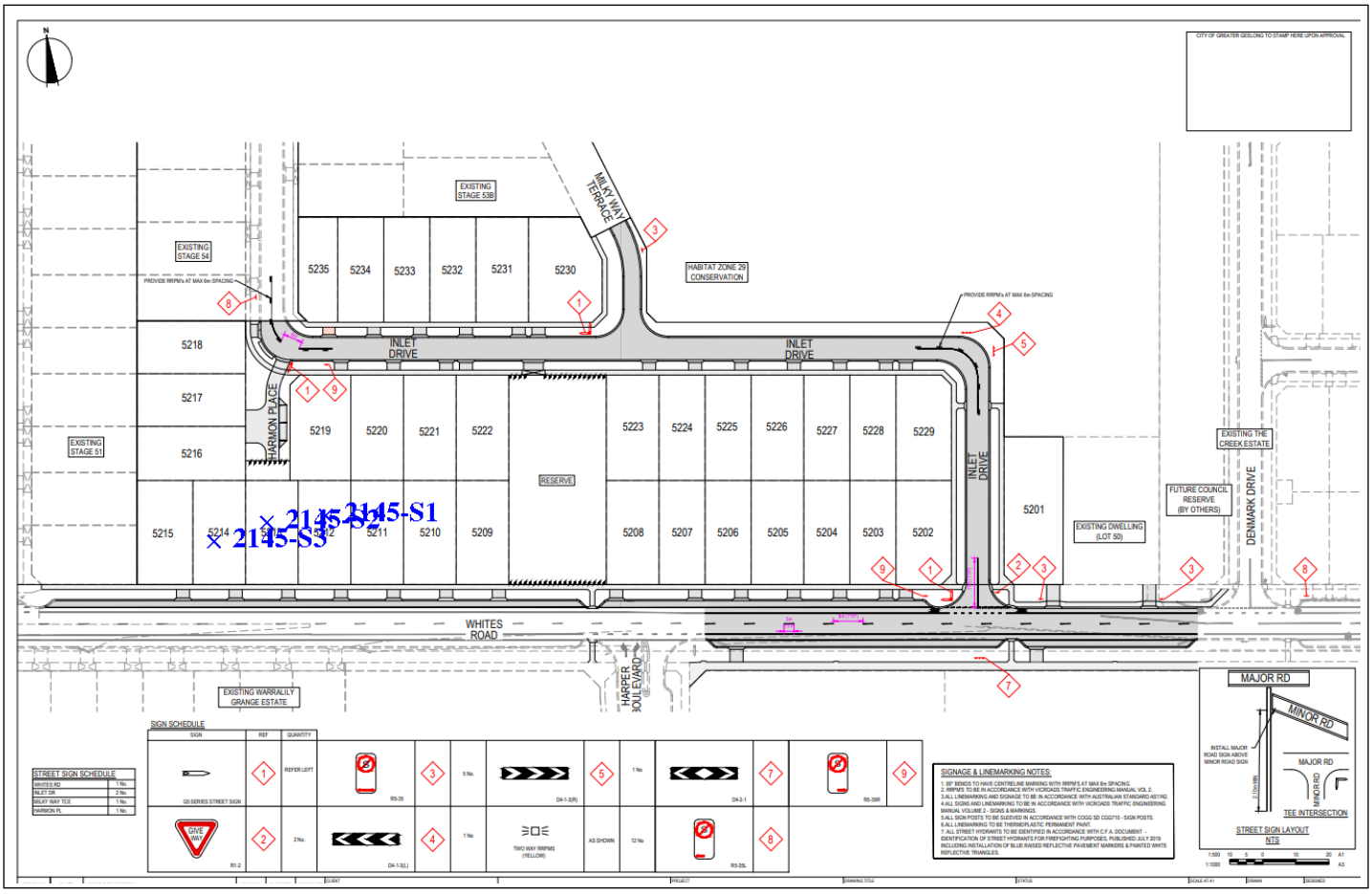
Geotechnical & Environmental Consultants



Material Test Report

Ground Science South West
Geotechnical & Environmental Consultants

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

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

Report Number: **GSSW2145-2**
Issue Number: 1
Date Issued: 16/05/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19567
Date Sampled: 14/05/2024
Dates Tested: 14/05/2024 - 15/05/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5215 to 5209 and Lot 5219 to 5222
Material: clayey SAND/sandy CLAY, fine to coarse grained, medium plasticity
Material Source: Site Won Fill

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	2145-S4	2145-S5	2145-S6
Date Tested	14/05/2024	14/05/2024	14/05/2024
Time Tested	10:21	15:10	15:15
Test Request #/Location	Refer to attached plan Lot 5215	Refer to attached plan Lot 5211	Refer to attached plan Lot 5220
Easting	266066,	266112,	266120,
Northing	5764988 (Zone 55H), 20 m	5765011 (Zone 55H), 37 m	5764990 (Zone 55H), 35 m
Layer / Reduced Level	2	2	2
Thickness of Layer (mm)	200	200	200
Soil Description	clayey SAND/sandy CLAY, fine to coarse grained, medium plasticity	clayey SAND/sandy CLAY, fine to coarse grained, medium plasticity	clayey SAND/sandy CLAY, fine to coarse grained, medium plasticity
Test Depth (mm)	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m^3	2.00	1.97	2.01
Field Moisture Content %	15.6	18.6	18.4
Field Dry Density (FDD) t/m^3	1.73	1.66	1.70
Peak Converted Wet Density t/m^3	2.06	2.08	2.06
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	16.9	18.7	18.9
Adj. Field Moisture Content % (AS1289.5.4.1)	15.6	18.6	18.4
Moisture Ratio % (AS1289.5.4.1)	92.0	99.5	97.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	1.5	0.0	0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**97.0**	**95.0**	**97.5**
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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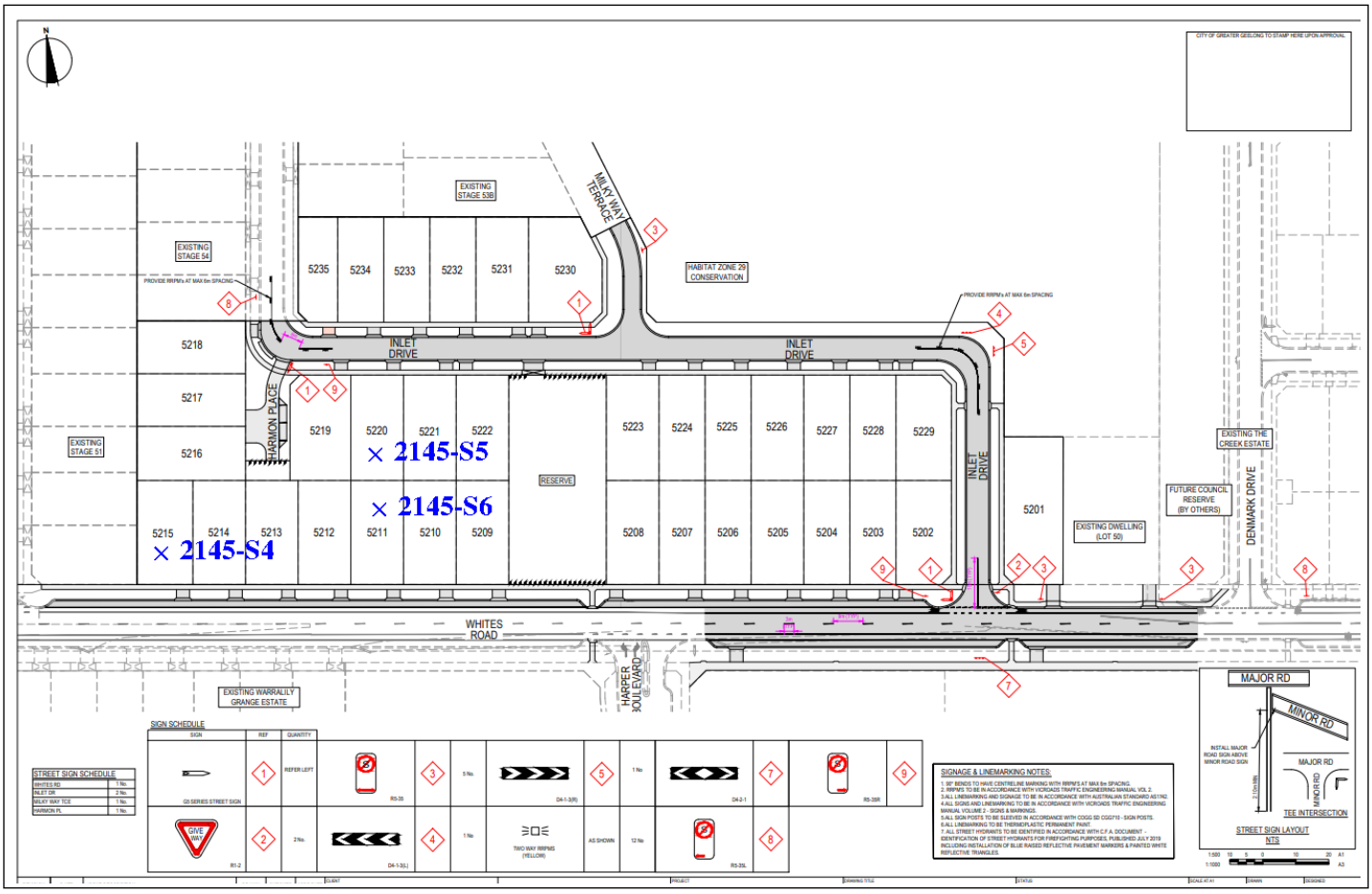

Material Test Report

Report Number: GSSW2145-3
Issue Number: 1
Date Issued: 17/05/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19584
Date Sampled: 15/05/2024
Dates Tested: 15/05/2024 - 16/05/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5215 to 5209 and Lot 5219 to 5222
Material: gravelly, clayey SAND, medium plasticity
Material Source: Site Won Fill

Ground Science South West
Geotechnical & Environmental Consultants

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

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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	2145-S7	2145-S8	2145-S9	2145-S10
Date Tested	15/05/2024	15/05/2024	15/05/2024	15/05/2024
Time Tested	10:00	13:00	14:00	15:00
Test Request #/Location	Refer to attached plan Lot 5222	Refer to attached plan Lot 5210	Refer to attached plan Lot 5210	Refer to attached plan Lot 5210
Easting	266152,	266136,	266136,	266136,
Northing	5765011 (Zone 55H), 34 m	5764989 (Zone 55H), 37 m	5764989 (Zone 55H), 37 m	5764989 (Zone 55H), 37 m
Layer / Reduced Level	2	1	2	3
Thickness of Layer (mm)	200	200	200	200
Soil Description	gravelly, clayey SAND, medium plasticity	gravelly, clayey SAND, medium plasticity	gravelly, clayey SAND, medium plasticity	gravelly, clayey SAND, medium plasticity
Test Depth (mm)	175	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	2	0	1	1
Percentage of Dry Oversize (%) (AS1289.5.4.1)	2	0	1	1
Field Wet Density (FWD) t/m^3	2.03	2.10	2.08	2.07
Field Moisture Content %	17.2	18.6	18.5	15.6
Field Dry Density (FDD) t/m^3	1.74	1.77	1.75	1.79
Peak Converted Wet Density t/m^3	**	2.07	**	**
Adjusted Peak Converted Wet Density t/m^3	2.03	**	2.08	2.08
Adj. Optimum Moisture Content % (AS1289.5.4.1)	18.0	19.1	18.9	16.3
Adj. Field Moisture Content % (AS1289.5.4.1)	16.9	18.6	18.4	15.5
Moisture Ratio % (AS1289.5.4.1)	**	97.5	**	**
Adjusted Moisture Ratio % (AS1289.5.4.1)	94.0	**	97.0	95.5
Moisture Variation (Wv) %	**	0.5	**	**
Adjusted Moisture Variation %	1.0	**	0.5	0.5
Hilf Density Ratio (%)	**100.0**	**101.5**	**99.5**	**99.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	**	**

