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Geotechnical Report
Level One Inspection and Testing

Gardenia Estate Stage 1
Beaconsfield

Prepared for:

Streetworks Pty Ltd
4 Len Thomas Place
Narre Warren 3805

Project 9694

23 October 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

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Geotechnical Report Level One Inspection and Testing
Gardenia Estate Stage 1

1. Introduction

Terra Firma Laboratories was engaged by *Streetworks Pty Ltd* as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Gardenia Estate Stage 1. This work was conducted over the period of 24/06/2017 to 19/09/2017.

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 Works

2.1. Areas of work

The areas of work included lots 1 to 36. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1) based on drawings prepared by Dalton Consulting and provided by *Streetworks Pty Ltd*.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development,* as directed by *Streetworks Pty Ltd*. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from 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.

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.

terra firma laboratories

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3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- Dozer
- Pad foot Roller
- Dump Trucks
- Excavator

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day*. At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 74 in-situ density tests, with a summary of results included in Appendix 2. Test Reports are referenced in Appendix 3.

Test numbers 1, 21, 22, 26, 29, 33, 35, 36, 45, 46, 59, 62 65, 68 and 69 originally failed to meet specification. *Streetworks Pty Ltd* were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

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It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

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 and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 24/06/2017 or work completed after the 19/09/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,

T Seymour

Tom Seymour
Lab Manager

terra firma laboratories

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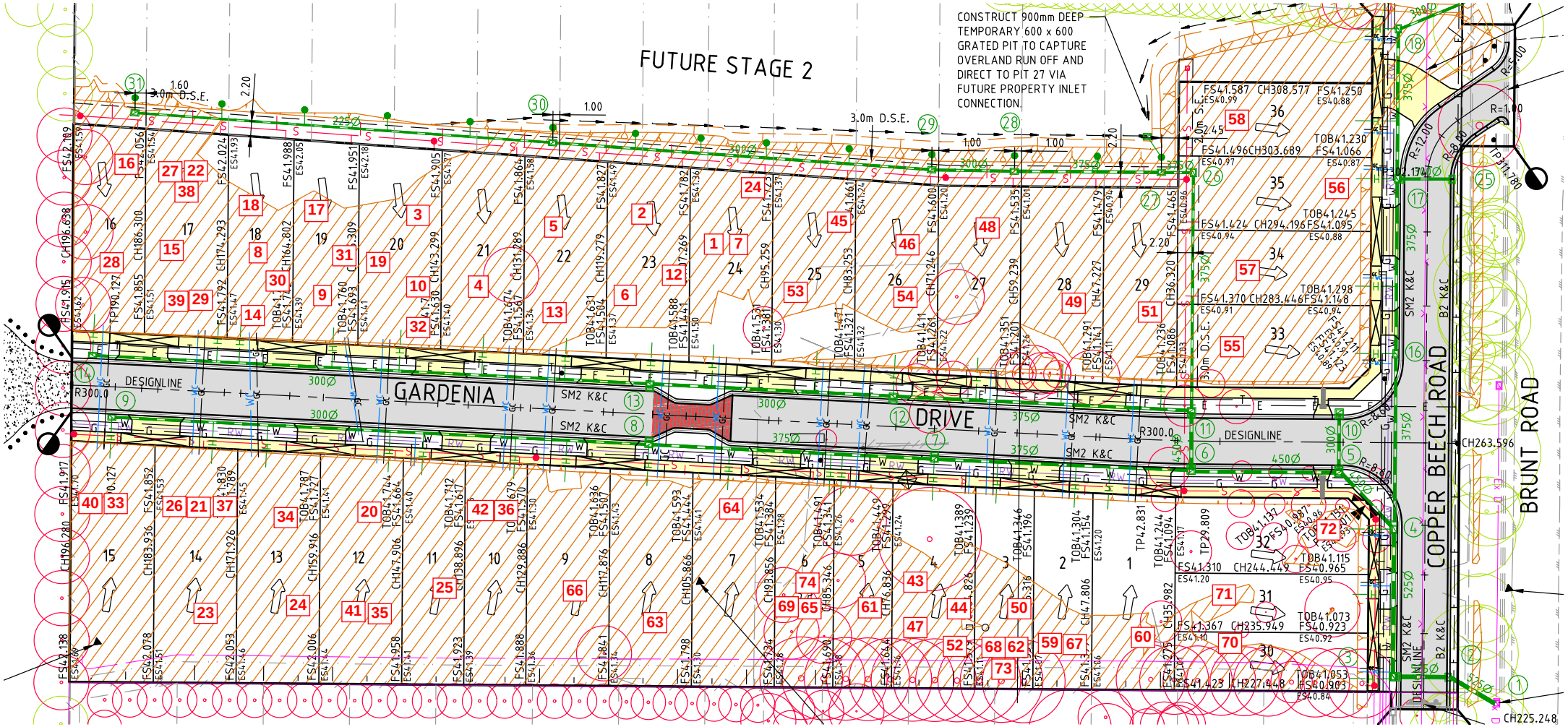
APPENDICES

Appendix 1: Site Plans

Appendix 2: Test Summary

Appendix 3: Test Reports



terra firma laboratories

47 National Avenue
Pakenham VIC 3810

Test Location Plan

Client : Streetworks Pty Ltd

Project : Gardenia Estate Stage 1

Scale NTS

Level One Test Summary

Client: Streetworks **Specification:** 95%
Project: Gardenia Stage 1 **Project No:** 9694

