Riverwalk Estate Stage 27, 28 and 29

GITA Inspection Verification Report

Prepared For:	Excell Gray Bruni
Report Number	D20361A, D20375A and D20381A V1
Version Release Date	11 September 2020
Report Released By	C Caulfield
Title	Project Manager
Signature	

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Appendices

1 Introduction

Terra Firma Laboratories was engaged by *Excell Gray Bruni* as the Geotechnical Inspection and Testing Authority (GITA) to provide Level 1 supervision and testing works on the earthworks component for Riverwalk Estate Stage 27, 28 and 29. This work was conducted over the period of 23/06/2020 to 25/06/2020 for Stage 27, 2/07/2020 to 22/07/2020 for stage 28 and 9/07/2020 to 22/07/2020 for stage 29

This report presents that the allotment earthworks was carried out in accordance with AS3798-2007 *Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2 Scope of Work

2.1 Area of Work

The areas of work included lots 2701 through to 2746 for stage 27, lots 2802 through to 2805, 2823, 2825 through to 2839, 2844 through to 2851, 2855 through to 2857 and 2863 through to 2865 for stage 28 and lots 2908 through to 2921 and 2935 through to 2940 for stage 29. The site will be a residential development.

The area on which fill was placed is shown on site plan (Appendix 1: *Test Location Plan*) based on drawings prepared by Dalton Consulting Engineers, drawing reference 10867FP01 and provided by *Excell Gray Bruni*.

The supervision work by the GITA involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2 Specification

The technical specification (Reference from Drawings) for compaction control requirements was provided by Excell Gray Bruni and established that:

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

Section 5.2 of AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser

than 37.5mm cannot be tested for relative compaction using the procedures of AS1289 5.1.1 and AS1289 5.2.1.

In accordance with Table 8.1 (AS3798), for large scale operations, (greater than 1500m^2), the minimum testing frequency is 1 test per layer per material type per 2500m^2 or 1 test per 500m^3 distributed reasonable evenly throughout full depth and area or 3 tests per lot. AS3798 defines a lot as "an area of work that is essentially homogenous in relation to material type and moisture condition, rolling response and compaction technique, and which has been used for the assessment of the relative compaction of an area of work". All three of these test frequencies must be achieved and this is typically confirmed to have been achieved when 3 tests per visit (day) have been completed.

2.3 Limitations

Terra Firma Laboratories cannot verify any works completed by others outside of the time period specified in the introduction. Uncontrolled works may include, but are not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes unless specified in section 2.1 of this report.

Terra Firma Laboratories cannot verify that the material used as a filling medium is free from chemical or other contamination. The scope and the period of Terra Firma Laboratories as described in the introduction are subject to restrictions and limitations. Terra Firma Laboratories did not perform a complete assessment of all possible conditions and 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 Terra Firma Laboratories.

Verification of finished surface level to design levels is outside of the scope of the GITA report.

Any drawings or marked locations 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.

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 Terra Firma Laboratories for incomplete or inaccurate data supplied by others.

addressed and for no other purpose. No responsibility is accepted to any third party who may use or rely on the whole or any part of the content of this submission. No responsibility will be taken for this report if it is altered in any way, or not reproduced in full.

3 Construction Method

3.1 Subgrade Preparation

At the time of subgrade inspection the following was observed:

- Subgrade preparation involved stripping the site of topsoil, vegetation and organic matter to a depth of approximately 200mm below existing levels.
- The site was cleared of all trees and stumps to the extent necessary for the fill placement to proceed
- The roots of all trees and any debris was removed from site prior to any fill placement

Tree roots were observed throughout the subgrade on stage 27. Terra Firma Laboratories was instructed by Excell Gray Bruni that the roots were not going to be removed before filling of the blocks.

The sub-grade area was then proof-rolled to confirm it was capable of withstanding test rolling without visible deformation or springing and any areas observed to be soft or otherwise unsuitable were rectified. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2 Fill Placement

The contractor was observed to have suitable construction equipment and plant available on-site during the construction period for use in the fill placement.

All fill was placed in layers of thicknesses not exceeding 300mm. At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made. It should be noted that the compaction tests are representative samples of the fill placed and support the visual assessment of the works completed. Each house lot does not necessarily require a compaction test to to have been conducted within the house allotment but may have been verified by testing conducted within up to a 2500m^2 area of the house lot.

Final fill placement levels were verified against design level by others. For the purposes of this report, it was observed that finished levels were in accordance with levels marked on site by survey markers.

The final 300mm of fill placed across the site was placed as a topsoil layer or growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications and placement of the final 300mm of fill was not observed by the GITA.

4 Construction Verification

Compaction Verification testing is summarized in a detailed test register with test certificates attached provided in Appendix 2: *Compaction Test Register and Test Certificates*. A test location plan (D20361, D20375 and D20381 D1, Appendix 1) providing a schematic of test locations across the extent of scope of works for every placed layer of fill is also documented.

