

45 Craig Road Stage 2

GITA Inspection Verification Report

Prepared For:	Street Works Pty Ltd
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Report Number	P20418A V1
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Version Release Date	12 Apr 2021
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Report Released By	C Caulfield
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Title	Project Manager
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Signature



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1 Introduction

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical Inspection and Testing Authority (GITA) to provide Level 1 supervision and testing works on the earthworks component for 45 Craig Road Stage 2. This work was conducted over the period of 30/11/2020 to 18/02/2021.

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 201 through to 216. The site will be a Residential development.

The area on which fill was placed is shown on site plan (Appendix 1: *Test Location Plan*) based on drawings prepared by Charlton Degg (Drawing Reference: 1432_2/R04) and provided by Street Works Pty Ltd.

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

2.2 Specification

The technical specification (Reference from Drawings) for compaction control requirements was provided by Street Works Pty Ltd 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. The scope and the period of Terra Firma Laboratories as described in the introduction are subject to restrictions and limitations. Terra Firma Laboratories did not perform a complete assessment of all possible conditions and circumstances that may exist at the site. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Terra Firma Laboratories.

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

Any drawings or marked locations presented in this report should be considered only as pictorial evidence of our work. Therefore, unless otherwise stated, any dimensions should not be used for accurate calculations or dimensioning.

Where data has been supplied by the client or a third party, it is assumed that the information is correct unless otherwise stated. No responsibility is accepted by Terra Firma Laboratories for incomplete or inaccurate data supplied by others.

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3 Construction Method

3.1 Subgrade Preparation

At the time of subgrade inspection the following was observed:

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

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 material 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 material 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

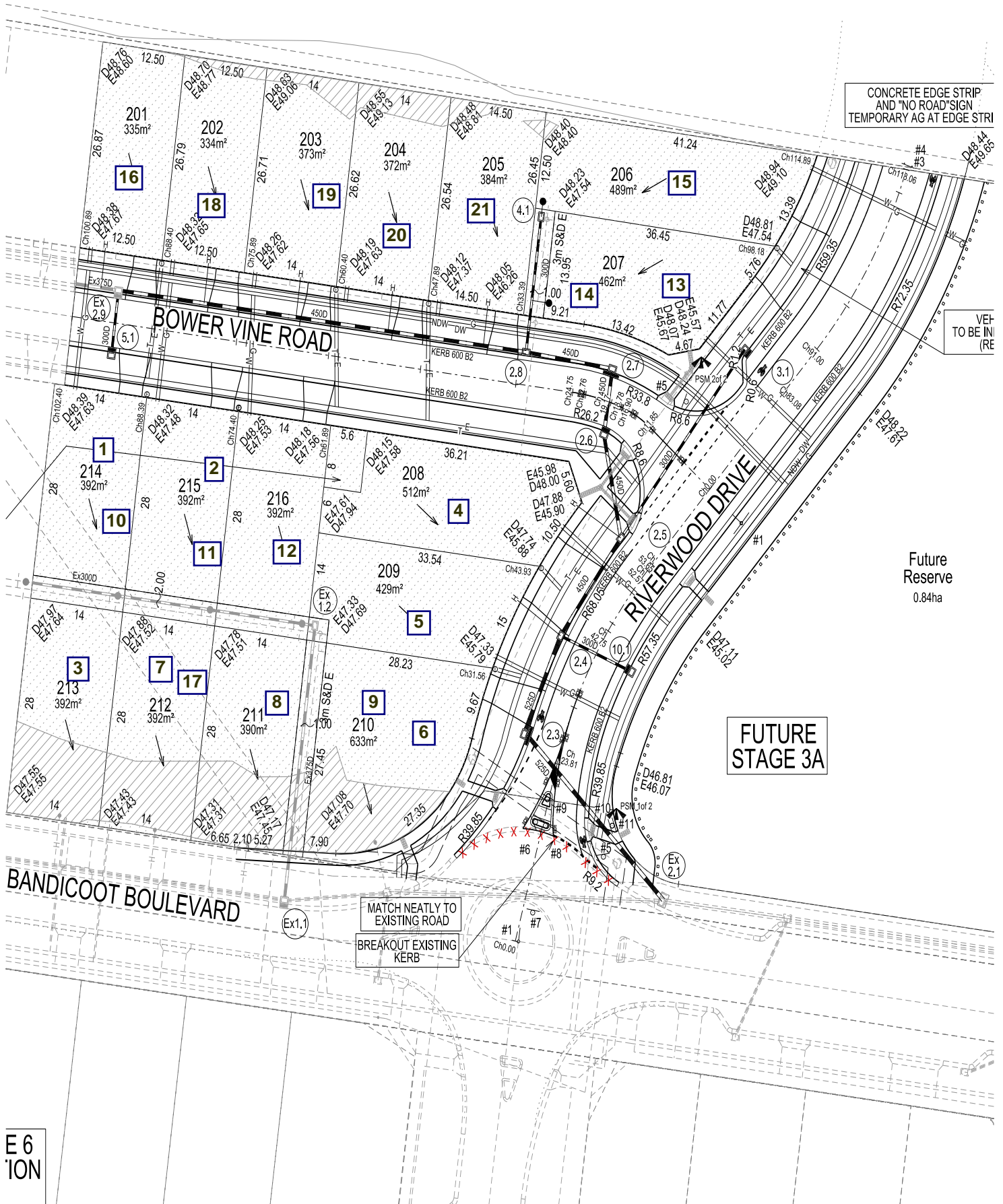
plan (P20418D1, Appendix 1) providing a schematic of test locations across the extent of scope of works for every placed layer of fill is also documented.

