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**Geotechnical Report
Level One Inspection and Testing**

**Acacia Ridge Stage 6
Cranbourne**

Prepared for:

**Streetworks Pty Ltd
4 Len Thomas Place
Narre Warren 3805**

Project 9608

24 August 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

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Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6

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 Acacia Stage 6. This work was conducted over the period of 16/05/2017 to 22/08/2017.

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 601 to 609 and 624 to 640. 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 Smec Urban Development 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.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

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.

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:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

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

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 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.

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 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



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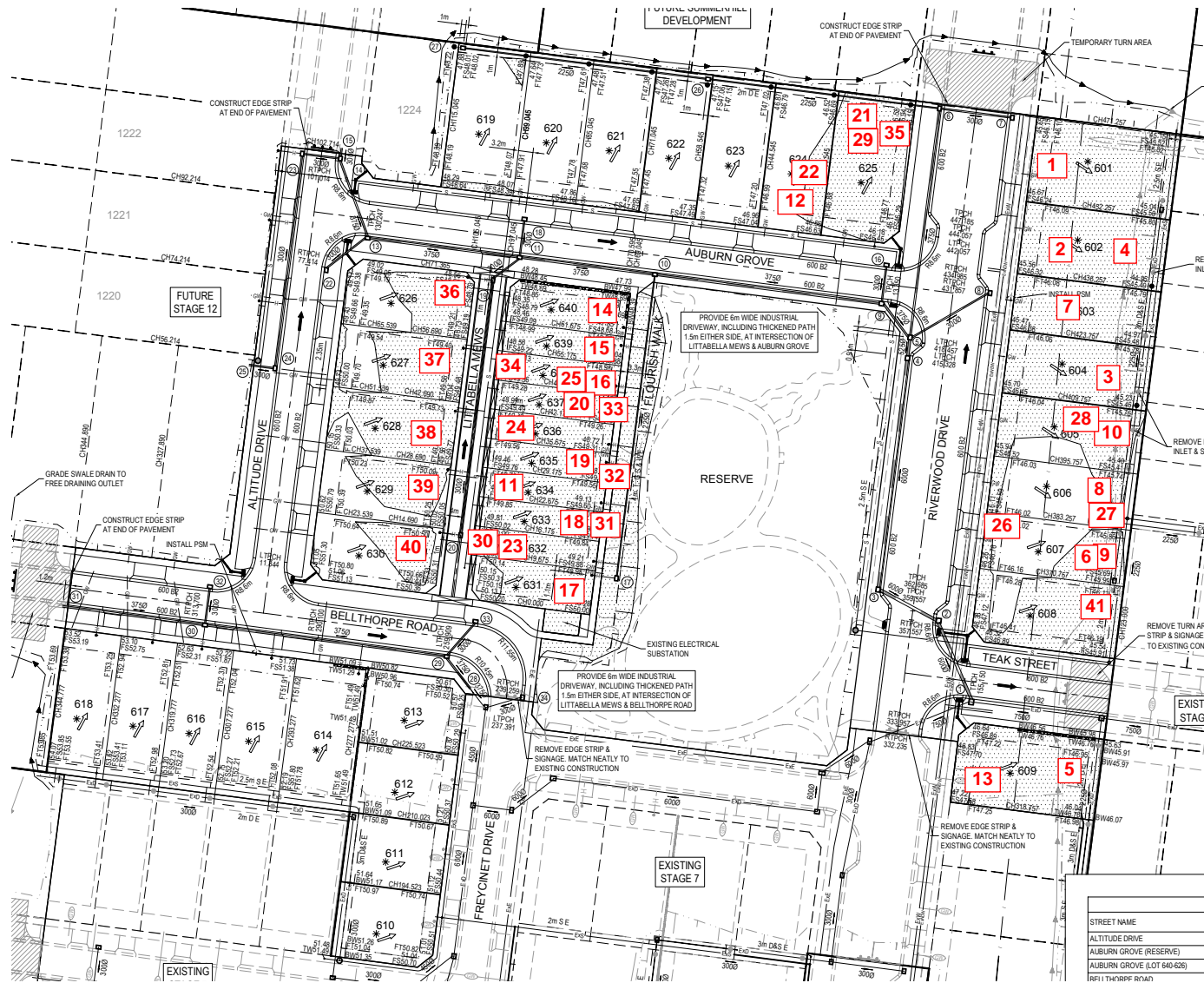
ABN: 11 925 206 385