A total of 12 density tests (Hilf method in accordance with 1289 5.7.1) were undertaken with 0 failed results on stage 27, 15 tests with 1 failed result on stage 28 and 17 tests with 0 failed results on stage 29. The contractor was notified of any failed tests and the failed areas were ripped, watered, compacted and then re-tested to confirm compliance with the specification. The results summarised in the compaction test register (Appendix 2) confirm that for every layer of fill placed in a specific work area, satisfactory testing was completed.

5 Statement of Compliance

The intention of this report is to provide a description of the earthworks construction for Stages 27,28 and 29 at Riverwalk Estate. For completed fill areas of greater than 300mm, and for works completed between 23/06/2020 and 25/06/2020 for stage 27, 2/07/2020 and 22/07/2020 for stage 28 and 9/07/2020 and 22/07/2020 for stage 29, earthworks construction activities were conducted under the full time supervision of the Geotechnical Inspection and Testing Authority. Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification. The earthworks construction for Stages 27, 28 and 29 of Riverwalk Estate was observed to be constructed in compliance with the requirements of the Technical Specification.

STAGE 27

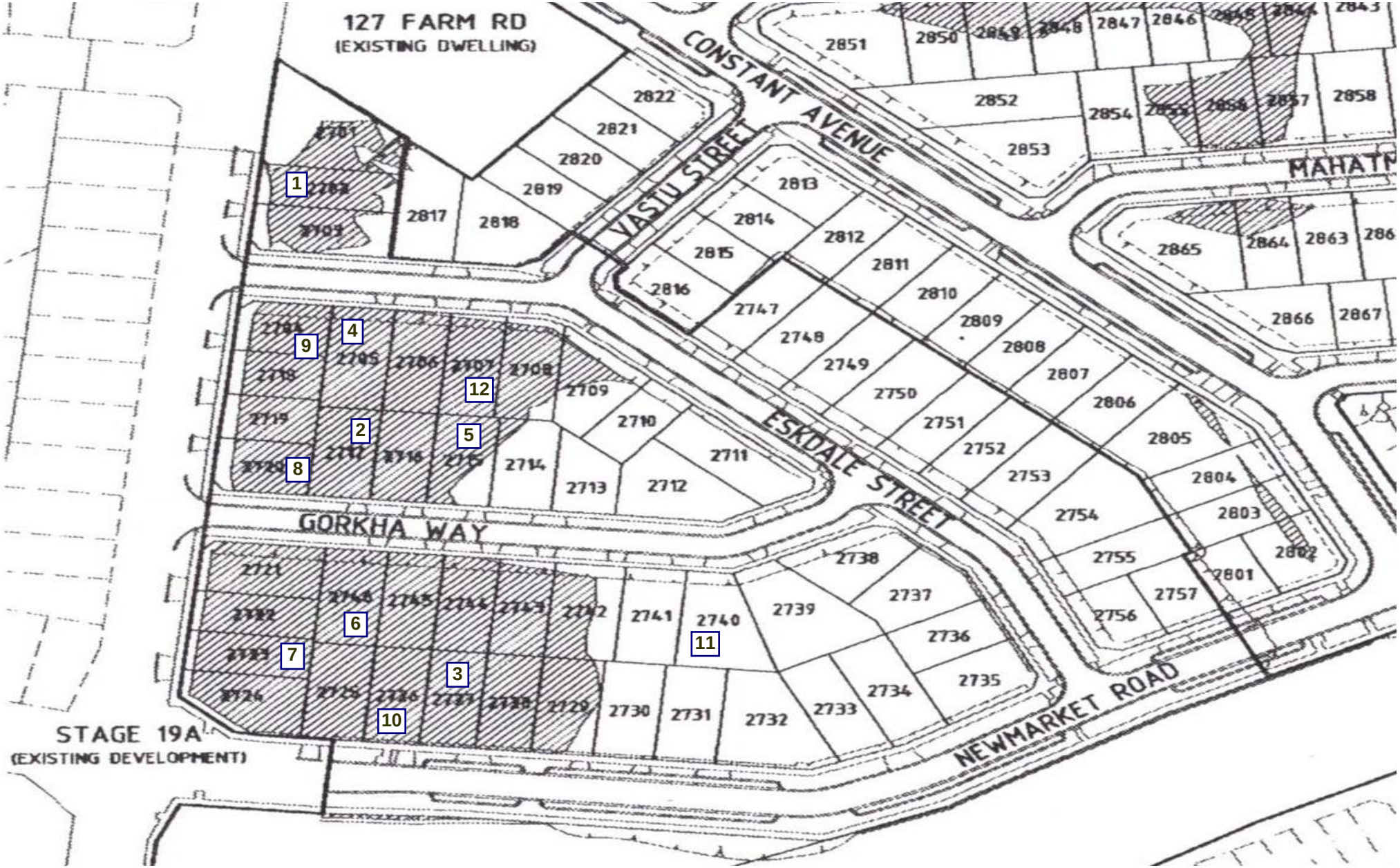
Our Head Office
47 National Ave
Pakenham, VIC 3810