A total of 21 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 2 at 45 Craig Road. For completed fill areas of greater than 300mm, and for works completed between 30/11/2020 and 18/02/2021, 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 2 of 45 Craig Road was observed to be constructed in compliance with the requirements of the Technical Specification.

Appendix 1: Test Location Plan



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Our Head Office
47 National Ave
Pakenham, VIC 3860

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

Test Location Plan

not to scale

Client: Streetworks Pty Ltd

Project: 45 Craig Road, Stage 2

Reference: P20418 D1

TERRA FIRMA LABORATORIES
TEST LOCATION PLAN 02/24

Appendix 2: Compaction Test Register and Test Certificates



Compaction Test Register

Client: Street Works Pty Ltd
Project: 45 Craig Road Stage 2

Project No: P20418
Specification: 95%

Date:	Test No:	Layer:	Retest of:	Density:	Pass/Fail:	Lot No:	Report No:
30/11/2020	1	Layer 1		101.0%	Pass	Lot 214	P20418-1
30/11/2020	2	Layer 1		100.5%	Pass	Lot 215	P20418-1
9/12/2020	3	Layer 1		99.5%	Pass	Lot 213	P20418-2
13/01/2021	4	Layer 2		100.5%	Pass	Lot 208	P20418-3
13/01/2021	5	Layer 1		101.5%	Pass	Lot 209	P20418-3
13/01/2021	6	Layer 1		99.5%	Pass	Lot 210	P20418-3
14/01/2021	7	Layer 3		94.5%	Fail	Lot 212	P20418-4
14/01/2021	8	Layer 3		98.0%	Pass	Lot 211	P20418-4
14/01/2021	9	Layer 3		96.0%	Pass	Lot 210	P20418-4
15/01/2021	10	Layer 2		96.0%	Pass	Lot 214	P20418-5
15/01/2021	11	Layer 2		98.5%	Pass	Lot 215	P20418-5
15/01/2021	12	Layer 3		99.5%	Pass	Lot 216	P20418-5
11/02/2021	13	Layer 1		97.0%	Pass	Lot 207	P20418-7
11/02/2021	14	Layer 2		100.5%	Pass	Lot 207	P20418-7
11/02/2021	15	Layer 1		98.0%	Pass	Lot 206	P20418-7
12/02/2021	16	Layer 1		101.5%	Pass	Lot 201	P20418-6
12/02/2021	17	Layer 3	Test #7	98.5%	Pass	Lot 212	P20418-6
12/02/2021	18	Layer 2		97.5%	Pass	Lot 202	P20418-6
18/02/2021	19	Layer 1		100.5%	Pass	Lot 203	P20418-8
18/02/2021	20	Layer 3		100.0%	Pass	Lot 204	P20418-8
18/02/2021	21	Layer 2		102.0%	Pass	Lot 205	P20418-8

Material Test Report

Report Number: P20418-1
Issue Number: 1
Date Issued: 03/12/2020
Client: Street Works Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: P20418
Project Name: 45 Craig Road Stage 2
Project Location: Cranbourne
Work Request: 4954
Date Sampled: 30/11/2020 12:00
Dates Tested: 01/12/2020 - 02/12/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: Sand
Material Source: Onsite