APPENDICES

Appendix 1: Site Plans

Appendix 2: Test Summary

Appendix 3: Test Reports



STREET NAME
ALTITUDE DRIVE
AUBURN GROVE (RESERVE)
AUBURN GROVE (LOT 640-628)
BELLTHORPE ROAD



47 National Avenue
Pakenham VIC 3810

Test Location Plan

Client : Streetworks Pty Ltd

Project : Acacia Ridge Stage 6

Scale
NTS



Level One Test Summary

Client: Streetworks **Specification:** 95%
Project: Acacia Ridge Stage 6 **Project No:** 9608

Date:	Test Number:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
16/05/2017	1	L1		96.5	PASS	601	9608-1
16/05/2017	2	L1		93.9	FAIL	602	9608-1
16/05/2017	3	L1		96	PASS	604	9608-2
17/05/2017	4	L1	2	98.5	PASS	602	9608-3
17/05/2017	5	L1		92.5	FAIL	609	9608-4
17/05/2017	6	L1		92.5	FAIL	607	9608-4
17/05/2017	7	L1		97.5	PASS	603	9608-3
19/05/2017	8	L1		93.5	FAIL	606	9608-5
19/05/2017	9	L1	6	93	FAIL	607	9608-5
19/05/2017	10	L1		93.5	FAIL	605	9608-5
22/05/2017	11	L1		97.5	PASS	634	9608-7
22/05/2017	12	L1		94	FAIL	624	6908-6
22/05/2017	13	L1	5	96	PASS	609	6908-6
22/05/2017	14	L1		99.5	PASS	640	9608-8
22/05/2017	15	L1		100.5	PASS	639	9608-8
22/05/2017	16	L1		93	FAIL	638	9608-9
23/05/2017	17	L1		95	PASS	631	9608-10
23/05/2017	18	L1		90.5	FAIL	633	9608-10
23/05/2017	19	L1		93	FAIL	635	9608-10
23/05/2017	20	L1		93.5	FAIL	637	9608-10
23/05/2017	21	L1		92	FAIL	625	9608-11
23/05/2017	22	L1	12	96.5	PASS	624	9608-11
24/05/2017	23	L2		93.5	FAIL	632	9608-12
24/05/2017	24	L3		95	PASS	636	9608-12
24/05/2017	25	L2	16	94	FAIL	638	9608-12
25/07/2017	26	L1	9	103	PASS	607	9608-14
25/07/2017	27	L1	8	102	PASS	606	9608-14
25/07/2017	28	L1	10	97.5	PASS	605	9608-14
25/07/2017	29	L1	21	91	FAIL	625	9608-14
25/07/2017	30	L1	23	96.5	PASS	632	9608-14
25/07/2017	31	L1	18	96	PASS	633	9608-14
25/07/2017	32	L1	19	101.5	PASS	635	9608-15
25/07/2017	33	L1	20	95	PASS	637	9608-15
25/07/2017	34	L2	25	95	PASS	638	9608-15
26/07/2017	35	L1	29	95	PASS	625	9608-13
22/08/2017	36	L1		97.5	PASS	626	9608-16
22/08/2017	37	L1		95	PASS	627	9608-16
22/08/2017	38	L1		96.5	PASS	628	9608-16
22/08/2017	39	L1		96.5	PASS	629	9608-16
22/08/2017	40	L1		95.5	PASS	630	9608-16
22/08/2017	41	L1		96.5	PASS	608	9608-16



COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

47 National Avenue, Pakenham VIC 3810
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report No 9608-1
 date of issue 26-May-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

