

Riverwalk Estate Stage 20

GITA Inspection Verification Report

Prepared For: Excell Gray Bruni

Report Number 10206A V1

Version Release Date 5th September 2018

Report Released By Richard Schembri

Title Laboratory Manager

Signature



Table of Contents

1 Introduction 3

2 Scope of Work 3

 2.1 Area of Work 3

 2.2 Specification 3

 2.3 Limitations..... 4

3 Construction Method 4

 3.1 Subgrade Preparation 4

 3.2 Fill Placement 4

4 Construction Verification..... 5

5 Statement of Compliance 5

Appendices

- Appendix 1 Test Location Plan
- Appendix 2 Compaction Test Register and Test Certificates

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 20. This work was conducted over the period of 04/04/2018 to 26/07/2018.

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 2006 through to 2023 and 2031 through to 2067. The site will be a residential estate.

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, Drawings 10920FP02 and 10920FP01) and provided by *Riverwalk Estate Stage 20*.

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 (Drawings 10920FP02 and 10920FP01) 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 1500m²), the minimum testing frequency is 1 test per layer per material type per 2500m² or 1 test per 500m³ 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.

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

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 plan

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 have been conducted within the house allotment but may have been verified by testing conducted within up to a 2500m² 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.

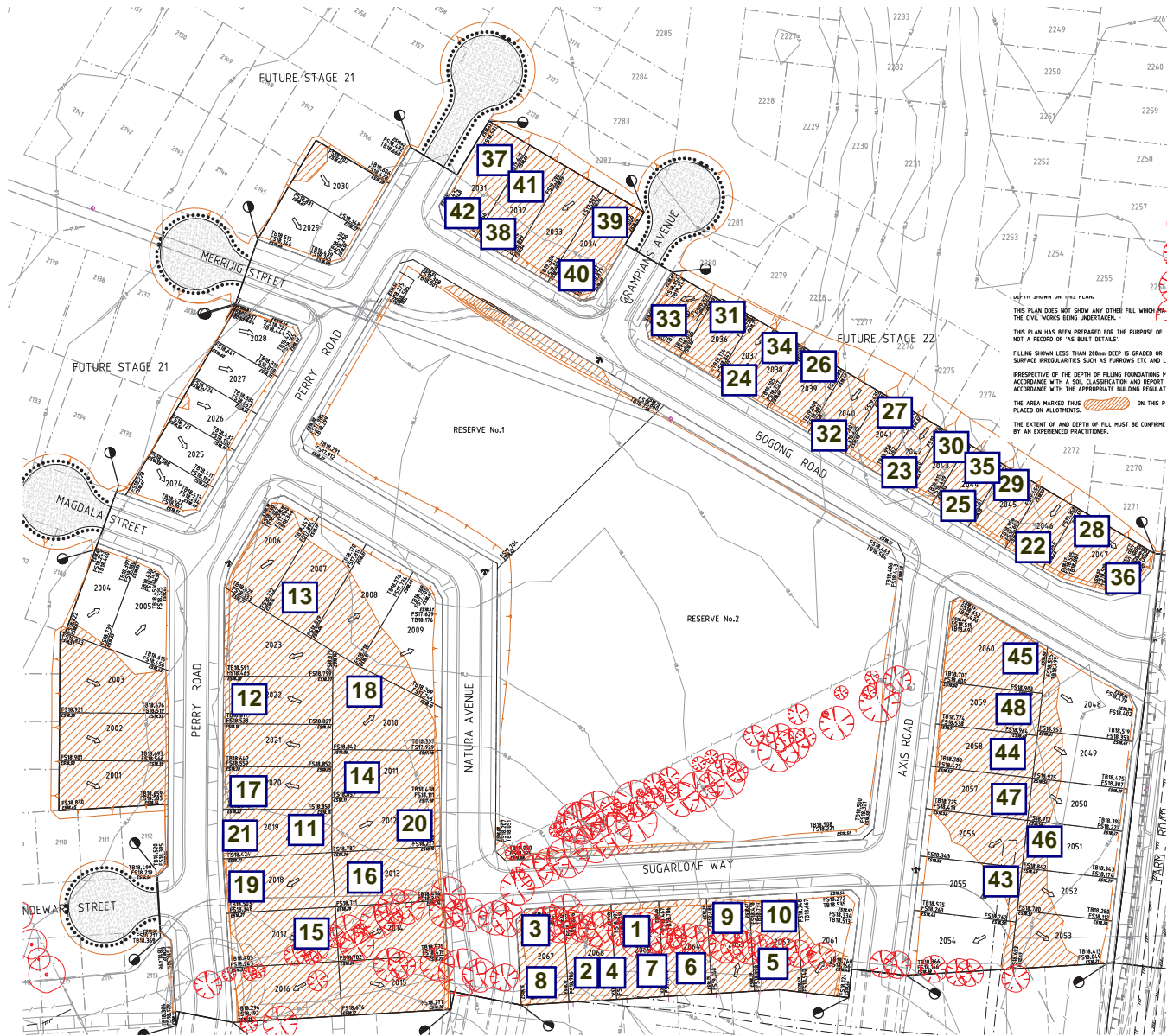
4 Construction Verification

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 (10206D1, 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 48 density tests (Hilf method in accordance with 1289 5.7.1) were undertaken with 1 failed results. 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 Stage 20 at Riverwalk Estate. For completed fill areas of greater than 300mm, and for works completed between 04/04/2018 and 26/07/2018, 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 Stage 20 of Riverwalk Estate was observed to be constructed in compliance with the requirements of the Technical Specification.