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

Material Test Report

Report Number: GSSW2145-3
Issue Number: 1
Date Issued: 17/05/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19584
Date Sampled: 15/05/2024
Dates Tested: 15/05/2024 - 16/05/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5215 to 5209 and Lot 5219 to 5222
Material: gravelly, clayey SAND, medium plasticity
Material Source: Site Won Fill

Ground Science South West
Geotechnical & Environmental Consultants

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

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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	2145-S11	2145-S12	2145-S13	
Date Tested	15/05/2024	15/05/2024	15/05/2024	
Time Tested	15:30	15:40	16:45	
Test Request #/Location	Refer to attached plan Lot 5209	Refer to attached plan Lot 5219	Refer to attached plan Lot 5221	
Easting	266143,	266130,	266128,	
Northing	5765002 (Zone 55H), 39 m	5765018 (Zone 55H), 35 m	5765010 (Zone 55H), 30 m	
Layer / Reduced Level	3	3	3	
Thickness of Layer (mm)	200	200	200	
Soil Description	gravelly, clayey SAND, medium plasticity	gravelly, clayey SAND, medium plasticity	gravelly, clayey SAND, medium plasticity	
Test Depth (mm)	175	175	175	
Sieve used to determine oversize (mm)	19.0	19.0	19.0	
Percentage of Wet Oversize (%)	2	0	1	
Percentage of Dry Oversize (%) (AS1289.5.4.1)	2	0	1	
Field Wet Density (FWD) t/m^3	2.11	2.10	2.04	
Field Moisture Content %	16.2	16.8	18.5	
Field Dry Density (FDD) t/m^3	1.82	1.80	1.73	
Peak Converted Wet Density t/m^3	**	2.08	**	
Adjusted Peak Converted Wet Density t/m^3	2.11	**	2.00	
Adj. Optimum Moisture Content % (AS1289.5.4.1)	16.6	17.4	19.4	
Adj. Field Moisture Content % (AS1289.5.4.1)	15.8	16.8	18.3	
Moisture Ratio % (AS1289.5.4.1)	**	96.5	**	
Adjusted Moisture Ratio % (AS1289.5.4.1)	95.5	**	94.5	
Moisture Variation (Wv) %	**	0.5	**	
Adjusted Moisture Variation %	0.5	**	1.0	
Hilf Density Ratio (%)	**100.0**	**101.0**	**102.0**	
Compaction Method	**Standard**	**Standard**	**Standard**	
Report Remarks	**	**	**	

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

Sample Locations Plan

x - approximate test location

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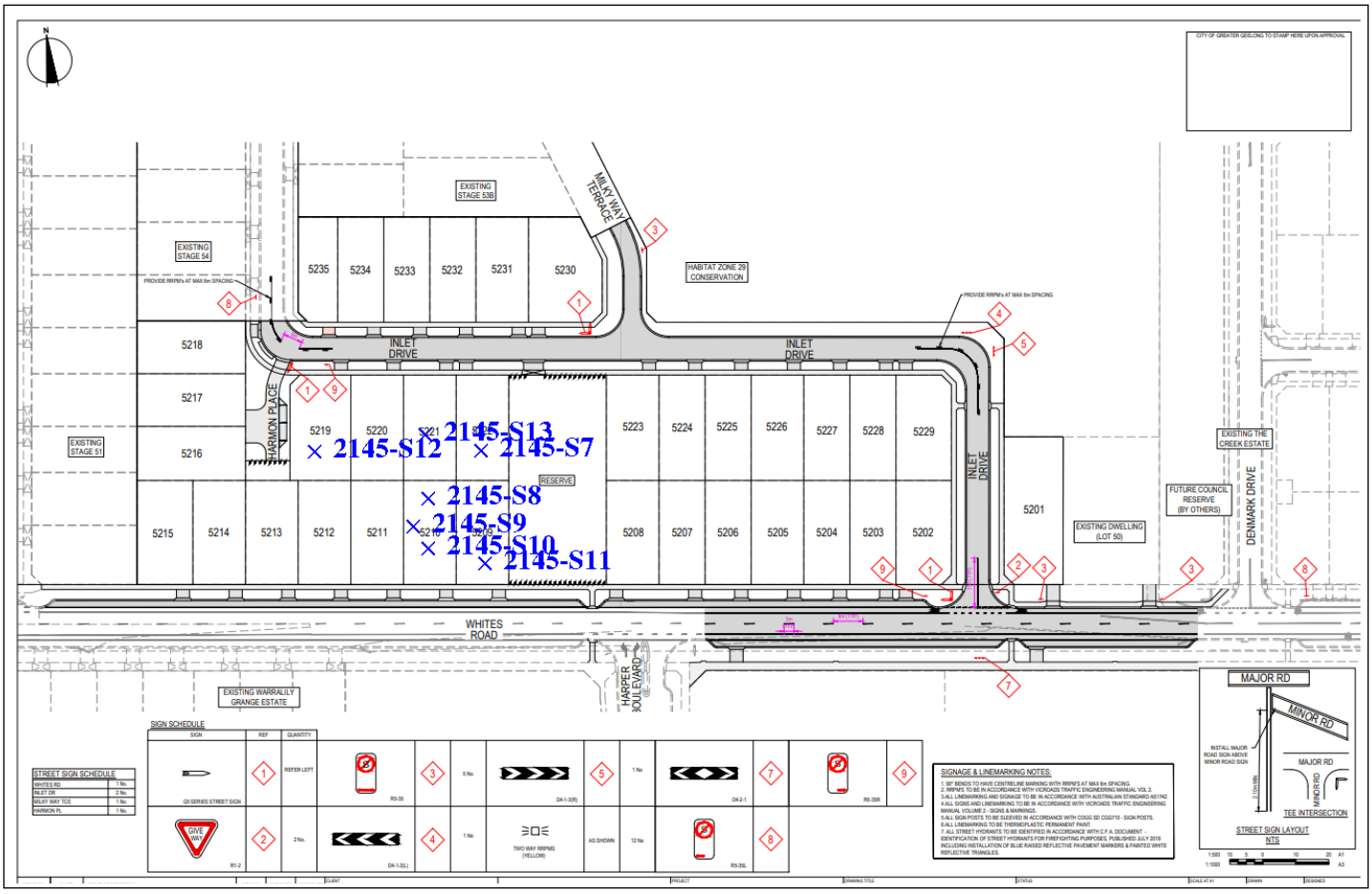

Material Test Report

Report Number: **GSSW2145-4**
Issue Number: 1
Date Issued: 20/05/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19610
Date Sampled: 16/05/2024
Dates Tested: 16/05/2024 - 17/05/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5208 to 5205 and 5223 to 5225
Material: gravelly, clayey SAND, medium plasticity
Material Source: Site Won Fill

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Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	2145-S14	2145-S15	2145-S16
Date Tested	16/05/2024	16/05/2024	16/05/2024
Time Tested	10:37	13:00	13:10
Test Request #/Location	Refer to attached plan Lot 5206	Refer to attached plan Lot 5208	Refer to attached plan Lot 5223
Easting	266218,	266197,	266201,
Northing	5764983 (Zone 55H), 35 m	5764989 (Zone 55H), 37 m	5765007 (Zone 55H), 34 m
Layer / Reduced Level	1	2	3
Thickness of Layer (mm)	200	200	200
Soil Description	gravelly, clayey SAND, medium plasticity	gravelly, clayey SAND, medium plasticity	gravelly, clayey SAND, medium plasticity
Test Depth (mm)	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	1	0	1
Percentage of Dry Oversize (%) (AS1289.5.4.1)	1	0	1
Field Wet Density (FWD) t/m^3	2.02	2.04	2.10
Field Moisture Content %	18.3	18.5	17.8
Field Dry Density (FDD) t/m^3	1.71	1.72	1.78
Peak Converted Wet Density t/m^3	**	2.01	**
Adjusted Peak Converted Wet Density t/m^3	2.03	**	2.10
Adj. Optimum Moisture Content % (AS1289.5.4.1)	18.6	19.2	17.9
Adj. Field Moisture Content % (AS1289.5.4.1)	18.2	18.5	17.7
Moisture Ratio % (AS1289.5.4.1)	**	96.5	**
Adjusted Moisture Ratio % (AS1289.5.4.1)	97.5	**	99.0
Moisture Variation (Wv) %	**	0.5	**
Adjusted Moisture Variation %	0.5	**	0.0
Hilf Density Ratio (%)	**99.5**	**101.5**	**100.0**
Compaction Method	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	**

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

Sample Locations Plan

x - approximate test location

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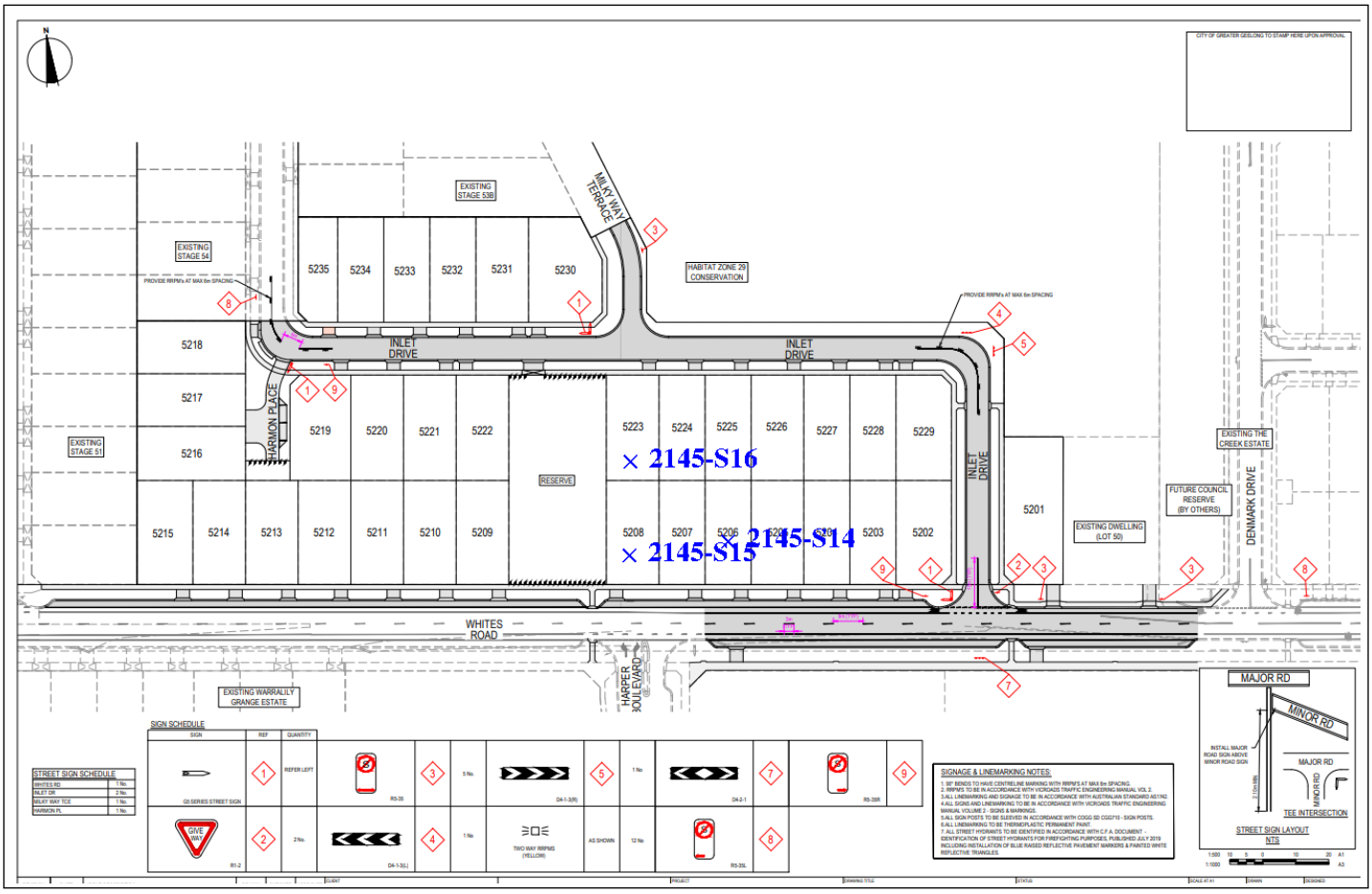