Feature	Block Fill
Layer thickness (mm)	300

tested by	AA
time	PM
date	16-May-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1							
Test No		1	2				
location	Lot No	601	602				
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	1.99				
field dry density	t/m ³	1.73	1.67				
field moisture content	%	18.7	19.0				
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	2.13	2.12				
adjusted peak converted wet density	t/m ³	-	-				
moisture variation from OMC (-dry,+wet)%		3.0	1.0				
Moisture ratio	%	120.0	105.5				
Hilf density ratio (R_{HD})	%	96.5	94.0				
material description							
Silty CLAY							



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



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COMPACTION ASSESSMENT
 BY NUCLEAR GAUGE METHOD

report No 9608-2
 date of issue 26-May-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

chainage	Refer to Location
Layer thickness (mm)	300

tested by	AA
time:	PM
date:	16-May-2017
checked by	CC

test procedures AS1289.2.1.1 & 5.8.1

test No		3				
location	Lot No	604				
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	1.97				
field dry density	t/m ³	1.61				
field moisture content	%	22.0				
laboratory compaction procedure AS1289.5.1.1 Standard Compaction						
standard maximum dry density	t/m ³	1.68				
standard optimum moisture content	%	17.5				

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)	%	4.5				
moisture ratio (R_m)	%	125.0				
dry density ratio (R_D)	%	96.0				

material description

Silty CLAY

compaction test details

date mat'l sampled 16-May-2017
 material source on site - On site
 material stabilised
 time elapsed



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report No 9608-3
 date of issue 26-May-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

Feature	Block Fill
Layer thickness (mm)	300

tested by	AA
time	All Day
date	17-May-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		4	7			
location	Lot No	602	603			
		Retest of 2				
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	2.05	2.02			
field dry density	t/m ³	1.73	1.72			
field moisture content	%	19.0	17.7			

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	2.07			
adjusted peak converted wet density	t/m ³	-	-			

moisture variation from OMC (-dry,+wet)%		1.0	3.0			
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Moisture ratio	%	106.0	122.0			
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Hilf density ratio (R_{HD})	%	98.5	97.5			
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material description

Silty CLAY



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COMPACTION ASSESSMENT
 BY NUCLEAR GAUGE METHOD

report No 9608-4
 date of issue 26-May-2017

Client Streetworks
 Client address 4 Len Thomas Place, Narre Warren, 3805
 Project Acacia Ridge Stage 6
 Location Cranbourne

chainage Refer to Location
 Layer thickness (mm) 300

tested by AA
 time: All Day
 date: 17-May-2017
 checked by CC

test procedures AS1289.2.1.1 & 5.8.1

test No		5	6			
location	Lot No	609	607			
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	1.91	1.85			
field dry density	t/m ³	1.54	1.47			
field moisture content	%	24.0	26.5			
laboratory compaction procedure AS1289.5.1.1 Standard Compaction						
standard maximum dry density	t/m ³	1.67	1.59			
standard optimum moisture content	%	19.5	20.0			

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)	%	4.5	6.0			
moisture ratio (R_m)	%	123.0	130.5			
dry density ratio (R_D)	%	92.5	92.5			

material description

Silty CLAY

compaction test details

date mat'l sampled 17-May-2017
 material source on site - On site
 material stabilised
 time elapsed



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COMPACTION ASSESSMENT
 BY NUCLEAR GAUGE METHOD

report No 9608-5
 date of issue 26-May-2017

Client Streetworks
 Client address 4 Len Thomas Place, Narre Warren, 3805
 Project Acacia Ridge Stage 6
 Location Cranbourne

chainage Refer to Location
 Layer thickness (mm) 200

tested by AA
 time: All Day
 date: 19-May-2017
 checked by CC

test procedures AS1289.2.1.1 & 5.8.1

test No		8	9	10		
location	Lot No	606	607	605		
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	1.98	1.84	1.97		
field dry density	t/m ³	1.57	1.42	1.57		
field moisture content	%	25.5	29.5	25.0		
laboratory compaction procedure AS1289.5.1.1 Standard Compaction						
standard maximum dry density	t/m ³	1.68	1.53	1.68		
standard optimum moisture content	%	19.5	22.5	19.5		