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47 National Ave
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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 20

Reference: 10206 D1



Compaction Test Register

Client: Excell Gray Bruni **Project No:** 10206
Project: Riverwalk Estate Stage 20 **Specification:** 95%

Date:	Test No:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
4/04/2018	1	Layer 1		96	Pass	2065	10206-1
4/04/2018	2	Layer 1		92.5	Fail	2066	10206-1
4/04/2018	3	Layer 1		95.5	Pass	2067	10206-1
5/04/2018	4	Layer 1	2	96	Pass	2066	10206-2
5/04/2018	5	Layer 2		98.5	Pass	2062	10206-2
5/04/2018	6	Layer 2		98.5	Pass	2064	10206-2
5/04/2018	7	Layer 3		97.5	Pass	2065	10206-2
5/04/2018	8	Layer 3		97.5	Pass	2067	10206-2
5/04/2018	9	Layer 3		97	Pass	2063	10206-2
5/04/2018	10	Layer 4		97.5	Pass	2062	10206-3
11/04/2018	11	Layer 1		96	Pass	2019	10206-4
11/04/2018	12	Layer 1		95.5	Pass	2022	10206-4
11/04/2018	13	Layer 2		100	Pass	2007	10206-4
11/04/2018	14	Layer 2		96	Pass	2011	10206-4
11/04/2018	15	Layer 2		96	Pass	2017	10206-4
12/04/2018	16	Layer 3		97	Pass	2013	10206-5
12/04/2018	17	Layer 3		101	Pass	2020	10206-5
12/04/2018	18	Layer 3		98	Pass	2010	10206-5
16/04/2018	19	Layer 4		95.5	Pass	2018	10206-6
16/04/2018	20	Layer 4		96	Pass	2012	10206-6
16/04/2018	21	Layer 4		96	Pass	2019	10206-6
17/04/2018	22	Layer 1		98	Pass	2046	10206-7
17/04/2018	23	Layer 1		97.5	Pass	2042	10206-7
17/04/2018	24	Layer 1		99.5	Pass	2037	10206-7
17/04/2018	25	Layer 2		98	Pass	2044	10206-7
17/04/2018	26	Layer 2		99	Pass	2039	10206-7
17/04/2018	27	Layer 2		97	Pass	2041	10206-7
18/04/2018	28	Layer 3		98.5	Pass	2047	10206-8
18/04/2018	29	Layer 3		99	Pass	2045	10206-8
18/04/2018	30	Layer 3		99	Pass	2043	10206-8
18/04/2018	31	Layer 4		99	Pass	2036	10206-8
18/04/2018	32	Layer 4		99.5	Pass	2040	10206-8
18/04/2018	33	Layer 4		99	Pass	2035	10206-8
19/04/2018	34	Layer 6		97.5	Pass	2038	10206-9
19/04/2018	35	Layer 7		97.5	Pass	2044	10206-9
19/04/2018	36	Layer 7		95.5	Pass	2047	10206-9
28/04/2018	37	Layer 1		98.5	Pass	2031	10206-10
28/04/2018	38	Layer 1		97.5	Pass	2032	10206-10
28/04/2018	39	Layer 1		98.5	Pass	2034	10206-10
28/04/2018	40	Layer 2		97.5	Pass	2034	10206-10
28/04/2018	41	Layer 2		97.5	Pass	2032	10206-10