Date:	Test Number:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
24/06/2017	1	L1		94.5	Fail	24	9694-1
24/06/2017	2	L1		95	Pass	23	9694-1
24/06/2017	3	L1		97.5	Pass	22	9694-1
26/06/2017	4	L2		95	Pass	21	9694-2
26/06/2017	5	L2		95	Pass	22	9694-2
26/06/2017	6	L2		95	Pass	23	9694-2
26/06/2017	7	L1	1	95	Pass	24	9694-2
27/06/2017	8	l1		98.5	Pass	18	9694-3
27/06/2017	9	L1		97.5	Pass	19	9694-3
27/06/2017	10	L1		99	Pass	20	9694-3
28/06/2017	11	l1		98.5	Pass	24	9694-4
26/06/2017	12	L1		96	Pass	23	9694-4
26/06/2017	13	L1		96.5	Pass	22	9694-4
29/06/2017	14	L1		96.5	Pass	18	9694-5
29/06/2017	15	L1		96.5	Pass	17	9694-5
29/06/2017	16	L1		96	Pass	16	9694-5
30/06/2017	17	L2		98	Pass	19	9694-6
30/06/2017	18	L2		98.5	Pass	18	9694-6
30/06/2017	19	L2		95.5	Pass	20	9694-6
1/07/2017	20	L1		97.5	Pass	12	9694-7
1/07/2017	21	L1		92.5	Fail	14	9694-7
1/07/2017	22	L2		94	Fail	17	9694-7
3/07/2017	23	L2		97.5	Pass	14	9694-8
3/07/2017	24	L2		95.5	Pass	13	9694-8
3/07/2017	25	L2		97	Pass	11	9694-8
2/08/2017	26	L1	21	93.5	Fail	14	9694-9
2/08/2017	27	L2	22	93.5	Fail	17	9694-9
2/08/2017	28	L3		96	Pass	16	9694-9
2/08/2017	29	L3		94	Fail	17	9694-9
3/08/2017	30	L3		96.5	Pass	18	9694-10
3/08/2017	31	L3		98	Pass	19	9694-10
3/08/2017	32	L3		96.5	Pass	20	9694-10
4/08/2017	33	L3		94.5	Fail	15	9694-11
4/08/2017	34	L3		95.5	Pass	13	9694-11
4/08/2017	35	L2		91.5	Fail	12	9694-11
4/08/2017	36	L2		93	Fail	10	9694-11
4/08/2017	37	L1	26	96.5	Pass	14	9694-11
15/08/2017	38	L2	27	95.5	Pass	17	9694-12
15/08/2017	39	L3	29	95	Pass	17	9694-12
15/08/2017	40	L3	33	96.5	Pass	15	9694-12
15/08/2017	41	L2	35	95.5	Pass	12	9694-12

Level One Test Summary

Client: Streetworks **Specification:** 95%
Project: Gardenia Stage 1 **Project No:** 9694

Date:	Test Number:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
15/08/2017	42	L2	36	95.5	Pass	10	9694-12
7/09/2017	43	L1		95	Pass	4	9694-14
7/09/2017	44	L3		95.5	Pass	4	9694-13
7/09/2017	45	FSL		93	Fail	25	9694-14
7/09/2017	46	FSL		93.5	Fail	26	9694-14
7/09/2017	47	L5		96.5	Pass	4	9694-13
7/09/2017	48	FSL		97	Pass	27	9694-14
7/09/2017	49	FSL		96	Pass	28	9694-15
7/09/2017	50	L1		98	Pass	3	9694-15
7/09/2017	51	FSL		96	Pass	29	9694-15
7/09/2017	52	L7		99	Pass	4	9694-15
11/09/2017	53	FSL	45	100	Pass	25	9694-16
11/09/2017	54	FSL	46	101.5	Pass	26	9694-16
11/09/2017	55	L1		96.5	Pass	33	9694-16
11/09/2017	56	L1		97	Pass	35	9694-16
11/09/2017	57	L3		97.5	Pass	34	9694-17
11/09/2017	58	L2		98	Pass	36	9694-17
12/09/2017	59	L1		93.5	Fail	2	9694-18
12/09/2017	60	L1		98	Pass	1	9694-19
12/09/2017	61	L1		97.5	Pass	5	9694-19
13/09/2017	62	L3		93.5	Fail	3	9694-20
13/09/2017	63	L2		96.5	Pass	8	9694-21
13/09/2017	64	L1		97	Pass	7	9694-21
13/09/2017	65	L2		91.5	Fail	6	9694-20
13/09/2017	66	L1		95	Pass	9	9694-21
13/09/2017	67	L1	59	98	Pass	2	9694-21
18/09/2017	68	L3	62	92.5	Fail	3	9694-22
18/09/2017	69	L2	65	93.5	Fail	6	9694-22
19/09/2017	70	L1		97	Pass	30	9694-23
19/09/2017	71	L1		98	Pass	31	9694-23
19/09/2017	72	L1		98.5	Pass	32	9694-24
19/09/2017	73	L3	68	96.5	Pass	3	9694-25
19/09/2017	74	L2	69	97.5	Pass	6	9694-24

Level One Test Summary

Client: Streetworks **Specification:** 95%
Project: Gardenia Stage 1 **Project No:** 9694

