CONTINENT GEOTECH SERVICES

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LEVEL 1 INSPECTION AND TESTING SUMMARY REPORT
Carolina South Stage 1, Deanside VIC

AMG Civil Group

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Document Details

Project Number	7437.01 – R0	Rev 0
Project Name	Carolina South Stage 1	
Project Location	Deanside, VIC	
Client	AMG Civil Group	

1. INTRODUCTION

This report presents the results of Level 1 Inspection and Testing for the fill placed within the proposed stage 1 division of Carolina South in Deanside VIC.

The works were commissioned by AMG Civil Group (client) by email request on 1st September 2023.

Level 1 Inspection and Testing, as defined in AS3798 – 2007 *'Guideline on Earthworks for Commercial and Residential Development'*, provides for full time inspection of the construction of controlled fill and field laboratory testing accordance with AS1289 *'Methods of Testing Soils for Engineering Purposes'.* The compaction control testing was undertaken by experienced Geotechnician from CGS.

2. PROJECT SUMMARY

Continent Geotech Services (CGS) provided the Level 1 Inspection and Testing of fill placed within the proposed subdivision in Carolina South, Deanside VIC. It is understood that the new residential subdivision is proposed to be developed.

The earthworks were carried out by AMG Civil Group with the owned and hired equipment. CGS undertook the compaction control testing of the material as part of Level 1 Inspection and Testing process.

The areas of controlled fill were placed at the locations according to the drawings prepared by AVID Property Group Pty. Ltd. and provided by client, Drawing No. 20226.1IW01 Rev. 1 for Carolina South – Stage 1. The Level 1 Inspection and testing commenced on 5th September 2023 and finished on 7th September 2023.

The Level 1 Inspection and testing was done for various dates summarised below in Table 1 of this report.

3. INSPECTION AND SUPERVISION

3.1 Fill Placement and Testing Specifications

All filling in excess of 300mm depth within the building envelope of allotments shall be undertaken to specification satisfying requirements of AS3798 – 2007 '*Guideline on Earthworks for Commercial and Residential Development'*, the following specifications based generally on the requirements of AS3798:

- The fill area shall be stripped of topsoil, subsoil, soft material, and vegetation to firm based approved by superintendent.
- Suitable fill material shall be placed in loose horizontal layers not exceeding 250mm in thickness.
- The fill shall be compacted to Dry Density Ratio of at least 95% Standard and moisture content is to be within ± 3% of the standard optimum moisture content (AS1289 5.1.1, 5.4.1 or 5.7.1),
- The fill material shall not contain greater than 20% by volume, of particles size greater than 37.5mm and no particle size over 200mm in any dimension,
- The frequency of field density testing shall be accordance with AS3798 for large scale developments (Type 1), which nominates a frequency of not less than
    - 1 test per layer of 200mm per 2500mm^2

- 1 test per 500m^3 distributed reasonably evenly throughout the full depth and area: or
- 3 tests per site visit, which requires the most tests.

The technical specification of the structural fill was not provided, so the above guidelines were assumed for completed earthworks at this site.

The duration of fill placement at different location within site are summarised in Table 1 below.

Table 1: Summary of Fill placement duration

Fill Area	Dates
Lot 1209 to Lot 1227	5th September 2023 to 7th September 2023

3.2 Strip Surface Inspection

The subgrade for the fill area was prepared by removing the topsoil and vegetation layer using the scrapers. The inspection was carried out to confirm all the vegetation and topsoils are removed from the stripped surface.

Subgrade assessment was carried out by CGS following the topsoil removal and before any fill was placed. The soils exposed at the subgrade comprised natural clayey silt and silty clay. No soft spots were observing during the subgrade assessment.

4. EARTHWORKS AND TESTING

4.1 Fill Material

Fill material was mainly sourced from nearby construction sites, the clean fill certificates were visually looked on site while fill transportation. All the fill material was placed using compactor blade and Cat Dozer, in layers with good moisture, compacted with compactor and pad foot roller. Some oversize boulders of rock were pushed away from fill area with compactor or removed while placement of loose layers while spreading and placement of material.

