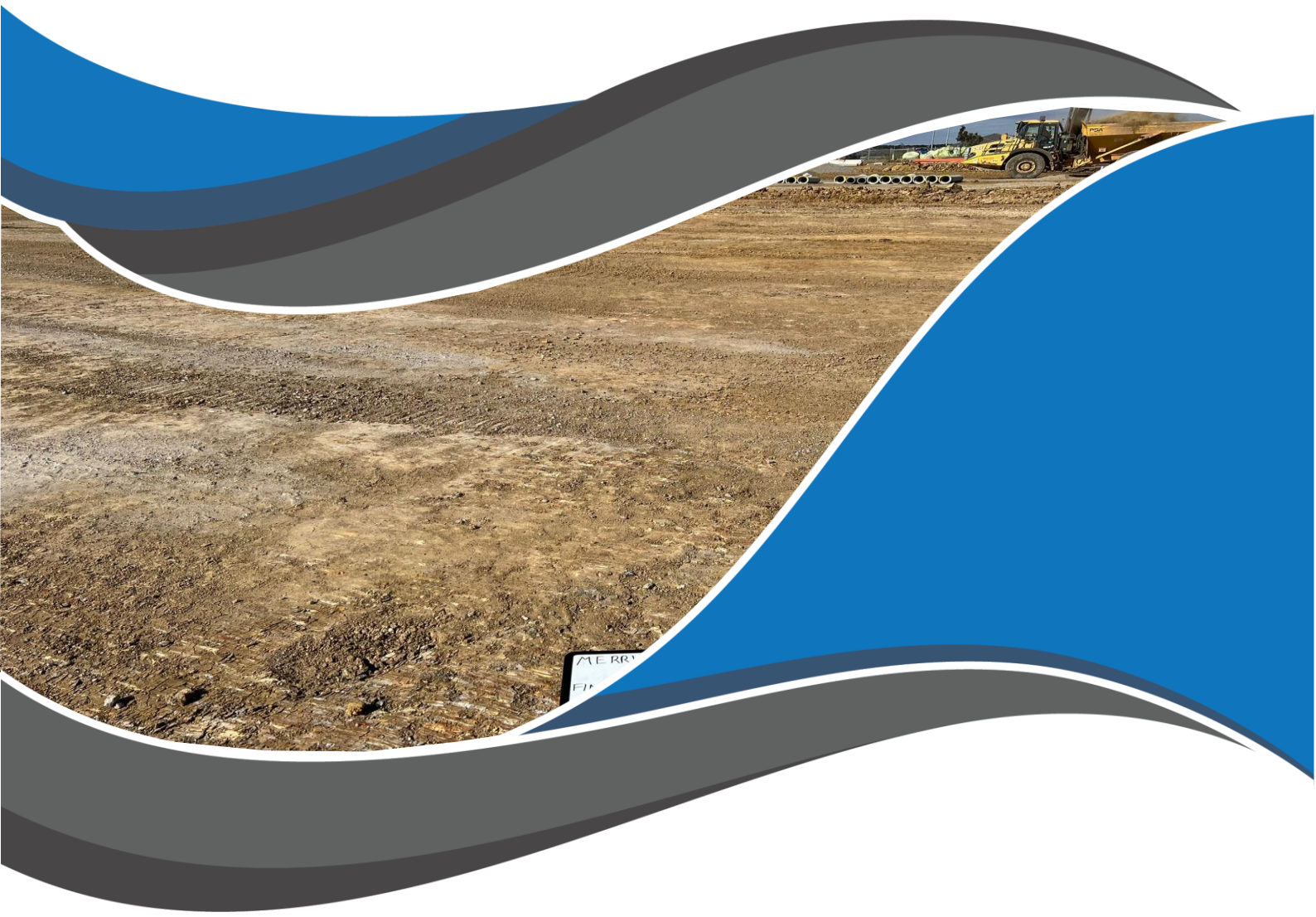
Merrifield Estate - Stage 42, Mickleham

Level 1 Inspection & Testing Report

Reference: 1120 0283-1



Prepared for:

BMD Urban

May 2022

A&Y ASSOCIATES

GEOTECHNICAL ENGINEERING CONSULTANTS

Document Control Record

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Report title		Level 1 Inspection & Testing			
Project reference number		1120 0283-1			
Client		BMD Urban			
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0	**19/05/2022**	**First Issue**	**B Mu**	**A Tan**	**A Tan**

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AUSTRALIA
Professional Engineer
MEMBER

Disclaimer

The findings and conclusions contained in this report are made based on site conditions that existed at the time this work was conducted. The conclusions present in this report are relevant to the conditions of the site and the state of legislation currently enacted as at the date of this report.

Findings and conclusions are made assuming that the soil, groundwater, geological and chemical conditions detailed within this report are accurate and remain applicable to the site at the time of writing. No other warranties are made or intended.

A&Y Associates (A&Y) Pty Ltd has used a degree of skill and care ordinarily exercised by reputable members of our profession practicing in the same or similar locality.

A&Y does not make any representation or warranty that the conclusions in this report will be applicable in the future as there may be changes in the condition of the site, applicable legislation or other factors that would affect the conclusions contained in this report.

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Contents

1 Introduction

This report presents the results of the Level 1 Inspection and Testing for the construction of the fill platforms located in Merrifield Estate - Stage 42, Mickleham.

2 Project Summary

It is understood that BMD Urban required the fill platforms within Merrifield Estate - Stage 42, Mickleham to be constructed under Level 1 Inspection and Testing undertaken by a Geotechnical Inspection and Testing Authority (GITA).

Level 1 Inspection and Testing, as defined in AS3798-2007 "Guidelines on Earthworks for Commercial and Residential Development," provides for full time inspection of the construction of controlled fill and field and laboratory testing in accordance with AS1289 "Methods of Testing Soils for Engineering Purposes".

The Level 1 inspection was undertaken by a Geotechnician from A&Y Associates over a period of five (5) working days from the **7th of October 2021 to 7th of January 2022.**

This report is applicable for fill placed by BMD Urban for the following lots located in Merrifield Estate - Stage 40, Mickleham, as shown in Appendix A – Site Plan.

- Lot 4201 – 4221
- Lot 4266 – 4279

A heat map indicating the amount of cut and fill prepared by JAC Surveyors dated 16th March 2022 has been attached in Appendix A along with the site plan.