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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Chris Caulfield
 Project Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	P20-4954A	P20-4954B	
Test Number	1	2	
Date Tested	30/11/2020	30/11/2020	
Time Tested	12:00	12:00	
Test Request #/Location	Lot 214	Lot 215	
Layer / Reduced Level	Layer 1	Layer 1	
Thickness of Layer (mm)	300	300	
Soil Description	Sand	Sand	
Test Depth (mm)	275	275	
Sieve used to determine oversize (mm)	19.0	19.0	
Percentage of Wet Oversize (%)	0	0	
Percentage of Dry Oversize (%) (AS1289.5.4.1)	**	**	
Field Wet Density (FWD) t/m ³	1.93	1.93	
Field Moisture Content %	6.6	5.9	
Field Dry Density (FDD) t/m ³	1.81	1.82	
Peak Converted Wet Density t/m ³	1.92	1.92	
Adjusted Peak Converted Wet Density t/m ³	**	**	
Adj. Optimum Moisture Content % (AS1289.5.4.1)	**	**	
Adj. Field Moisture Content % (AS1289.5.4.1)	6.6	5.9	
Moisture Ratio % (AS1289.5.4.1)	74.0	71.0	
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	
Moisture Variation (Wv) %	2.5	2.5	
Adjusted Moisture Variation %	**	**	
Hilf Density Ratio (%)	101.0	100.5	
Compaction Method	Standard	Standard	
Report Remarks	**	**	

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Material Test Report

Report Number: P20418-2
Issue Number: 1
Date Issued: 14/12/2020
Client: Street Works Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: P20418
Project Name: 45 Craig Road Stage 2
Project Location: Cranbourne
Client Reference: 45 Craig Road Stage 2
Work Request: 5017
Date Sampled: 09/12/2020 16:00
Dates Tested: 09/12/2020 - 10/12/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite - Stockpile



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 Lab Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1

Sample Number	P20-5017A		
Test Number	3		
Date Tested	09/12/2020		
Time Tested	16:00		
Test Request #/Location	Lot 213		
Layer / Reduced Level	Layer1		
Thickness of Layer (mm)	300		
Soil Description	SAND		
Test Depth (mm)	275		
Sieve used to determine oversize (mm)	19.0		
Percentage of Wet Oversize (%)	0		
Percentage of Dry Oversize (%) (AS1289.5.4.1)	**		
Field Wet Density (FWD) t/m ³	2.04		
Field Moisture Content %	14.9		
Field Dry Density (FDD) t/m ³	1.78		
Peak Converted Wet Density t/m ³	2.05		
Adjusted Peak Converted Wet Density t/m ³	**		
Adj. Optimum Moisture Content % (AS1289.5.4.1)	14.6		
Adj. Field Moisture Content % (AS1289.5.4.1)	14.9		
Moisture Ratio % (AS1289.5.4.1)	102.0		
Adjusted Moisture Ratio % (AS1289.5.4.1)	**		
Moisture Variation (Wv) %	-0.5		
Adjusted Moisture Variation %	**		
Hilf Density Ratio (%)	99.5		
Compaction Method	Standard		
Report Remarks	**		

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Material Test Report

Report Number: P20418-3
Issue Number: 1
Date Issued: 15/01/2021
Client: Street Works Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: P20418
Project Name: 45 Craig Road Stage 2
Project Location: Cranbourne
Client Reference: 7151
Work Request: 5147
Date Sampled: 13/01/2021
Dates Tested: 13/01/2021 - 14/01/2021
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Site Selection: AS 1289.1.4.1
Material: SAND
Material Source: Imported



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 Lab Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	P21-5147A	P21-5147B	P21-5147C
Test Number	4	5	6
Date Tested	13/01/2021	13/01/2021	13/01/2021
Time Tested	14:33	14:40	14:45
Test Request #/Location	Lot 208	Lot 209	Lot 210
Layer / Reduced Level	Layer 2	Layer 1	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	SAND	SAND	SAND
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	**	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	**	**	**
Field Wet Density (FWD) t/m ³	2.06	2.14	2.03
Field Moisture Content %	10.5	11.2	10.4
Field Dry Density (FDD) t/m ³	1.87	1.93	1.84
Peak Converted Wet Density t/m ³	2.05	2.11	2.03
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	**	**	**
Adj. Field Moisture Content % (AS1289.5.4.1)	**	11.2	10.4
Moisture Ratio % (AS1289.5.4.1)	101.0	108.5	86.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	0.0	-1.0	1.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	100.5	101.5	99.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Material Test Report