Material Test Report

Report Number: GSSW2145-5
Issue Number: 1
Date Issued: 21/05/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19626
Date Sampled: 17/05/2024
Dates Tested: 17/05/2024 - 20/05/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5208 to 5205 and 5223 to 5225
Material: gravelly, clayey SAND, medium plasticity
Material Source: Feehans Road Mount Duneed

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Laboratory Manager
NATA Accredited Laboratory Number: 20109

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1					
Sample Number	2145-S18	2145-S19	2145-S20	2145-S21	2145-S22
Date Tested	17/05/2024	17/05/2024	17/05/2024	17/05/2024	17/05/2024
Time Tested	11:30	11:40	12:03	15:20	15:31
Test Request #/Location	Refer to attached plan Lot 5225 edge	Refer to attached plan Lot 5207	Refer to attached plan Lot 5205	Refer to attached plan Lot 5231	Refer to attached plan Lot 5230
Easting	266211,	266243,	266217,	266165,	266175,
Northing	5765009 (Zone 55H), 35 m	5764983 (Zone 55H), 38 m	5764981 (Zone 55H), 38 m	5765057 (Zone 55H), 37 m	5765065 (Zone 55H), 34 m
Layer / Reduced Level	2	2	2	FSL (insitu subgrade)	FSL (insitu subgrade)
Thickness of Layer (mm)	200	200	200	200	200
Soil Description	gravelly, clayey SAND, medium plasticity	gravelly, clayey SAND, medium plasticity	gravelly, clayey SAND, medium plasticity	gravelly, clayey SAND, medium plasticity	gravelly, clayey SAND, medium plasticity
Test Depth (mm)	175	175	175	175	175
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	2.07	2.05	2.07	2.11	1.89
Field Moisture Content %	17.4	18.2	22.0	13.6	11.6
Field Dry Density (FDD) t/m^3	1.76	1.73	1.70	1.86	1.69
Peak Converted Wet Density t/m^3	1.98	1.99	2.01	2.10	1.87
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	19.7	20.4	21.5	15.5	16.6
Adj. Field Moisture Content % (AS1289.5.4.1)	17.4	18.2	22.0	13.6	11.6
Moisture Ratio % (AS1289.5.4.1)	88.5	89.0	102.0	88.0	70.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**	**
Moisture Variation (Wv) %	2.0	2.0	-0.5	2.0	5.0
Adjusted Moisture Variation %	**	**	**	**	**
Hilf Density Ratio (%)	**104.0**	**102.5**	**103.0**	**100.0**	**100.5**
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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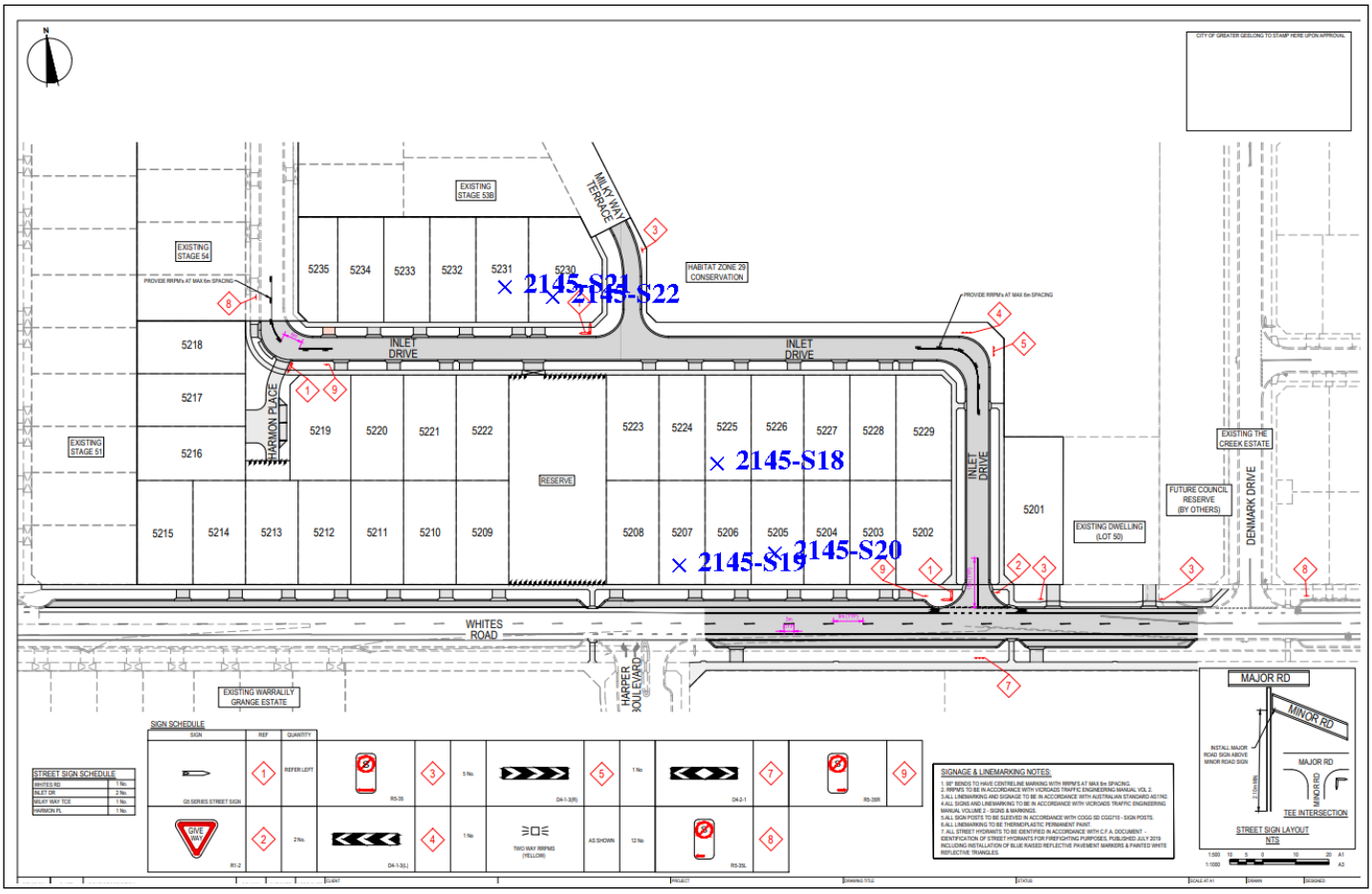

Material Test Report

Report Number: GSSW2145-6
Issue Number: 1
Date Issued: 23/05/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19651
Date Sampled: 21/05/2024
Dates Tested: 21/05/2024 - 22/05/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5208 to 5205 and 5223 to 5225
Material: sandy CLAY, trace gravel, high plasticity
Material Source: Feehans Road Mount Duneed

Ground Science South West
Geotechnical & Environmental Consultants

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

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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	2145-S23	2145-S24	2145-S25	2145-S26
Date Tested	21/05/2024	21/05/2024	21/05/2024	21/05/2024
Time Tested	12:30	12:45	15:30	17:01
Test Request #/Location	Refer to attached plan Lot 5205	Refer to attached plan Lot 5207	Refer to attached plan Lot 5224 edge	Refer to attached plan Lot 5205 edge
Easting	266209,	266241,	266233,	266259,
Northing	5764992 (Zone 55H), 21 m	5764973 (Zone 55H), 34 m	5765017 (Zone 55H), 33 m	5764978 (Zone 55H), 32 m
Layer / Reduced Level	3	3	1	2
Thickness of Layer (mm)	200	200	200	200
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)	175	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0	0
Field Wet Density (FWD) t/m^3	2.01	1.98	2.05	2.05
Field Moisture Content %	22.7	22.8	22.9	22.8
Field Dry Density (FDD) t/m^3	1.64	1.61	1.67	1.67
Peak Converted Wet Density t/m^3	1.96	1.90	1.90	1.93
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	24.0	25.0	25.1	24.7
Adj. Field Moisture Content % (AS1289.5.4.1)	22.7	22.8	22.9	22.8
Moisture Ratio % (AS1289.5.4.1)	94.5	91.0	91.0	92.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**
Moisture Variation (Wv) %	1.0	2.0	2.0	2.0
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	**103.0**	**104.0**	**108.0**	**106.0**
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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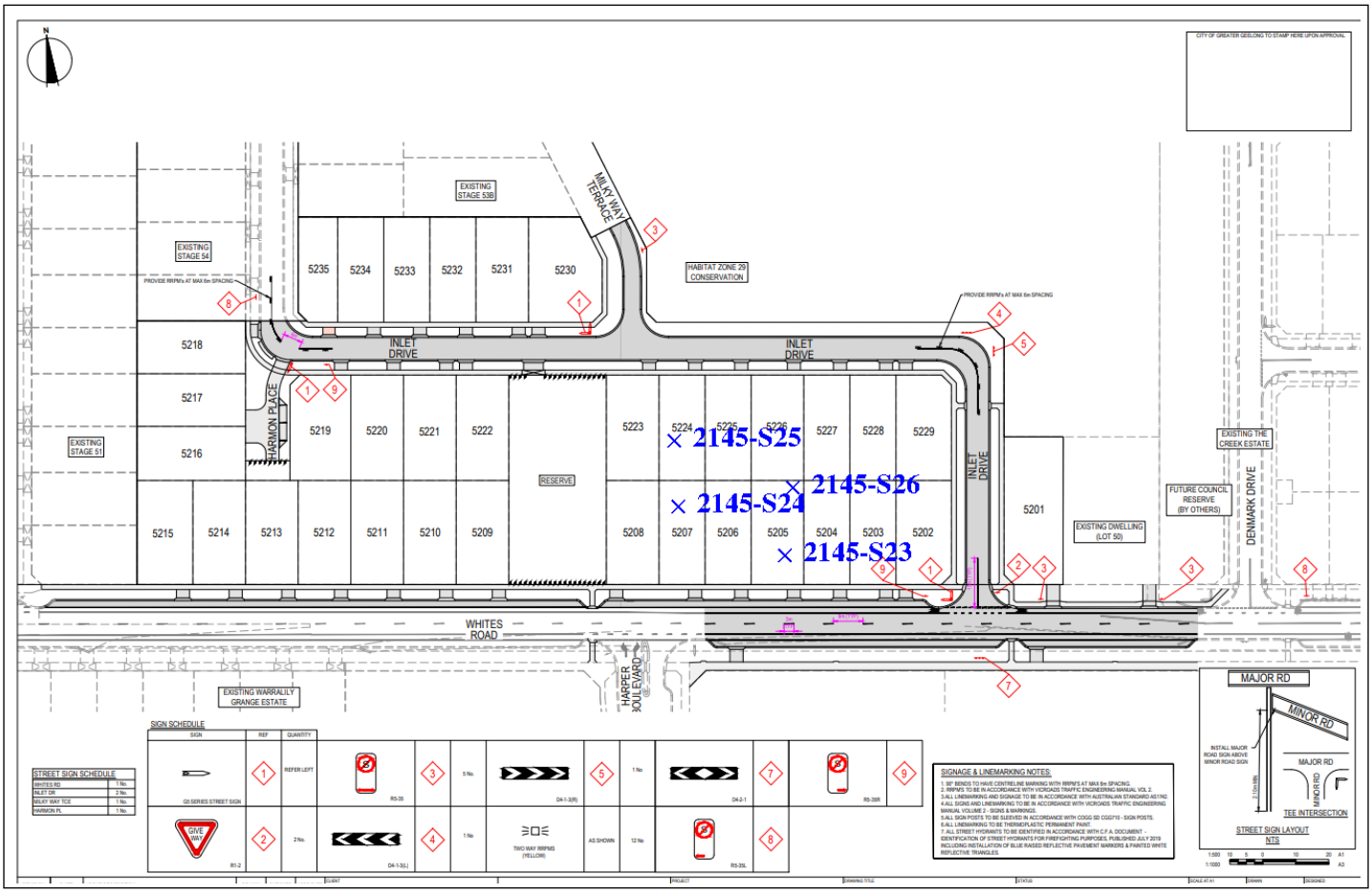