test procedure AS1289.5.4.1

oversize material retained on AS sieve	mm	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0		
percent of oversize material	dry	0	0	0		
adjusted standard maximum dry density	t/m ³	0.00	0.00	0.00		
adjusted standard optimum moisture content	%	0.0	0.0	0.0		
moisture variation (-dry,+wet)	%	6.0	7.0	5.5		
moisture ratio (R_m)	%	129.5	130.5	129.5		
dry density ratio (R_D)	%	93.5	93.0	93.5		

material description

Sandy CLAY

compaction test details

date mat'l sampled 19-May-2017
 material source onsite - On site
 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 9608-6
 date of issue 26-May-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

Feature	Block Fill
Layer thickness (mm)	300

tested by	AA
time	AM
date	22-May-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1						
Test No		12	13			
location	Lot No	624	609			
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)			Retest of 5			
depth from F.S.L.	m	Layer 1	Layer 1			
measurement depth	mm	275	275			
field wet density	t/m ³	1.89	1.95			
field dry density	t/m ³	1.49	1.58			
field moisture content	%	26.4	24.0			
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	2.01	2.03			
adjusted peak converted wet density	t/m ³	-	-			
moisture variation from OMC (-dry,+wet)%		3.5	3.5			
Moisture ratio	%	115.5	116.0			
Hilf density ratio (R_{HD})	%	94.0	96.5			
material description						
Sandy CLAY						



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COMPACTION ASSESSMENT
 BY NUCLEAR GAUGE METHOD

report No 9608-7
 date of issue 26-May-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

chainage	Refer to Location
Layer thickness (mm)	300

tested by	AA
time:	AM
date:	22-May-2017
checked by	CC

test procedures AS1289.2.1.1 & 5.8.1

test No	11				
location	Lot No	634			
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)					
depth from F.S.L.	m	0			
measurement depth	mm	275			
field wet density	t/m ³	1.88			
field dry density	t/m ³	1.43			
field moisture content	%	31.5			

laboratory compaction procedure AS1289.5.1.1 Standard Compaction

standard maximum dry density	t/m ³	1.46			
standard optimum moisture content	%	27.5			

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)	%	4.5			

moisture ratio (R_m)	%	115.5			
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dry density ratio (R_D)	%	98.0			
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material description

Sandy CLAY

compaction test details

date mat'l sampled	22-May-2017
material source	onsite - On site
material stabilised	
time elapsed	



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47 National Avenue, Pakenham VIC 3810
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report No 9608-8
 date of issue 26-May-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

Feature	Block Fill
Layer thickness (mm)	300

tested by	RW
time	All Day
date	22-May-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1							
Test No		14	15				
location	Lot No	640	639				
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	2.07	2.07				
field dry density	t/m ³	1.71	1.72				
field moisture content	%	21.1	20.6				
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	2.06				
adjusted peak converted wet density	t/m ³	-	-				
moisture variation from OMC (-dry,+wet)%		1.5	1.5				
Moisture ratio	%	108.5	108.5				
Hilf density ratio (R_{HD})	%	99.5	100.5				
material description							
Silty CLAY							



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COMPACTION ASSESSMENT
 BY NUCLEAR GAUGE METHOD

report No 9608-9
 date of issue 26-May-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

chainage	Refer to Location
Layer thickness (mm)	300

tested by	RW
time:	All Day
date:	22-May-2017
checked by	CC

test procedures AS1289.2.1.1 & 5.8.1

test No		16				
location	Lot No	638				
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	2.00				
field dry density	t/m ³	1.68				
field moisture content	%	19.0				
laboratory compaction procedure AS1289.5.1.1 Standard Compaction						
standard maximum dry density	t/m ³	1.81				
standard optimum moisture content	%	15.0				