Report Number: P20418-4
Issue Number: 1
Date Issued: 03/02/2021
Client: Street Works Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: P20418
Project Name: 45 Craig Road Stage 2
Project Location: Cranbourne
Client Reference: 07201
Work Request: 5163
Date Sampled: 14/01/2021
Dates Tested: 14/01/2021 - 18/01/2021
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite - Stockpile



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 Project Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	P21-5163A	P21-5163B	P21-5163C
Test Number	7	8	9
Date Tested	14/01/2021	14/01/2021	14/01/2021
Time Tested	15:00	15:00	15:00
Test Request #/Location	7 Lot 212	8 Lot 211	9 Lot 210
Layer / Reduced Level	3	3	3
Thickness of Layer (mm)	300	300	300
Soil Description	SAND	SAND	SAND
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	**	**	**
Field Wet Density (FWD) t/m ³	1.82	1.84	2.00
Field Moisture Content %	7.0	5.4	12.6
Field Dry Density (FDD) t/m ³	1.71	1.75	1.78
Peak Converted Wet Density t/m ³	1.93	1.88	2.09
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	**	**	14.0
Adj. Field Moisture Content % (AS1289.5.4.1)	7.0	5.4	12.6
Moisture Ratio % (AS1289.5.4.1)	61.5	65.0	90.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	4.5	3.0	1.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	94.5	98.0	96.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Material Test Report

Report Number: P20418-5
Issue Number: 1
Date Issued: 03/02/2021
Client: Street Works Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: P20418
Project Name: 45 Craig Road Stage 2
Project Location: Cranbourne
Client Reference: 07202
Work Request: 5175
Date Sampled: 15/01/2021 16:30
Dates Tested: 15/01/2021 - 18/01/2021
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: SAND
Material Source: Onsite - Stockpile



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 Project Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	P21-5175A	P21-5175B	P21-5175C
Test Number	10	11	12
Date Tested	15/01/2021	15/01/2021	15/01/2021
Time Tested	15:30	15:45	16:00
Test Request #/Location	Lot 214	Lot 215	Lot 216
Layer / Reduced Level	Layer2	Layer2	Layer3
Thickness of Layer (mm)	300	300	300
Soil Description	SAND	SAND	SAND
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m ³	2.06	2.13	2.10
Field Moisture Content %	13.9	12.6	11.4
Field Dry Density (FDD) t/m ³	1.81	1.89	1.89
Peak Converted Wet Density t/m ³	2.15	2.16	2.11
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	14.1	12.5	11.6
Adj. Field Moisture Content % (AS1289.5.4.1)	13.9	12.6	11.4
Moisture Ratio % (AS1289.5.4.1)	98.5	101.0	98.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	0.0	0.0	0.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	96.0	98.5	99.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Material Test Report

Report Number: P20418-6
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Lot Number Added
Date Issued: 12/04/2021
Client: Street Works Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: P20418
Project Name: 45 Craig Road Stage 2 Level One
Project Location: Cranbourne
Client Reference: 06091
Work Request: 5374
Date Sampled: 12/02/2021 14:00
Dates Tested: 12/02/2021 - 16/02/2021
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Location: 45 Craig Rd Level 1 Fill
Material: Sand
Material Source: Onsite



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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Chris Caulfield
 Project Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	P21-5374A	P21-5374B	P21-5374C
Test Number	16	17	18
Date Tested	12/02/2021	12/02/2021	12/02/2021
Time Tested	14:00	14:00	14:00
Test Request #/Location	Lot 201	Lot 212 Retest #7	Lot 202
Layer / Reduced Level	Layer 1	Layer	Layer 2
Thickness of Layer (mm)	300	300	300
Soil Description	Sand	Sand	Sand
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m ³	1.87	1.86	1.84
Field Moisture Content %	4.4	6.6	6.2
Field Dry Density (FDD) t/m ³	1.79	1.74	1.73
Peak Converted Wet Density t/m ³	1.84	1.88	1.89
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	5.9	9.7	6.6
Adj. Field Moisture Content % (AS1289.5.4.1)	4.4	6.6	6.2
Moisture Ratio % (AS1289.5.4.1)	74.5	68.0	94.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	1.5	3.5	0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	101.5	98.5	97.5
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Material Test Report