The cleaned fill material was visually assessed by Geotechnician to confirm it is clean from debris/ vegetative matter and oversize rocks. It should be noted that no environmental analysis was performed by CGS on the fill material.

4.2 Fill Construction

The fill material was moisture conditioned during the placement and prior to placement while it was stockpiled.

The fill material generally placed in approximately 200m to 300mm loose layers, compacted layers achieved approximately 150mm to 250mm in thickness. The material was spread using dozer and compactor blade. The Cat 12 tonne padfoot roller was used to compact the material after placement. There was no onsite surveyor was to provide the reduced levels while fill placement, however the layers were checked with site personnel with electronic laser level.

CGS's level 1 Geotechnician was on site on a full-time basis during placement, compaction and testing of the fill.

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4.3 Testing and Results

Field density testing was undertaken progressively on the compacted fill at the frequency of minimum tests as required for Type 1 Earthworks (large scale operations) as defined in table 8.1 of the AS3798-2007.

The field testing was undertaken by CGS, and all laboratory testing was performed in our NATA accredited laboratory in Thomastown.

The total of 18 (eighteen) field density and laboratory Hilf compaction tests were performed in all fill areas. The reports verify the achievement of the minimum density requirement of 95% Standard Compaction throughout the full depth area, with each layer tested accordingly. All the tests' results were provided to AMG Civil for inclusion within their internal quality system (refer to Appendix 1).

5. CONCLUSION

Following the completion of the earthworks and material assessment, the filling procedures conducted by AMG Civil Group satisfied the requirements of AS3798, regarding the placement of fill material on a project under Level 1 Supervision, and in accordance with specification as provided to CGS. Based on observations made by our on-site Geotechnician (Level 1 Inspector) and the results of field and laboratory tests, CGS consider that the engineered fill placed with stage 1 by AMG Civil Group to the layers indicated in Appendix 2, as far as we have able to determine, has been placed in general accordance with intent of the specification.

This report has been prepared for benefit of our client with respect to the particular brief given to us and it may not be relied upon in other purpose without our prior review and agreement. No responsibility for this report will be taken by CGS if it is altered in any way, or not reproduced in full.

6. LIMITATION OF THIS REPORT

This report is valid for the following completion of level 1 supervision. CGS does not accept responsibility for any distortion or deviation of measurements as reported at the time given. It should be noted that even though the fill layer was moisture conditioned while compacting and meets the requirement but over the dry and wet weather it is subject to drying and cracking. The top 200-300mm of fill will deteriorate with time and should be taken into account by foundation engineer prior to construction of dwelling. The levels nominated in this report are guiding to amounts of fill placed and do not necessarily reflect accurate survey of fill levels.

It should be noted that any fill placed as part of drainage, sewer works, pavement works is not part of this level 1 supervision report

This report will be considered invalid if:

- Any works were carried/conducted on the site without supervision of CGS technician

Any other unforeseeable event any event outside of the time described above.

7. UNDERSTANDING LEVEL 1 INSPECTION AND TESTING

The purpose of performing level 1 inspection and testing is to ensure compliance of fill construction with the nominated specifications. The engagement of Geotechnical Inspection Testing Authority (GITA) allows the contractor to perform his role in the construction of the filling operation while the GITA monitors quality control of process of the fill placement. The visual observations of construction process and methodologies used by contractor allows the GITA to approve the subsequent placement of fill without having to wait to completion of testing and the extended time it takes to complete the laboratory results. The GITA will carry out random spots checks of the filling operations and complete the compaction control test for day's work. Level 1 inspection and testing requires full time inspection and testing of the fill placement undertaken on site. CGS are notified daily by project foreman where subsequent days of fill placement under level 1 to occur. Generally, projects rely on importation of a fill source, there can be delays in receipt of sufficient material to start placing which may result the periods where GITA representative not required on site. It is contractor's responsibility to notify the GITA prior to start any fill placement. A GITA relies on the contractor to advise when the site attendance required and makes all reasonable visual attempts to assess if the works were the same as pervious day of attendance.