Compaction Test Register

Client: Excell Gray Bruni **Project No:** 10206
Project: Riverwalk Estate Stage 20 **Specification:** 95%

Date:	Test No:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
28/04/2018	42	Layer 2		99	Pass	2031	10206-10
25/07/2018	43	Layer 1		95.5	Pass	2055	10206-11
25/07/2018	44	Layer 1		95	Pass	2058	10206-11
25/07/2018	45	Layer 1		96.5	Pass	2060	10206-11
26/07/2018	46	Layer 2		97	Pass	2051	10206-12
26/07/2018	47	Layer 2		98	Pass	2057	10206-12
26/07/2018	48	Layer 2		98	Pass	2059	10206-12



COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

Terraforma Laboratories - Deer Park Laboratory
 Factory 6 / 22-24 Westwood Drive, Deer Park Phone No: 8348 5596

report No 10206-1
 date of issue 24-May-2018

Client Excell Gray Bruni
 Client address 12 Allied Drive, Tullamarine, 3043
 Project Riverwalk Stage 20 Level 1
 Location Werribee

Location Lot Fill
 Layer thickness (mm) 300

tested by PD
 time 14:00 PM
 date 04-Apr-2018
 checked by RS

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		1	2	3		
location	Lot No	2065	2066	2067		
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)						
depth from F.S.L.	m	Layer 1	Layer 1	Layer 1		
measurement depth	mm	275	275	275		
field wet density	t/m ³	1.86	1.79	1.88		
field dry density	t/m ³	1.66	1.60	1.69		
field moisture content	%	11.7	11.7	11.7		

laboratory compaction procedure AS1289 5.7.1

compactive effort		standard	standard	standard		
oversize material retained on AS sieve	mm	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0		
peak converted wet density	t/m ³	1.93	1.93	1.97		
adjusted peak converted wet density	t/m ³	-	-	-		

moisture variation from OMC (-dry,+wet)%		-2.0	-2.0	-1.5		
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Moisture ratio	%	87.5	87.5	87.5		
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Hilf density ratio (R_{HD})	%	96.0	92.5	95.5		
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material description

Silty CLAY



The results of the tests, calibrations and/or measurements included in this document are traceable to Australian national standards requirements.
 Accredited for compliance with ISO/IEC 17025

LABORATORY ACCREDITATION No 15357

Approved Signature
 R Schembri



COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

Terraforma Laboratories - Deer Park Laboratory
 Factory 6 / 22-24 Westwood Drive, Deer Park Phone No: 8348 5596

report No 10206-2
 date of issue 24-May-2018

Client	Excell Gray Bruni
Client address	12 Allied Drive, Tullamarine, 3043
Project	Riverwalk Stage 20 Level 1
Location	Werribee

Location	Lot Fill
Layer thickness (mm)	300

tested by	PD
time	All Day
date	05-Apr-2018
checked by	RS

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		4	5	6	7	8	9
location	Lot No	2066 Retest of 2	2062	2064	2065	2067	2063
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 1	Layer 2	Layer 2	Layer 3	Layer 3	Layer 4
measurement depth	mm	275	275	275	275	275	275
field wet density	t/m ³	1.91	1.92	1.94	1.90	1.93	1.92
field dry density	t/m ³	1.72	1.73	1.74	1.71	1.73	1.73
field moisture content	%	11.1	10.8	11.4	11.1	11.4	10.8