Material Test Report

Report Number: GSSW2145-7
Issue Number: 1
Date Issued: 30/05/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19714
Date Sampled: 28/05/2024
Dates Tested: 28/05/2024 - 29/05/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5223 to 5229 and Lot 5204 to 5202
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: 470 Horseshoe Bend Road, Armstrong Creek, 3217

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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	2145-S29	2145-S30	2145-S31
Date Tested	28/05/2024	28/05/2024	28/05/2024
Time Tested	13:20	16:00	16:24
Test Request #/Location	Refer to attached plan Lot 5228	Refer to attached plan Lot 5226	Refer to attached plan Lot 5204
Easting	266251,	266232,	266261,
Northing	5765025 (Zone 55H), 36 m	5765023 (Zone 55H), 30 m	5764975 (Zone 55H), 33 m
Layer / Reduced Level	1	1	1
Thickness of Layer (mm)	200	200	200
Soil Description	CLAY, with sand, trace gravel	CLAY, with sand, trace gravel	CLAY, with sand, trace gravel
Test Depth (mm)	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	5
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	5
Field Wet Density (FWD) t/m^3	1.91	2.04	1.93
Field Moisture Content %	21.5	19.8	17.5
Field Dry Density (FDD) t/m^3	1.58	1.70	1.65
Peak Converted Wet Density t/m^3	1.99	2.04	**
Adjusted Peak Converted Wet Density t/m^3	**	**	2.03
Adj. Optimum Moisture Content % (AS1289.5.4.1)	21.5	21.0	19.2
Adj. Field Moisture Content % (AS1289.5.4.1)	21.5	19.8	16.7
Moisture Ratio % (AS1289.5.4.1)	100.0	94.0	**
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	87.0
Moisture Variation (Wv) %	0.0	1.0	**
Adjusted Moisture Variation %	**	**	2.5
Hilf Density Ratio (%)	**96.0**	**100.0**	**95.0**
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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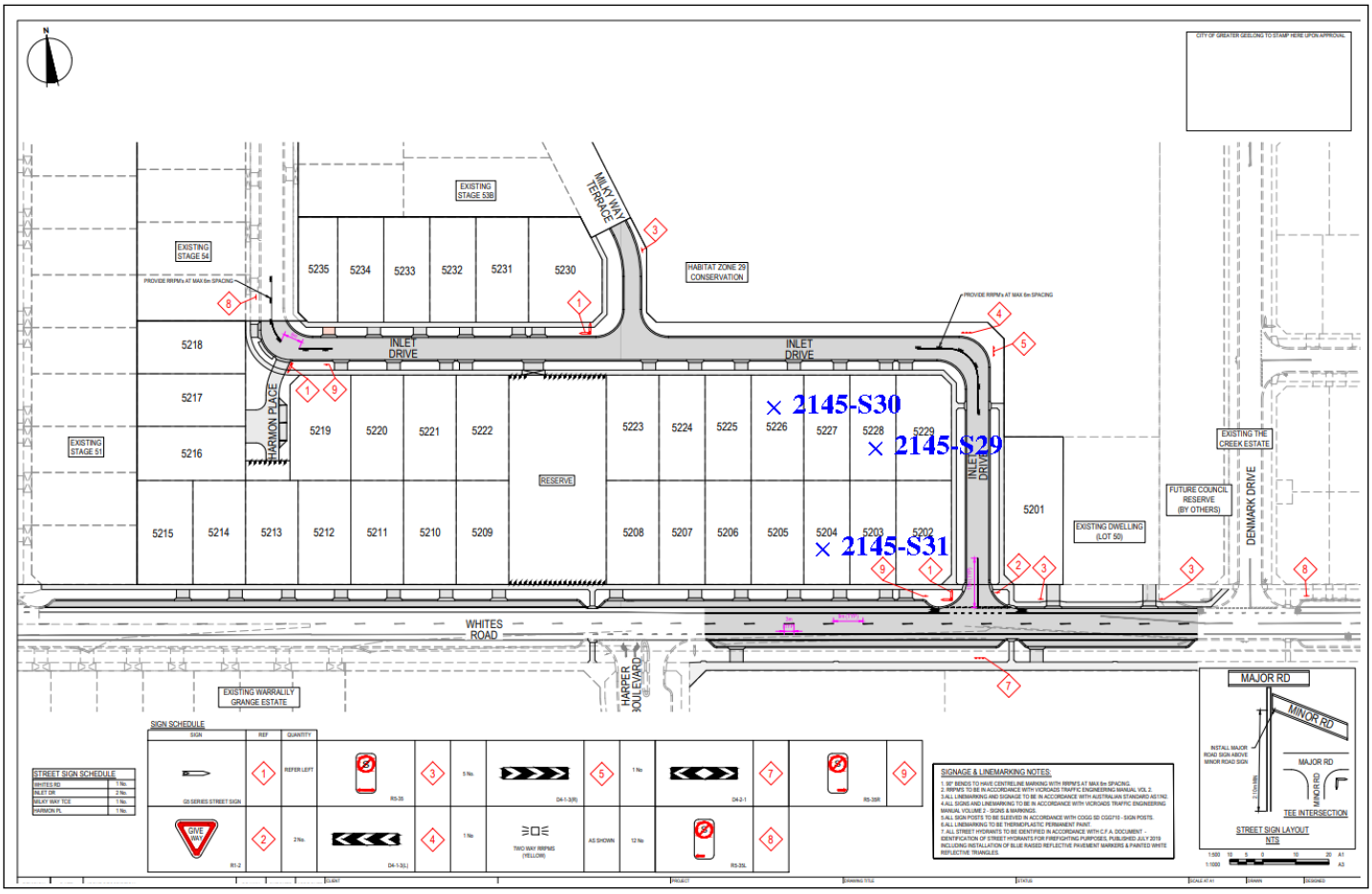

Material Test Report

Report Number: GSSW2145-8
Issue Number: 1
Date Issued: 31/05/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19726
Date Sampled: 29/05/2024
Dates Tested: 29/05/2024 - 30/05/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5223 to 5229 and Lot 5204 to 5202
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: 470 Horseshoe Bend Road, Armstrong Creek, 3217

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Laboratory Manager
NATA Accredited Laboratory Number: 20109

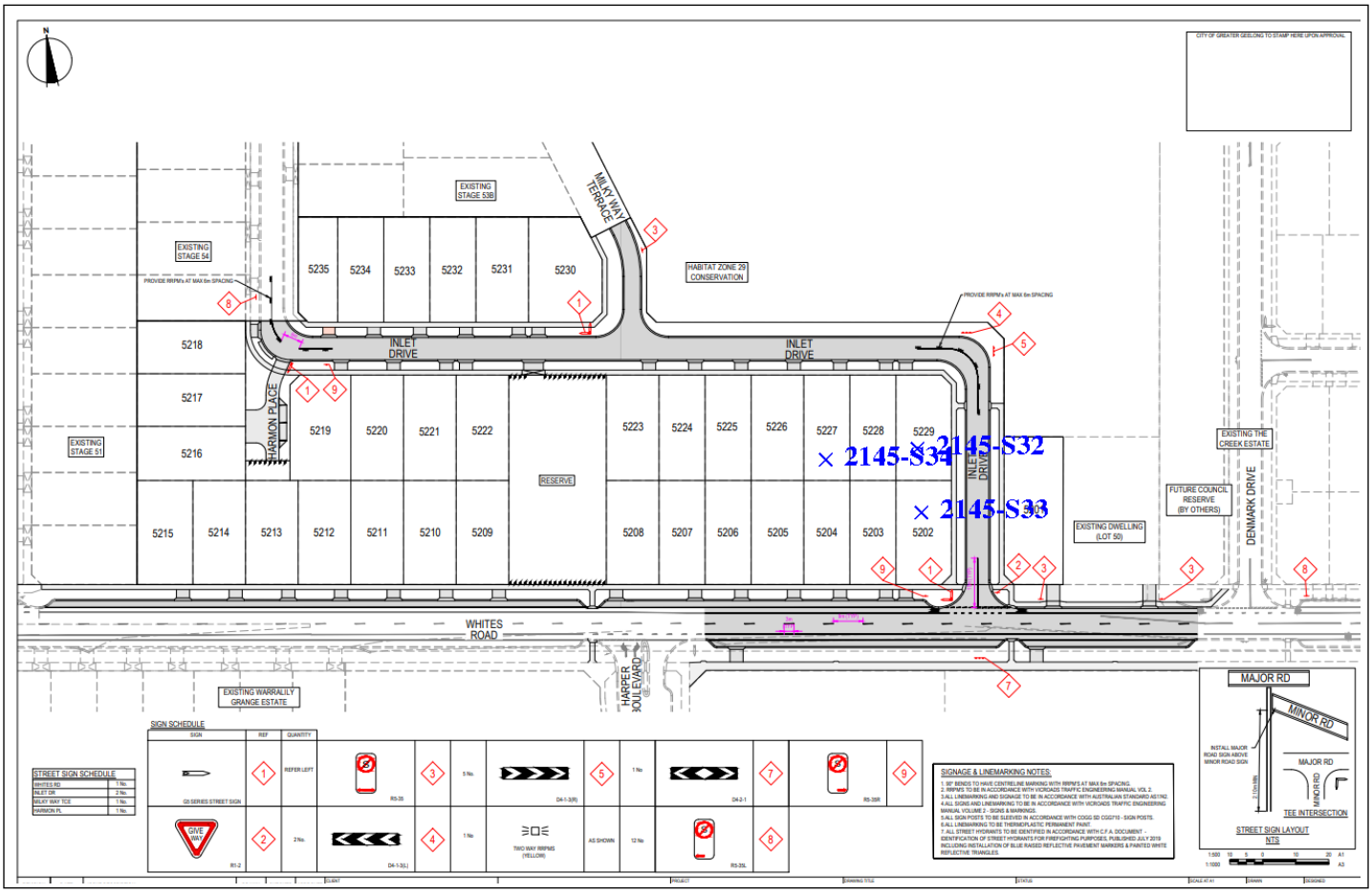
Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	2145-S32	2145-S33	2145-S34
Date Tested	29/05/2024	29/05/2024	29/05/2024
Time Tested	15:10	15:20	16:04
Test Request #/Location	Refer to attached plan Lot 5229	Refer to attached plan Lot 5220	Refer to attached plan Lot 5227
Easting	266294,	266291,	266264,
Northing	5765010 (Zone 55H), 32 m	5764987 (Zone 55H), 35 m	5765023 (Zone 55H), 30 m
Layer / Reduced Level	Layer 2	Layer 2	Layer 2
Thickness of Layer (mm)	200	200	200
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)	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m^3	1.96	1.99	2.04
Field Moisture Content %	18.9	18.4	18.9
Field Dry Density (FDD) t/m^3	1.65	1.68	1.72
Peak Converted Wet Density t/m^3	1.99	1.97	2.05
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	21.0	20.3	18.9
Adj. Field Moisture Content % (AS1289.5.4.1)	18.9	18.4	18.9
Moisture Ratio % (AS1289.5.4.1)	90.0	90.5	100.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	2.0	2.0	0.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**98.5**	**101.0**	**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

