

Level 1 Supervision & Inspection Report

Merrifield Estate – Stage 34

Ref: 14874/P/621

Prepared for
BMD Urban Pty Ltd

6 August 2018

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2					
3					

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Site Location Plan

- Site Plan - Stage 34

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Testing Results

- Hilf Density Locations
- Hilf Density Ratio (%)

1 INTRODUCTION

Construction Sciences was commissioned by BMD Urban Pty Ltd to provide Level 1 supervision and testing services for the Merrifield Estate Development – Stage 34 project located at Mickleham, Victoria.

This report represents the results of inspection activities, compaction and moisture control, and laboratory testing carried out for the placement of fill material on the 24th of July 2018 for the Merrifield Estate Development – Stage 34 (As shown in the attached site location plan in Appendix A).

All works were carried out in accordance with:

- AS 1289 “*Methods of Testing Soils for Engineering Purposes*”.
- AS3798-2007 “*Guidelines on earthworks for commercial & residential developments*”

The material used as fill in the level 1 earthworks was sourced from the existing on site materials.

A total of approximately 3,998m³ of compacted fill has been placed on stage 34 over the duration of Level 1 supervision. The fill volume has been determined from site supervision records and supported information provided by the client.

2 EARTHWORK SPECIFICATIONS

The earthworks are to be carried out in general accordance with AS3798-2007 ‘*Guidelines on earthworks for commercial & residential developments*’.

The specification requirements were that fill materials are to be placed and compacted to a density ratio of not less than 95% standard compaction as determined by AS 1289 “*Methods of Testing Soils for Engineering Purposes*”.

3 SITE INSPECTION & TESTING

3.1 Existing Surface Assessments

Prior to commencement of filling, Construction Sciences confirmed that all unsuitable and weaker material such as top soil, silt, uncontrolled or loose soil, organic effected material and other wet areas had been appropriately stripped in accordance with AS 3798-2007. The exposed surface after removal of unsuitable material was compacted and checked for soft areas by proof rolling.

Where no movement or vertical deflection was detected, the stripped surface was assessed to be suitable for the placement of fill.

3.2 Fill Placement

All fill material on site was thoroughly inspected by Construction Sciences site representative to ensure it meets the “**suitable material**” requirements outlined in AS3798-2007.

The fill material typically comprised of:

- Gravelly Clay, Medium plasticity, Brown

Placement of fill was carried out using the following plant:

- 1* Excavator
- 1* Sheep-foot compactor.
- 1* Grader
- 1* Water Cart

The fill material was spread in near-horizontal layers, and compacted in successive layers to a maximum thickness of 250mm, using a sheep-foot compactor.

3.3 Compaction Control Testing

Compaction control tests were carried out at regular intervals throughout the placement of fill in accordance with the minimum test frequency recommendations included in AS3798-2007 *‘Guidelines on Earthworks for commercial and residential developments’*.

The in-situ density tests were conducted using a nuclear density/moisture meter in accordance with AS 1289 5.8.1 *“Determination of field density and field moisture content of a soil a nuclear surface moisture-density gauge”*.

Disturbed samples taken from each density test site were tested at Construction Sciences’ NATA accredited soil laboratory, using the Hilf rapid compaction method, in accordance with AS 1289.5.7.1.

A total of eight (8) field density tests were carried out throughout the earthworks as below Table 3-1. These 8 tests equates to one test to approximately every 499.75m³ of fill.

Table 3-1 Summary of Field Density Test Results

Test Numbers	Mean Density (%)	Standard Deviation (%)
8	97.8	1.163

All density test results carried out in the engineered fill material are included in Appendix B. A summary of test results is presented in below in Table 3-2.