Report Number: P20418-7
Issue Number: 1
Date Issued: 17/02/2021
Client: Street Works Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: P20418
Project Name: 45 Craig Road Stage 2
Project Location: Cranbourne
Client Reference: 06090
Work Request: 5364
Date Sampled: 11/02/2021 14:30
Dates Tested: 11/02/2021 - 12/02/2021
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Material: Sand
Material Source: Onsite



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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Janaka Somaratne
 Lab Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	P21-5364A	P21-5364B	P21-5364C
Test Number	13	14	15
Date Tested	11/02/2021	11/02/2021	11/02/2021
Time Tested	14:30	14:30	14:30
Test Request #/Location	Lot 207	Lot 207	Lot 206
Layer / Reduced Level	Layer 1	Layer 2	Layer 1
Thickness of Layer (mm)	300	300	300
Soil Description	Sand	Sand	Sand
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m ³	1.84	1.90	1.86
Field Moisture Content %	6.6	6.0	6.3
Field Dry Density (FDD) t/m ³	1.73	1.79	1.75
Peak Converted Wet Density t/m ³	1.90	1.89	1.91
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	9.4	8.9	10.0
Adj. Field Moisture Content % (AS1289.5.4.1)	6.6	6.0	6.3
Moisture Ratio % (AS1289.5.4.1)	70.0	67.5	63.0
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	3.0	3.0	4.0
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	97.0	100.5	98.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

Material Test Report

Report Number: P20418-8
Issue Number: 2 - This version supersedes all previous issues
Reissue Reason: Correct Lot Number Added
Date Issued: 12/04/2021
Client: Street Works Pty Ltd
 45 Commercial Drive, Pakenham Vic 3810
Project Number: P20418
Project Name: 45 Craig Road Stage 2 Level One
Project Location: Cranbourne
Client Reference: 06092
Work Request: 5411
Date Sampled: 18/02/2021 15:00
Dates Tested: 19/02/2021 - 19/02/2021
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95%
Location: 45 Craig Road Stage 2
Material: Sand
Material Source: Onsite



Pakenham Laboratory
 47 National Avenue Pakenham VIC 3810
 Phone: (03) 9769 5799
 Email: ccaulfield@terrafirmalabs.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Chris Caulfield
 Project Manager

NATA Accredited Laboratory Number: 15357

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	P21-5411A	P21-5411B	P21-5411C
Test Number	19	20	21
Date Tested	18/02/2021	18/02/2021	18/02/2021
Time Tested	15:30	15:30	15:30
Test Request #/Location	Lot 203	Lot 204	Lot 205
Layer / Reduced Level	Layer 1	Layer 3	Layer 2
Thickness of Layer (mm)	300	300	300
Soil Description	Sand	Sand	Sand
Test Depth (mm)	275	275	275
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0	0	0
Percentage of Dry Oversize (%) (AS1289.5.4.1)	0	0	0
Field Wet Density (FWD) t/m ³	2.05	1.91	2.03
Field Moisture Content %	5.0	4.5	3.8
Field Dry Density (FDD) t/m ³	1.95	1.83	1.96
Peak Converted Wet Density t/m ³	2.04	1.91	2.00
Adjusted Peak Converted Wet Density t/m ³	**	**	**
Adj. Optimum Moisture Content % (AS1289.5.4.1)	5.8	4.6	4.1
Adj. Field Moisture Content % (AS1289.5.4.1)	5.0	4.5	3.8
Moisture Ratio % (AS1289.5.4.1)	86.0	98.0	92.5
Adjusted Moisture Ratio % (AS1289.5.4.1)	**	**	**
Moisture Variation (Wv) %	1.0	0.0	0.5
Adjusted Moisture Variation %	**	**	**
Hilf Density Ratio (%)	100.5	100.0	102.0
Compaction Method	Standard	Standard	Standard
Report Remarks	**	**	**

Moisture Variation Note:

Positive values = test is dry of OMC

Negative values = test is wet of OMC

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 201

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 201 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
- Verification of finished surface level to design levels is outside of the scope of the GITA Inspection and Verification report.
- Compaction tests results documented in a level 1 GITA report verify the construction methods observed on site are satisfactory. Testing is conducted with random sampling across an area of work that is defined in the Australian Standard as a "lot" which is "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" (AS 3798-2007). As such, any test completed is representative of an area that may be up to 2500m² in area and across several house lots.

A GITA Inspection Verification report (Reference: P20418A) has been published on 12 Apr 2021 and documents that the allotment earthworks were carried out in accordance with AS3798 and in compliance with the project specification provided by the contractor.