Prepared By

R Singh – Geotechnical Engineer

Reviewed by

S Kang – Project Manager

APPENDIX 1 – TESTING SUMMARY

Sample No.	Test No.	Location (Easting/Northing)	Layer	Material Type	Date Tested	Density Ratio (%)	Moisture Variation of OMC (%)	Adjusted Moisture Variation (%)	Pass/Fail
23-335A	1	Refer to Plan	Layer 1	Silty Gravelly CLAY	5-Sep-23	99.5	-	1.0% Wet	Pass
23-335B	2	Refer to Plan	Layer 1	Silty Gravelly CLAY	5-Sep-23	99.5	-	2.0% Wet	Pass
23-335C	3	Refer to Plan	Layer 1	Silty Gravelly CLAY	5-Sep-23	98.5	-	2.5% Wet	Pass
23-335D	4	Refer to Plan	Layer 1	Silty Gravelly CLAY	5-Sep-23	100.0	-	2.0% Dry	Pass
23-335E	5	Refer to Plan	Layer 1	Silty Gravelly CLAY	5-Sep-23	100.0	-	2.0% Dry	Pass
23-335F	6	Refer to Plan	Layer 1	Silty Gravelly CLAY	5-Sep-23	99.0	-	2.0% Wet	Pass

23-325A	7	(298191/5822230)	Layer 2	Silty Gravelly CLAY	6-Sep-23	101.0	-	2.5% Dry	Pass
23-325B	8	(298162/5822246)	Layer 2	Silty Gravelly CLAY	6-Sep-23	100.0	-	0.5% Dry	Pass
23-325C	9	(298175/5822272)	Layer 2	Silty Gravelly CLAY	6-Sep-23	101.5	-	2.0% Dry	Pass
23-325D	10	(298125/5822267)	Layer 3	Silty Gravelly CLAY	6-Sep-23	100.0	-	0.5% Dry	Pass
23-325E	11	(298189/5822241)	Layer 3	Silty Gravelly CLAY	6-Sep-23	99.5	-	2.0% Dry	Pass
23-325F	12	(298177/5822250)	Layer 3	Silty Gravelly CLAY	6-Sep-23	98.0	-	1.5% Dry	Pass
23-328A	13	(298168/5822268)	FSL	Silty Gravelly CLAY	7-Sep-23	103.5	3.0% Dry	-	Pass
23-328B	14	(298186/5822254)	FSL	Silty Gravelly CLAY	7-Sep-23	103.0	-	2.5% Dry	Pass
23-328C	15	(298197/5822239)	FSL	Silty Gravelly CLAY	7-Sep-23	103.5	-	2.5% Dry	Pass
23-328D	16	(298204/5822255)	FSL	Silty Gravelly CLAY	7-Sep-23	101.5	-	2.0% Dry	Pass

23-328E	17	(298189/5822263)	FSL	Silty Gravelly CLAY	7-Sep-23	100.5	-	2.0% Dry	Pass
23-328F	18	(298161/5822239)	FSL	Silty Gravelly CLAY	7-Sep-23	100.5	-	2.5% Dry	Pass

APPENDIX 2 – NATA LAB RESULTS

Material Test Report

Report Number: 7437-1
Issue Number: 1
Date Issued: 12/09/2023
Client: AMG Civil Group
20 Graystone Court, Epping VIC 3076
Contact: Mark Russo
Project Number: 7437
Project Name: Carolina South Stage 1
Project Location: Cnr Sinclairs Rd & Amalfi Pde, Deanside, VIC 3335
Work Request: 335
Date Sampled: 05/09/2023
Dates Tested: 06/09/2023 - 07/09/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted

Continent Geotech Services
Continent Geotech Services Pty Ltd
Main Laboratory
14/337 Settlement Road Thomastown Victoria 3074
Phone: (03) 9465 9813
Email: admin@continentgeotech.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory: Arveendra Gounder
Laboratory Manager
NATA Accredited Laboratory Number: 19945

