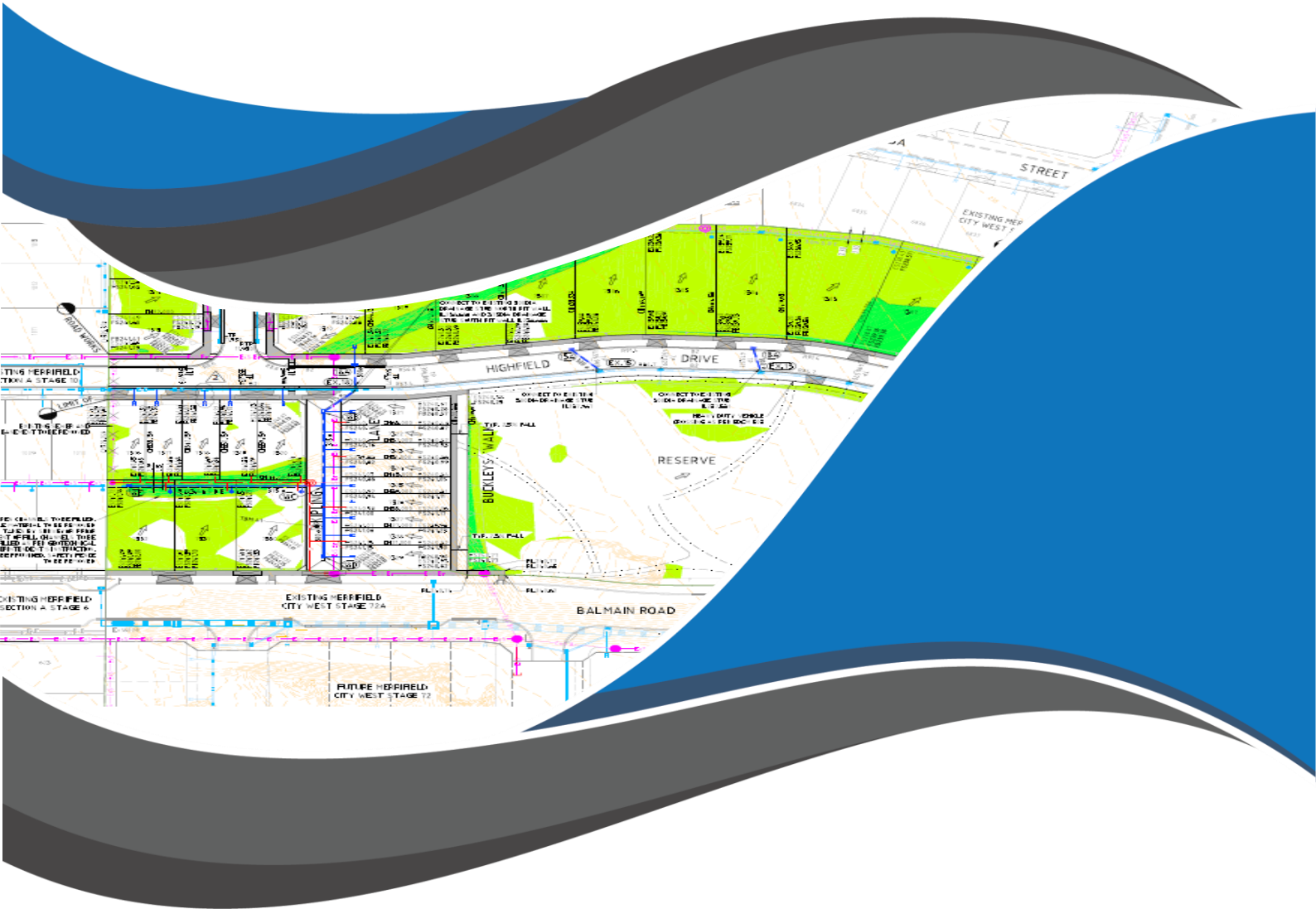


Merrifield - Stage 73 - Swale Drain, Mickleham

Level 1 Inspection & Testing Report

Reference: 1120 0236-1



Prepared for:

BMD Urban

September 2021



A&Y ASSOCIATES
GEOTECHNICAL ENGINEERING CONSULTANTS

Document Control Record

Prepared by:

A&Y Associates Pty Ltd

ABN 92 614 244 665

5/16 Network Drive

Truganina, VIC 3029

T: (03) 8754 8325

E: info@ayassociates.com.au

W: www.ayassociates.com.au

Document control

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Contact name		Alyssa Willder			
Contact number		0400 207 600			
Contact e-mail		alyssa.willder@bmd.com.au			
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Approver



Alvin Tan

(BE Civil and Infrastructure), MIEAust

Senior Geotechnical Engineer

E: alvin@ayassociates.com.au | M: 0449 288 338



ENGINEERS
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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Applicability

This report has been prepared for the benefit for our client with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

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1 Introduction

This report presents the results of the Level 1 Inspection and Testing for the construction of the fill platforms and backfilling of existing swale drain located in Merrifield - Stage 73, Mickleham.