Date:	Test Number:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
24/06/2017	1	L1		94.5	Fail	24	9694-1
24/06/2017	2	L1		95	Pass	23	9694-1
24/06/2017	3	L1		97.5	Pass	22	9694-1
26/06/2017	4	L2		95	Pass	21	9694-2
26/06/2017	5	L2		95	Pass	22	9694-2
26/06/2017	6	L2		95	Pass	23	9694-2
26/06/2017	7	L1	1	95	Pass	24	9694-2
27/06/2017	8	l1		98.5	Pass	18	9694-3
27/06/2017	9	L1		97.5	Pass	19	9694-3
27/06/2017	10	L1		99	Pass	20	9694-3
28/06/2017	11	l1		98.5	Pass	24	9694-4
26/06/2017	12	L1		96	Pass	23	9694-4
26/06/2017	13	L1		96.5	Pass	22	9694-4
29/06/2017	14	L1		96.5	Pass	18	9694-5
29/06/2017	15	L1		96.5	Pass	17	9694-5
29/06/2017	16	L1		96	Pass	16	9694-5
30/06/2017	17	L2		98	Pass	19	9694-6
30/06/2017	18	L2		98.5	Pass	18	9694-6
30/06/2017	19	L2		95.5	Pass	20	9694-6
1/07/2017	20	L1		97.5	Pass	12	9694-7
1/07/2017	21	L1		92.5	Fail	14	9694-7
1/07/2017	22	L2		94	Fail	17	9694-7
3/07/2017	23	L2		97.5	Pass	14	9694-8
3/07/2017	24	L2		95.5	Pass	13	9694-8
3/07/2017	25	L2		97	Pass	11	9694-8
2/08/2017	26	L1	21	93.5	Fail	14	9694-9
2/08/2017	27	L2	22	93.5	Fail	17	9694-9
2/08/2017	28	L3		96	Pass	16	9694-9
2/08/2017	29	L3		94	Fail	17	9694-9
3/08/2017	30	L3		96.5	Pass	18	9694-10
3/08/2017	31	L3		98	Pass	19	9694-10
3/08/2017	32	L3		96.5	Pass	20	9694-10
4/08/2017	33	L3		94.5	Fail	15	9694-11
4/08/2017	34	L3		95.5	Pass	13	9694-11
4/08/2017	35	L2		91.5	Fail	12	9694-11
4/08/2017	36	L2		93	Fail	10	9694-11
4/08/2017	37	L1	26	96.5	Pass	14	9694-11
15/08/2017	38	L2	27	95.5	Pass	17	9694-12
15/08/2017	39	L3	29	95	Pass	17	9694-12
15/08/2017	40	L3	33	96.5	Pass	15	9694-12
15/08/2017	41	L2	35	95.5	Pass	12	9694-12

Level One Test Summary

Client: Streetworks **Specification:** 95%
Project: Gardenia Stage 1 **Project No:** 9694

Date:	Test Number:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
15/08/2017	42	L2	36	95.5	Pass	10	9694-12
7/09/2017	43	L1		95	Pass	4	9694-14
7/09/2017	44	L3		95.5	Pass	4	9694-13
7/09/2017	45	FSL		93	Fail	25	9694-14
7/09/2017	46	FSL		93.5	Fail	26	9694-14
7/09/2017	47	L5		96.5	Pass	4	9694-13
7/09/2017	48	FSL		97	Pass	27	9694-14
7/09/2017	49	FSL		96	Pass	28	9694-15
7/09/2017	50	L1		98	Pass	3	9694-15
7/09/2017	51	FSL		96	Pass	29	9694-15
7/09/2017	52	L7		99	Pass	4	9694-15
11/09/2017	53	FSL	45	100	Pass	25	9694-16
11/09/2017	54	FSL	46	101.5	Pass	26	9694-16
11/09/2017	55	L1		96.5	Pass	33	9694-16
11/09/2017	56	L1		97	Pass	35	9694-16
11/09/2017	57	L3		97.5	Pass	34	9694-17
11/09/2017	58	L2		98	Pass	36	9694-17
12/09/2017	59	L1		93.5	Fail	2	9694-18
12/09/2017	60	L1		98	Pass	1	9694-19
12/09/2017	61	L1		97.5	Pass	5	9694-19
13/09/2017	62	L3		93.5	Fail	3	9694-20
13/09/2017	63	L2		96.5	Pass	8	9694-21
13/09/2017	64	L1		97	Pass	7	9694-21
13/09/2017	65	L2		91.5	Fail	6	9694-20
13/09/2017	66	L1		95	Pass	9	9694-21
13/09/2017	67	L1	59	98	Pass	2	9694-21
18/09/2017	68	L3	62	92.5	Fail	3	9694-22
18/09/2017	69	L2	65	93.5	Fail	6	9694-22
19/09/2017	70	L1		97	Pass	30	9694-23
19/09/2017	71	L1		98	Pass	31	9694-23
19/09/2017	72	L1		98.5	Pass	32	9694-24
19/09/2017	73	L3	68	96.5	Pass	3	9694-25
19/09/2017	74	L2	69	97.5	Pass	6	9694-24

COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

terra firma laboratories

47 National Avenue, Pakenham VIC 3810

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report No 9694-1

date of issue 27-Jun-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	225

tested by	SP
time	PM
date	26-Jun-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**1**	**2**	**3**			
location Lot No		24	23	22			
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	200	200	200			
field wet density	t/m^3	2.02	2.00	2.04			
field dry density	t/m^3	1.75	1.74	1.75			
field moisture content	%	15.3	15.1	16.3			
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	2.13	2.10	2.09			
adjusted peak converted wet density	t/m^3	-	-	-			
moisture variation from OMC (-dry,+wet)%		1.0	0.5	0.5			
Moisture ratio	**%**	**105.5**	**104.0**	**102.0**			
Hilf density ratio (R_{HD})	**%**	**94.5**	**95.0**	**97.5**			

material description

Silty CLAY

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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