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1						
Sample Number	23-335A	23-335B	23-335C	23-335D	23-335E	23-335F
Date Tested	05/09/2023	05/09/2023	05/09/2023	05/09/2023	05/09/2023	05/09/2023
Time Tested	**	**	**	**	**	**
Test Request #/Location	Refer to plan	Refer to plan	Refer to plan	Refer to plan	Refer to plan	Refer to plan
Layer / Reduced Level	1	1	1	1	1	1
Thickness of Layer (mm)	200	200	200	200	200	200
Soil Description	Silty gravelly CLAY	Silty gravelly CLAY	Silty gravelly CLAY	Silty gravelly CLAY	Silty gravelly CLAY	Silty gravelly CLAY
Test Depth (mm)	175	175	175	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	10	10	9	10	11	9
Percentage of Dry Oversize (%) (AS1289.5.4.1)	**	**	**	**	**	**
Field Wet Density (FWD) t/m^3	1.96	1.97	1.95	1.98	1.97	1.95
Field Moisture Content %	23.4	17.9	24.0	18.2	16.9	23.8
Field Dry Density (FDD) t/m^3	1.62	1.70	1.60	1.70	1.72	1.60
Peak Converted Wet Density t/m^3	**	**	**	**	**	**
Adjusted Peak Converted Wet Density t/m^3	1.97	1.98	1.98	1.98	1.97	1.97
Adj. Optimum Moisture Content % (AS1289.5.4.1)	20.2	14.2	19.6	18.5	17.0	19.6
Adj. Field Moisture Content % (AS1289.5.4.1)	21.1	16.0	21.9	16.3	14.9	21.7
Moisture Ratio % (AS1289.5.4.1)	**	**	**	**	**	**
Adjusted Moisture Ratio % (AS1289.5.4.1)	104.5	113.0	112.0	88.5	88.0	111.0
Moisture Variation (Wv) %	**	**	**	**	**	**
Adjusted Moisture Variation %	-1.0	-2.0	-2.5	2.0	2.0	-2.0
Hilf Density Ratio (%)	**99.5**	**99.5**	**98.5**	**100.0**	**100.0**	**99.0**
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

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Results relate only to the items tested/sampled.