Ground Science South West
Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW2145-9
Issue Number: 1
Date Issued: 03/06/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19746
Date Sampled: 30/05/2024
Dates Tested: 30/05/2024 - 31/05/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5223 to 5229 , Lot 5204 to 5202 and lot 5201
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: 470 Horseshoe Bend Road, Armstrong Creek, 3217

Ground Science South West
Geotechnical & Environmental Consultants

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

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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	2145-S35	2145-S36	2145-S37
Date Tested	30/05/2024	30/05/2024	30/05/2024
Time Tested	14:30	15:00	15:53
Test Request #/Location	Refer to attached plan Lot 5225	Refer to attached plan Lot 5223	Refer to attached plan Lot 5203
Easting	266255,	266227,	266278,
Northing	5765021 (Zone 55H), 42 m	5765020 (Zone 55H), 32 m	5764974 (Zone 55H), 32 m
Layer / Reduced Level	3	3	3
Thickness of Layer (mm)	200	200	200
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)	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m^3	2.04	2.07	2.02
Field Moisture Content %	19.5	18.7	18.8
Field Dry Density (FDD) t/m^3	1.71	1.75	1.70
Peak Converted Wet Density t/m^3	1.99	2.01	2.08
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	22.2	20.3	18.8
Adj. Field Moisture Content % (AS1289.5.4.1)	19.5	18.7	18.8
Moisture Ratio % (AS1289.5.4.1)	87.5	92.0	100.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	2.5	1.5	0.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**102.5**	**103.0**	**97.5**
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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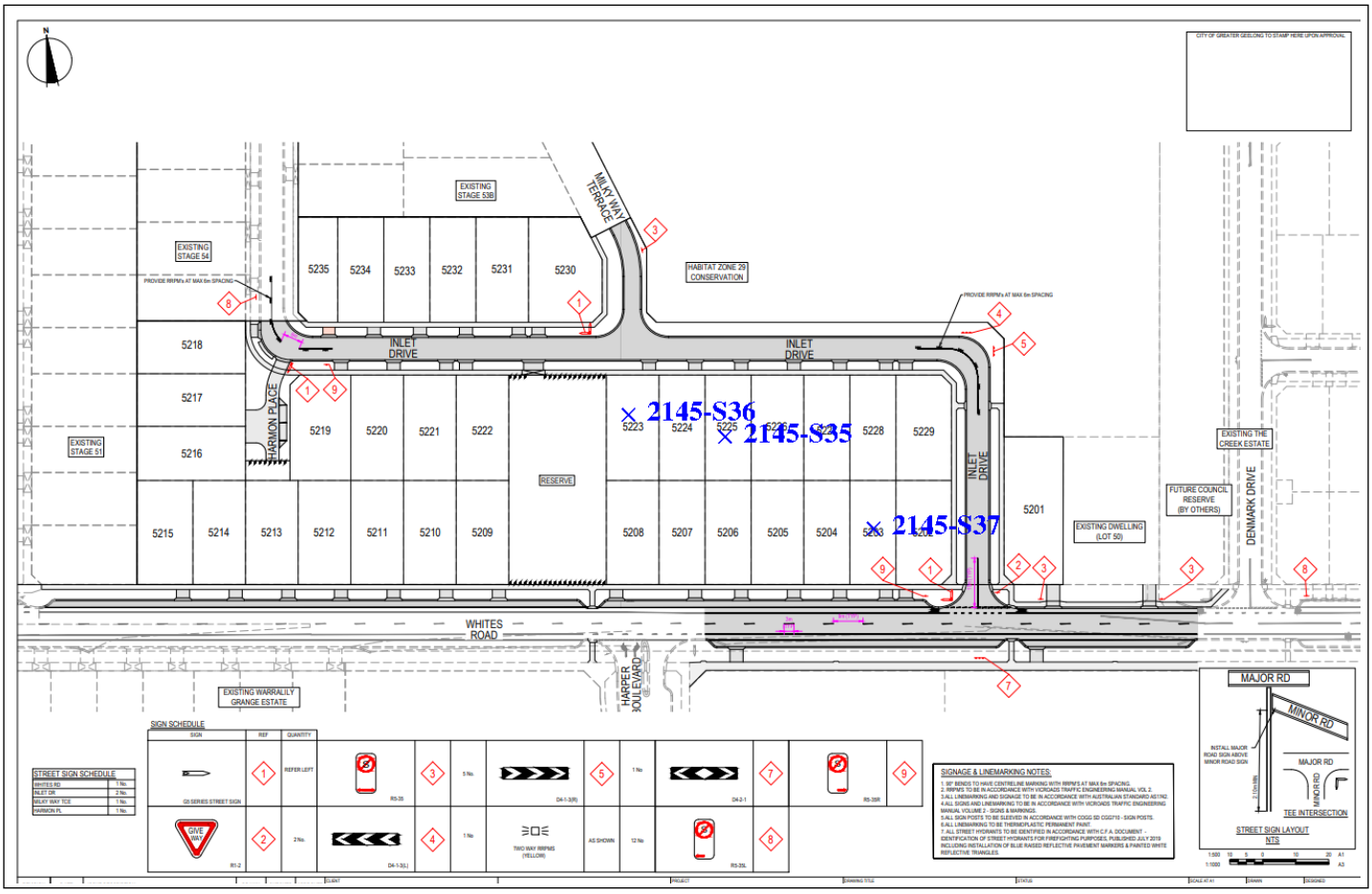

Material Test Report

Report Number: GSSW2145-10
Issue Number: 1
Date Issued: 04/06/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19761
Date Sampled: 31/05/2024
Dates Tested: 31/05/2024 - 03/06/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5223 to 5229 , Lot 5204 to 5202 and Lot 5201
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: 470 Horseshoe Bend Road, Armstrong Creek, 3217

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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

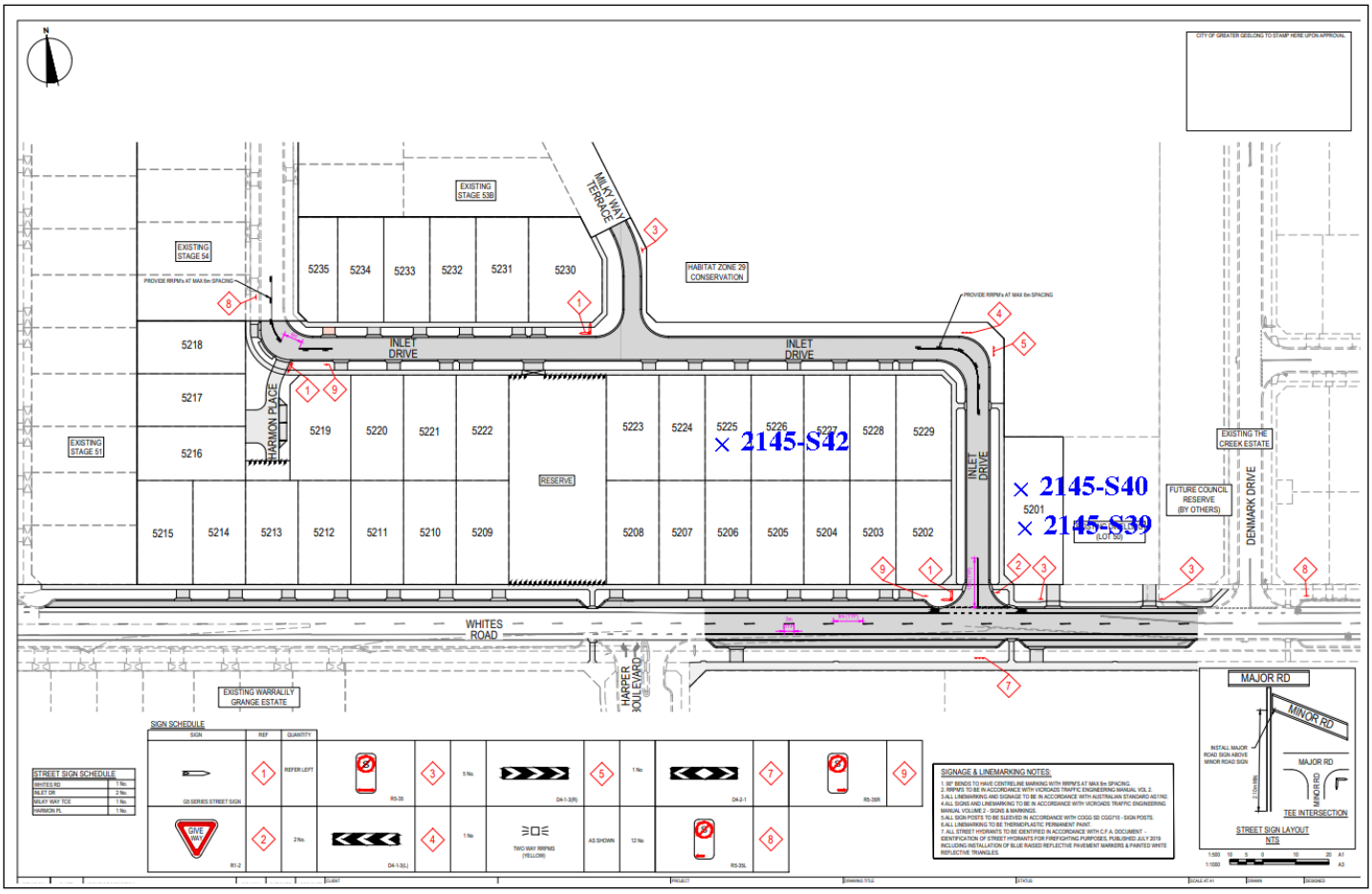
Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	2145-S39	2145-S40	2145-S42
Date Tested	31/05/2024	31/05/2024	31/05/2024
Time Tested	09:00	10:30	14:00
Test Request #/Location	Refer to attached plan Lot 5201	Refer to attached plan Lot 5201	Refer to attached plan Lot 5225
Easting	266302,	266312,	266239
Northing	5764964 (Zone 55H), 35 m	5764965 (Zone 55H), 36 m	5764988 (Zone 55H), 24 m
Layer / Reduced Level	1	2	4
Thickness of Layer (mm)	200	200	200
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)	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	2	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	2	0	0
Field Wet Density (FWD) t/m^3	1.98	2.00	1.97
Field Moisture Content %	22.9	20.0	16.7
Field Dry Density (FDD) t/m^3	1.62	1.67	1.69
Peak Converted Wet Density t/m^3	**	2.03	2.03
Adjusted Peak Converted Wet Density t/m^3	2.03	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	22.1	20.5	16.6
Adj. Field Moisture Content % (AS1289.5.4.1)	22.3	20.0	16.7
Moisture Ratio % (AS1289.5.4.1)	**	97.5	100.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	100.5	**	**
Moisture Variation (Wv) %	**	0.5	0.0
Adjusted Moisture Variation %	0.0	**	**
Hilf Density Ratio (%)	**97.5**	**98.5**	**97.0**
Compaction Method	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	**