Our Laboratories
Pakenham 03 9769 5799
Deer Park 03 8348 5596
Bibra Lake 08 9395 7220

Appendix 1: Test Location Plan
Stage 27

Our Head Office
47 National Ave
Pakenham, VIC 3810

Our Laboratories
Pakenham 03 9769 5799
Deer Park 03 8348 5596
Bibra Lake 08 9395 7220



terra firma laboratories

Our Head Office
47 National Ave
Pakenham, VIC 3810

Our Laboratories
Pakenham 03 9769 5799
Deer Park 03 8348 5596
Bibra Lake 08 9395 7220

Test Location Plan

not to scale

Client:	Excell Gray Bruni
Project:	Riverwalk Estate, Stage 27
Reference:	D20361 D1

Appendix 2: Compaction Test Register and Test Certificates

Stage 27

Compaction Test Register

Client: Excell Gray Bruni
Project No: D20361
Project: Reverwalk Estate Stage 27
Specification: 95%

Date:	Test No:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
23/06/2020	1	Layer 1		98	Pass	LOT 2702	D20361-1
23/06/2020	2	Layer 1		96	Pass	LOT 2717	D20361-1
23/06/2020	3	Layer 1		98	Pass	LOT 2727	D20361-1
23/06/2020	4	Layer 2		98.5	Pass	LOT 2705	D20361-1
23/06/2020	5	Layer 2		101.5	Pass	LOT 2715	D20361-1
23/06/2020	6	Layer 2		98.5	Pass	LOT 2746	D20361-1
24/06/2020	7	Layer 3		97.5	Pass	LOT 2723	D20361-2
24/06/2020	8	Layer 3		98	Pass	LOT 2720	D20361-2
24/06/2020	9	Layer 3		98	Pass	LOT 2704	D20361-2
25/06/2020	10	Layer 4		100	Pass	LOT 2726	D20361-3
25/06/2020	11	Layer 4		98	Pass	LOT 2740	D20361-3
25/06/2020	12	Layer 4		98	Pass	LOT 2707	D20361-3

Material Test Report

Report Number: D20361-1
Issue Number: 1
Date Issued: 25/06/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Contact: Daniel
Project Number: D20361
Project Name: River Walk Stage 27 - Level one
Project Location: Weribee
Work Request: 1829
Date Sampled: 23/06/2020 15:00
Dates Tested: 23/06/2020 - 24/06/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On Site

Terra Firma Laboratories Pty Ltd
Deer Park Laboratory
Factory 1 80-82 Rebecca Drive Ravenhall VIC 3023
Phone: 0435 751 756
Email: ehippola@terrafirmalabs.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Eranda Hippola
Snr lab Tech
NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1						
Sample Number	D20-1829A	D20-1829B	D20-1829C	D20-1829D	D20-1829E	D20-1829F
Test Number	1	2	3	4	5	6
Date Tested	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020	23/06/2020
Time Tested	15:00	15:00	15:00	15:00	15:00	15:00
Test Request #/Location	LOT 2702	LOT 2717	LOT 2727	LOT 2705	LOT 2715	LOT 2746
Chainage (m)	**	**	**	**	**	**
Location Offset (m)	**	**	**	**	**	**
Layer / Reduced Level	Layer 1	Layer 1	Layer 1	Layer 2	Layer 2	Layer 2
Thickness of Layer (mm)	300	300	300	300	300	300
Soil Description	Clay	Clay	Clay	Clay	Clay	Clay
Test Depth (mm)	275	275	275	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0	0.0	**	**
Field Wet Density (FWD) t/m^3	1.94	1.92	1.96	1.96	1.95	1.95
Field Moisture Content %	21.1	22.2	21.0	21.5	21.8	21.4
Field Dry Density (FDD) t/m^3	1.60	1.57	1.62	1.62	1.60	1.60
Peak Converted Wet Density t/m^3	1.98	2.00	2.00	1.99	1.92	1.97
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	114.0	117.0	117.5	116.0	100.5	104.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**	**	**	**
Moisture Variation (Wv) %	-2.5	-3.0	-3.0	-3.0	0.0	-1.0
Adjusted Moisture Variation %	**	**	**	**	**	**
Hilf Density Ratio (%)	**98.0**	**96.0**	**98.0**	**98.5**	**101.5**	**98.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**

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

Material Test Report

Report Number: D20361-2
Issue Number: 1
Date Issued: 26/06/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Contact: Daniel
Project Number: D20361
Project Name: River Walk Stage 27 - Level one
Project Location: Weribee
Work Request: 1837
Date Sampled: 24/06/2020 14:00
Dates Tested: 24/06/2020 - 25/06/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On Site