Sample Locations Plan

x - approximate test location

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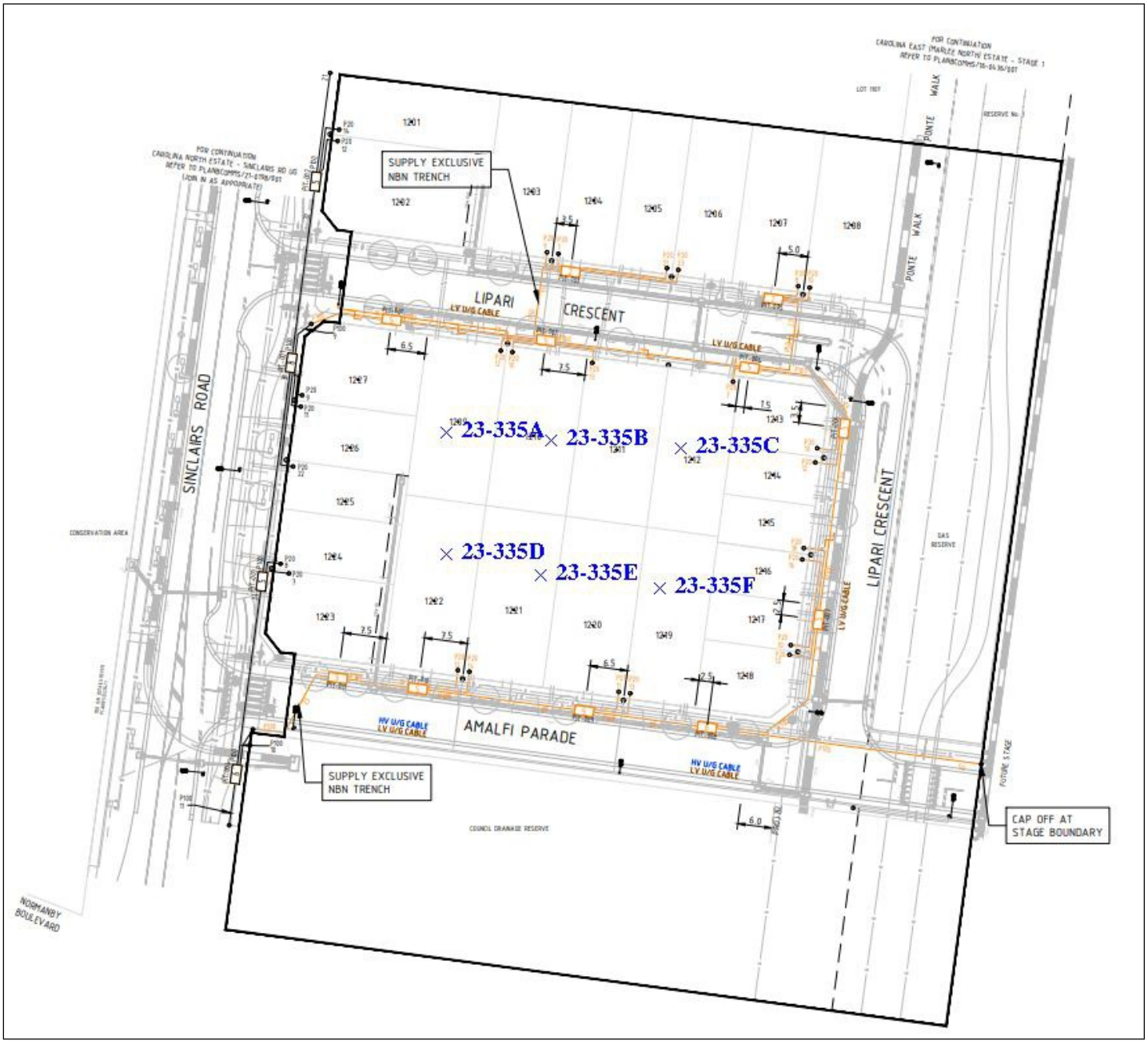

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Material Test Report

Report Number: 7437-2
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Site plan added*
Date Issued: 02/07/2024
Client: AMG Civil Group
20 Graystone Court, Epping VIC 3076
Contact: Mark Russo
Project Number: 7437
Project Name: Carolina South Stage 1
Project Location: Cnr Sinclairs Rd & Amalfi Pde, Deanside, VIC 3335
Work Request: 325
Dates Tested: 06/09/2023 - 11/09/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted

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Approved Signatory: Arveendra Gounder
Laboratory Manager
NATA Accredited Laboratory Number: 19945

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1						
Sample Number	23-325A	23-325B	23-325C	23-325D	23-325E	23-325F
Date Tested	06/09/2023	06/09/2023	06/09/2023	06/09/2023	06/09/2023	06/09/2023
Time Tested	**	**	**	**	**	**
Test Request #/Location	**	**	**	**	**	**
Easting	55H 298191	55H 298162	55H 2981175	55H 2981205	55H 298189	55H 298177
Northing	5822230	5822246	5822272	5822267	5822241	5822250
Layer / Reduced Level	2	2	2	3	3	3
Thickness of Layer (mm)	200	200	200	200	200	200
Soil Description	Silty gravelly CLAY	Silty gravelly CLAY	Silty gravelly CLAY	Silty gravelly CLAY	Silty gravelly CLAY	Silty gravelly CLAY
Test Depth (mm)	175	175	175	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	8	8	10	7	13	13
Percentage of Dry Oversize (%) (AS1289.5.4.1)	**	**	**	**	**	**
Field Wet Density (FWD) t/m^3	1.90	1.91	1.91	1.88	1.92	1.90
Field Moisture Content %	23.5	25.0	23.9	21.8	27.9	25.0
Field Dry Density (FDD) t/m^3	1.56	1.56	1.58	1.57	1.55	1.56
Peak Converted Wet Density t/m^3	**	**	**	**	**	**
Adjusted Peak Converted Wet Density t/m^3	1.88	1.91	1.89	1.89	1.94	1.94
Adj. Optimum Moisture Content % (AS1289.5.4.1)	24.3	23.5	23.5	20.9	26.2	23.4
Adj. Field Moisture Content % (AS1289.5.4.1)	21.6	22.9	21.4	20.3	24.3	21.7
Moisture Ratio % (AS1289.5.4.1)	**	**	**	**	**	**
Adjusted Moisture Ratio % (AS1289.5.4.1)	89.0	97.5	91.5	97.0	93.0	92.5
Moisture Variation (Wv) %	**	**	**	**	**	**
Adjusted Moisture Variation %	2.5	0.5	2.0	0.5	2.0	1.5
Hilf Density Ratio (%)	**101.0**	**100.0**	**101.5**	**100.0**	**99.5**	**98.0**
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