LABORATORY ACCREDITATION No **15357**

Approved Signature

C Caulfield

COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

terra firma laboratories

47 National Avenue, Pakenham VIC 3810

ph 03 5943 0980 www.terrafirmalabs.com.au

report No 9694-2

date of issue 28-Jun-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	225

tested by	SP
time	PM
date	27-Jun-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**4**	**5**	**6**	**7**		
location Lot No Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)		21	22	23	24 Retest of 1		
depth from F.S.L.	m	Layer 2	Layer 2	Layer 2	Layer 1		
measurement depth	mm	200	200	200	200		
field wet density	t/m^3	2.05	2.04	2.04	2.06		
field dry density	t/m^3	1.77	1.79	1.78	1.81		
field moisture content	%	15.7	13.8	14.5	13.9		
laboratory compaction procedure AS1289 5.7.1							
compactive effort		standard	standard	standard	standard		
oversize material retained on AS sieve	mm	19.0	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0	0		
peak converted wet density	t/m^3	2.15	2.15	2.14	2.17		
adjusted peak converted wet density	t/m^3	-	-	-	-		
moisture variation from OMC (-dry,+wet)%		3.0	1.5	0.5	1.0		
Moisture ratio	**%**	**123.5**	**110.0**	**104.0**	**107.0**		
Hilf density ratio (R_{HD})	**%**	**95.0**	**95.0**	**95.0**	**95.0**		

material description

Silty CLAY

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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

LABORATORY ACCREDITATION No **15357**

Approved Signature

C Caulfield

COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

terra firma laboratories

47 National Avenue, Pakenham VIC 3810

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report No 9694-3

date of issue 30-Jun-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	225

tested by	SP
time	All Day
date	27-Jun-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**8**	**9**	**10**			
location	Lot No	18	19	20			
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	200	200	200			
field wet density	t/m^3	2.09	2.10	2.08			
field dry density	t/m^3	1.81	1.84	1.81			
field moisture content	%	14.9	14.2	14.8			
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	2.12	2.15	2.10			
adjusted peak converted wet density	t/m^3	-	-	-			
moisture variation from OMC (-dry,+wet)%		0.5	1.5	1.5			
Moisture ratio	**%**	**105.0**	**110.5**	**111.0**			
Hilf density ratio (R_{HD})	**%**	**98.5**	**97.5**	**99.0**			

material description

Silty CLAY

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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

LABORATORY ACCREDITATION No **15357**

Approved Signature

C Caulfield

COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

terra firma laboratories

47 National Avenue, Pakenham VIC 3810

ph 03 5943 0980 www.terrafirmalabs.com.au

report No 9694-4

date of issue 05-Jul-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	200

tested by	SKB
time	All Day
date	28-Jun-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**11**	**12**	**13**			
location Lot No		24	23	22			
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	175	175	175			
field wet density	t/m^3	2.11	2.04	2.05			
field dry density	t/m^3	1.84	1.76	1.79			
field moisture content	%	14.4	15.8	14.6			
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	2.14	2.12	2.13			
adjusted peak converted wet density	t/m^3	-	-	-			
moisture variation from OMC (-dry,+wet)%		0.5	1.0	0.0			
Moisture ratio	**%**	**104.0**	**107.0**	**101.0**			
Hilf density ratio (R_{HD})	**%**	**98.5**	**96.0**	**96.5**			

material description

Silty CLAY

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LABORATORY ACCREDITATION No **15357**

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C Caulfield

COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

terra firma laboratories

47 National Avenue, Pakenham VIC 3810

ph 03 5943 0980 www.terrafirmalabs.com.au

report No 9694-5

date of issue 05-Jul-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	250

tested by	SP
time	PM
date	30-Jun-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**14**	**15**	**16**			
location Lot No		18	17	16			
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	225	225	225			
field wet density	t/m^3	2.03	2.04	2.06			
field dry density	t/m^3	1.75	1.77	1.79			
field moisture content	%	16.4	15.6	15.3			
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	2.11	2.12	2.14			
adjusted peak converted wet density	t/m^3	0.00	0.00	0.00			
moisture variation from OMC (-dry,+wet)%		0.0	1.0	1.0			
Moisture ratio	**%**	**100.0**	**106.0**	**106.0**			
Hilf density ratio (R_{HD})	**%**	**96.5**	**96.5**	**96.0**			

material description

Sandy CLAY

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

terra firma laboratories

47 National Avenue, Pakenham VIC 3810

ph 03 5943 0980 www.terrafirmalabs.com.au

report No 9694-6

date of issue 05-Jul-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	250

tested by	SKB
time	All Day
date	30-Jun-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**17**	**18**	**19**			
location	Lot No	19	18	20			
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	225	225	225			
field wet density	t/m^3	2.13	2.09	2.11			
field dry density	t/m^3	1.87	1.81	1.86			
field moisture content	%	13.9	15.5	13.9			
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	2.17	2.12	2.21			
adjusted peak converted wet density	t/m^3	-	-	-			
moisture variation from OMC (-dry,+wet)%		2.0	1.0	3.0			
Moisture ratio	**%**	**115.0**	**108.0**	**127.0**			
Hilf density ratio (R_{HD})	**%**	**98.0**	**98.5**	**95.5**			