Terra Firma Laboratories Pty Ltd
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Email: ehippola@terrafirmalabs.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Eranda Hippola
Snr lab Tech
NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-1837A	D20-1837B	D20-1837C
Test Number	7	8	9
Date Tested	24/06/2020	24/06/2020	24/06/2020
Time Tested	14:30	14:30	14:30
Test Request #/Location	LOT 2723	LOT 2720	LOT 2704
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 3	Layer 3	Layer 3
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0
Field Wet Density (FWD) t/m^3	1.99	2.00	1.99
Field Moisture Content %	17.3	17.5	17.7
Field Dry Density (FDD) t/m^3	1.70	1.70	1.69
Peak Converted Wet Density t/m^3	2.04	2.04	2.03
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	119.5	116.0	115.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-3.0	-2.5	-2.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**97.5**	**98.0**	**98.0**
Compaction Method	**Standard**	**Standard**	**Standard**

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

Material Test Report

Report Number: **D20361-3**
Issue Number: 2 - *This version supersedes all previous issues*
Date Issued: 29/06/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Contact: Daniel
Project Number: D20361
Project Name: River Walk Stage 27 - Level one
Project Location: Weribee
Work Request: 1841
Date Sampled: 25/06/2020
Dates Tested: 25/06/2020 - 26/06/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On Site

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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Eranda Hippola
Snr lab Tech
NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-1841A	D20-1841B	D20-1841C
Test Number	10	11	12
Date Tested	25/06/2020	25/06/2020	25/06/2020
Time Tested	**	**	**
Test Request #/Location	LOT 2726	LOT 2740	LOT 2707
Layer / Reduced Level	**	**	**
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	**	0.0	0.0
Field Wet Density (FWD) t/m^3	1.98	2.01	2.00
Field Moisture Content %	2.9	14.0	12.6
Field Dry Density (FDD) t/m^3	1.92	1.76	1.77
Peak Converted Wet Density t/m^3	1.98	2.05	2.04
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	93.5	104.5	104.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	0.0	-0.5	-0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**100.0**	**98.0**	**98.0**
Compaction Method	**Standard**	**Standard**	**Standard**

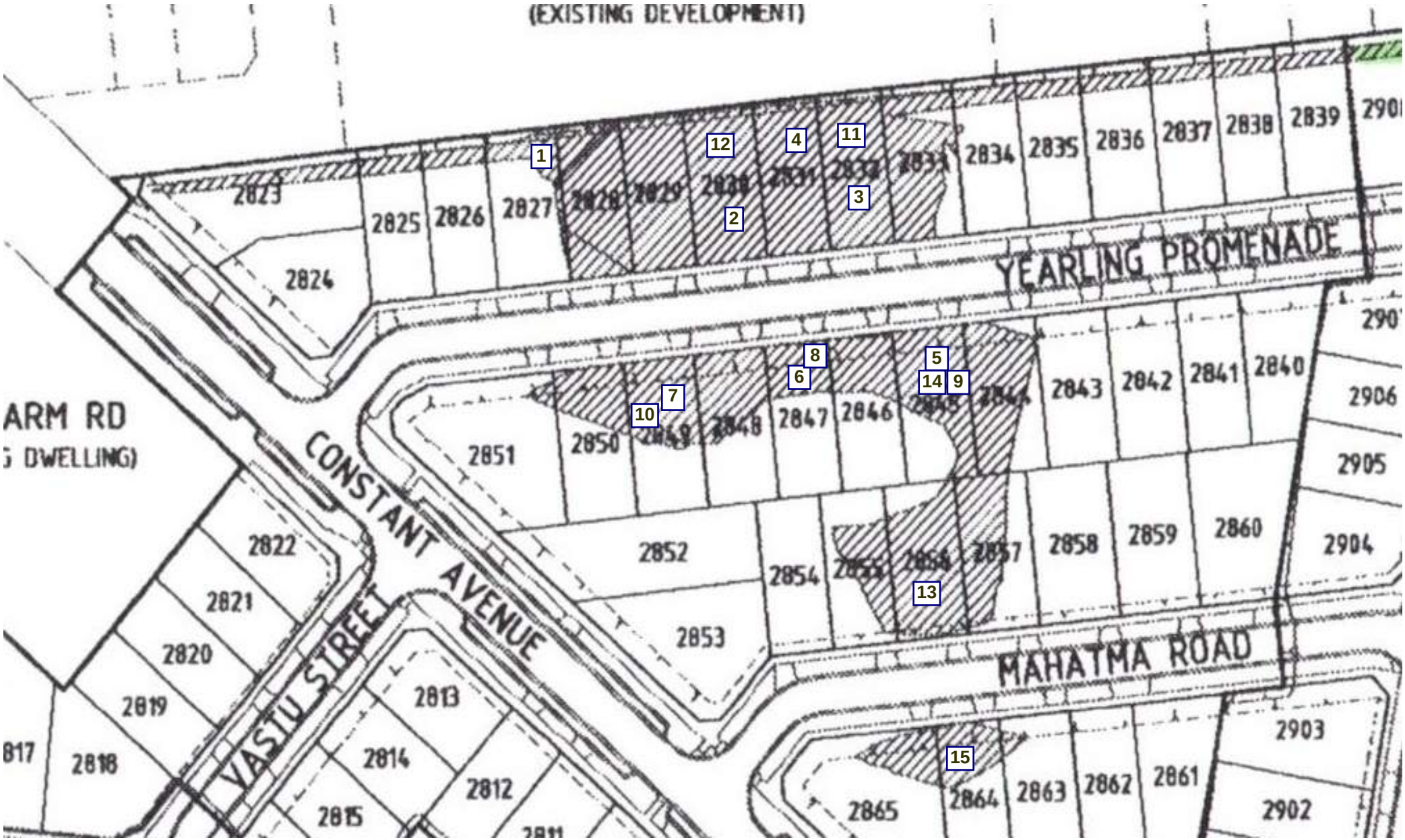
Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