Table 3-2 Summary of Density Testing

No	Sample Number	Report Number	Date	Density Ratio (%)
1	14874/S/214475	14874/R/80255-1	24/07/2018	100.5
2	14874/S/214476	14874/R/80255-1	24/07/2018	98.0
3	14874/S/214477	14874/R/80255-1	24/07/2018	97.5
4	14874/S/214478	14874/R/80255-1	24/07/2018	98.0
5	14874/S/214479	14874/R/80255-1	24/07/2018	97.0
6	14874/S/214480	14874/R/80255-1	24/07/2018	97.5
7	14874/S/214481	14874/R/80255-1	24/07/2018	97.0
8	14874/S/214482	14874/R/80255-1	24/07/2018	97.0
Results	Mean Density (%)	Standard Deviation (%)	Lowest Result	Highest Result
8	97.8	1.163	97.0	100.5

Table 3-3 Summary of Field Moisture Results

Successful Test Numbers	Mean Moisture (%)	Standard Deviation (%)
8	96.8	5.477

Table 3-4 Summary of Field Moistures

No	Sample Number	Report Number	Date	Moisture Ratio (%)
1	14874/S/214475	14874/R/80255-1	24/07/2018	87.0
2	14874/S/214476	14874/R/80255-1	24/07/2018	100.5
3	14874/S/214477	14874/R/80255-1	24/07/2018	100.0
4	14874/S/214478	14874/R/80255-1	24/07/2018	98.0
5	14874/S/214479	14874/R/80255-1	24/07/2018	100.0
6	14874/S/214480	14874/R/80255-1	24/07/2018	100.0
7	14874/S/214481	14874/R/80255-1	24/07/2018	99.5
8	14874/S/214482	14874/R/80255-1	24/07/2018	89.0
Results	Mean Moisture (%)	Standard Deviation (%)	Lowest Result	Highest Result
8	96.8	5.477	87.0	100.5

4 GENERAL STATEMENT OF COMPLIANCE

It is considered that the placement of fill material at the Merrifield Estate Development – Stage 34 was carried out in accordance with AS3798-2007 “*Guidelines on earthworks for commercial and residential developments*”. It is concluded that the fill was compacted to a density ratio not less than the specified requirement.

5 LIMIT OF LIABILITY

This report has been produced for, and is the property of our client BMD Urban Pty Ltd.