3 Project Specifications

No specification has been provided for the construction works in Merrifield Estate - Stage 42, Mickleham. The supervision and inspections were performed based on AS3798. A short summary of the requirements outlined in AS3798 is provided below:

- Material to be used for fill construction shall satisfy the requirements of AS3798-2007 "Guidelines on Earthworks for Commercial and Residential Developments". The material used shall be free of:
    - Organic soils, such as topsoils, severely root affected subsoil and peat;
    - Contaminated soils;
    - Materials which undergo volume change or loss of strength when disturbed and exposed to moisture;
    - Silts, or materials that have deleterious engineering properties of silt;
    - Fill that contains wood, metal, plastic, boulders, or other deleterious material, in sufficient proportions to affect the required performance of fill;
    - The maximum particle size of any rocks or other lump, within the layer, has not exceeded two-thirds (2/3) of the compacted layer thickness.
- Compaction to achieve a dry density ratio of at least 95% Standard, as the project was classified as **Residential**.

4 Subgrade Assessment

The subgrade was assessed by A&Y Associates following the topsoil removal and before any fill was placed. The subgrade assessment was undertaken on the **7th Octover 2021 and 22nd December 2021** as mentioned in report *1120 0283-1 (SSI1)*.

The exposed subgrade material comprised natural silty clay. No wet or soft patches were found during the inspection. No evidence of deleterious material was found during the inspection.

5 Earthworks

The earthworks for this project included stripping of topsoil, removing of tree roots, proof rolling the subgrade and placement and compaction of fill to construct engineered platforms.

Based on design plans and site inspection, it appears that the fill thickness placed is approximately 200mm-600mm. The fill layers or thickness nominated in this report are provided as a guide on the amounts of fill placed and do not necessarily reflect an accurate survey of the fill levels.

6 Fill Material

The fill material used for the platform consisted of site derived material. The material was predominantly comprised of Silty Clay with gravel.

7 Testing

Field density testing was undertaken on the compacted fill at a frequency of a minimum of 3 tests per lot (AS3798 Table 8.1).

Tests were performed using a Nuclear Density Gauge for field density determination as per AS 1289.5.8.1. Testing was completed at a minimum rate of 3 field density tests per day's production based on the minimum requirements of AS 3798-2007 and taken from each layer of fill placed.

A total of 15 field density tests were performed during the earthworks. All of the test results met the specified compaction requirement of 95% Standard Compaction.

The locations of the 15 field density tests are shown in Appendix B – Test Locations. A summary of the test results obtained from the field density testing is presented in Appendix C – Test Results Summary. The laboratory test reports of the field density tests are presented in Appendix D – NATA Test Results.

8 Finished Surface Levels

It should be noted that even though the final fill layer meets the specification requirements, over time, the material may be subject to adverse weather conditions resulting in either surface softening or drying and cracking. The top 150mm – 200mm of the fill will deteriorate with time and should be considered by the foundation engineer.

9 Exclusion

A&Y Associates was not involved in monitoring and testing the following works and as such are not included in the Level 1 report.

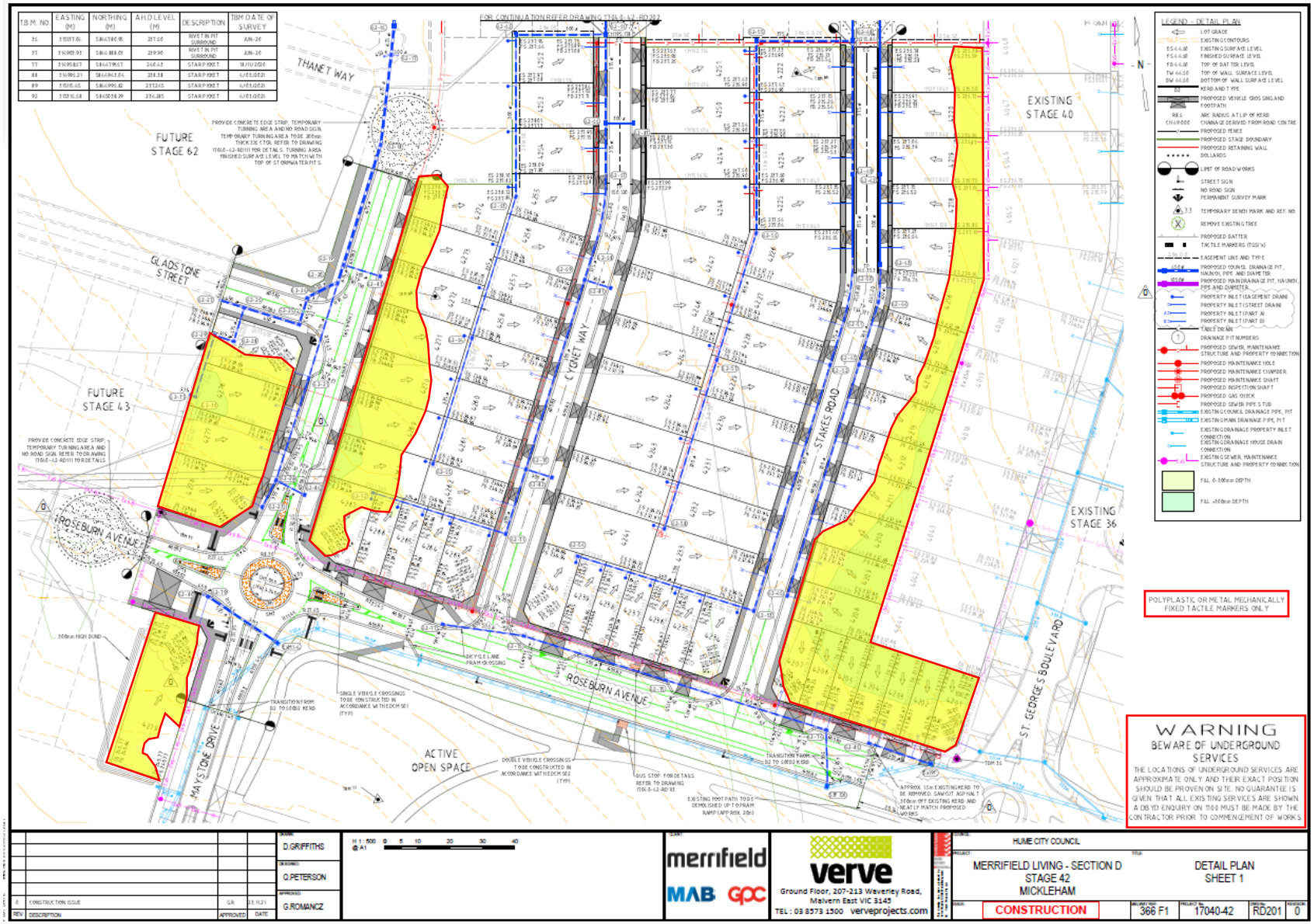
- Any trenches excavated and backfilled on site for the installation of underground services such as sewers, electrical conduits, water mains etc.
- Footpaths in front of the lots that may be excavated and filled after the Level 1 supervision conducted by A&Y Associates.
- Uncontrolled fill and topsoil that may have been placed as part of the landscaping of the site following the completion of the engineered fill construction.