2 Project Summary

It is understood that BMD Urban require the backfill and fill platforms within Merrifield - Stage 73, Mickleham to be performed 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 on **27th April 2021, 28th April 2021, 21st May 2021, 24th May 2021 and 25th May 2021**.

This report is applicable for fill placed by BMD Urban for the shaded areas of the following lots located in Merrifield - Stage 73, Mickleham as shown in Appendix A – Site Plan.

- Lot 7301 to Lot 7303
- Lot 7305 to Lot 7312
- Lot 7316 to Lot 7320
- Lot 7330 to Lot 7332

3 Project Specifications

No specification has been provided for the construction works in Merrifield - Stage 73, Mickleham. The supervision and inspections were performed based on AS3798. A short summary of the requirements outline in AS3798 is provided below:

- All filling in excess of 300mm depth within the building envelope of allotments shall be undertaken to specifications satisfying the requirements of AS3798.
- Material to be used for fill construction shall satisfy the requirements of AS3798-2007 "Guidelines on Earthworks for Commercial and Residential Developments". 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 performed over three (3) working days on the **27th April 2021, 21st May 2021 and 24th May 2021** as mentioned in report 1120 0236-1 (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 average fill thickness placed is ranging from 150mm to 600mm.

6 Fill Material

The fill material used for the platform consisted of site derived material which predominantly comprising of Clay.

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 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.