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Sample Locations Plan

x - approximate test location

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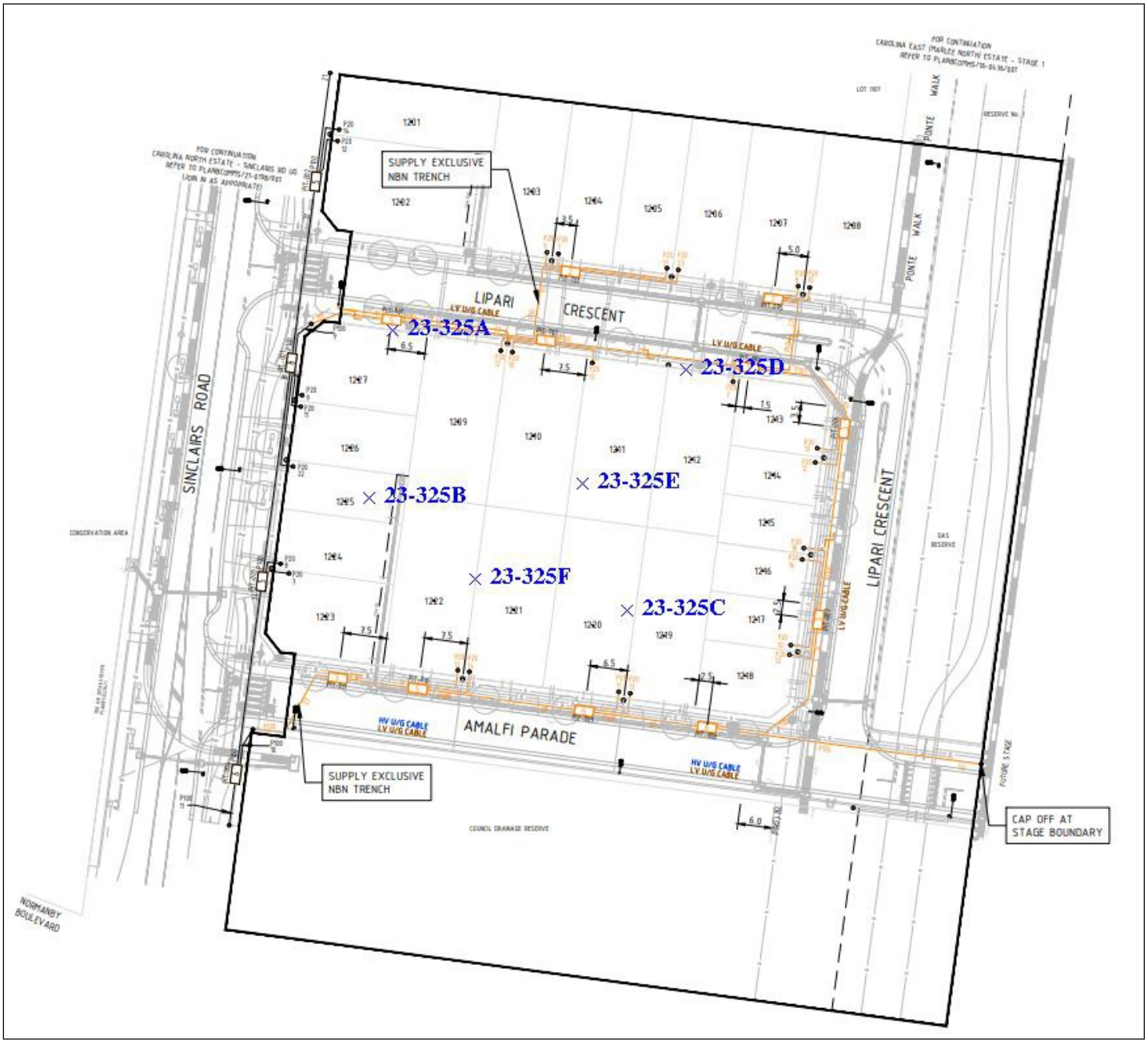