laboratory compaction procedure AS1289 5.7.1

compactive effort		standard	standard	standard	standard	standard	standard
oversize material retained on AS sieve	mm	19.0	19.0	19.0	19.0	19.0	19.0
percent of oversize material	wet	0	0	0	0	0	0
peak converted wet density	t/m ³	1.983	1.955	1.969	1.95	1.982	1.985
adjusted peak converted wet density	t/m ³	-	-	-	-	-	-

moisture variation from OMC (-dry,+wet)%		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
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Moisture ratio	%	79.5	79.0	80.0	80.0	79.5	79.5
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Hilf density ratio (R_{HD})	%	96.0	98.5	98.5	97.5	97.5	97.0
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material description

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

Terraforma Laboratories - Deer Park Laboratory
 Factory 6 / 22-24 Westwood Drive, Deer Park Phone No: 8348 5596

report No 10206-3
 date of issue 24-May-2018

Client	Excell Gray Bruni
Client address	12 Allied Drive, Tullamarine, 3043
Project	Riverwalk Stage 20 Level 1
Location	Werribee

Location	Lot Fill
Layer thickness (mm)	300

tested by	PD
time	All Day
date	05-Apr-2018
checked by	RS

Field density test procedure AS1289.2.1.1 and 5.8.1						
Test No		10				
location	Lot No	2062				
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)						
depth from F.S.L.	m	Layer 4				
measurement depth	mm	275				
field wet density	t/m ³	1.92				
field dry density	t/m ³	1.68				
field moisture content	%	14.0				
laboratory compaction procedure AS1289 5.7.1						
compactive effort		standard				
oversize material retained on AS sieve	mm	19.0				
percent of oversize material	wet	0				
peak converted wet density	t/m ³	1.96				
adjusted peak converted wet density	t/m ³	-				
moisture variation from OMC (-dry,+wet)%		-3.0				
Moisture ratio	%	83.0				
Hilf density ratio (R_{HD})	%	97.5				
material description						
Silty CLAY						



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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

Terraforma Laboratories - Deer Park Laboratory
 Factory 6 / 22-24 Westwood Drive, Deer Park Phone No: 8348 5596

report No 10206-4
 date of issue 24-May-2018

Client	Excell Gray Bruni
Client address	12 Allied Drive, Tullamarine, 3043
Project	Riverwalk Stage 20 Level 1
Location	Werribee

Location	Lot Fill
Layer thickness (mm)	300

tested by	PD
time	12:30 PM
date	11-Apr-2018
checked by	RS

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		11	12	13	14	15
location	Lot No	2019	2022	2007	2011	2017
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)						
depth from F.S.L.	m	Layer 1	Layer 1	Layer 1	Layer 2	Layer 2
measurement depth	mm	275	275	275	275	275
field wet density	t/m ³	1.85	1.91	1.94	1.84	1.82
field dry density	t/m ³	1.64	1.70	1.72	1.68	1.66
field moisture content	%	12.3	12.4	12.9	10.0	9.9

laboratory compaction procedure AS1289 5.7.1

compactive effort		standard	standard	standard	standard	standard
oversize material retained on AS sieve	mm	19.0	19.0	19.0	19.0	19.0
percent of oversize material	wet	0	0	0	0	0
peak converted wet density	t/m ³	1.92	2	1.94	1.92	1.9
adjusted peak converted wet density	t/m ³					

moisture variation from OMC (-dry,+wet)%		-2.0	-1.5	-1.5	-2.0	-2.0
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Moisture ratio	%	88.0	88.0	88.5	86.0	86.0
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Hilf density ratio (R_{HD})	%	96.0	95.5	100.0	96.0	96.0
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material description

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

Terrafirma Laboratories - Deer Park Laboratory
 Factory 6 / 22-24 Westwood Drive, Deer Park Phone No: 8348 5596

report No 10206-5
 date of issue 24-May-2018

Client	Excell Gray Bruni
Client address	12 Allied Drive, Tullamarine, 3043
Project	Riverwalk Stage 20 Level 1
Location	Werribee