material description

Silty CLAY

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

terra firma laboratories

47 National Avenue, Pakenham VIC 3810

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report No 9694-7

date of issue 05-Jul-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	300

tested by	CC
time	All Day
date	01-Jul-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**20**	**21**	**22**			
location Lot No		12	14	17			
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 1	Layer 1	Layer 2			
measurement depth	mm	275	275	275			
field wet density	t/m^3	1.96	2.00	1.99			
field dry density	t/m^3	1.68	1.69	1.71			
field moisture content	%	16.2	18.0	16.8			
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	2.01	2.16	2.12			
adjusted peak converted wet density	t/m^3	-	-	-			
moisture variation from OMC (-dry,+wet)%		-1.0	2.5	2.0			
Moisture ratio	**%**	**94.0**	**116.0**	**112.5**			
Hilf density ratio (R_{HD})	**%**	**97.5**	**92.5**	**94.0**			

material description

Silty CLAY

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

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47 National Avenue, Pakenham VIC 3810

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report No 9694-8

date of issue 05-Jul-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	300

tested by	SKB
time	All Day
date	03-Jul-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**23**	**24**	**25**			
location Lot No		14	13	11			
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	2.00	2.05	2.05			
field dry density	t/m^3	1.72	1.83	1.76			
field moisture content	%	16.1	11.9	16.6			
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	2.05	2.16	2.12			
adjusted peak converted wet density	t/m^3	-	-	-			
moisture variation from OMC (-dry,+wet)%		1.0	-0.5	1.5			
Moisture ratio	**%**	**107.0**	**95.5**	**111.5**			
Hilf density ratio (R_{HD})	**%**	**97.5**	**95.5**	**97.0**			

material description

Silty CLAY

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

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47 National Avenue, Pakenham VIC 3810

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report No 9694-9

date of issue 07-Aug-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	300

tested by	SP
time	PM
date	03-Aug-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**26**	**27**	**28**	**29**		
location Lot No		14 Retest of 21	17 Retest of 22	16	17		
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 1	Layer 2	Layer 3	Layer 3		
measurement depth	mm	275	275	275	275		
field wet density	t/m^3	2.01	2.00	1.95	1.95		
field dry density	t/m^3	1.81	1.73	1.60	1.61		
field moisture content	%	11.0	16.1	22.1	21.1		
laboratory compaction procedure AS1289 5.7.1							
compactive effort		standard	standard	standard	standard		
oversize material retained on AS sieve	mm	19.0	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0	0		
peak converted wet density	t/m^3	2.15	2.14	2.04	2.08		
adjusted peak converted wet density	t/m^3	-	-	-	-		
moisture variation from OMC (-dry,+wet)%		0.0	2.5	1.5	2.0		
Moisture ratio	**%**	**98.0**	**119.0**	**107.0**	**111.0**		
Hilf density ratio (R_{HD})	**%**	**93.5**	**93.5**	**96.0**	**94.0**		

material description

Silty CLAY

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/ersion 6 October 2016

COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

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47 National Avenue, Pakenham VIC 3810

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report No 9694-11

date of issue 07-Aug-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	275

tested by	SP
time	PM
date	04-Aug-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**33**	**34**	**35**	**36**	**37**	
location Lot No		15	13	12	10	14 Retest of 26	
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 3	Layer 3	Layer 2	Layer 2	Layer 1	
measurement depth	mm	250	250	250	250	250	
field wet density	t/m^3	2.07	1.96	1.89	1.90	2.09	
field dry density	t/m^3	1.86	1.62	1.54	1.56	1.85	
field moisture content	%	11.4	21.0	22.4	22.1	13.1	
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	2.19	2.06	2.07	2.05	2.17	
adjusted peak converted wet density	t/m^3	-	-	-	-	-	
moisture variation from OMC (-dry,+wet)%		0.5	3.0	3.5	3.0	1.5	
Moisture ratio	**%**	**105.0**	**118.5**	**118.0**	**116.0**	**111.5**	
Hilf density ratio (R_{HD})	**%**	**94.5**	**95.5**	**91.5**	**93.0**	**96.5**	

material description

Silty CLAY

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

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47 National Avenue, Pakenham VIC 3810

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report No 9694-12

date of issue 18-Aug-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	300

tested by	SP
time	AM
date	15-Aug-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**38**	**39**	**40**	**41**	**42**	
location Lot No		17 Retest of 27	17 Retest of 29	15 Retest of 33	12 Retest of 35	10 Retest of 36	
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 2	Layer 3	Layer 3	Layer 2	Layer 2	
measurement depth	mm	275	275	275	275	275	
field wet density	t/m^3	2.01	2.01	2.02	1.99	2.00	
field dry density	t/m^3	1.68	1.68	1.75	1.66	1.70	
field moisture content	%	19.1	19.4	15.3	19.6	17.7	
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	2.10	2.11	2.09	2.08	2.10	
adjusted peak converted wet density	t/m^3	-	-	-	-	-	
moisture variation from OMC (-dry,+wet)%		3.0	2.5	0.5	0.5	1.0	
Moisture ratio	**%**	**119.5**	**114.0**	**104.0**	**102.0**	**107.0**	
Hilf density ratio (R_{HD})	**%**	**95.5**	**95.0**	**96.5**	**95.5**	**95.5**	

material description

Silty CLAY

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S Benbow

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COMPACTION ASSESSMENT
BY NUCLEAR GAUGE METHOD

report No 9694-13
date of issue 03-Oct-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