STAGE 28

Appendix 1: Test Location Plan
Stage 28

Our Head Office
47 National Ave
Pakenham, VIC 3810

Our Laboratories
Pakenham 03 9769 5799
Deer Park 03 8348 5596
Bibra Lake 08 9395 7220



terra firma laboratories

Our Head Office
47 National Ave
Pakenham, VIC 3810

Our Laboratories
Pakenham 03 9769 5799
Deer Park 03 8348 5596
Bibra Lake 08 9395 7220

Test Location Plan

not to scale

Client:	Excell Gray Bruni
Project:	Riverwalk Estate, Stage 28
Reference:	D20375 D1

Appendix 2: Compaction Test Register and Test Certificates

Stage 28

Compaction Test Register

Client: Excell Gray Bruni
Project No: D20375
Project: Reverwalk Estate Stage 28
Specification: 95%

Date:	Test No:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
02/07/2020	1	Layer 1		96.5	Pass	LOT 2827	D20375-2
02/07/2020	2	Layer 1		95.5	Pass	LOT 2830	D20375-2
02/07/2020	3	Layer 1		99.0	Pass	LOT 2832	D20375-2
03/07/2020	4	Layer 1		97.0	Pass	LOT 2831	D20375-1
03/07/2020	5	Layer 1		96.0	Pass	LOT 2845	D20375-1
03/07/2020	6	Layer 1		97.5	Pass	LOT 2847	D20375-1
03/07/2020	7	Layer 1		96.0	Pass	LOT 2849	D20375-1
06/07/2020	8	Layer 2		99.5	Pass	LOT 2847	D20375-3
06/07/2020	9	Layer 2		94.0	Pass	LOT 2845	D20375-3
06/07/2020	10	Layer 2		97.0	Pass	LOT 2849	D20375-3
07/07/2020	11	Layer 2		98.5	Pass	LOT 2832	D20375-4
07/07/2020	12	Layer 2		97.5	Pass	LOT 2830	D20375-4
07/07/2020	13	Layer 2		97.0	Pass	LOT 2856	D20375-4
07/07/2020	14	Layer 2	9	101.5	Pass	LOT 2845	D20375-4
22/07/2020	15	Layer 1		102.5	Pass	Lot 2864	D20375-5

Material Test Report

Report Number: **D20375-1**
Issue Number: 1
Date Issued: 07/07/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Project Number: D20375
Project Name: Riverwalk Estate Stage 28 - Level one
Project Location: Werribee
Work Request: 1886
Date Sampled: 03/07/2020
Dates Tested: 03/07/2020 - 06/07/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On site

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Approved Signatory: Eranda Hippola
Snr lab Tech
NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D20-1886A	D20-1886B	D20-1886C	D20-1886D
Test Number	4	5	6	7
Date Tested	03/07/2020	03/07/2020	03/07/2020	03/07/2020
Time Tested	**	**	**	**
Test Request #/Location	LOT 2831	LOT 2845	LOT 2847	LOT 2849
Layer / Reduced Level	Layer 1	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300	300
Soil Description	Clay	Clay	Clay	Clay
Test Depth (mm)	275	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0	0.0
Field Wet Density (FWD) t/m^3	1.92	1.91	1.94	1.90
Field Moisture Content %	17.2	15.7	15.4	13.6
Field Dry Density (FDD) t/m^3	1.64	1.65	1.68	1.67
Peak Converted Wet Density t/m^3	1.99	1.99	1.99	1.98
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	102.5	97.0	91.0	85.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**	**
Moisture Variation (Wv) %	-0.5	0.5	1.5	2.5
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	**97.0**	**96.0**	**97.5**	**96.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**

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

Material Test Report

Report Number: D20375-2
Issue Number: 1
Date Issued: 07/07/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Project Number: D20375
Project Name: Riverwalk Estate Stage 28 - Level one
Project Location: Werribee
Work Request: 1880
Date Sampled: 02/07/2020
Dates Tested: 02/07/2020 - 06/07/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On site