Location	Lot Fill
Layer thickness (mm)	300

tested by	PD
time	14:30 PM
date	12-Apr-2018
checked by	RS

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		16	17	18		
location	Lot No	2013	2020	2010		
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)						
depth from F.S.L.	m	Layer 3	Layer 3	Layer 3		
measurement depth	mm	275	275	275		
field wet density	t/m ³	1.86	2.00	1.87		
field dry density	t/m ³	1.70	1.79	1.69		
field moisture content	%	9.7	11.7	10.9		

laboratory compaction procedure AS1289 5.7.1

compactive effort		standard	standard	standard		
oversize material retained on AS sieve	mm	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0		
peak converted wet density	t/m ³	1.92	1.98	1.91		
adjusted peak converted wet density	t/m ³	-	-	-		

moisture variation from OMC (-dry,+wet)%		-4.0	-4.0	-4.0		
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Moisture ratio	%	71.5	75.0	73.5		
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Hilf density ratio (R_{HD})	%	97.0	101.0	98.0		
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material description

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

TerraFirma Laboratories - Deer Park Laboratory
 Factory 6 / 22-24 Westwood Drive, Deer Park Phone No: 8348 5596

report No 10206-6
 date of issue 24-May-2018

Client	Excell Gray Bruni
Client address	12 Allied Drive, Tullamarine, 3043
Project	Riverwalk Stage 20 Level 1
Location	Werribee

Location	Lot Fill
Layer thickness (mm)	300

tested by	NB
time	15:00 PM
date	16-Apr-2018
checked by	RS

Field density test procedure AS1289.2.1.1 and 5.8.1						
Test No		19	20	21		
location	Lot No	2018	2012	2019		
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)						
depth from F.S.L.	m	Layer 4	Layer 4	Layer 4		
measurement depth	mm	275	275	275		
field wet density	t/m ³	1.89	1.88	1.86		
field dry density	t/m ³	1.62	1.62	1.61		
field moisture content	%	16.6	15.7	15.4		
laboratory compaction procedure AS1289 5.7.1						
compactive effort		standard	standard	standard		
oversize material retained on AS sieve	mm	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0		
peak converted wet density	t/m ³	1.98	1.96	1.94		
adjusted peak converted wet density	t/m ³	-	-	-		
moisture variation from OMC (-dry,+wet)%		-1.5	-1.5	-1.5		
Moisture ratio	%	90.5	92.0	91.0		
Hilf density ratio (R_{HD})	%	95.5	96.0	96.0		
material description						
Silty CLAY						



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LABORATORY ACCREDITATION No 15357



COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

Terraforma Laboratories - Deer Park Laboratory
 Factory 6 / 22-24 Westwood Drive, Deer Park Phone No: 8348 5596

report No 10206-7
 date of issue 24-May-2018

Client Excell Gray Bruni
 Client address 12 Allied Drive, Tullamarine, 3043
 Project Riverwalk Stage 20 Level 1
 Location Werribee

Location Lot Fill
 Layer thickness (mm) 300

tested by NB/WF
 time 04:03 PM
 date 17-Apr-2018
 checked by RS

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		22	23	24	25	26	27
location	Lot No	2046	2042	2037	2044	2039	2041
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 1	Layer 1	Layer 1	Layer 2	Layer 2	Layer 2
measurement depth	mm	275	275	275	275	275	275
field wet density	t/m ³	1.98	1.99	1.98	2.00	1.99	2.00
field dry density	t/m ³	1.76	1.78	1.75	1.77	1.77	1.76
field moisture content	%	12.0	11.8	13.2	13.0	12.7	13.9

laboratory compaction procedure AS1289 5.7.1

compactive effort		standard	standard	standard	standard	standard	standard
oversize material retained on AS sieve	mm	19.0	19.0	19.0	19.0	19.0	19.0
percent of oversize material	wet	0	0	0	0	0	0
peak converted wet density	t/m ³	2.02	2.04	1.99	2.04	2.01	2.06
adjusted peak converted wet density	t/m ³	-	-	-	-	-	-

moisture variation from OMC (-dry,+wet)%		-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
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Moisture ratio	%	88.0	87.5	88.5	88.5	88.0	89.0
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Hilf density ratio (R_{HD})	%	98.0	97.5	99.5	98.0	99.0	97.0
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material description