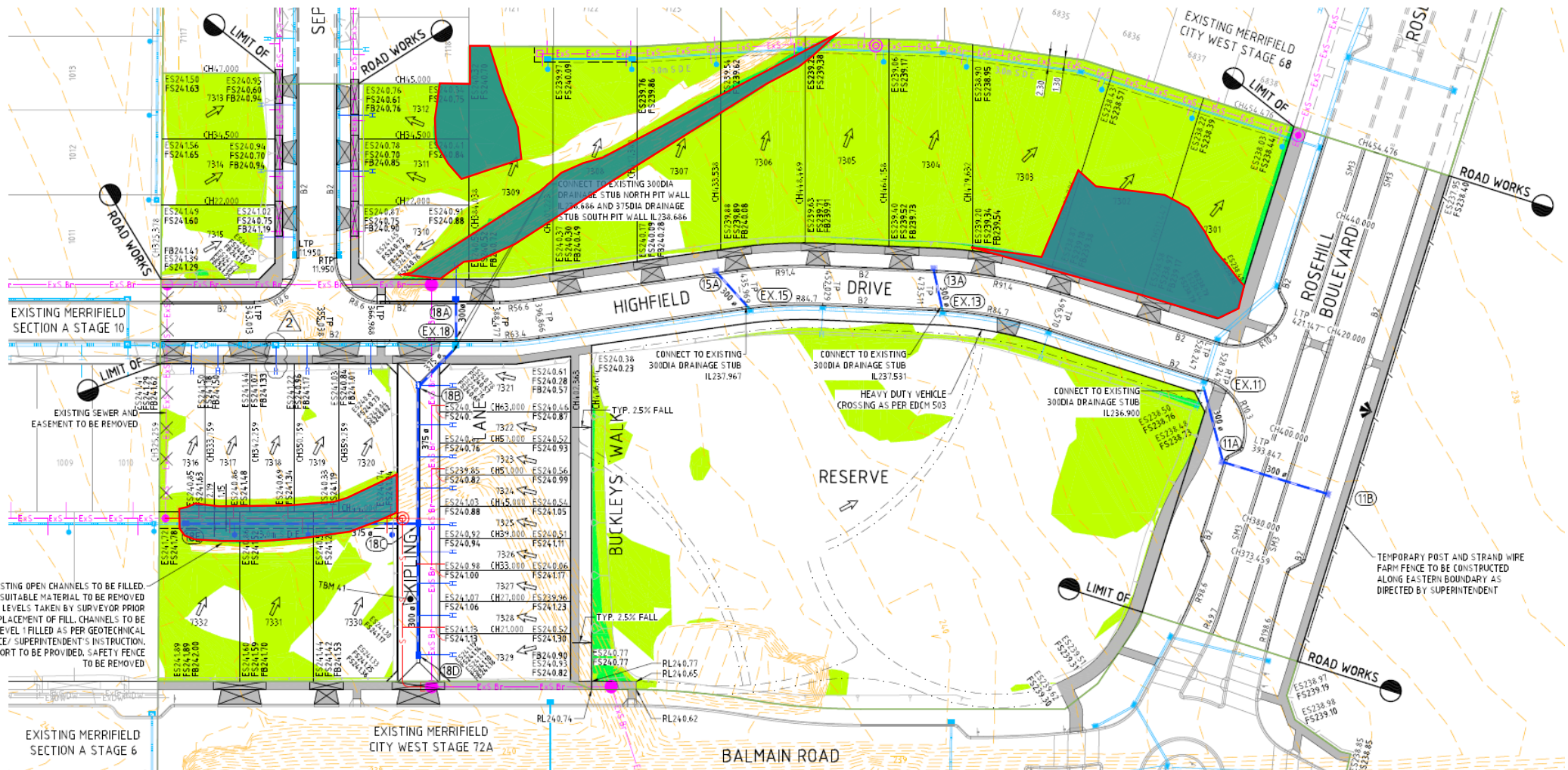
9 Conclusion


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

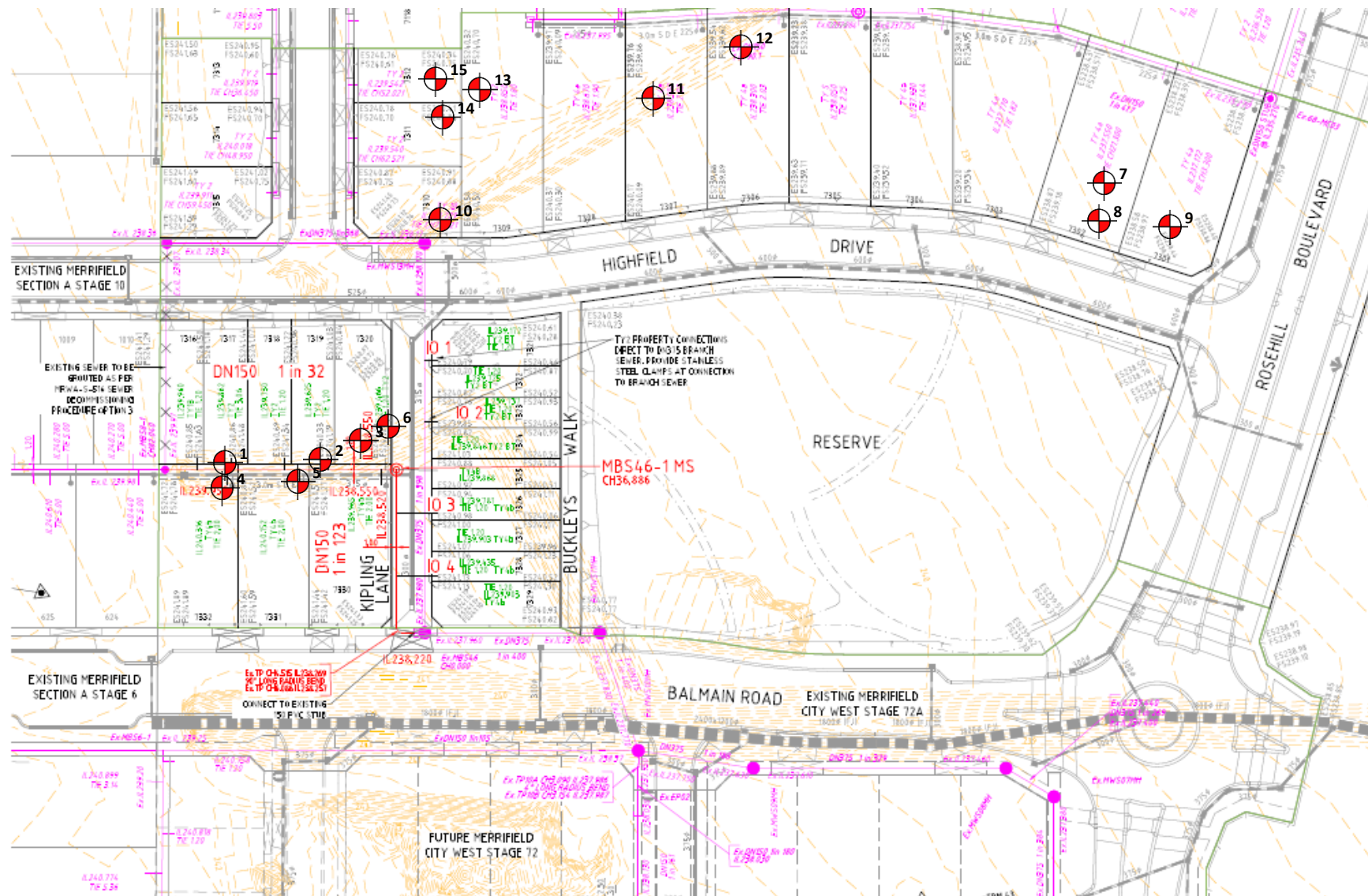


PROJECT: Merrifield - Stage 73 - Swale Drain	CLIENT: BMD Urban	SITE PLAN SKETCH—NOT TO SCALE	 A&Y ASSOCIATES GEOTECHNICAL ENGINEERING CONSULTANTS
LOCATION: Mickleham	PROJECT No: 1120 0236-1		

Appendix B – Test Locations



Indicative Test Location



PROJECT:
Merrifield - Stage 73 - Swale Drain

LOCATION:
Mickleham

CLIENT:
BMD Urban

PROJECT No:
1120 0236-1

SITE PLAN SKETCH—NOT TO SCALE

Appendix C – Test Results Summary

[illegible]

Appendix D – NATA Test Results

Field Density Test Results AS1289.5.7.1

Client:	BMD Urban			Job No:	BMD1595		
Project:	Merrifield - Stage 73 - Swale Drain (Level 1)			Report:	1		
Location:	Mickleham						



Sample No	1	2	3			
Date Tested	27/04/2021	27/04/2021	27/04/2021			
Time Tested	AM	AM	PM			

Test Location	Lot 7317	Lot 7319	Lot 7320			
Level/Layer	1	2	3			
Layer Thickness	mm 150	mm 150	mm 150			
Test Depth	mm 125	mm 125	mm 125			
Field Wet Density	t/m ³ 1.88	t/m ³ 1.89	t/m ³ 1.86			
Field Moisture Content	% 24.6	% 25.9	% 25.2			
Material:	Site Derived Clay Fill	Site Derived Clay Fill	Site Derived Clay Fill			

Oversize Material	WET, % 3.2	WET, % 3.1	WET, % 2.6			
Sieve Size	mm 19	mm 19	mm 19			
Peak Converted Wet Density	t/m ³ 1.85	t/m ³ 1.86	t/m ³ 1.86			
Optimum Moisture Content	% 27.5	% 29	% 28			