Terra Firma Laboratories Pty Ltd
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Email: ehippola@terrafirmalabs.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Eranda Hippola
Snr lab Tech
NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-1880A	D20-1880B	D20-1880C
Test Number	1	2	3
Date Tested	02/07/2020	02/07/2020	02/07/2020
Time Tested	**	**	**
Test Request #/Location	LOT 2827	LOT 2830	LOT 2832
Layer / Reduced Level	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0
Field Wet Density (FWD) t/m^3	1.92	1.90	1.96
Field Moisture Content %	15.4	16.9	16.6
Field Dry Density (FDD) t/m^3	1.66	1.63	1.68
Peak Converted Wet Density t/m^3	1.99	1.99	1.98
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	98.0	96.5	99.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	0.5	0.5	0.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**96.5**	**95.5**	**99.0**
Compaction Method	**Standard**	**Standard**	**Standard**

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

Material Test Report

Report Number: **D20375-3**
Issue Number: 1
Date Issued: 08/07/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Project Number: D20375
Project Name: Riverwalk Estate Stage 28 - Level one
Project Location: Werribee
Work Request: 1890
Date Sampled: 06/07/2020
Dates Tested: 06/07/2020 - 07/07/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On site

Terra Firma Laboratories Pty Ltd
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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Eranda Hippola
Snr lab Tech
NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-1890A	D20-1890B	D20-1890C
Test Number	8	9	10
Date Tested	06/07/2020	06/07/2020	06/07/2020
Time Tested	**	**	**
Test Request #/Location	LOT 2847	LOT 2845	LOT 2849
Layer / Reduced Level	Layer 2	Layer 2	Layer 2
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	**	0.0	0.0
Field Wet Density (FWD) t/m^3	1.99	1.97	1.91
Field Moisture Content %	13.6	12.1	11.7
Field Dry Density (FDD) t/m^3	1.76	1.75	1.71
Peak Converted Wet Density t/m^3	2.00	2.10	1.97
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	89.5	87.5	86.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	1.5	1.5	2.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**99.5**	**94.0**	**97.0**
Compaction Method	**Standard**	**Standard**	**Standard**

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

Material Test Report

Report Number: D20375-4
Issue Number: 1
Date Issued: 16/07/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Project Number: D20375
Project Name: Riverwalk Estate Stage 28 - Level one
Project Location: Werribee
Work Request: 1893
Date Sampled: 07/07/2020
Dates Tested: 07/07/2020 - 15/07/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On site

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Approved Signatory: Eranda Hippola
Snr lab Tech

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D20-1893A	D20-1893B	D20-1893C	D20-1893D
Test Number	11	12	13	14
Date Tested	07/07/2020	07/07/2020	07/07/2020	07/07/2020
Time Tested	**	**	**	**
Test Request #/Location	LOT 2832	LOT 2830	LOT 2856	Re - test LOT 2845
Layer / Reduced Level	Layer 2	Layer 2	Layer 2	Layer 2
Thickness of Layer (mm)	300	300	300	300
Soil Description	Clay	Clay	Clay	Clay
Test Depth (mm)	275	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	**	0.0
Field Wet Density (FWD) t/m^3	1.96	1.98	1.97	1.97
Field Moisture Content %	17.7	15.9	15.1	12.0
Field Dry Density (FDD) t/m^3	1.67	1.71	1.71	1.76
Peak Converted Wet Density t/m^3	2.00	2.03	2.03	1.95
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	97.5	101.5	98.5	73.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**	**
Moisture Variation (Wv) %	0.5	0.0	0.0	4.5
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	**98.5**	**97.5**	**97.0**	**101.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**

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

Material Test Report

Report Number: **D20375-5**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Lot Number Changed*
Date Issued: 11/09/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Project Number: D20375
Project Name: Riverwalk Estate Stage 28 - Level one
Project Location: Werribee
Work Request: 1982
Date Sampled: 22/07/2020
Dates Tested: 23/07/2020 - 27/07/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On site

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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Chris Caulfield
Project Manager
NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-1982A		
Test Number	15		
Date Tested	22/07/2020		
Time Tested	**		
Test Request #/Location	Lot 2864		
Layer / Reduced Level	Layer 1		
Thickness of Layer (mm)	300		
Soil Description	Clay		
Test Depth (mm)	275		
Sieve used to determine oversize (mm)	19.0		
Percentage of Wet Oversize (%)	0.0		
Field Wet Density (FWD) t/m^3	1.95		
Field Moisture Content %	15.6		
Field Dry Density (FDD) t/m^3	1.68		
Peak Converted Wet Density t/m^3	1.90		
Adjusted Peak Converted Wet Density t/m^3	**		
Moisture Ratio % (AS 1289.5.4.1)	80.0		
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**		
Moisture Variation (Wv) %	4.0		
Adjusted Moisture Variation %	**		
Hilf Density Ratio (%)	**102.5**		
Compaction Method	**Standard**		