For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 202

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 202 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
- Verification of finished surface level to design levels is outside of the scope of the GITA Inspection and Verification report.
- Compaction tests results documented in a level 1 GITA report verify the construction methods observed on site are satisfactory. Testing is conducted with random sampling across an area of work that is defined in the Australian Standard as a "lot" which is "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" (AS 3798-2007). As such, any test completed is representative of an area that may be up to 2500m² in area and across several house lots.

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For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 203

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 203 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
- Verification of finished surface level to design levels is outside of the scope of the GITA Inspection and Verification report.
- Compaction tests results documented in a level 1 GITA report verify the construction methods observed on site are satisfactory. Testing is conducted with random sampling across an area of work that is defined in the Australian Standard as a "lot" which is "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" (AS 3798-2007). As such, any test completed is representative of an area that may be up to 2500m² in area and across several house lots.

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For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 204

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 204 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
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For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 205

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 205 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
- Verification of finished surface level to design levels is outside of the scope of the GITA Inspection and Verification report.
- Compaction tests results documented in a level 1 GITA report verify the construction methods observed on site are satisfactory. Testing is conducted with random sampling across an area of work that is defined in the Australian Standard as a "lot" which is "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" (AS 3798-2007). As such, any test completed is representative of an area that may be up to 2500m² in area and across several house lots.

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For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 206

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 206 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

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For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 207

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 207 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
- Verification of finished surface level to design levels is outside of the scope of the GITA Inspection and Verification report.
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For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 208

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 208 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
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For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 209

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 209 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
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For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 210

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 210 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

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For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 211

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 211 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
- Verification of finished surface level to design levels is outside of the scope of the GITA Inspection and Verification report.
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A GITA Inspection Verification report (Reference: P20418A) has been published on 12 Apr 2021 and documents that the allotment earthworks were carried out in accordance with AS3798 and in compliance with the project specification provided by the contractor.

For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 212

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 212 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
- Verification of finished surface level to design levels is outside of the scope of the GITA Inspection and Verification report.
- Compaction tests results documented in a level 1 GITA report verify the construction methods observed on site are satisfactory. Testing is conducted with random sampling across an area of work that is defined in the Australian Standard as a "lot" which is "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" (AS 3798-2007). As such, any test completed is representative of an area that may be up to 2500m² in area and across several house lots.

A GITA Inspection Verification report (Reference: P20418A) has been published on 12 Apr 2021 and documents that the allotment earthworks were carried out in accordance with AS3798 and in compliance with the project specification provided by the contractor.

For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 213

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 213 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
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A GITA Inspection Verification report (Reference: P20418A) has been published on 12 Apr 2021 and documents that the allotment earthworks were carried out in accordance with AS3798 and in compliance with the project specification provided by the contractor.

For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 214

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 214 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

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A GITA Inspection Verification report (Reference: P20418A) has been published on 12 Apr 2021 and documents that the allotment earthworks were carried out in accordance with AS3798 and in compliance with the project specification provided by the contractor.

For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 215

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 215 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
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For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager

12 Apr 2021

TO WHOM IT MAY CONCERN

Re: 45 Craig Road Stage 2
Junction Village
Lot 216

Terra Firma Laboratories was engaged by Street Works Pty Ltd as the Geotechnical and Inspection Testing Authority (GITA) to provide Level 1 supervision and testing on the earthworks component for 45 Craig Road, Stage 2, Junction Village in accordance with Australian Standard AS3798 Guidelines for Earthworks for Commercial and Residential Development.

Lot 216 as defined in drawing Ref 1432_2/R04 from *Charlton Degg*, provided by the contractor, was included in the scope of works.

With regard to any fill placement please consider the following:

- Controlled fill was placed up to 300mm below finished surface level. The final 300mm material is considered top soil and organic matter and not controlled fill.
- Verification of finished surface level to design levels is outside of the scope of the GITA Inspection and Verification report.
- Compaction tests results documented in a level 1 GITA report verify the construction methods observed on site are satisfactory. Testing is conducted with random sampling across an area of work that is defined in the Australian Standard as a "lot" which is "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" (AS 3798-2007). As such, any test completed is representative of an area that may be up to 2500m² in area and across several house lots.

A GITA Inspection Verification report (Reference: P20418A) has been published on 12 Apr 2021 and documents that the allotment earthworks were carried out in accordance with AS3798 and in compliance with the project specification provided by the contractor.

For and on behalf of

Terra Firma Laboratories



C Caulfield
Project Manager