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

Sample Locations Plan

x - approximate test location

Ground Science South West
Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW2145-10A
Issue Number: 1
Date Issued: 04/06/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19761
Date Sampled: 31/05/2024
Dates Tested: 31/05/2024 - 03/06/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 98% Standard Compaction & +/- 3% Moisture Variation
Location: Inlet Drive
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: 470 Horseshoe Bend Road, Armstrong Creek, 3217

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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	2145-S38	2145-S41	2145-S43	2145-S44	2145-S45
Date Tested	31/05/2024	31/05/2024	31/05/2024	31/05/2024	31/05/2024
Time Tested	08:30	11:00	15:00	16:00	16:27
Test Request #/Location	Refer to attached plan Inlet Drive	Refer to attached plan Inlet Drive	Refer to attached plan Inlet Drive	Refer to attached plan Inlet Drive	Refer to attached plan Inlet Drive
Easting	266304,	266305,	266275	266297,	266302
Northing	5764987 (Zone 55H), 33 m	5764995 (Zone 55H), 33 m	5765033 (Zone 55H), 30 m	5764968 (Zone 55H), 33 m	5765024 (Zone 55H), 35m
Elevation (m)	600mm BFSL	400mm BFSL	200mm BFSL	200mm BFSL	Top of subgrade
Layer / Reduced Level	1	2	3	3	FSL
Thickness of Layer (mm)	200	200	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
Test Depth (mm)	175	175	125	125	125
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	2.01	2.02	2.12	2.05	2.03
Field Moisture Content %	18.5	17.9	17.8	19.8	17.9
Field Dry Density (FDD) t/m^3	1.70	1.72	1.80	1.71	1.73
Peak Converted Wet Density t/m^3	2.05	2.09	2.09	2.04	2.07
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	18.8	18.3	17.5	19.3	17.0
Adj. Field Moisture Content % (AS1289.5.4.1)	18.5	17.9	17.8	19.8	17.9
Moisture Ratio % (AS1289.5.4.1)	98.5	98.0	102.0	102.5	105.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**	**	**
Moisture Variation (Wv) %	0.5	0.5	-0.5	-0.5	-1.0
Adjusted Moisture Variation %	**	**	**	**	**
Hilf Density Ratio (%)	**98.0**	**97.0**	**101.5**	**100.0**	**98.5**
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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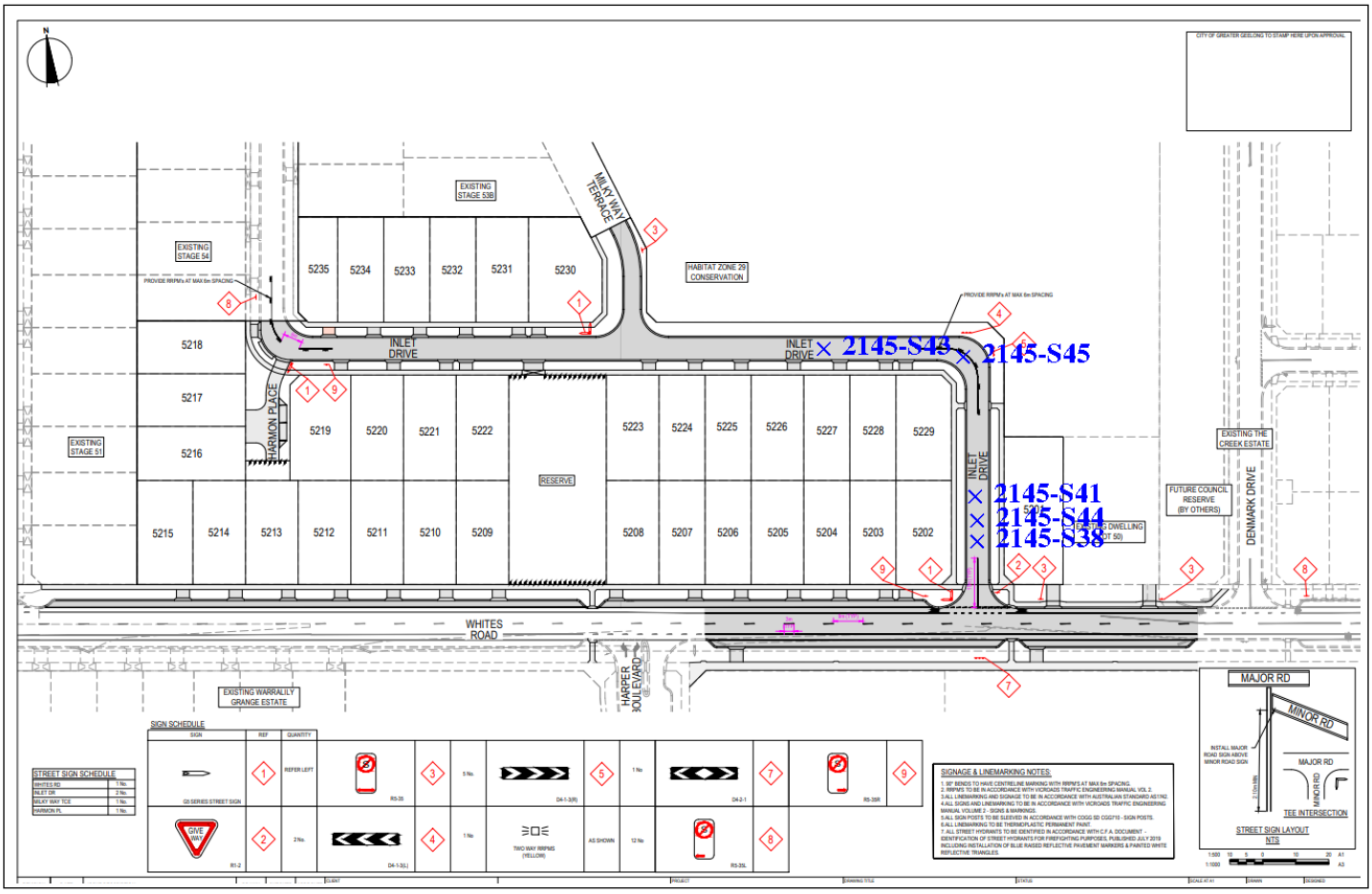

Material Test Report

Report Number: **GSSW2145-11**
Issue Number: 1
Date Issued: 06/06/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19772
Date Sampled: 03/06/2024
Dates Tested: 03/06/2024 - 04/06/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5230, 5226 , 5229, 5201
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: 470 Horseshoe Bend Road, Armstrong Creek, 3217

Ground Science South West
Geotechnical & Environmental Consultants

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Phone: (03) 5282 1566
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Accredited for compliance with ISO/IEC 17025 - Testing

NATA
WORLD RECOGNISED ACCREDITATION

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

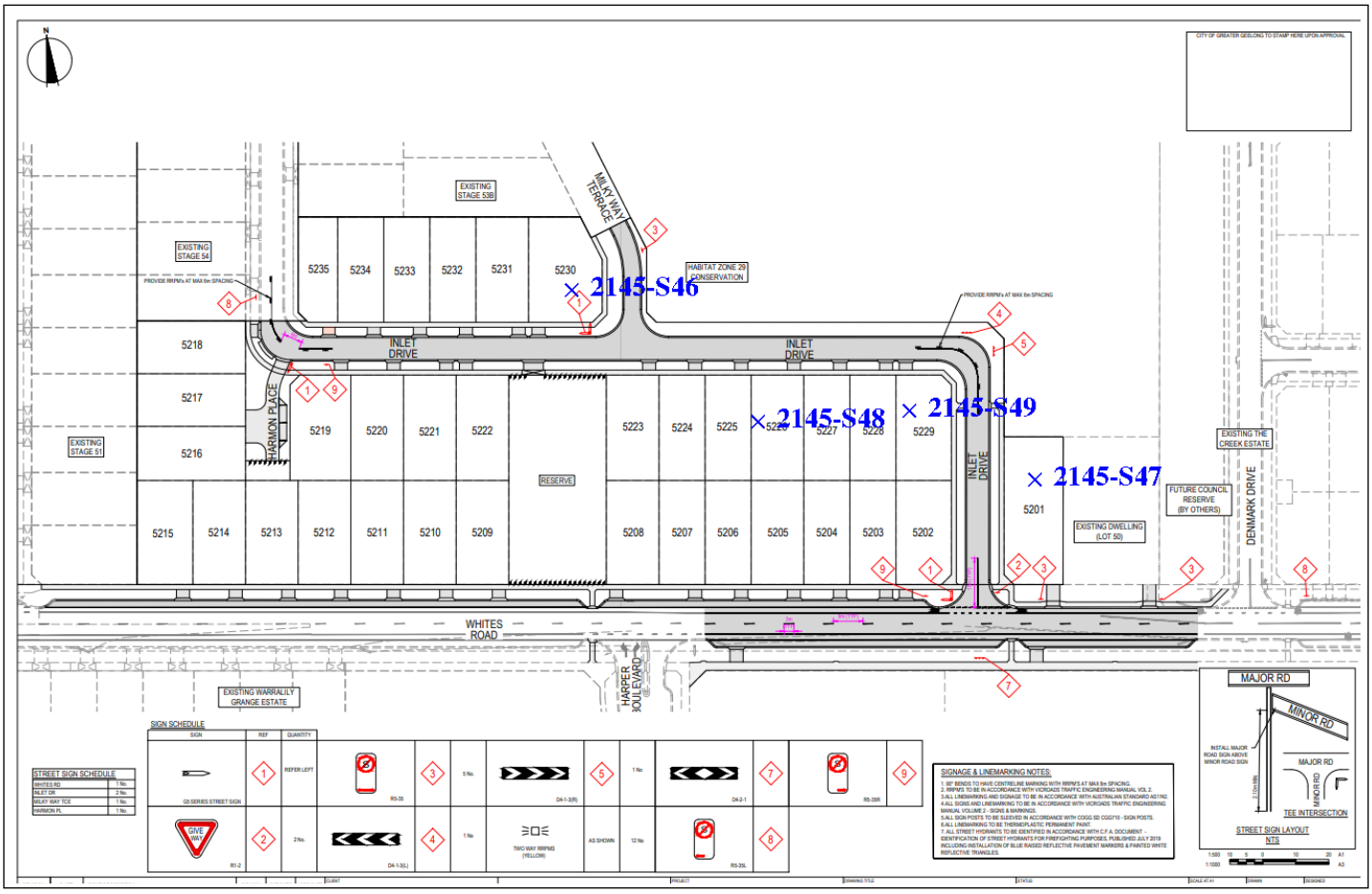
Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	2145-S46	2145-S47	2145-S48	2145-S49
Date Tested	03/06/2024	03/06/2024	03/06/2024	03/06/2024
Time Tested	12:10	12:25	15:30	15:40
Test Request #/Location	Refer to attached plan Lot 5230	Refer to attached plan Lot 5201	Refer to attached plan Lot 5226	Refer to attached plan Lot 5229
Layer / Reduced Level	FSL	3	4	4
Thickness of Layer (mm)	200	200	200	200
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)	175	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0	0
Field Wet Density (FWD) t/m^3	2.01	2.08	2.12	2.10
Field Moisture Content %	19.9	20.1	20.0	21.9
Field Dry Density (FDD) t/m^3	1.68	1.73	1.76	1.72
Peak Converted Wet Density t/m^3	2.03	2.09	2.09	2.00
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**
Moisture Variation (Wv) %	1.0	0.0	0.0	1.0
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	**99.0**	**100.0**	**101.0**	**105.0**
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

Ground Science South West
Geotechnical & Environmental Consultants



Material Test Report

Report Number: GSSW2145-12
Issue Number: 1
Date Issued: 06/06/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19780
Date Sampled: 03/06/2024
Dates Tested: 03/06/2024 - 04/06/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 98% Standard Compaction & +/- 3% Moisture Variation
Location: Inlet Drive near to lot 5201 retest
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: 470 Horseshoe Bend Road, Armstrong Creek, 3217