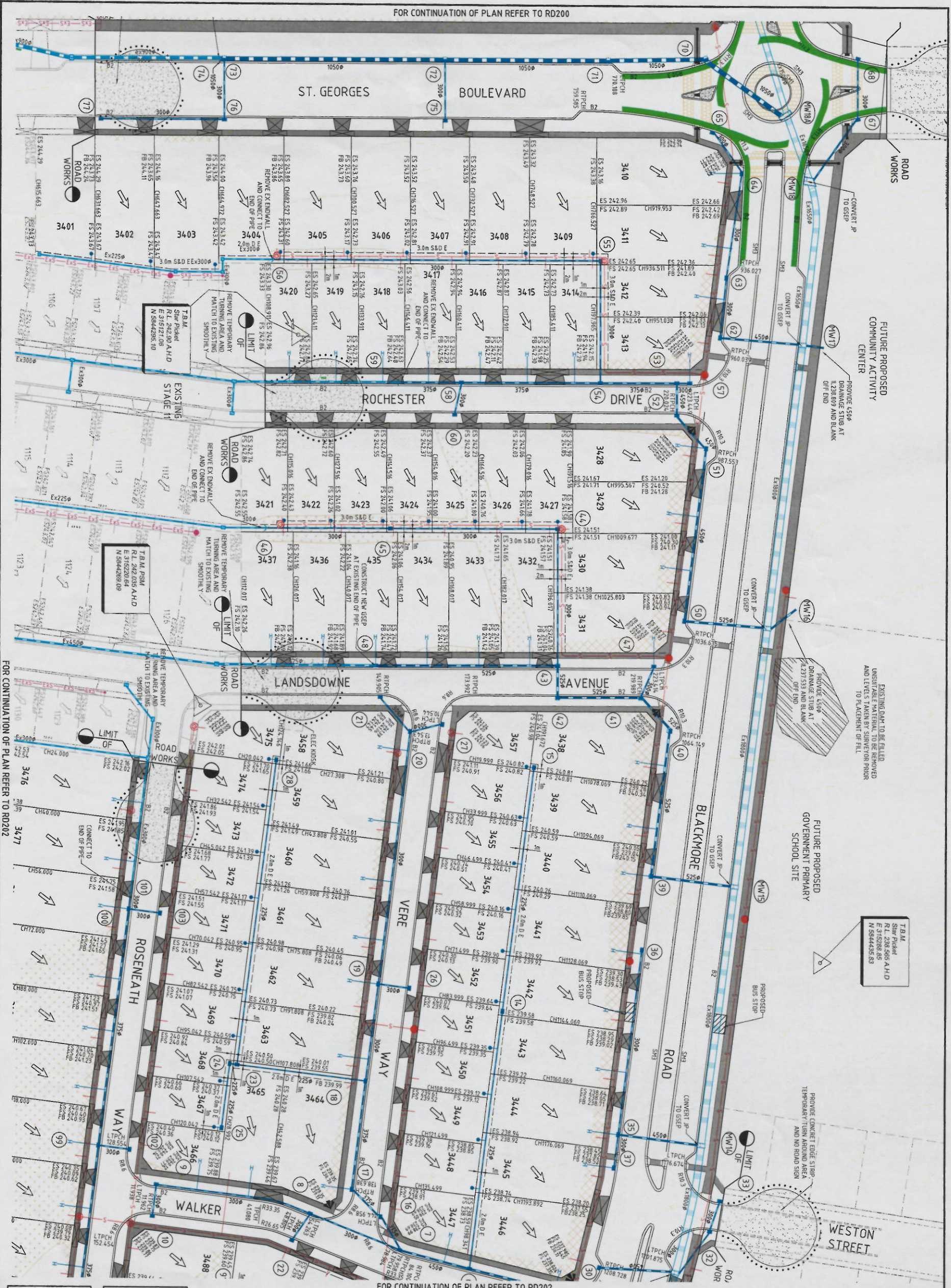
Construction Sciences accepts no liability to any third party, and will not enter into any communication with a third party regarding this report.

Appendix A

3 Pages

Site Location Plan

- Stage 34



LEGEND - DETAIL

- LOT GRADE
- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- TOP OF BATTER LEVEL
- PERMANENT SURVEY MARK
- TEMPORARY BENCH MARK
- REMOVE EX TREE
- PROPOSED DRAINAGE
- NEIGHBOUR WATER DRAINAGE
- EXISTING DRAINAGE
- TABLE DRAIN
- PROPERTY INLET
- HOUSE DRAIN
- SMD PIT NUMBER
- EXISTING SEWER
- PROPOSED SEWER
- CUT - 50mm DEPTH
- FL - 30mm DEPTH
- ROUNDABOUT THRESHOLD TREATMENT
- GIS EMBEDDED (AS2005 S1996) OR VECROADS APPROVED EQUIVALENT AS PER VICROADS CYCLE RITE No. 14 (2005)

WARNING

BE AWARE OF UNDERGROUND SERVICES

THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN. A HO'S ENQUIRY ON 100 MUST BE MADE BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS.

WARNING

ANY DESIGN SURFACE LEVELS SHOWN ARE PRELIMINARY ONLY AND SUBJECT TO FINAL DETAIL DESIGN. DO NOT USE FOR CONSTRUCTION

ELEC KIOSK LEVELS

SCALE 1:100

LOT 3475

LOT 3458

ELEC KIOSK

3	SEWER ALIGNMENT AMENDED	GR	04.12.17	T. CANAVAN
2	CONSTRUCTION ISSUE	GR	27.11.17	D. HUDSON
1	CONSTRUCTION ISSUE	GR	14.11.17	D. HUDSON
0	CONSTRUCTION ISSUE	GR	22.01.17	D. HUDSON
A	PRELIMINARY ISSUE	GR	30.06.17	G. ROMANICZ
REV	DESCRIPTION	APPROVED	DATE	