10 Conclusion

On the completion of the earthworks and after analysing the materials used, it has been concluded that the filling procedure conducted by BMD Urban appears to be consistent with the requirements of AS 3798 in regards to the placement of fill materials on a project under Level 1 Supervision and in accordance with the project specification as provided to A&Y Associates.

Appendix A - Site Plan

Area Inspected and Tested



PROJECT: Merrifield Estate – Stage 42 (Level 1)	**CLIENT:** BMD Urban
LOCATION: Mickleham	**PROJECT No:** 1120 0283-1

SITE PLAN SKETCH—NOT TO SCALE

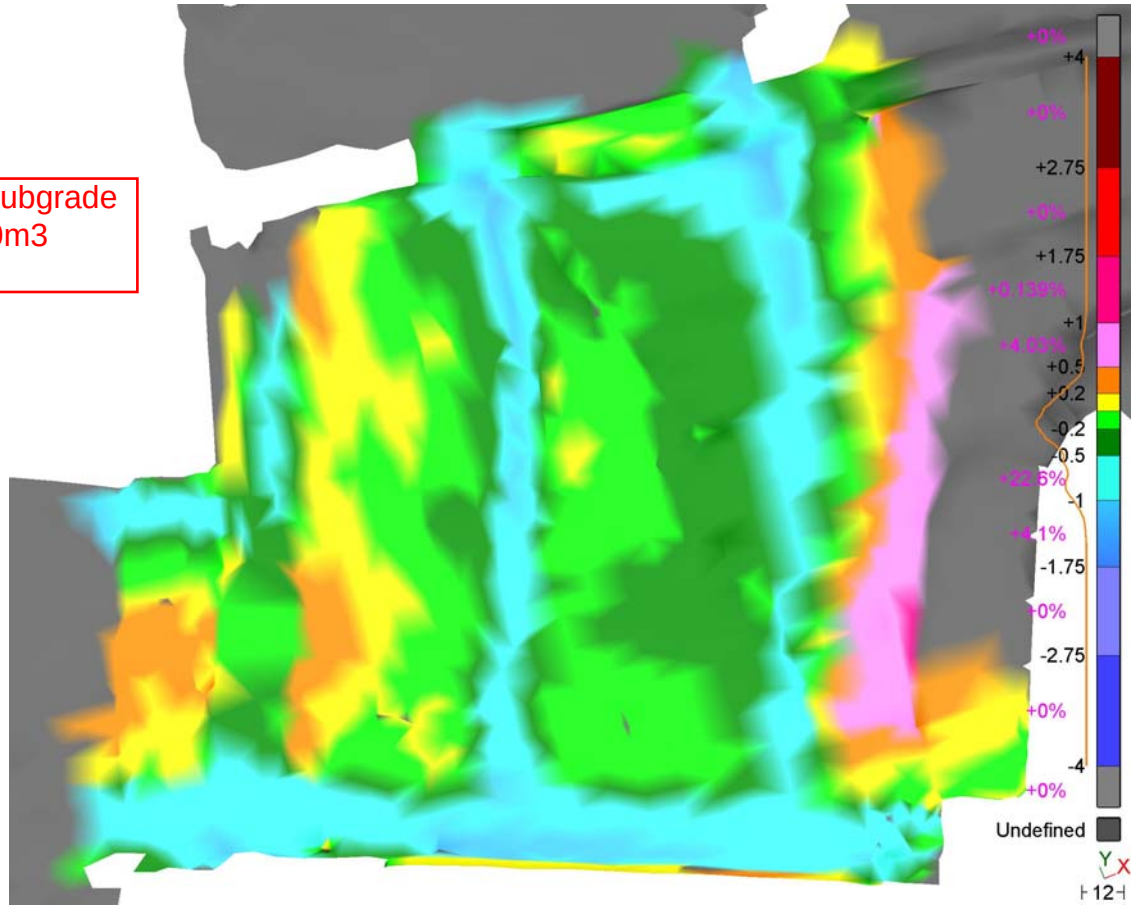
A&Y ASSOCIATES
GEOTECHNICAL ENGINEERING CONSULTANTS

3D view hardcopy

Merrifield St42 Heatmap

Date: Monday 16 May 2022
Name: *Supplied Strip-220228 vs SG*

Supplied Strip vs Subgrade
Fill Placed - 2,540m3
Cut - 13,670m3

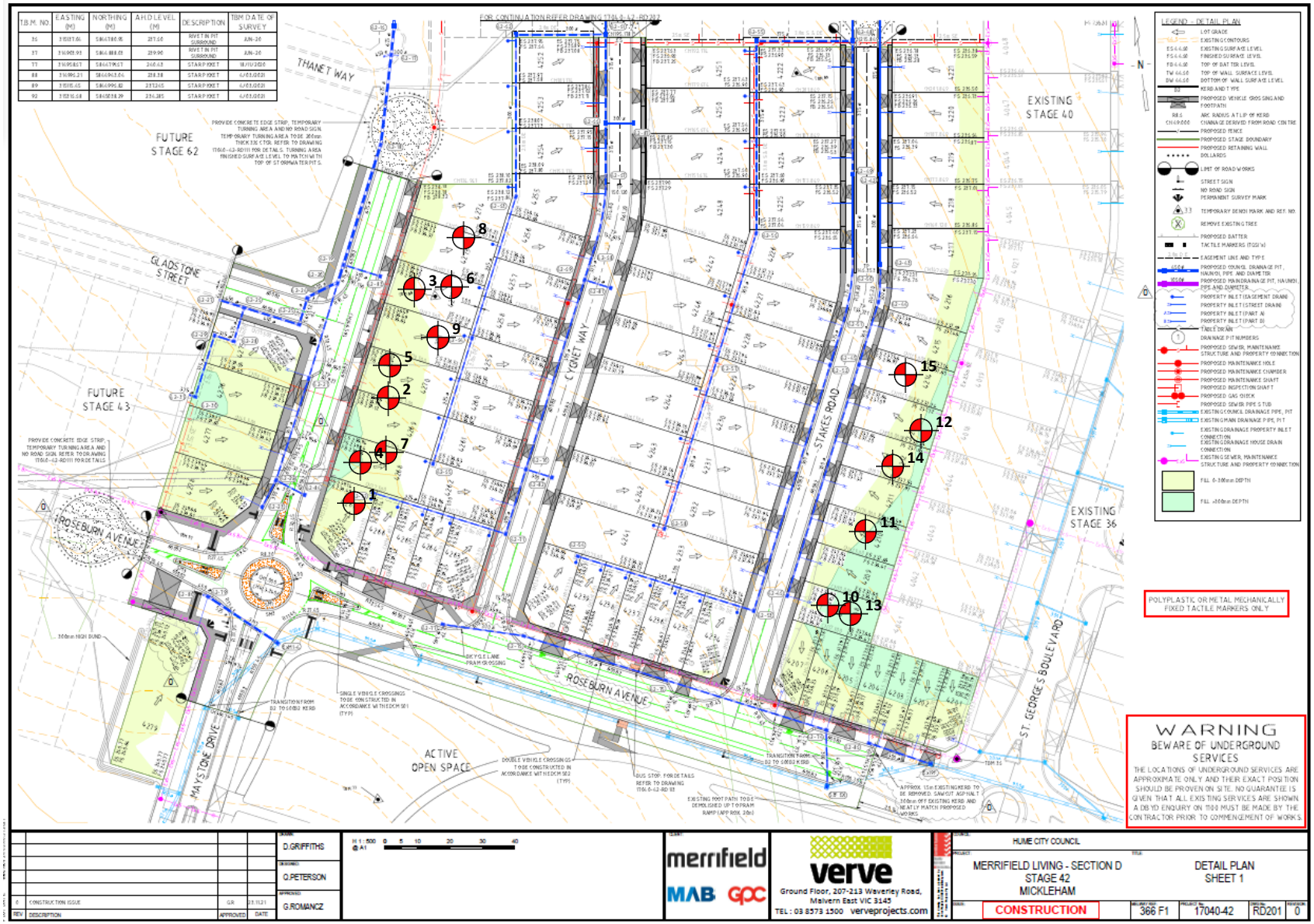


3DReshaper
www.3dreshaper.com
support@3dreshaper.com

Company: JAC Surveyors
Time: 12:48 PM

Appendix B – Test Locations

Indicative Test Location



PROJECT: **Merrifield Estate – Stage 42 (Level 1)**	**CLIENT:** **BMD Urban**
LOCATION: **Mickleham**	**PROJECT No:** **1120 0283-1**

SITE PLAN SKETCH—NOT TO SCALE

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Appendix C – Test Results Summary

Project No	1120 0283-1				Client	BMD Urban				
Project Name	Merrifield Estate - Stage 42				Specification			Density Ratio ≥ 95% of Peak Wet Density		
Location	Mickleham									
Test No	Retest of Test	Date	Location	Layer	Oversize	Density Ratio	Moisture Ratio	Moisture Variation	Pass / Fail	Retest
#	#		Lot #	#	%	%	%	%		Pass / Fail
1	-	7/10/2021	-	1	6.5	98.5	98.5	-0.5	Pass	-
2	-	7/10/2021	-	1	6.9	98.5	96.5	-0.5	Pass	-
3	-	7/10/2021	-	1	6.0	98.5	98.0	-0.5	Pass	-
4	-	8/10/2021	-	2	6.0	99.0	98.0	-0.5	Pass	-
5	-	8/10/2021	-	2	6.9	98.5	97.0	-0.5	Pass	-
6	-	8/10/2021	-	2	6.5	98.5	98.5	-0.5	Pass	-
7	-	9/10/2021	-	FSL	6.2	96.0	98.5	-0.5	Pass	-