Silty CLAY



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 Accredited for compliance with ISO/IEC 17025

Approved Signature
 R Schembri



COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

Terraforma Laboratories - Deer Park Laboratory
 Factory 6 / 22-24 Westwood Drive, Deer Park Phone No: 8348 5596

report No 10206-8
 date of issue 24-May-2018

Client Excell Gray Bruni
 Client address 12 Allied Drive, Tullamarine, 3043
 Project Riverwalk Stage 20 Level 1
 Location Werribee

Location Lot Fill
 Layer thickness (mm) 300

tested by NB
 time ALL DAY
 date 18-Apr-2018
 checked by RS

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		28	29	30	31	32	33
location	Lot No	2047	2045	2043	2036	2040	2035
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 3	Layer 3	Layer 4	Layer 4	Layer 5	Layer 5
measurement depth	mm	275	275	275	275	275	275
field wet density	t/m ³	1.97	1.98	1.98	1.99	1.97	1.96
field dry density	t/m ³	1.79	1.80	1.77	1.75	1.73	1.72
field moisture content	%	9.9	10.3	11.5	13.5	13.9	13.8

laboratory compaction procedure AS1289 5.7.1

compactive effort		standard	standard	standard	standard	standard	standard
oversize material retained on AS sieve	mm	19.0	19.0	19.0	19.0	19.0	19.0
percent of oversize material	wet	0	0	0	0	0	0
peak converted wet density	t/m ³	2.002	2.004	1.995	2.01	1.98	1.98
adjusted peak converted wet density	t/m ³	-	-	-	-	-	-

moisture variation from OMC (-dry,+wet)%		-3.5	-3.5	-3.5	-3.5	-3.5	-3.5
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Moisture ratio	%	73.0	75.5	77.5	78.5	80.0	79.5
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Hilf density ratio (R_{HD})	%	98.5	99.0	99.0	99.0	99.5	99.0
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material description

Silty CLAY



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 Accredited for compliance with ISO/IEC 17025

Approved Signature

R Schembri



COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

Terra Firma Laboratories - Deer Park Laboratory
 Factory 6 / 22-24 Westwood Drive, Deer Park Phone No: 8348 5596

report No 10206-9
 date of issue 24-May-2018

Client Excell Gray Bruni
 Client address 12 Allied Drive, Tullamarine, 3043
 Project Riverwalk Stage 20 Level 1
 Location Werribee

Location Lot Fill
 Layer thickness (mm) 300

tested by NB/EH
 time ALL DAY
 date 19-Apr-2018
 checked by RS

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		34	35	36		
location	Lot No	2038	2044	2047		
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)						
depth from F.S.L.	m	layer 6	layer 7	layer 7		
measurement depth	mm	275	275	275		
field wet density	t/m ³	1.99	1.97	2.04		
field dry density	t/m ³	1.80	1.78	1.84		
field moisture content	%	10.6	10.5	10.8		

laboratory compaction procedure AS1289 5.7.1

compactive effort		standard	standard	standard		
oversize material retained on AS sieve	mm	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0		
peak converted wet density	t/m ³	2.04	2.02	2.13		
adjusted peak converted wet density	t/m ³	-	-	-		

moisture variation from OMC (-dry,+wet)%		-1.5	-1.5	-1.5		
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Moisture ratio	%	86.5	86.5	86.5		
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Hilf density ratio (R_{HD})	%	97.5	97.5	95.5		
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material description

Silty CLAY



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 R Schembri



COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

Terraforma Laboratories - Deer Park Laboratory
 Factory 6 / 22-24 Westwood Drive, Deer Park Phone No: 8348 5596

report No 10206-10
 date of issue 24-May-2018

Client Excell Gray Bruni
 Client address 12 Allied Drive, Tullamarine, 3043
 Project Riverwalk Stage 20 Level 1
 Location Werribee