merrifield

verve

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verveprojects.com

HUME CITY COUNCIL

MERRIFIELD LIVING - SECTION C

STAGE 34

MCKLEHAM

CONSTRUCTION

DETAIL PLAN - 2

366 E2

17017-34

RD201

3

LEGEND - DETAIL

- LOT GRADE
- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- TOP OF BATTER LEVEL
- PERMANENT SURVEY MARK
- TEMPORARY BENCH MARK
- REMOVE EX TREE
- PROPOSED DRAINAGE
- MELBOURNE WATER DRAINAGE
- EXISTING DRAINAGE
- TABLE DRAIN
- PROPERTY INLET
- HOUSE DRAIN
- SMD PIT NUMBERS
- EXISTING SEWER
- PROPOSED SEWER
- CUT - 150mm DEPTH
- FILL - 300mm DEPTH

EXISTING DRAINAGE
SWALES TO BE
LEVEL 1 FILLED



WARNING

BEWARE OF UNDERGROUND SERVICES

ANY DESIGN SURFACE LEVELS SHOWN ARE PRELIMINARY ONLY AND SUBJECT TO FINAL DETAIL DESIGN. DO NOT USE FOR CONSTRUCTION

4	ROAD CHANGE REVISED	GR	31.01.18	DESIGNED	T. CAMMANN	HUMER CITY COUNCIL	MERRIFIELD LIVING - SECTION C STAGE 34 MCKLEHAM	DETAIL PLAN - 3	366 E2	17017	RD202	4
3	SEWER ALIGNMENT AMENDED	GR	08.12.17	DESIGNED	T. CAMMANN							
2	CONSTRUCTION ISSUE	GR	27.11.17	DESIGNED	T. CAMMANN							
1	CONSTRUCTION ISSUE	GR	14.11.17	DESIGNED	T. CAMMANN							
0	CONSTRUCTION ISSUE	GR	22.09.17	DESIGNED	T. CAMMANN							
A	PRELIMINARY ISSUE	GR	30.06.17	DESIGNED	T. CAMMANN							
REV	DESCRIPTION	APPROVED	DATE	APPROVED	G. ROMANOV							