8	-	9/10/2021	-	FSL	6.0	95.5	98.5	-0.5	Pass	-
9	-	9/10/2021	-	FSL	6.0	96.5	97.5	-0.5	Pass	-
10	-	22/12/2021	-	1	6.3	96.5	99.0	-0.5	Pass	-
11	-	22/12/2021	-	1	6.2	97.0	98.0	-0.5	Pass	-
12	-	22/12/2021	-	1	5.0	98.5	97.5	-0.5	Pass	-
13	-	7/01/2022	-	2	4.0	97.5	85.0	-3.0	Pass	-
14	-	7/01/2022	-	2	6.0	98.0	85.0	-2.5	Pass	-
15	-	7/01/2022	-	2	4.5	98.0	85.0	-3.0	Pass	-

** Negative (-) value indicates that the field moisture content is drier than the optimum moisture content (OMC)

** Positive (+) value indicates that the field moisture content is wetter than the optimum moisture content (OMC)

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Appendix D – NATA Test Results

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Field Density Test Results
AS1289.5.7.1

A & Y Associates Pty Ltd
5/16 Network Drive
Truganina VIC 3029
PH: 0400 413 531
info@ayassociates.com.au

Client: BMD Urban **Job No:** BMD1890

Project: Merrifield Estate - Stage 42 (Level 1) **Report:** 1

Location: Mickleham

Sample No		1	2	3			
Date Tested		07/10/2021	07/10/2021	07/10/2021			
Time Tested		PM	PM	PM			
Test Location		Refer to Plan	Refer to Plan	Refer to Plan			
Level/Layer		Layer 1	Layer 1	Layer 1			
Layer Thickness	mm	200	200	200			
Test Depth	mm	175	175	175			
Field Wet Density	t/m^3	2.04	2.07	1.99			
Field Moisture Content	%	19.7	19.8	20.1			
Material:		Site Derived Clay Fill	Site Derived Clay Fill	Site Derived Clay Fill			
Oversize Material	WET, %	6.5	6.9	6.0			
Sieve Size	mm	19	19	19			
Peak Converted Wet Density	t/m^3	2.06	2.09	2.00			
Optimum Moisture Content	%	20	20.5	20.5			
Moisture Ratio	%	98.5	96.5	98			
Moisture Variation from OMC	%	-0.5 Drier	-0.5 Drier	-0.5 Drier			
Density Ratio	%	98.5	98.5	98.5			

Specification: 95% STD **Test Selection:** N/A

Notes: Ref : 1120 0283-1 (SI01)

Test Method AS1289 5.8.1, 5.7.1, 2.1.1, 1.1 **Sampling Method:** AS 1289 1.2.1 6.4(b)

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NATA Accredited Laboratory No. 20172