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

STAGE 29

Appendix 1: Test Location Plan
Stage 29

Our Head Office
47 National Ave
Pakenham, VIC 3810

Our Laboratories
Pakenham 03 9769 5799
Deer Park 03 8348 5596
Bibra Lake 08 9395 7220

terra firma laboratories

Our Head Office
47 National Ave
Pakenham, VIC 3810

Our Laboratories
Pakenham 03 9769 5799
Deer Park 03 8348 5596
Bibra Lake 08 9395 7220

Test Location Plan

not to scale

Client:	Excell Gray Bruni
Project:	Riverwalk Estate, Stage 29
Reference:	D20381 D1

Appendix 2: Compaction Test Register and Test Certificates

Stage 29

Compaction Test Register

Client: Excell Gray Bruni
Project No: D20381
Project: Reverwalk Estate Stage 28
Specification: 95%

Date:	Test No:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
09/07/2020	1	Layer 1		102.0	Pass	LOT 2936	D20381-2
09/07/2020	2	Layer 1		102.5	Pass	LOT 2938	D20381-2
09/07/2020	3	Layer 1		104.0	Pass	LOT 2940	D20381-2
10/07/2020	4	Layer 2		97.5	Pass	LOT 2921	D20381-1
10/07/2020	5	Layer 1		99.0	Pass	LOT 2916	D20381-1
10/07/2020	6	Layer 2		97.0	Pass	LOT 2935	D20381-1
14/07/2020	7	Layer 2		99.0	Pass	Lot 2908	D20381-3
14/07/2020	8	Layer 2		99.0	Pass	Lot 2912	D20381-3
14/07/2020	9	Layer 1		97.5	Pass	Lot 2918	D20381-3
20/07/2020	10	Layer 3		97.0	Pass	Lot 2913	D20381-4
20/07/2020	11	Layer 3		101.5	Pass	Lot 2916	D20381-4
20/07/2020	12	Layer 3		99.5	Pass	Lot 2920	D20381-4
21/07/2020	13	Layer 3		98.5	Pass	Lot 2919	D20381-5
21/07/2020	14	Layer 3		100.0	Pass	Lot 2916	D20381-5
21/07/2020	15	Layer 3		100.0	Pass	Lot 2912	D20381-5
22/07/2020	16	Layer 3		100.5	Pass	Lot 2935	D20381-6
22/07/2020	17	Layer 3		102.0	Pass	Lot 2938	D20381-6

Material Test Report

Report Number: **D20381-1**
Issue Number: 1
Date Issued: 16/07/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Project Number: D20381
Project Name: Riverwalk Estate Stage 29 - Level one
Project Location: Werribee
Work Request: 1918
Dates Tested: 10/07/2020 - 14/07/2020

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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Eranda Hippola
Snr lab Tech
NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-1918A	D20-1918B	D20-1918C
Test Number	4	5	6
Date Tested	10/07/2020	10/07/2020	10/07/2020
Time Tested	**	**	**
Test Request #/Location	LOT 2921	LOT 2916	LOT 2935
Layer / Reduced Level	**	**	**
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0
Field Wet Density (FWD) t/m^3	1.98	1.96	1.98
Field Moisture Content %	16.6	15.9	15.5
Field Dry Density (FDD) t/m^3	1.70	1.69	1.72
Peak Converted Wet Density t/m^3	2.03	1.98	2.04
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	100.5	99.0	102.0
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	0.0	0.0	-0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**97.5**	**99.0**	**97.0**
Compaction Method	**Standard**	**Standard**	**Standard**

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

Material Test Report

Report Number: **D20381-2**
Issue Number: 1
Date Issued: 16/07/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Project Number: D20381
Project Name: Riverwalk Estate Stage 29 - Level one
Project Location: Werribee
Work Request: 1907
Date Sampled: 09/07/2020
Dates Tested: 09/07/2020 - 14/07/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On site

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NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-1907A	D20-1907B	D20-1907C
Test Number	1	2	3
Date Tested	09/07/2020	09/07/2020	09/07/2020
Time Tested	**	**	**
Test Request #/Location	LOT 2936	LOT 2938	LOT 2940
Layer / Reduced Level	Layer 1	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0
Field Wet Density (FWD) t/m^3	1.98	2.00	1.98
Field Moisture Content %	12.8	13.9	12.2
Field Dry Density (FDD) t/m^3	1.76	1.75	1.77
Peak Converted Wet Density t/m^3	1.94	1.94	1.91
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	77.5	78.5	75.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	3.5	4.0	4.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**102.0**	**102.5**	**104.0**
Compaction Method	**Standard**	**Standard**	**Standard**

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

Material Test Report

Report Number: D20381-3
Issue Number: 1
Date Issued: 21/07/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Project Number: D20381
Project Name: Riverwalk Estate Stage 29 - Level one
Project Location: Werribee
Work Request: 1931
Date Sampled: 14/07/2020
Dates Tested: 14/07/2020 - 20/07/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On site