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Appendix B

5 Pages

HILF Density Testing

- **Hilf Density Locations**
- **Hilf Density Ratio (%)**

Site Location Sketch

MELBOURNE

Client: BMD Urban Pty Ltd

Job No. 14874/P/621

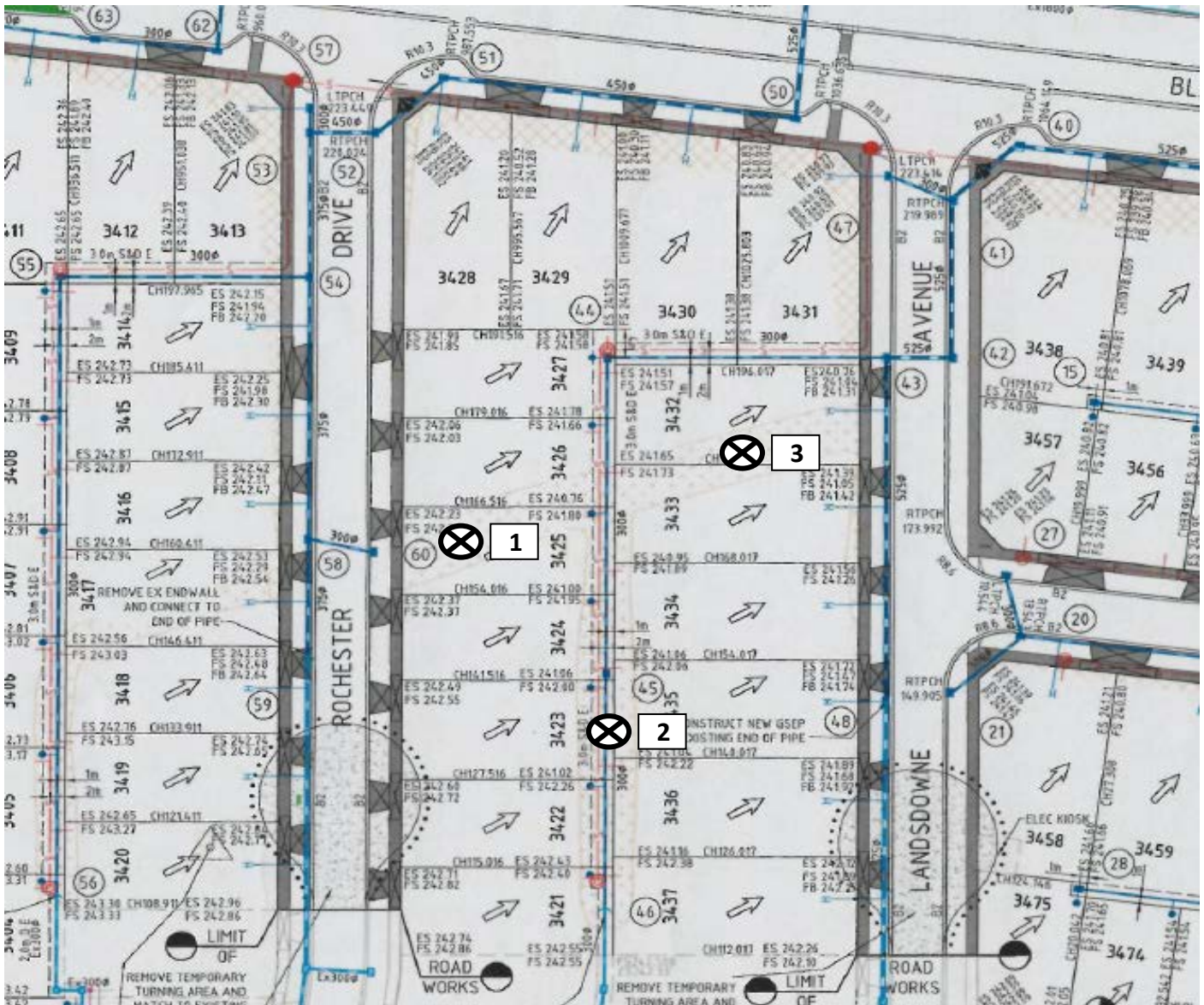
Test Request No. T/43491

Date Tested: 24/07/2018

Test site locations only

NOT TO SCALE

↑
North



Site Location Sketch

MELBOURNE

Client: BMD Urban Pty Ltd

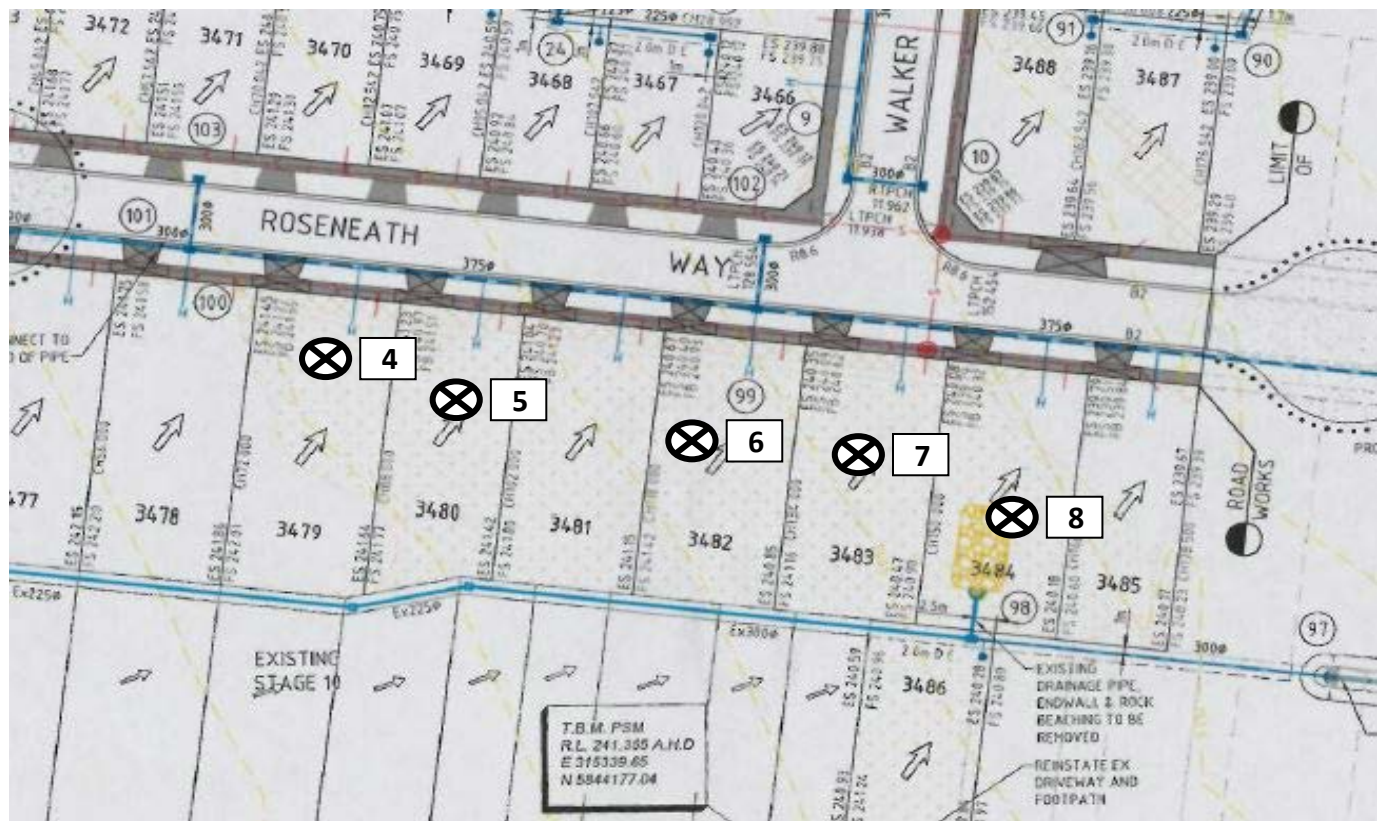
Job No. 14874/P/621

Test Request No. T/43491

Date Tested: 24/07/2018

Test site locations only

NOT TO SCALE





LOT REPORT - WET DENSITY RATIO

Client:	BMD Urban Pty Ltd	Report Number:	14874/R/80255-1
Client Address:	PO BOX 1128, CAMBERWELL	Project Number:	14874/P/621
Project:	Merrifield Estate - Stage 34	Lot Number:	
Location:	Merrifield	Internal Test Request:	14874/T/43491
Supplied To:	n/a	Client Reference/s:	Level 1 Fill STG 34
Area Description:	Fill Pad	Report Date / Page:	6/08/2018 Page 1 of 3