Ground Science South West
Geotechnical & Environmental Consultants

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

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NATA
WORLD RECOGNISED ACCREDITATION

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

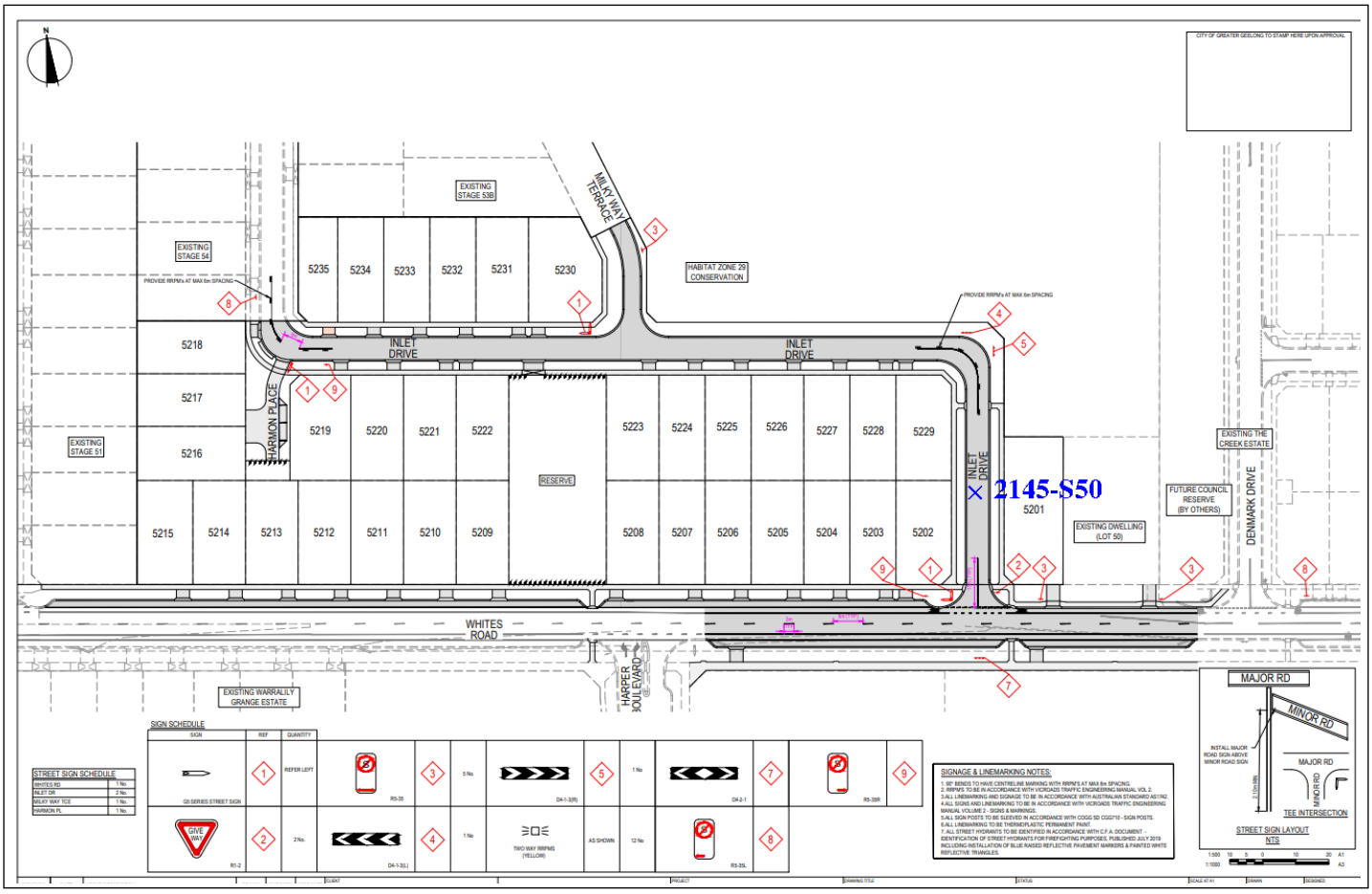
Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	2145-S50		
Date Tested	03/06/2024		
Time Tested	14:09		
Test Request #/Location	Refer to attached plan Inlet Drive (retest of S41)		
Easting	266306		
Northing	5764991 55H		
Layer / Reduced Level	2		
Thickness of Layer (mm)	200		
Soil Description	CLAY, with sand, trace gravel, high plasticity		
Test Depth (mm)	175		
Sieve used to determine oversize (mm)	19.0		
Percentage of Wet Oversize (%)	0		
Field Wet Density (FWD) t/m^3	2.08		
Field Moisture Content %	21.1		
Field Dry Density (FDD) t/m^3	1.71		
Peak Converted Wet Density t/m^3	1.98		
Adjusted Peak Converted Wet Density t/m^3	**		
Moisture Variation (Wv) %	1.0		
Adjusted Moisture Variation %	**		
Hilf Density Ratio (%)	**104.5**		
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: GSSW2145-14
Issue Number: 1
Date Issued: 11/06/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19793
Date Sampled: 05/06/2024
Dates Tested: 05/06/2024 - 06/06/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5201
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Onsite

Ground Science South West
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Email: chrism@groundsciencesw.com.au

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WORLD RECOGNISED ACCREDITATION

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

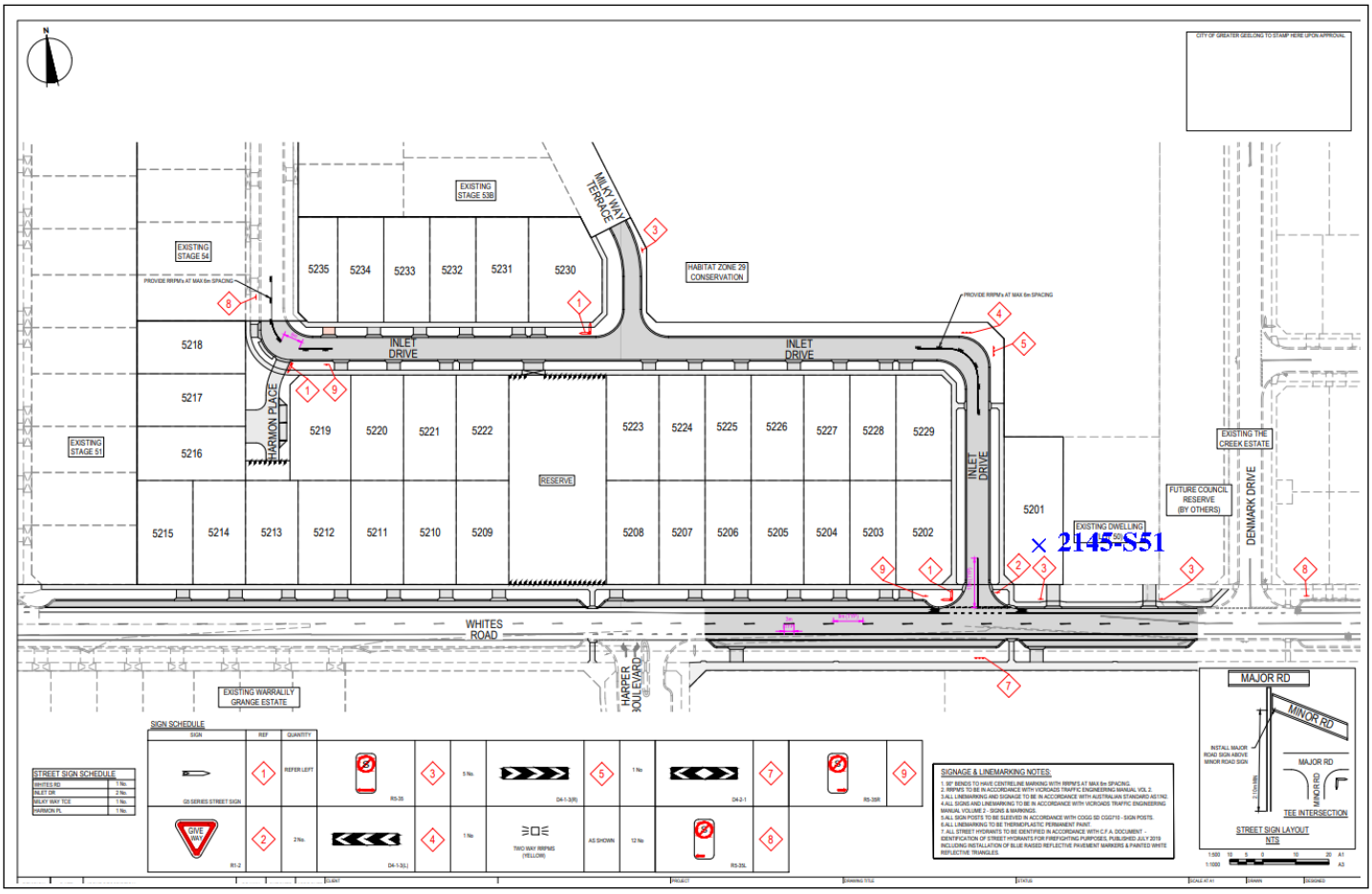
Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	2145-S51		
Date Tested	05/06/2024		
Time Tested	15:30		
Test Request #/Location	Refer to attached plan Lot 5201		
Easting	266312,		
Northing	5764966 (Zone 55H), 33 m		
Layer / Reduced Level	4		
Thickness of Layer (mm)	200		
Soil Description	CLAY, with sand, trace gravel, high plasticity		
Test Depth (mm)	175		
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	2.05		
Field Moisture Content %	19.0		
Field Dry Density (FDD) t/m^3	1.73		
Peak Converted Wet Density t/m^3	2.08		
Adjusted Peak Converted Wet Density t/m^3	**		
Adj. Optimum Moisture Content % (AS1289.5.4.1)	18.9		
Adj. Field Moisture Content % (AS1289.5.4.1)	19.0		
Moisture Ratio % (AS1289.5.4.1)	100.5		
Adjusted Moisture Ratio % (AS1289.5.4.1)	**		
Moisture Variation (Wv) %	0.0		
Adjusted Moisture Variation %	**		
Hilf Density Ratio (%)	**98.5**		
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: GSSW2145-15
Issue Number: 1
Date Issued: 11/06/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19806
Date Sampled: 05/06/2024
Dates Tested: 05/06/2024 - 06/06/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 98% Standard Compaction & +/- 3% Moisture Variation
Location: Inlet Drive
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Onsite

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	2145-S52	2145-S53	
Date Tested	05/06/2024	05/06/2024	
Time Tested	16:25	16:35	
Test Request #/Location	Refer to attached plan Inlet Drive	See attached plan Inlet Drive	
Easting	266301,	266298,	
Northing	5764981 (Zone 55H), 29 m	5764967 (Zone 55H), 32 m	
Layer / Reduced Level	FSL	FSL	
Thickness of Layer (mm)	150	150	
Soil Description	CLAY, with sand, trace gravel, high plasticity	CLAY, with sand, trace gravel, high plasticity	
Test Depth (mm)	125	125	
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	2.08	2.07	
Field Moisture Content %	18.0	20.5	
Field Dry Density (FDD) t/m^3	1.76	1.72	
Peak Converted Wet Density t/m^3	2.10	1.99	
Adjusted Peak Converted Wet Density t/m^3	**	**	
Adj. Optimum Moisture Content % (AS1289.5.4.1)	18.5	21.5	
Adj. Field Moisture Content % (AS1289.5.4.1)	18.0	20.5	
Moisture Ratio % (AS1289.5.4.1)	97.5	95.5	
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	
Moisture Variation (Wv) %	0.5	1.0	
Adjusted Moisture Variation %	**	**	
Hilf Density Ratio (%)	**99.0**	**104.0**	
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