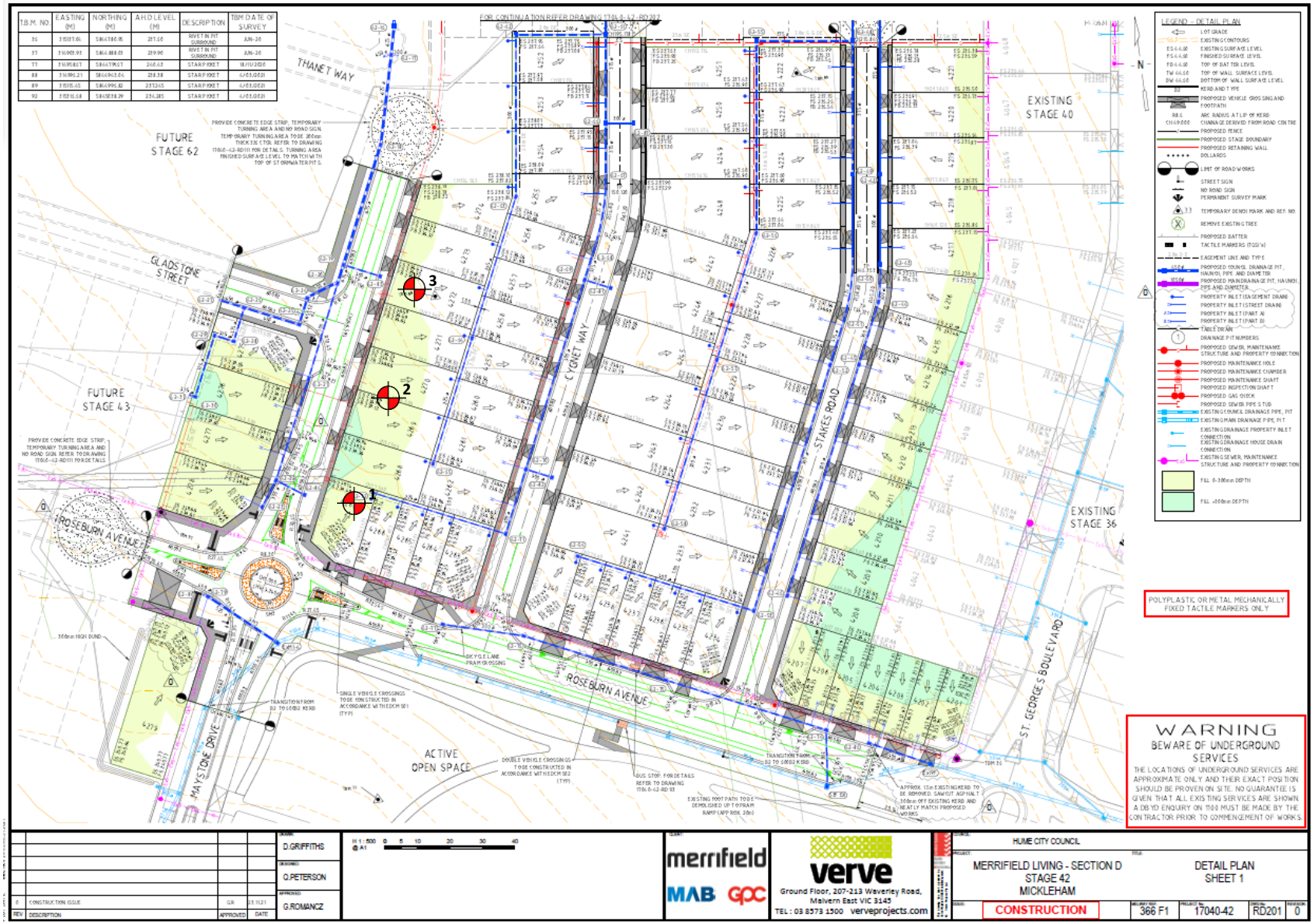
Accreditation for compliance with ISO/IEC 17025 - Testing

The results of tests, calibrations and/or measurements included in this document, are traceable to Australian / National Standards

Approved Signatory: David Burns

Date: 12/10/2021

Test Location



PROJECT: Merrifield Estate – Stage 42 (Level 1)	**CLIENT:** BMD Urban	**DATE:** 07/10/2021
LOCATION: Mickleham	**PROJECT No:** 1120 0283-1 (SI01)	**SITE PLAN SKETCH—NOT TO SCALE**

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Field Density Test Results
AS1289.5.7.1

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PH: 0400 413 531
info@ayassociates.com.au

Client:	BMD Urban			**Job No:**	BMD1890	
Project:	Merrifield Estate - Stage 42 (Level 1)			**Report:**	2	
Location:	Mickleham					

Sample No		4	5	6			
Date Tested		08/10/2021	08/10/2021	08/10/2021			
Time Tested		PM	PM	PM			
Test Location		Refer to Plan	Refer to Plan	Refer to Plan			
Level/Layer		Layer 2	Layer 2	Layer 2			
Layer Thickness	mm	200	200	200			
Test Depth	mm	175	175	175			
Field Wet Density	t/m^3	1.90	2.00	1.96			
Field Moisture Content	%	22.0	19.4	19.7			
Material:		Site Derived Clay Fill	Site Derived Clay Fill	Site Derived Clay Fill			
Oversize Material	WET, %	6.0	6.9	6.5			
Sieve Size	mm	19	19	19			
Peak Converted Wet Density	t/m^3	1.89	2.02	1.97			
Optimum Moisture Content	%	22.5	20	20			
Moisture Ratio	%	98	97	98.5			
Moisture Variation from OMC	%	-0.5 Drier	-0.5 Drier	-0.5 Drier			
Density Ratio	%	99.0	98.5	98.5			

Specification:	95% STD	**Test Selection:**	N/A
Notes:	Ref : 1120 0283-1 (SI02)		
Test Method	AS1289 5.8.1, 5.7.1, 2.1.1, 1.1	**Sampling Method:**	AS 1289 1.2.1 6.4(b)