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
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Sample Number	14874/S/214475	14874/S/214476	14874/S/214477	14874/S/214478
ID / Client ID	-	-	-	-
Lot Number	-	-	-	-
Date / Time Tested	24/07/2018	24/07/2018	24/07/2018	24/07/2018
Material Source	Onsite	Onsite	Onsite	Onsite
Material Type	Clay	Clay	Clay	Clay
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b
Depths: Test / Nom / Actual (mm)	225 / 250 / 250	225 / 250 / 250	225 / 250 / 250	225 / 250 / 250
Standard or Modified	Standard	Standard	Standard	Standard
Layer Number	1	1	1	1
Location Number	1	2	3	4
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	0	0	0	0
Compaction Sample Number	14874/S/214475	14874/S/214476	14874/S/214477	14874/S/214478
Sample Description	Clay	Clay	Clay	Clay
Moisture Test Results:				
Field Moisture Content (%)	15.6	15.5	16.4	14.7
Adjusted / Moisture Variation (%)	2.0	0.0	0.0	0.5
Optimum Moisture Content (%)	18.0	15.5	16.5	15.0
Moisture Variation from OMC	(Drier than OMC)	(Wetter than OMC)	(at OMC)	(Drier than OMC)
Moisture Ratio (%)	87.0	100.5	100.0	98.0
Density Test Results:				
Field Wet Density (t/m ³)	2.12	2.13	2.11	2.12
Adj/Peak Conv Wet Density (t/m ³)	2.11	2.18	2.16	2.16
Density Ratio Required (%)	95	95	95	95
Hilf Density Ratio (%)	100.5	98.0	97.5	98.0

Remarks

	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		
	Accreditation Number:	1986	
	Corporate Site Number:	14874	
	Approved Signatory: Daniel Boyd		Form ID: W5ASRepSum Rev 4



LOT REPORT - WET DENSITY RATIO

Client:	BMD Urban Pty Ltd	Report Number:	14874/R/80255-1
Client Address:	PO BOX 1128, CAMBERWELL	Project Number:	14874/P/621
Project:	Merrifield Estate - Stage 34	Lot Number:	
Location:	Merrifield	Internal Test Request:	14874/T/43491
Supplied To:	n/a	Client Reference/s:	Level 1 Fill STG 34
Area Description:	Fill Pad	Report Date / Page:	6/08/2018 Page 2 of 3

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
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Sample Number	14874/S/214479	14874/S/214480	14874/S/214481	14874/S/214482
ID / Client ID	-	-	-	-
Lot Number	-	-	-	-
Date / Time Tested	24/07/2018	24/07/2018	24/07/2018	24/07/2018
Material Source	Onsite	Onsite	Onsite	Onsite
Material Type	Clay	Clay	Clay	Clay
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b
Depths: Test / Nom / Actual (mm)	225 / 250 / 250	225 / 250 / 250	225 / 250 / 250	225 / 250 / 250
Standard or Modified	Standard	Standard	Standard	Standard
Layer Number	2	2	2	3
Location Number	5	6	7	8
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	0	0	0	0
Compaction Sample Number	14874/S/214479	14874/S/214480	14874/S/214481	14874/S/214482
Sample Description	Clay	Clay	Clay	Clay
Moisture Test Results:				
Field Moisture Content (%)	15.4	16.1	15.8	14.3
Adjusted / Moisture Variation (%)	0.0	0.0	0.0	2.0
Optimum Moisture Content (%)	15.5	16.0	16.0	16.0
Moisture Variation from OMC	(at OMC)	(at OMC)	(Drier than OMC)	(Drier than OMC)
Moisture Ratio (%)	100.0	100.0	99.5	89.0
Density Test Results:				
Field Wet Density (t/m³)	2.12	2.12	2.13	2.11
Adj/Peak Conv Wet Density (t/m³)	2.18	2.17	2.19	2.18
Density Ratio Required (%)	95	95	95	95
Hill Density Ratio (%)	97.0	97.5	97.0	97.0

Remarks

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	Accreditation Number:	1986	
	Corporate Site Number:	14874	
	Approved Signatory: Daniel Boyd		Form ID: W5ASRepSum Rev 4