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Material Test Report

Report Number: 7437-3
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Site plan added*
Date Issued: 02/07/2024
Client: AMG Civil Group
20 Graystone Court, Epping VIC 3076
Contact: Mark Russo
Project Number: 7437
Project Name: Carolina South Stage 1
Project Location: Cnr Sinclairs Rd & Amalfi Pde, Deanside, VIC 3335
Work Request: 328
Date Sampled: 07/09/2023
Dates Tested: 07/09/2023 - 18/09/2023
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted

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NATA WORLD RECOGNISED ACCREDITATION

Approved Signatory: Arveendra Gounder
Laboratory Manager
NATA Accredited Laboratory Number: 19945

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1						
Sample Number	23-328A	23-328B	23-328C	23-328D	23-328E	23-328F
Date Tested	07/09/2023	07/09/2023	07/09/2023	07/09/2023	07/09/2023	07/09/2023
Time Tested	**	**	**	**	**	**
Test Request #/Location	Carolina - Stage 1	Carolina - Stage 1	Carolina - Stage 1	Carolina - Stage 1	Carolina - Stage 1	Carolina - Stage 1
Easting	298168	298186	298197	298204	298189	298161
Northing	5822268	5822254	5822239	5822255	5822263	5822239
Layer / Reduced Level	FSL	FSL	FSL	FSL	FSL	FSL
Thickness of Layer (mm)	200	200	200	200	200	200
Soil Description	Silty gravelly CLAY	Silty gravelly CLAY	Silty gravelly CLAY	Silty gravelly CLAY	Silty gravelly CLAY	Silty gravelly CLAY
Test Depth (mm)	175	175	175	175	175	175
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	6	7	6	8	5
Percentage of Dry Oversize (%) (AS1289.5.4.1)	**	**	**	**	**	**
Field Wet Density (FWD) t/m^3	1.93	1.94	1.98	1.95	1.96	1.92
Field Moisture Content %	15.5	16.0	16.4	17.3	18.2	18.6
Field Dry Density (FDD) t/m^3	1.67	1.68	1.72	1.68	1.67	1.63
Peak Converted Wet Density t/m^3	1.86	**	**	**	**	**
Adjusted Peak Converted Wet Density t/m^3	**	1.88	1.91	1.92	1.94	1.91
Adj. Optimum Moisture Content % (AS1289.5.4.1)	**	17.7	17.5	18.1	18.9	20.2
Adj. Field Moisture Content % (AS1289.5.4.1)	15.5	15.1	15.1	16.3	16.8	17.7
Moisture Ratio % (AS1289.5.4.1)	84.5	**	**	**	**	**
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	85.5	86.5	89.5	89.0	88.0
Moisture Variation (Wv) %	3.0	**	**	**	**	**
Adjusted Moisture Variation %	**	2.5	2.5	2.0	2.0	2.5
Hilf Density Ratio (%)	**103.5**	**103.0**	**103.5**	**101.5**	**100.5**	**100.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**
Report Remarks	**	**	**	**	**	**