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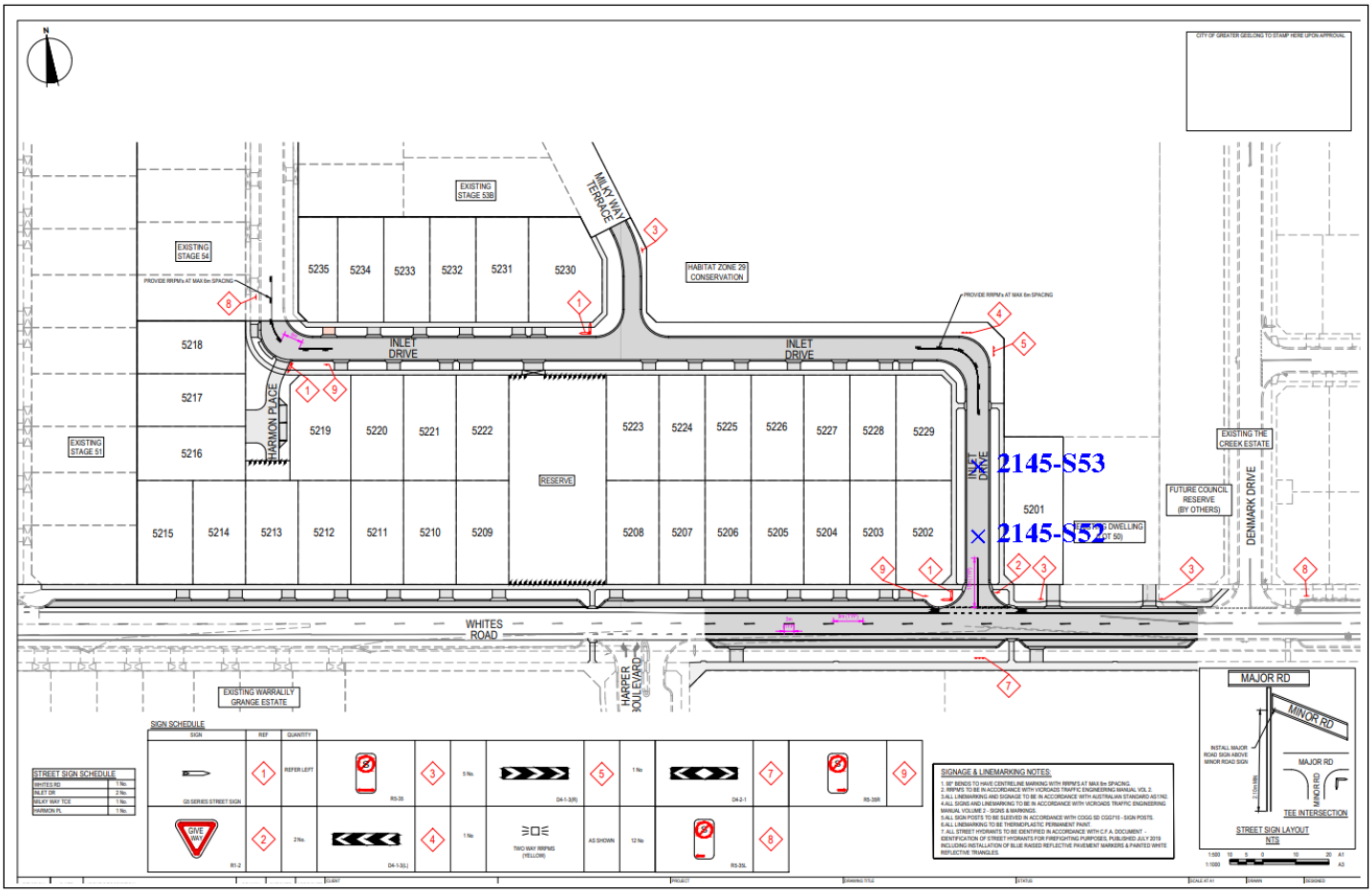

Material Test Report

Report Number: GSSW2145-16
Issue Number: 1
Date Issued: 11/06/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19809
Date Sampled: 06/06/2024
Dates Tested: 06/06/2024 - 07/06/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Lot 5201
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: Onsite

Ground Science South West
Geotechnical & Environmental Consultants

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

Accredited for compliance with ISO/IEC 17025 - Testing

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	2145-S54	2145-S55	2145-S56
Date Tested	06/06/2024	06/06/2024	06/06/2024
Time Tested	13:00	15:00	15:55
Test Request #/Location	Refer to attached plan Lot 5201	Refer to attached plan Lot 5201	Refer to attached plan Lot 5201
Easting	266303,	266319,	266321,
Northing	5764959 (Zone 55H), -0 m	5764956 (Zone 55H), 32 m	5764982 (Zone 55H), 32 m
Layer / Reduced Level	4	4	4
Thickness of Layer (mm)	200	200	200
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)	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m^3	1.98	2.07	2.08
Field Moisture Content %	17.2	17.5	17.5
Field Dry Density (FDD) t/m^3	1.69	1.76	1.77
Peak Converted Wet Density t/m^3	2.09	2.06	2.10
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	17.6	18.2	18.1
Adj. Field Moisture Content % (AS1289.5.4.1)	17.2	17.5	17.5
Moisture Ratio % (AS1289.5.4.1)	97.5	96.5	97.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	0.5	0.5	0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**95.0**	**100.5**	**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

Material Test Report

Report Number: GSSW2145-17
Issue Number: 1
Date Issued: 14/06/2024
Client: CREO CONSULTANTS PTY LTD
Level 7/176 Wellington Parade, East Melbourne Victoria 3002
Project Number: GSSW2145
Project Name: ARMSTRONG ESTATE STAGE 52
Project Location: MOUNT DUNEED
Work Request: 19838
Date Sampled: 12/06/2024
Dates Tested: 12/06/2024 - 13/06/2024
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% Standard Compaction & +/- 3% Moisture Variation
Location: Nature strip area lots 5205 to 5215
Material: CLAY, with sand, trace gravel, high plasticity
Material Source: 470 Horseshoe Bend Road, Armstrong Creek, 3217

Ground Science South West
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8 Freedman Street North Geelong Vic 3215
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Email: chrism@groundsciencesw.com.au

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NATA
WORLD RECOGNISED ACCREDITATION

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

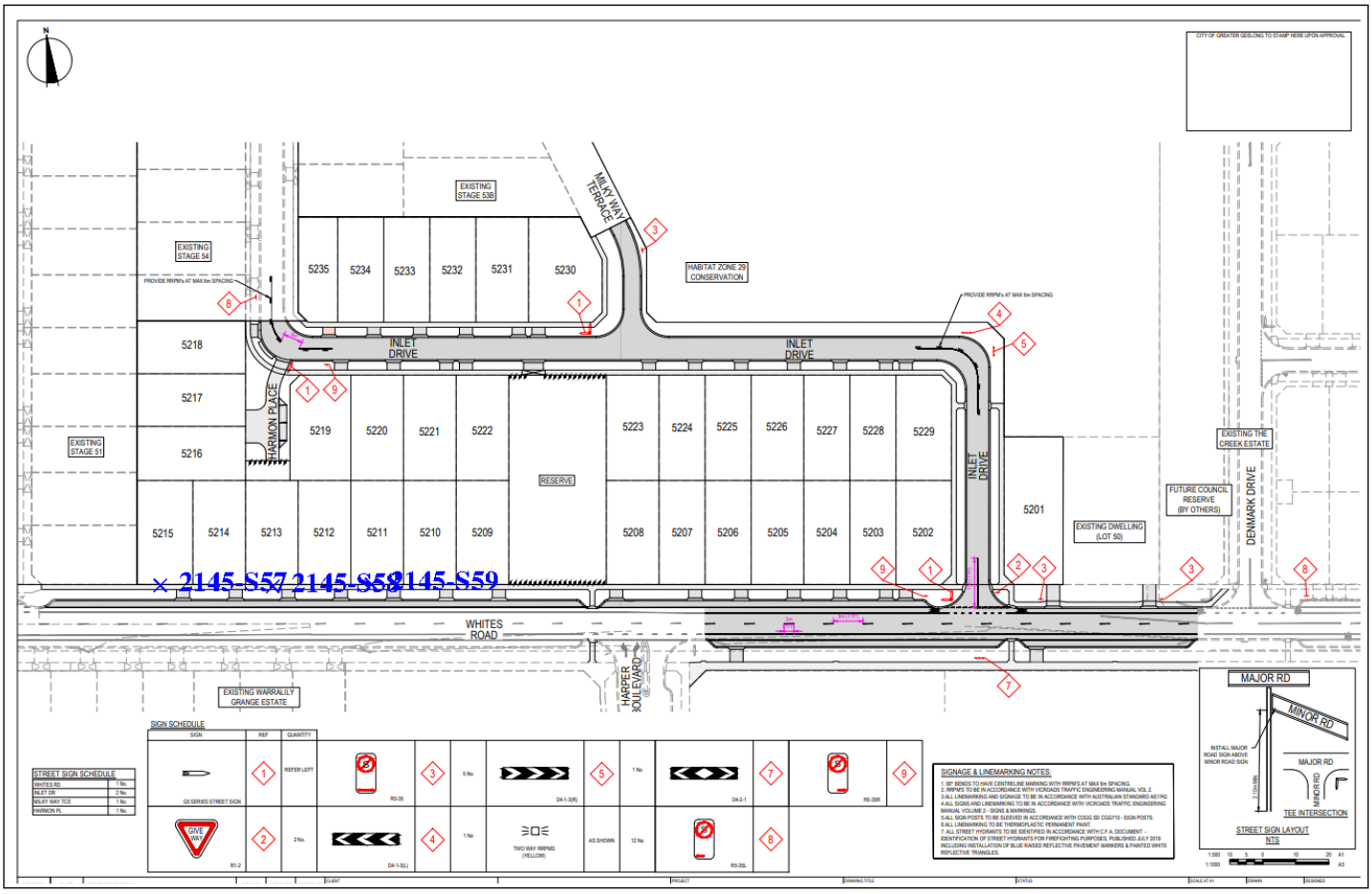
Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	2145-S57	2145-S58	2145-S59
Date Tested	12/06/2024	12/06/2024	12/06/2024
Time Tested	13:38	13:46	14:02
Test Request #/Location	Lot 5215 Nature Strip area	Lot 5213 Nature Strip area	Lot 5211 Nature Strip area
Easting	266053,	266086,	266114,
Northing	5764982 (Zone 55H), 31 m	5764979 (Zone 55H), 35 m	5764973 (Zone 55H), 35 m
Layer / Reduced Level	FSL (3)	FSL (3)	FSL (3)
Thickness of Layer (mm)	200	200	200
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)	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m^3	2.12	2.03	2.02
Field Moisture Content %	17.5	17.2	17.1
Field Dry Density (FDD) t/m^3	1.80	1.73	1.72
Peak Converted Wet Density t/m^3	2.10	2.06	2.05
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	17.3	17.1	17.0
Adj. Field Moisture Content % (AS1289.5.4.1)	17.5	17.2	17.1
Moisture Ratio % (AS1289.5.4.1)	101.5	100.5	100.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	0.0	0.0	0.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**101.0**	**98.5**	**98.5**
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



APPENDIX D

Site Photographs


DEERE
DRAPER'S


KOMATSU
DRAPER


CAT


Waterhaven
PREMIUM CREEK
FRONT LAND
DRAPERS


DRAPERS
KOMATSU
PC 220 LC


CATERPILLAR