LOT REPORT - WET DENSITY RATIO

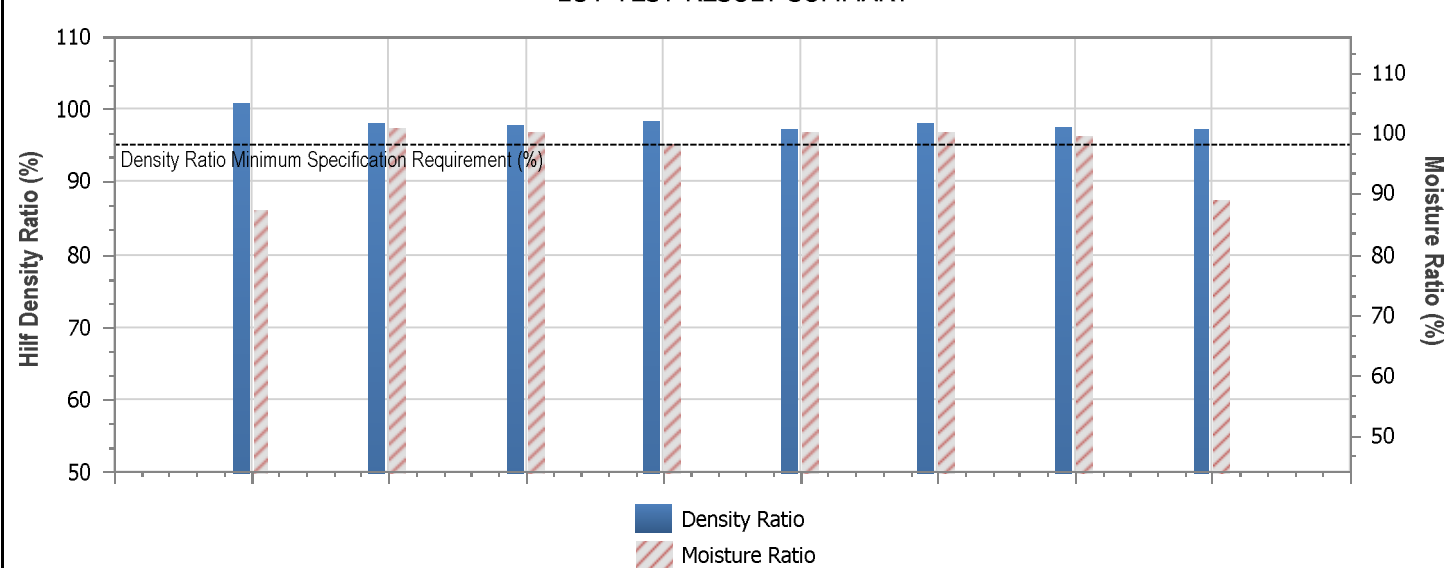
Client:	BMD Urban Pty Ltd	Report Number:	14874/R/80255-1
Client Address:	PO BOX 1128, CAMBERWELL	Project Number:	14874/P/621
Project:	Merrifield Estate - Stage 34	Lot Number:	
Location:	Merrifield	Internal Test Request:	14874/T/43491
Supplied To:	n/a	Client Reference/s:	Level 1 Fill STG 34
Area Description:	Fill Pad	Report Date / Page:	6/08/2018 Page 3 of 3

Test Procedures:	
Statistical Analysis Test Method:	Lot Average (Lot average calculations are not covered by NATA endorsement)

Nuclear Gauge Calibration Details

Calibration Number	-	Material Source	-
Calibration Last Updated	-	Material Type	-
Nominated Calibration Layer Depth (mm)	-		-

LOT TEST RESULT SUMMARY



Tests in Lot = 8	Lot Minimum	Lot Maximum	Lot Mean	Standard Deviation
Moisture Ratio (%)	87.2	100.6	96.8	5.471
Half Density Ratio (%)	97.0	100.6	97.9	1.161

Lot Number: -

Mean Density Ratio (%): 97.9

Mean Moisture Ratio (%): 96.8

Remarks



The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
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Accreditation Number: 1986
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