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

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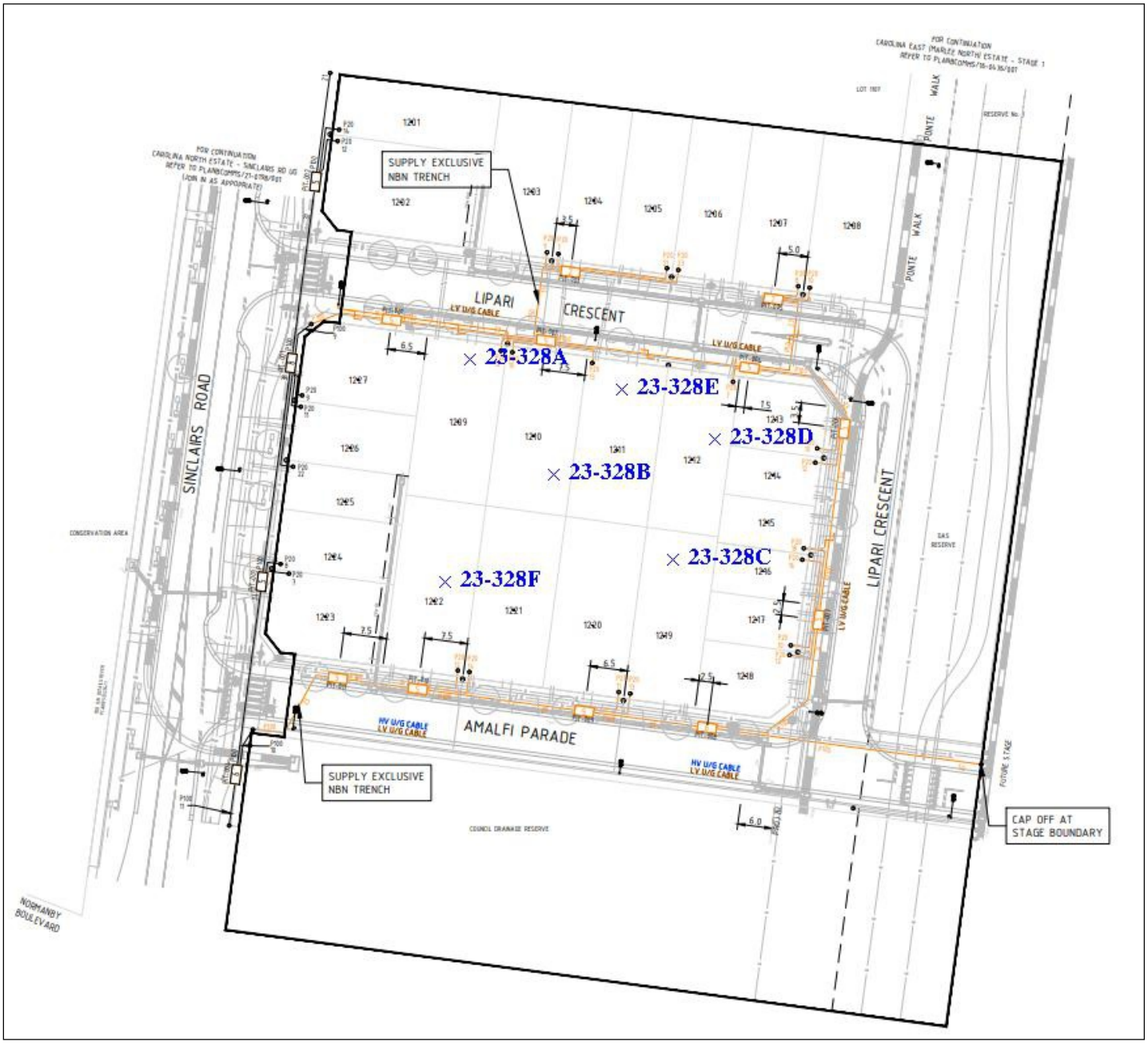

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