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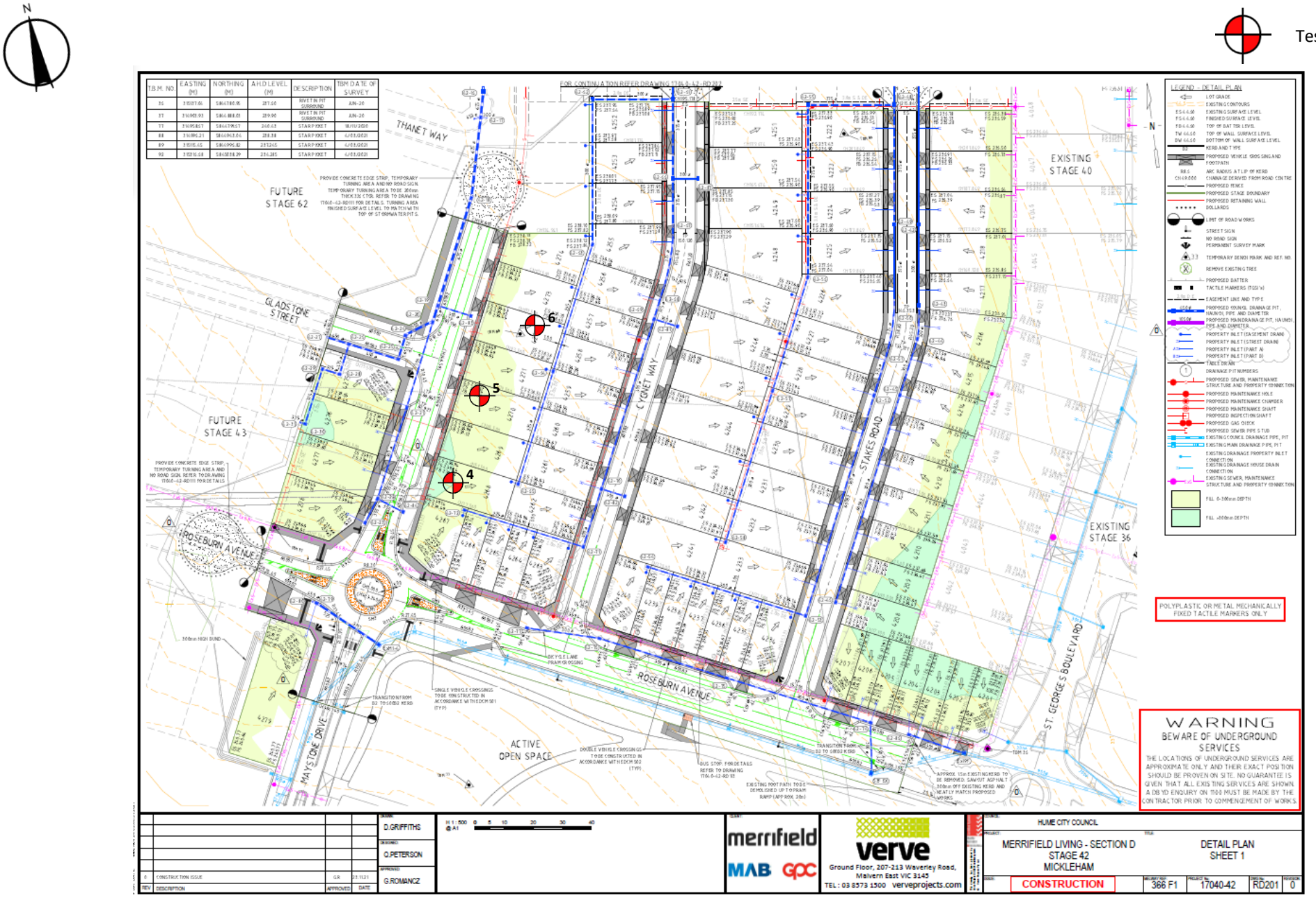
Approved Signatory:

David Burns

Date: 12/10/2021



PROJECT: Merrifield Estate – Stage 42 (Level 1)	**CLIENT:** BMD Urban	**DATE:** 08/10/2021
LOCATION: Mickleham	**PROJECT No:** 1120 0283-1 (SI02)	**SITE PLAN SKETCH—NOT TO SCALE**

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Field Density Test Results
AS1289.5.7.1

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Client:	BMD Urban			**Job No:**	BMD1890	
Project:	Merrifield Estate - Stage 42 (Level 1)			**Report:**	3	
Location:	Mickleham					

Sample No		7	8	9			
Date Tested		09/10/2021	09/10/2021	09/10/2021			
Time Tested		PM	PM	PM			
Test Location		Refer to Plan	Refer to Plan	Refer to Plan			
Level/Layer		FSL	FSL	FSL			
Layer Thickness	mm	200	200	200			
Test Depth	mm	175	175	175			
Field Wet Density	t/m^3	2.02	1.97	1.94			
Field Moisture Content	%	18.7	19.7	20.5			
Material:		Site Derived Clay Fill	Site Derived Clay Fill	Site Derived Clay Fill			
Oversize Material	WET, %	6.2	6.0	6.0			
Sieve Size	mm	19	19	19			
Peak Converted Wet Density	t/m^3	2.09	2.04	1.99			
Optimum Moisture Content	%	19	20	21			
Moisture Ratio	%	98.5	98.5	97.5			
Moisture Variation from OMC	%	-0.5 Drier	-0.5 Drier	-0.5 Drier			
Density Ratio	%	96.0	95.5	96.5			

Specification:	95% STD	**Test Selection:**	N/A
Notes:	Ref : 1120 0283-1 (SI03)		
Test Method	AS1289 5.8.1, 5.7.1, 2.1.1, 1.1	**Sampling Method:**	AS 1289 1.2.1 6.4(b)

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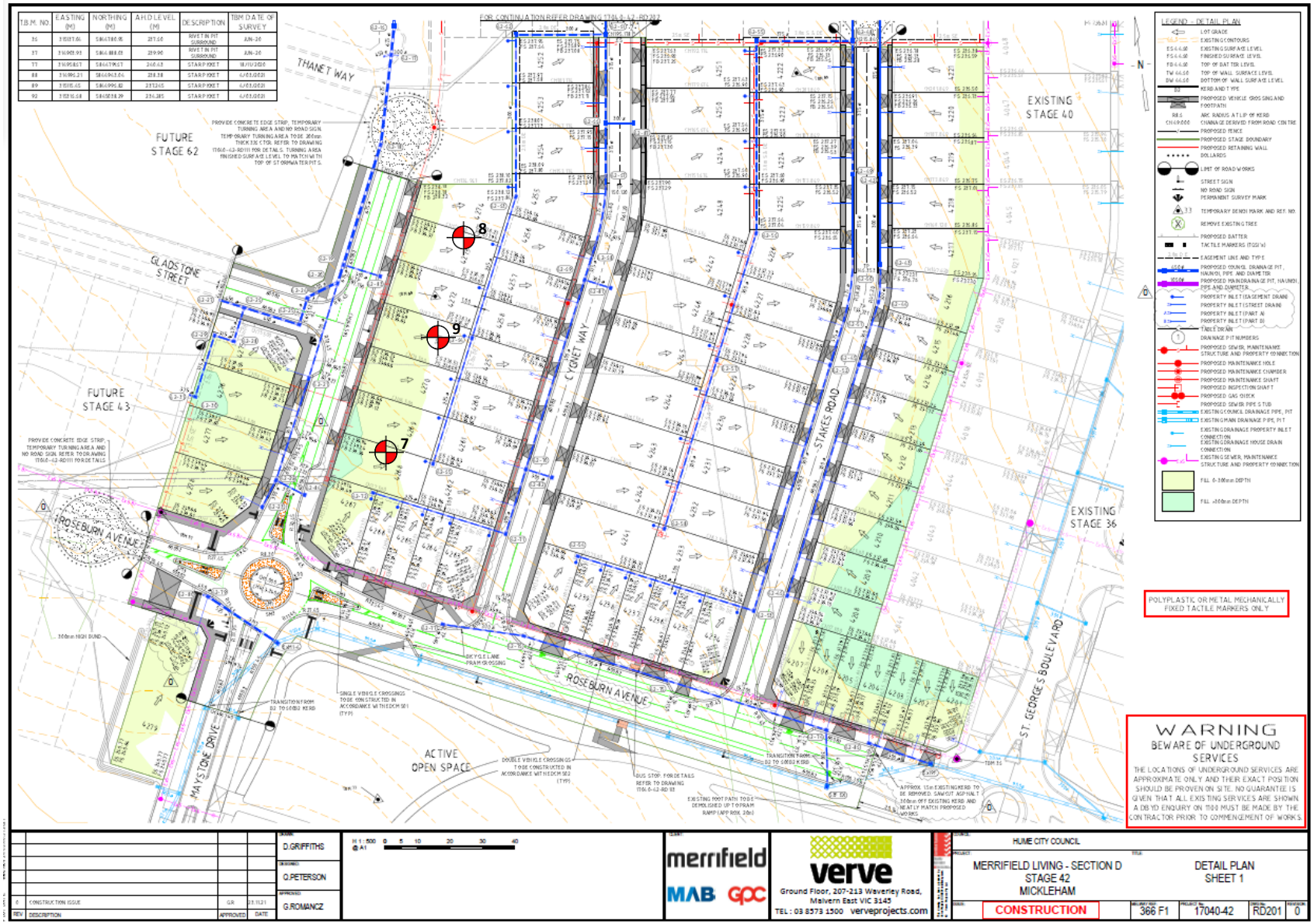
Approved Signatory:

David Burns

Date: 12/10/2021

Test Location



PROJECT: Merrifield Estate – Stage 42 (Level 1)	**CLIENT:** BMD Urban	**DATE:** 09/10/2021
LOCATION: Mickleham	**PROJECT No:** 1120 0283-1 (SI03)	**SITE PLAN SKETCH—NOT TO SCALE**

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Field Density Test Results
AS1289.5.7.1

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Client: BMD Urban **Job No:** BMD1890

Project: Merrifield Estate - Stage 42 (Level 1) **Report:** 4

Location: Mickleham

Sample No		10	11	12			
Date Tested		22/12/2021	22/12/2021	22/12/2021			
Time Tested		AM	AM	AM			
Test Location		Lot #4208 Refer to Plan	Lot #4210 Refer to Plan	Lot #4213 Refer to Plan			
Level/Layer		Layer 1	Layer 1	Layer 1			
Layer Thickness	mm	200	200	200			
Test Depth	mm	175	175	175			
Field Wet Density	t/m^3	1.99	1.99	1.95			
Field Moisture Content	%	17.8	24.5	26.3			
Material:		Site Derived Clay Fill	Site Derived Clay Fill	Site Derived Clay Fill			
Oversize Material	WET, %	6.3	6.2	5.0			
Sieve Size	mm	19	19	19			
Peak Converted Wet Density	t/m^3	2.04	2.03	1.97			
Optimum Moisture Content	%	18	25	27			
Moisture Ratio	%	99	98	97.5			
Moisture Variation from OMC	%	-0.5 Drier	-0.5 Drier	-0.5 Drier			
Density Ratio	%	96.5	97.0	98.5			

Specification: 95% STD **Test Selection:** N/A

Notes: Ref : 1120 0283-1 (SI04)

Test Method AS1289 5.8.1, 5.7.1, 2.1.1, 1.1 **Sampling Method:** AS 1289 1.2.1 6.4(b)

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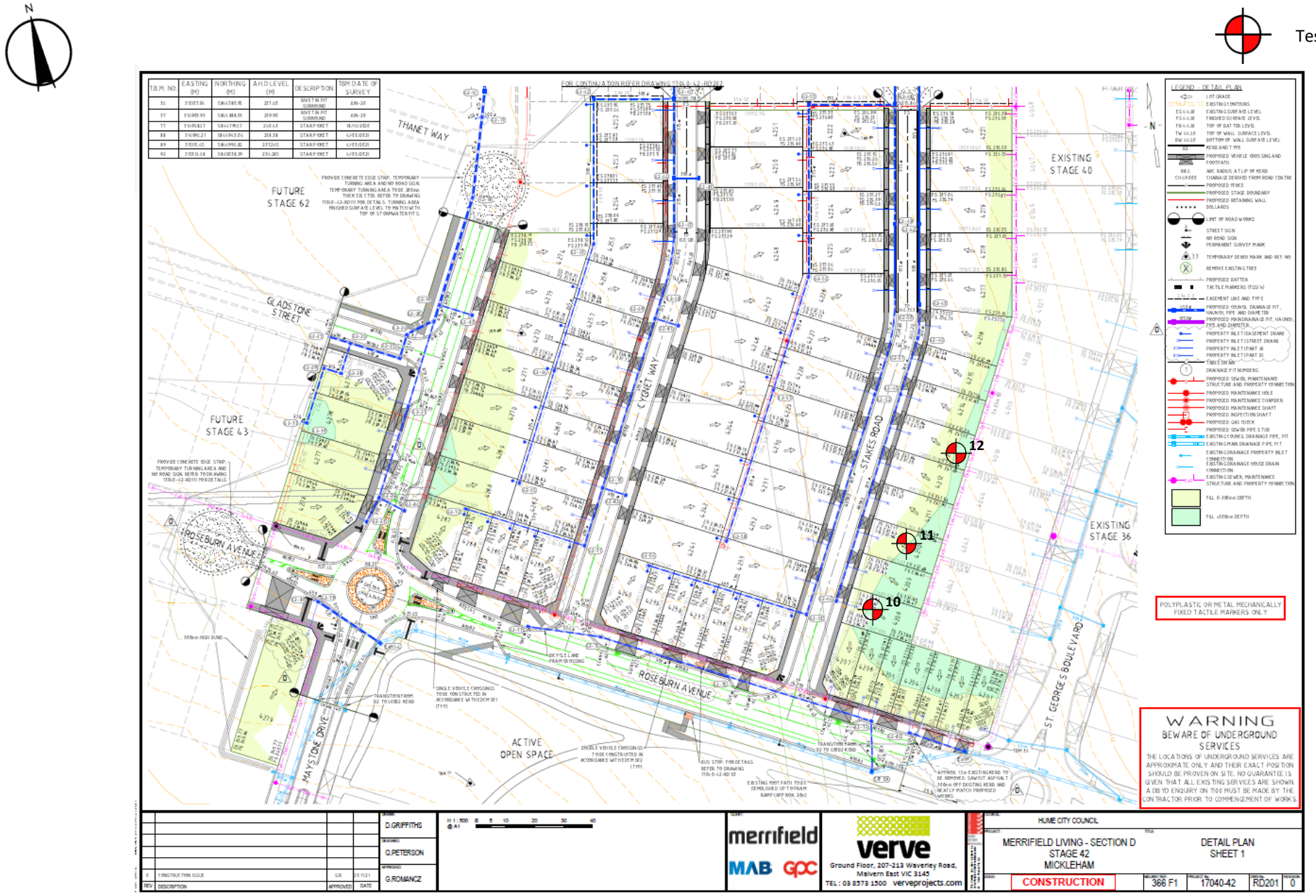
Approved Signatory: David Burns