chainage	Refer to Location
Layer thickness (mm	300

tested by	TR
time:	All Day
date:	07-Sep-2017
checked by	CC

test procedures AS1289.2.1.1 & 5.8.1

test No		44	47				
location Lot No		4	4				
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 3	Layer 5				
measurement depth	mm	275	275				
field wet density	t/m^3	2.05	2.06				
field dry density	t/m^3	1.71	1.76				
field moisture content	%	20.0	17.5				
laboratory compaction procedure AS1289.5.1.1 Standard Compaction							
standard maximum dry density	t/m^3	**1.78**	**1.82**				
standard optimum moisture content	%	**15.5**	**13.0**				
test procedure AS1289.5.4.1							
oversize material retained on AS sieve	mm	19.0	19.0				
percent of oversize material	wet	1	0				
percent of oversize material	dry	1	0				
adjusted standard maximum dry density	t/m^3	1.79	1.82				
adjusted standard optimum moisture content	%	15.5	0.0				
moisture variation (-dry,+wet)	%	4.5	4.0				
moisture ratio (R_m)	**%**	130.0	130.5				
dry density ratio (R_D)	**%**	**95.5**	**96.5**				

material description

Silty CLAY

compaction test details

date mat'l sampled	07-Sep-2017
material source	Imported - imported
material stabilised	
time elapsed	

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

47 National Avenue, Pakenham VIC 3810
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report No	9694-14
date of issue	03-Oct-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	300

tested by	TR
time	All Day
date	07-Sep-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**43**	**45**	**46**	**48**		
location	Lot No	4	25	26	27		
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 1	FSL	FSL	FSL		
measurement depth	mm	275	275	275	275		
field wet density	t/m^3	1.96	2.02	1.98	2.06		
field dry density	t/m^3	1.58	1.76	1.72	1.80		
field moisture content	%	24.3	14.8	15.0	14.6		
laboratory compaction procedure AS1289 5.7.1							
compactive effort		standard	standard	standard	standard		
oversize material retained on AS sieve	mm	19.0	19.0	19.0	19.0		
percent of oversize material	wet	0	0	1	0		
peak converted wet density	t/m^3	2.07	2.17	-	2.12		
adjusted peak converted wet density	t/m^3	-	-	2.11	-		
moisture variation from OMC (-dry,+wet)%		3.5	0.5	-1.5	1.0		
Moisture ratio	**%**	**117.5**	**104.0**	**91.5**	**108.5**		
Hilf density ratio (R_{HD})	**%**	**95.0**	**93.0**	**93.5**	**97.0**		

material description

Silty CLAY

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

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report No 9694-15

date of issue 03-Oct-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	300

tested by	TR
time	All Day
date	07-Sep-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**49**	**50**	**51**	**52**		
location Lot No		28	3	29	4		
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	FSL	Layer 1	FSL	Layer 7		
measurement depth	mm	275	275	275	275		
field wet density	t/m^3	2.03	2.12	2.04	2.16		
field dry density	t/m^3	1.76	1.82	1.79	1.85		
field moisture content	%	15.5	16.5	14.0	16.7		
laboratory compaction procedure AS1289 5.7.1							
compactive effort		standard	standard	standard	standard		
oversize material retained on AS sieve	mm	19.0	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0	9		
peak converted wet density	t/m^3	2.11	2.16	2.13	-		
adjusted peak converted wet density	t/m^3	-	-	-	2.18		
moisture variation from OMC (-dry,+wet)%		0.5	1.0	2.0	3.0		
Moisture ratio	**%**	**104.5**	**107.0**	**116.0**	**123.5**		
Hilf density ratio (R_{HD})	**%**	**96.0**	**98.0**	**96.0**	**99.0**		

material description

Silty CLAY

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

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47 National Avenue, Pakenham VIC 3810

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report No 9694-16

date of issue 03-Oct-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	300

tested by	TR
time	All Day
date	11-Sep-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**53**	**54**	**55**	**56**		
location Lot No Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)		25 Retest of 45	26 Retest of 46	33	35		
depth from F.S.L.	m	FSL	FSL	FSL	FSL		
measurement depth	mm	275	275	275	275		
field wet density	t/m^3	2.12	2.17	2.00	2.04		
field dry density	t/m^3	1.84	1.93	1.63	1.66		
field moisture content	%	15.3	12.6	23.0	22.9		
laboratory compaction procedure AS1289 5.7.1							
compactive effort		standard	standard	standard	standard		
oversize material retained on AS sieve	mm	19.0	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0	0		
peak converted wet density	t/m^3	2.12	2.14	2.07	2.11		
adjusted peak converted wet density	t/m^3	-	-	-	-		
moisture variation from OMC (-dry,+wet)%		1.0	-0.5	2.5	3.5		
Moisture ratio	**%**	**106.5**	**97.5**	**112.5**	**118.5**		
Hilf density ratio (R_{HD})	**%**	**100.0**	**101.5**	**96.5**	**97.0**		