Location Lot Fill
 Layer thickness (mm) 250

tested by PD
 time ALL DAY
 date 28-Apr-2018
 checked by RS

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		37	38	39	40	41	42
location	Lot No	2031	2032	2034	2034	2032	2031
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 1	Layer 1	Layer 1	Layer 2	Layer 2	Layer 2
measurement depth	mm	225	225	225	225	225	225
field wet density	t/m ³	1.97	1.93	1.90	1.89	1.91	1.93
field dry density	t/m ³	1.79	1.75	1.72	1.85	1.74	1.76
field moisture content	%	10.2	10.1	10.3	2.2	10.0	10.0

laboratory compaction procedure AS1289 5.7.1

compactive effort		standard	standard	standard	standard	standard	standard
oversize material retained on AS sieve	mm	19.0	19.0	19.0	19.0	19.0	19.0
percent of oversize material	wet	0	0	0	0	0	0
peak converted wet density	t/m ³	2.005	1.98	1.93	1.945	1.965	1.95
adjusted peak converted wet density	t/m ³	-	-	-	-	-	-

moisture variation from OMC (-dry,+wet)%		-3.5	-3.5	-3.5	-4.0	-3.5	-4.0
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Moisture ratio	%	74.5	73.5	74.0	38.0	73.5	72.5
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Hilf density ratio (R_{HD})	%	98.5	97.5	98.5	97.5	97.5	99.0
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material description

Silty Clay



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 R Schembri



COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

TerraFirma Laboratories - Deer Park Laboratory
 Factory 6 / 22-24 Westwood Drive, Deer Park Phone No: 8348 5596

report No 10206-11
 date of issue 02-Aug-2018

Client Excell Gray Bruni
 Client address 12 Allied Drive, Tullamarine, 3043
 Project Riverwalk Stage 20 Level 1
 Location Werribee

Location Lot Fill
 Layer thickness (mm) 300

tested by NB
 time ALL DAY
 date 25-Jul-2018
 checked by RS

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		43	44	45		
location	Lot No	2055	2058	2060		
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)						
depth from F.S.L.	m	Layer 1	Layer 1	Layer 1		
measurement depth	mm	275	275	275		
field wet density	t/m ³	1.92	1.93	1.91		
field dry density	t/m ³	1.71	1.72	1.71		
field moisture content	%	12.5	12.0	12.1		

laboratory compaction procedure AS1289 5.7.1

compactive effort		standard	standard	standard		
oversize material retained on AS sieve	mm	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0		
peak converted wet density	t/m ³	2.005	2.035	1.98		
adjusted peak converted wet density	t/m ³	-	-	-		

moisture variation from OMC (-dry,+wet)%		-1.5	-1.5	-1.5		
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Moisture ratio	%	89.0	89.0	89.5		
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Hilf density ratio (R_{HD})	%	95.5	95.0	96.5		
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material description

Silty CLAY



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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

Terraforma Laboratories - Deer Park Laboratory
 Factory 6 / 22-24 Westwood Drive, Deer Park Phone No: 8348 5596

report No 10206-12
 date of issue 02-Aug-2018

Client Excell Gray Bruni
 Client address 12 Allied Drive, Tullamarine, 3043
 Project Riverwalk Stage 20 Level 1
 Location Werribee

Location Lot Fill
 Layer thickness (mm) 300

tested by AIW
 time ALL DAY
 date 26-Jul-2018
 checked by RS

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		46	47	48		
location	Lot No	2051	2057	2059		
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)						
depth from F.S.L.	m	Layer 2	Layer 2	Layer 2		
measurement depth	mm	275	275	275		
field wet density	t/m ³	1.92	1.93	1.92		
field dry density	t/m ³	1.73	1.74	1.73		
field moisture content	%	10.8	10.8	10.7		

laboratory compaction procedure AS1289 5.7.1

compactive effort		standard	standard	standard		
oversize material retained on AS sieve	mm	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0		
peak converted wet density	t/m ³	1.97	1.97	1.955		
adjusted peak converted wet density	t/m ³	-	-	-		

moisture variation from OMC (-dry,+wet)%		-1.5	-1.5	-1.5		
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Moisture ratio	%	87.5	88.0	87.5		
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Hilf density ratio (R_{HD})	%	97.0	98.0	98.0		
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material description

Silty CLAY



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 R Schembri