Date: 23/12/2021



PROJECT: Merrifield Estate – Stage 42 (Level 1)	**CLIENT:** BMD Urban	**DATE:** 22/12/2021
LOCATION: Mickleham	**PROJECT No:** 1120 0283-1 (SI04)	**SITE PLAN SKETCH—NOT TO SCALE**

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Field Density Test Results
AS1289.5.7.1

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Client: BMD Urban **Job No:** BMD1890

Project: Merrifield Estate - Stage 42 (Level 1) **Report:** 5

Location: Mickleham

Sample No		13	14	15			
Date Tested		07/01/2022	07/01/2022	07/01/2022			
Time Tested		AM	AM	AM			
Test Location		Lot #4208 Refer to Plan	Lot #4212 Refer to Plan	Lot #4214 Refer to Plan			
Level/Layer		Layer 2	Layer 2	Layer 2			
Layer Thickness	mm	200	200	200			
Test Depth	mm	175	175	175			
Field Wet Density	t/m^3	1.83	1.98	1.84			
Field Moisture Content	%	17.9	15.3	16.2			
Material:		Site Derived Clay Fill	Site Derived Clay Fill	Site Derived Clay Fill			
Oversize Material	WET, %	4.0	6.0	4.5			
Sieve Size	mm	19	19	19			
Peak Converted Wet Density	t/m^3	1.86	2.00	1.86			
Optimum Moisture Content	%	21	18	19			
Moisture Ratio	%	85	85	85			
Moisture Variation from OMC	%	-3.0 Drier	-2.5 Drier	-3.0 Drier			
Density Ratio	%	97.5	98.0	98.0			

Specification: 95% STD **Test Selection:** N/A

Notes: Ref : 1120 0283-1 (SI05)

Test Method AS1289 5.8.1, 5.7.1, 2.1.1, 1.1 **Sampling Method:** AS 1289 1.2.1 6.4(b)

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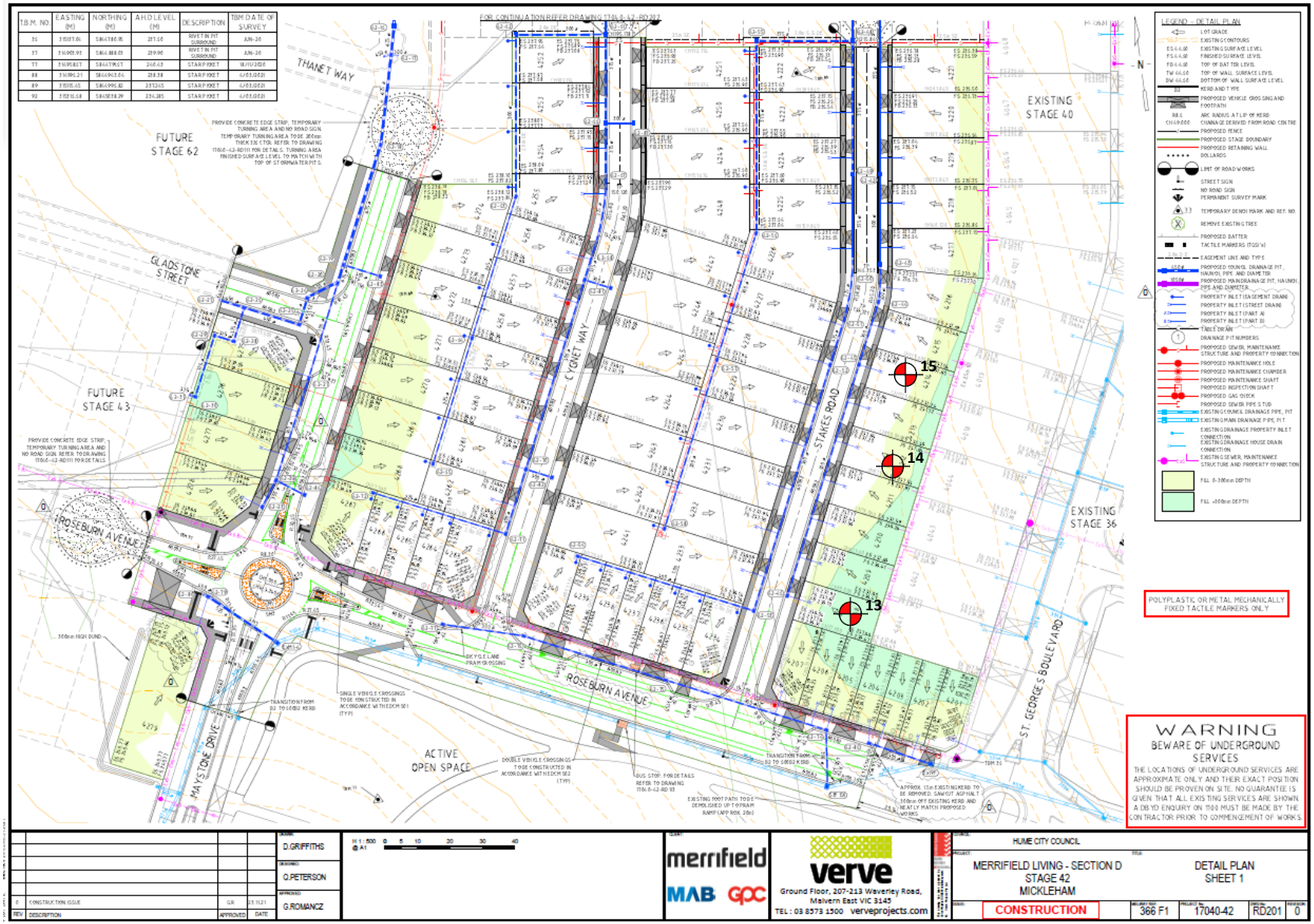
Approved Signatory: David Burns

Date: 20/01/2022

Test Location



PROJECT: Merrifield Estate – Stage 42 (Level 1)	**CLIENT:** BMD Urban	**DATE:** 07/01/2022
LOCATION: Mickleham	**PROJECT No:** 1120 0283-1 (SI05)	**SITE PLAN SKETCH—NOT TO SCALE**

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