material description

Silty CLAY

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

terra firma laboratories

47 National Avenue, Pakenham VIC 3810

ph 03 5943 0980 www.terrafirmalabs.com.au

report No 9694-17

date of issue 03-Oct-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	300

tested by	TR
time	All Day
date	11-Sep-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**57**	**58**				
location	Lot No	34	36				
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer-3	Layer-2				
measurement depth	mm	275	275				
field wet density	t/m^3	2.03	2.01				
field dry density	t/m^3	1.65	1.62				
field moisture content	%	22.9	24.3				
laboratory compaction procedure AS1289 5.7.1							
compactive effort		standard	standard				
oversize material retained on AS sieve	mm	19.0	19.0				
percent of oversize material	wet	0	0				
peak converted wet density	t/m^3	2.08	2.05				
adjusted peak converted wet density	t/m^3	-	-				
moisture variation from OMC (-dry,+wet)%		3.5	3.5				
Moisture ratio	**%**	**119.0**	**116.5**				
Hilf density ratio (R_{HD})	**%**	**97.5**	**98.0**				

material description

Silty CLAY

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Approved Signature

C Caulfield

COMPACTION ASSESSMENT
BY NUCLEAR GAUGE METHOD

terra firma laboratories
47 National Avenue, Pakenham VIC 3810
ph 03 5943 0980 www.terrafirmalabs.com.au

report No 9694-18
date of issue 03-Oct-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

chainage	Refer to Locations
Layer thickness (mm	300

tested by	TR
time:	All Day
date:	12-Sep-2017
checked by	CC

test procedures AS1289.2.1.1 & 5.8.1

test No		**59**					
location Lot No		2					
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 1					
measurement depth	mm	275					
field wet density	t/m^3	2.05					
field dry density	t/m^3	1.69					
field moisture content	%	21.0					
laboratory compaction procedure AS1289.5.1.1 Standard Compaction							
standard maximum dry density	t/m^3	**1.81**					
standard optimum moisture content	%	**15.5**					
test procedure AS1289.5.4.1							
oversize material retained on AS sieve	mm	19.0					
percent of oversize material	wet	0					
percent of oversize material	dry	0					
adjusted standard maximum dry density	t/m^3	0.00					
adjusted standard optimum moisture content	%	0.0					
moisture variation (-dry,+wet)	%	6.0					
moisture ratio (R_m)	**%**	137.5					
dry density ratio (R_D)	**%**	**93.5**					

material description

Mudstone

compaction test details

date mat'l sampled	12-Sep-2017
material source	Imported - imported
material stabilised	
time elapsed	

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

47 National Avenue, Pakenham VIC 3810
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report No 9694-19
date of issue 03-Oct-2017

Client	Streetworks	Feature	Block Fill	tested by	TR
Client address	4 Len Thomas Place, Narre Warren, 3805			time	All Day
Project	Gardenia Estate - Stage 1	Layer thickness (mm)	300	date	12-Sep-2017
Location	Beaconsfield			checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**60**	**61**				
location Lot No		1	5				
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer-1	Layer-1				
measurement depth	mm	275	275				
field wet density	t/m^3	2.06	2.06				
field dry density	t/m^3	1.68	1.66				
field moisture content	%	22.4	24.1				
laboratory compaction procedure AS1289 5.7.1							
compactive effort		standard	standard				
oversize material retained on AS sieve	mm	19.0	19.0				
percent of oversize material	wet	0	0				
peak converted wet density	t/m^3	2.10	2.11				
adjusted peak converted wet density	t/m^3	-	-				
moisture variation from OMC (-dry,+wet)%		3.0	3.5				
Moisture ratio	**%**	**117.5**	**117.5**				
Hilf density ratio (R_{HD})	**%**	**98.0**	**97.5**				

material description

Mudstone

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BY NUCLEAR GAUGE METHOD

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47 National Avenue, Pakenham VIC 3810
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report No 9694-20
date of issue 03-Oct-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

chainage	Refer to Location
Layer thickness (mm	300

tested by	TR
time:	All Day
date:	13-Sep-2017
checked by	CC

test procedures AS1289.2.1.1 & 5.8.1

test No		**62**	**65**				
location	Lot No	3	6				
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 3	Layer 2				
measurement depth	mm	275	275				
field wet density	t/m^3	2.05	2.04				
field dry density	t/m^3	1.70	1.71				
field moisture content	%	20.0	19.0				
laboratory compaction procedure AS1289.5.1.1 Standard Compaction							
standard maximum dry density	t/m^3	**1.82**	**1.87**				
standard optimum moisture content	%	**16.5**	**14.0**				
test procedure AS1289.5.4.1							
oversize material retained on AS sieve	mm	19.0	19.0				
percent of oversize material	wet	0	0				
percent of oversize material	dry	0	0				
adjusted standard maximum dry density	t/m^3	0.00	1.87				
adjusted standard optimum moisture content	%	0.0	0.0				
moisture variation (-dry,+wet)	%	4.0	5.0				
moisture ratio (R_m)	**%**	123.5	134.5				
dry density ratio (R_D)	**%**	**93.5**	**91.5**				

material description

Mudstone

compaction test details

date mat'l sampled	13-Sep-2017
material source	Imported - imported
material stabilised	
time elapsed	