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)	%	4.0				
moisture ratio (R_m)	%	125.5				
dry density ratio (R_D)	%	93.0				

material description

Silty CLAY

compaction test details

date mat'l sampled	22-May-2017
material source	on site - On site
material stabilised	
time elapsed	



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Approved Signature
 C Caulfield



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COMPACTION ASSESSMENT
 BY NUCLEAR GAUGE METHOD

report No 9608-10
 date of issue 31-May-2017

Client Streetworks
 Client address 4 Len Thomas Place, Narre Warren, 3805
 Project Acacia Ridge Stage 6
 Location Cranbourne

chainage Refer to Location
 Layer thickness (mm) 300

tested by AA
 time: All Day
 date: 23-May-2017
 checked by CC

test procedures AS1289.2.1.1 & 5.8.1

test No		17	18	19	20		
location	Lot No	631	633	635	637		
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 1		
measurement depth	mm	275	275	275	275		
field wet density	t/m ³	1.91	1.94	1.92	1.93		
field dry density	t/m ³	1.52	1.56	1.55	1.55		
field moisture content	%	25.5	24.5	23.5	24.5		
laboratory compaction procedure AS1289.5.1.1 Standard Compaction							
standard maximum dry density	t/m ³	1.60	1.73	1.67	1.66		
standard optimum moisture content	%	22.0	17.0	19.5	18.0		

test procedure AS1289.5.4.1

oversize material retained on AS sieve	mm	19.0	19.0	19.0	19.0		
percent of oversize material	wet	0	0	0	0		
percent of oversize material	dry	0	0	0	0		
adjusted standard maximum dry density	t/m ³	0.00	1.73	0.00	0.00		
adjusted standard optimum moisture content %		0.0	0.0	0.0	0.0		
moisture variation (-dry,+wet)	%	3.5	7.0	4.5	6.5		
moisture ratio (R_m)	%	116.0	141.5	123.0	135.0		
dry density ratio (R_D)	%	95.0	90.5	93.0	93.5		

material description

Sandy CLAY

compaction test details

date mat'l sampled 23-May-2017
 material source onsite - On site
 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 9608-11
 date of issue 31-May-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

Feature	Block Fill
Layer thickness (mm)	300

tested by	AA
time	All Day
date	23-May-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		21	22			
location	Lot No	625	624			
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	1.94	1.92			
field dry density	t/m ³	1.60	1.56			
field moisture content	%	20.9	23.6			

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	2.11	1.99			
adjusted peak converted wet density	t/m ³	-	-			

moisture variation from OMC (-dry,+wet)%		1.5	1.5			
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Moisture ratio	%	108.0	107.5			
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Hilf density ratio (R_{HD})	%	92.0	96.5			
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material description

Sandy CLAY



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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

47 National Avenue, Pakenham VIC 3810
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report No 9608-12
 date of issue 01-Jun-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

Feature	Block Fill
Layer thickness (mm)	200

tested by	TR
time	All Day
date	24-May-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		23	24	25		
location	Lot No	632	636	638		
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)						
depth from F.S.L.	m	Layer-2	Layer-3	Layer-2		
measurement depth	mm	175	175	175		
field wet density	t/m ³	2.03	2.04	2.05		
field dry density	t/m ³	1.72	1.72	1.71		
field moisture content	%	18.0	19.0	19.8		

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	2.17	2.15	2.17		
adjusted peak converted wet density	t/m ³	-	-	-		

moisture variation from OMC (-dry,+wet)%		1.5	3.0	1.5		
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Moisture ratio	%	110.0	120.5	110.0		
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Hilf density ratio (R_{HD})	%	93.5	95.0	94.0		
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material description

Sandy CLAY



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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

47 National Avenue, Pakenham VIC 3810
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report No 9608-13
 date of issue 28-Jul-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