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NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-1931A	D20-1931B	D20-1931C
Test Number	7	8	9
Date Tested	14/07/2020	14/07/2020	14/07/2020
Time Tested	**	**	**
Test Request #/Location	1 Lot 2908	2 Lot 2912	3 Lot 2918
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 2	Layer 2	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0
Field Wet Density (FWD) t/m^3	1.96	1.96	1.94
Field Moisture Content %	13.3	13.4	13.4
Field Dry Density (FDD) t/m^3	1.73	1.73	1.71
Peak Converted Wet Density t/m^3	1.98	1.98	1.99
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	84.0	84.5	84.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	2.5	2.5	2.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**99.0**	**99.0**	**97.5**
Compaction Method	**Standard**	**Standard**	**Standard**

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

Material Test Report

Report Number: **D20381-4**
Issue Number: 1
Date Issued: 24/07/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Project Number: D20381
Project Name: Riverwalk Estate Stage 29 - Level one
Project Location: Werribee
Work Request: 1963
Date Sampled: 20/07/2020
Dates Tested: 20/07/2020 - 23/07/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On site

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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Janaka Somaratne
Lab Manager
NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-1963A	D20-1963B	D20-1963C
Test Number	10	11	12
Date Tested	20/07/2020	20/07/2020	20/07/2020
Time Tested	**	**	**
Test Request #/Location	1 Lot 2913	2 Lot 2916	3 Lot 2920
Layer / Reduced Level	Layer 3	Layer 3	Layer 3
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	**	**	**
Field Wet Density (FWD) t/m^3	1.95	1.96	1.94
Field Moisture Content %	18.9	15.7	15.9
Field Dry Density (FDD) t/m^3	1.64	1.70	1.68
Peak Converted Wet Density t/m^3	2.00	1.93	1.95
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	105.0	86.5	87.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	-1.0	2.5	2.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**97.0**	**101.5**	**99.5**
Compaction Method	**Standard**	**Standard**	**Standard**

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

Material Test Report

Report Number: **D20381-5**
Issue Number: 1
Date Issued: 27/07/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Project Number: D20381
Project Name: Riverwalk Estate Stage 29 - Level one
Project Location: Werribee
Work Request: 1974
Dates Tested: 21/07/2020 - 24/07/2020

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Approved Signatory: Eranda Hippola
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NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-1974A	D20-1974B	D20-1974C
Test Number	13	14	15
Date Tested	21/07/2020	21/07/2020	21/07/2020
Time Tested	**	**	**
Test Request #/Location	1 Lot 2919	2 Lot 2916	3 Lot 2912
Chainage (m)	**	**	**
Location Offset (m)	**	**	**
Layer / Reduced Level	Layer 3	Layer 3	Layer 3
Thickness of Layer (mm)	300	300	300
Soil Description	Clay	Clay	Clay
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0
Field Wet Density (FWD) t/m^3	1.94	1.97	1.96
Field Moisture Content %	19.1	18.9	19.3
Field Dry Density (FDD) t/m^3	1.63	1.66	1.64
Peak Converted Wet Density t/m^3	1.97	1.97	1.96
Adjusted Peak Converted Wet Density t/m^3	**	**	**
Moisture Ratio % (AS 1289.5.4.1)	99.0	99.0	99.5
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	0.0	0.0	0.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	**98.5**	**100.0**	**100.0**
Compaction Method	**Standard**	**Standard**	**Standard**

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

Material Test Report

Report Number: **D20381-6**
Issue Number: 1
Date Issued: 29/07/2020
Client: Excell Gray Bruni
12 Allied Drive, Tullamarine Vic 3043
Project Number: D20381
Project Name: Riverwalk Estate Stage 29 - Level one
Project Location: Werribee
Work Request: 1981
Date Sampled: 22/07/2020
Dates Tested: 22/07/2020 - 27/07/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Material: Clay
Material Source: On site

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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Janaka Somaratne
Lab Manager
NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D20-1981A	D20-1981B	
Test Number	16	17	
Date Tested	22/07/2020	22/07/2020	
Time Tested	**	**	
Test Request #/Location	Lot 2935	Lot 2938	
Layer / Reduced Level	Layer 3	Layer 3	
Thickness of Layer (mm)	300	300	
Soil Description	Clay	Clay	
Test Depth (mm)	275	275	
Sieve used to determine oversize (mm)	19.0	19.0	
Percentage of Wet Oversize (%)	0.0	0.0	
Field Wet Density (FWD) t/m^3	1.94	1.99	
Field Moisture Content %	19.5	26.5	
Field Dry Density (FDD) t/m^3	1.63	1.57	
Peak Converted Wet Density t/m^3	1.93	1.95	
Adjusted Peak Converted Wet Density t/m^3	**	**	
Moisture Ratio % (AS 1289.5.4.1)	92.0	101.0	
Adjusted Moisture Ratio % (AS 1289.5.4.1)	**	**	
Moisture Variation (Wv) %	1.5	0.0	
Adjusted Moisture Variation %	**	**	
Hilf Density Ratio (%)	**100.5**	**102.0**	
Compaction Method	**Standard**	**Standard**	

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