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

terra firma laboratories

47 National Avenue, Pakenham VIC 3810

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report No 9694-21

date of issue 03-Oct-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	300

tested by	TR
time	All Day
date	13-Sep-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**63**	**64**	**66**	**67**		
location Lot No		8	7	9	2 Retest of 59		
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer-2	Layer-1	Layer-1	Layer-1		
measurement depth	mm	275	275	275	275		
field wet density	t/m^3	2.05	2.03	2.03	2.05		
field dry density	t/m^3	1.69	1.70	1.71	1.67		
field moisture content	%	21.2	19.3	18.6	23.3		
laboratory compaction procedure AS1289 5.7.1							
compactive effort		standard	standard	standard	standard		
oversize material retained on AS sieve	mm	19.0	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0	0		
peak converted wet density	t/m^3	2.12	2.10	2.13	2.09		
adjusted peak converted wet density	t/m^3	-	-	-	-		
moisture variation from OMC (-dry,+wet)%		3.5	3.0	3.5	3.5		
Moisture ratio	**%**	**119.0**	**120.0**	**122.5**	**118.0**		
Hilf density ratio (R_{HD})	**%**	**96.5**	**97.0**	**95.0**	**98.0**		

material description

Mudstone

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BY NUCLEAR GAUGE METHOD

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report No 9694-22
date of issue 03-Oct-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

chainage	Refer to Location
Layer thickness (mm)	300

tested by	TR
time:	01:11 PM
date:	18-Sep-2017
checked by	CC

test procedures AS1289.2.1.1 & 5.8.1

test No		68	69				
location Lot No		3 Retest of 62	6 Retest of 65				
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 3	Layer 2				
measurement depth	mm	275	275				
field wet density	t/m^3	2.01	1.99				
field dry density	t/m^3	1.67	1.64				
field moisture content	%	20.5	22.0				
laboratory compaction procedure AS1289.5.1.1 Standard Compaction							
standard maximum dry density	t/m^3	**1.80**	**1.75**				
standard optimum moisture content	%	**15.5**	**16.0**				
test procedure AS1289.5.4.1							
oversize material retained on AS sieve	mm	19.0	19.0				
percent of oversize material	wet	0	0				
percent of oversize material	dry	0	0				
adjusted standard maximum dry density	t/m^3	0.00	0.00				
adjusted standard optimum moisture content	%	0.0	0.0				
moisture variation (-dry,+wet)	%	5.0	6.0				
moisture ratio (R_m)	**%**	132.0	136.5				
dry density ratio (R_D)	**%**	**92.5**	**93.5**				

material description

Mudstone

compaction test details

date mat'l sampled	18-Sep-2017
material source	Imported - imported
material stabilised	
time elapsed	

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report No 9694-23

date of issue 03-Oct-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	300

tested by	TR
time	All Day
date	19-Sep-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**70**	**71**				
location Lot No		30	31				
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer-1	Layer-1				
measurement depth	mm	275	275				
field wet density	t/m^3	2.01	2.04				
field dry density	t/m^3	1.61	1.64				
field moisture content	%	25.0	24.2				
laboratory compaction procedure AS1289 5.7.1							
compactive effort		standard	standard				
oversize material retained on AS sieve	mm	19.0	19.0				
percent of oversize material	wet	0	0				
peak converted wet density	t/m^3	2.08	2.08				
adjusted peak converted wet density	t/m^3	-	-				
moisture variation from OMC (-dry,+wet)%		3.5	3.5				
Moisture ratio	**%**	**116.5**	**117.5**				
Hilf density ratio (R_{HD})	**%**	**97.0**	**98.0**				

material description

Mudstone

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/ersion 6 October 2016

COMPACTION ASSESSMENT
BY NUCLEAR GAUGE METHOD

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report No 9694-24
date of issue 03-Oct-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

chainage	Refer to Location
Layer thickness (mm	300

tested by	TR
time:	All Day
date:	19-Sep-2017
checked by	CC

test procedures AS1289.2.1.1 & 5.8.1

test No		**73**					
location Lot No		31 Retest of 68					
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer 1					
measurement depth	mm	275					
field wet density	t/m^3	2.05					
field dry density	t/m^3	1.68					
field moisture content	%	22.0					
laboratory compaction procedure AS1289.5.1.1 Standard Compaction							
standard maximum dry density	t/m^3	**1.74**					
standard optimum moisture content	%	**19.0**					
test procedure AS1289.5.4.1							
oversize material retained on AS sieve	mm	19.0					
percent of oversize material	wet	0					
percent of oversize material	dry	0					
adjusted standard maximum dry density	t/m^3	0.00					
adjusted standard optimum moisture content	%	0.0					
moisture variation (-dry,+wet)	%	3.0					
moisture ratio (R_m)	**%**	116.5					
dry density ratio (R_D)	**%**	**96.5**					

material description

Mudstone

compaction test details

date mat'l sampled	19-Sep-2017
material source	Imported - imported
material stabilised	
time elapsed	

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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

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47 National Avenue, Pakenham VIC 3810

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report No 9694-25

date of issue 03-Oct-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Gardenia Estate - Stage 1
Location	Beaconsfield

Feature	Block Fill
Layer thickness (mm)	300

tested by	TR
time	All Day
date	19-Sep-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		**72**	**74**				
location Lot No		32	6 Retest of 69				
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	Layer-1	Layer-2				
measurement depth	mm	275	275				
field wet density	t/m^3	2.04	2.05				
field dry density	t/m^3	1.63	1.69				
field moisture content	%	25.0	20.9				
laboratory compaction procedure AS1289 5.7.1							
compactive effort		standard	standard				
oversize material retained on AS sieve	mm	19.0	19.0				
percent of oversize material	wet	0	0				
peak converted wet density	t/m^3	2.07	2.10				
adjusted peak converted wet density	t/m^3	-	-				
moisture variation from OMC (-dry,+wet)%		3.5	3.0				
Moisture ratio	**%**	**117.0**	**118.5**				
Hilf density ratio (R_{HD})	**%**	**98.5**	**97.5**				

material description

Mudstone

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