Feature	Block Fill
Layer thickness (mm)	300

tested by	SP
time	03:00 PM
date	26-Jul-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1							
Test No		35					
location	Lot No	625					
		Retest of 29					
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	1.96					
field dry density	t/m ³	1.63					
field moisture content	%	20.0					
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	2.06					
adjusted peak converted wet density	t/m ³	-					
moisture variation from OMC (-dry,+wet)%		1.5					
Moisture ratio	%	109.0					
Hilf density ratio (R_{HD})	%	95.0					
material description							
Silty CLAY							



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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

47 National Avenue, Pakenham VIC 3810
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report No 9608-14
 date of issue 28-Jul-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

Feature	Block Fill
Layer thickness (mm)	300

tested by	SP
time	PM
date	25-Jul-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		26	27	28	29	30	31
location	Lot No	607	606	605	625	632	633
		Retest of 9	Retest of 8	Retest of 10	Retest of 21	Retest of 23	Retest of 18
Sampling procedures AS1289.1.1,1.2.1-Clause 6.4(b)							
depth from F.S.L.	m	L1	L1	L1	L1	L1	L1
measurement depth	mm	275	275	275	275	275	275
field wet density	t/m ³	2.03	2.05	1.95	1.89	1.98	1.95
field dry density	t/m ³	1.69	1.73	1.59	1.55	0.67	1.57
field moisture content	%	20.2	17.9	22.3	21.8	193.3	23.8

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	1.97	2.00	2.00	2.07	2.05	2.03
adjusted peak converted wet density	t/m ³	-	-	-	-	-	-

moisture variation from OMC (-dry,+wet)%		-1.0	-0.5	2.5	3.0	2.5	3.0
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Moisture ratio	%	95.5	96.0	113.0	117.0	103.5	115.0
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Hilf density ratio (R_{HD})	%	103.0	102.5	97.5	91.0	96.5	96.0
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material description

Silty CLAY



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report No 9608-15
 date of issue 28-Jul-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

Feature	Block Fill
Layer thickness (mm)	300

tested by	SP
time	PM
date	25-Jul-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		32	33	34		
location	Lot No	635	637	638		
		Retest of 19	Retest of 20	Retest of 25		
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	2.05	1.97	1.96		
field dry density	t/m ³	1.68	1.62	1.63		
field moisture content	%	21.6	21.7	20.3		

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	2.02	2.08	2.07		
adjusted peak converted wet density	t/m ³	-	-	-		

moisture variation from OMC (-dry,+wet)%		0.0	3.0	3.0		
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Moisture ratio	%	99.0	118.0	117.5		
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Hilf density ratio (R_{HD})	%	101.5	95.0	95.0		
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material description

Silty CLAY



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COMPACTION ASSESSMENT

BY NUCLEAR GAUGE METHOD

47 National Avenue, Pakenham VIC 3810
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report No 9608-16
 date of issue 24-Aug-2017

Client	Streetworks
Client address	4 Len Thomas Place, Narre Warren, 3805
Project	Acacia Ridge Stage 6
Location	Cranbourne

Feature	Block Fill
Layer thickness (mm)	300

tested by	SP
time	AM
date	22-Aug-2017
checked by	CC

Field density test procedure AS1289.2.1.1 and 5.8.1

Test No		36	37	38	39	40	41
location	Lot No	626	627	628	629	630	608
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 1	Layer 1	Layer 1
measurement depth	mm	275	275	275	275	275	275
field wet density	t/m ³	1.93	1.99	1.94	2.05	2.01	1.92
field dry density	t/m ³	1.63	1.74	1.62	1.72	1.73	1.56
field moisture content	%	18.5	14.7	20.2	19.5	16.3	23.3

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	1.98	2.10	2.01	2.12	2.10	1.99
adjusted peak converted wet density	t/m ³	-	-	-	-	-	-

moisture variation from OMC (-dry,+wet)%		0.5	1.0	1.0	1.5	1.0	1.5
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Moisture ratio	%	102.5	106.5	105.0	108.0	105.5	108.0
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Hilf density ratio (R_{HD})	%	97.5	95.0	96.5	96.5	95.5	96.5
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material description

Silty CLAY



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