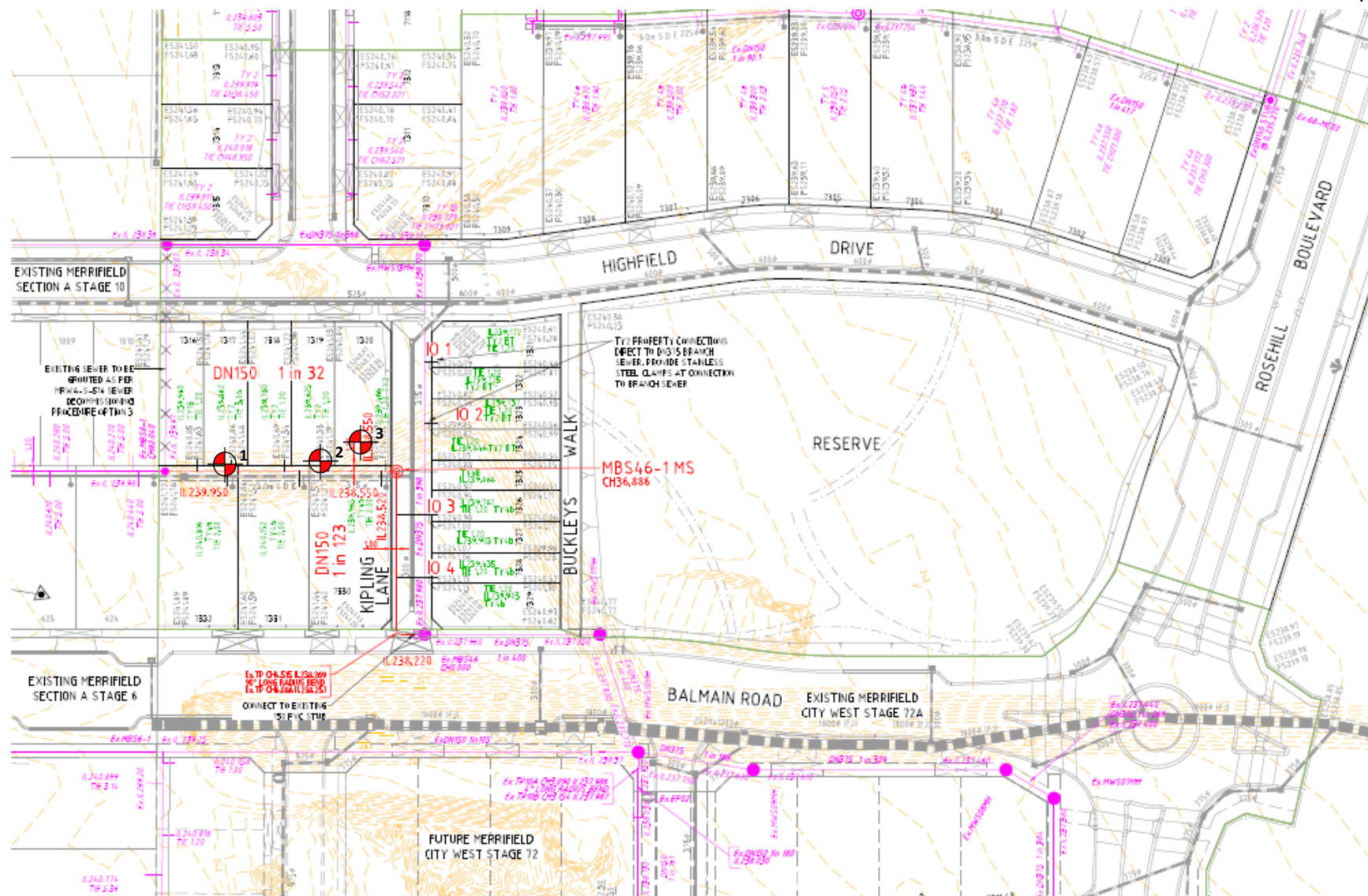
Moisture Ratio	% 89.5	% 89.5	% 90			
Moisture Variation	% -3.0	% -3.0	% -3.0			
from OMC	Drier	Drier	Drier			
Density Ratio	% 101.5	% 101.0	% 100.0			


Specification:	95% STD	Test Selection:	N/A
Notes:	Ref: 1120 0236-1 (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)

 <p>NATA WORLD RECOGNISED ACCREDITATION</p>	NATA Accredited Laboratory No. 20172	<p>Approved Signatory:</p>  <p>David Burns</p> <p>Date: 28/04/2021</p>
	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	



Test Location



PROJECT: Merrifield - Stage 73 - Swale Drain	CLIENT: BMD Urban	DATE: 27/04/2021	 A&Y ASSOCIATES GEOTECHNICAL ENGINEERING CONSULTANTS
LOCATION: Mickleham	PROJECT No: 1120 0236-1 (SI01)	SITE PLAN SKETCH—NOT TO SCALE	

Field Density Test Results AS1289.5.7.1

Client:	BMD Urban			Job No:	BMD1595		
Project:	Merrifield - Stage 73 - Swale Drain (Level 1)			Report:	2		
Location:	Mickleham						



Sample No	4	5	6			
Date Tested	28/04/2021	28/04/2021	28/04/2021			
Time Tested	AM	AM	AM			

Test Location	Lot 7332	Lot 7331	Lot 7320			
Level/Layer	4	FSL	FSL			
Layer Thickness	mm 150	150	150			
Test Depth	mm 125	125	125			
Field Wet Density	t/m ³ 1.90	1.85	1.84			
Field Moisture Content	% 22.1	23.2	25.3			
Material:	Site Derived Clay	Site Derived Clay	Site Derived Clay			

Oversize Material	WET, %	0.0	0.0	0.0		
Sieve Size	mm	19	19	19		
Peak Converted Wet Density	t/m ³	1.94	1.94	1.90		
Optimum Moisture Content	%	25.5	25.5	28.5		

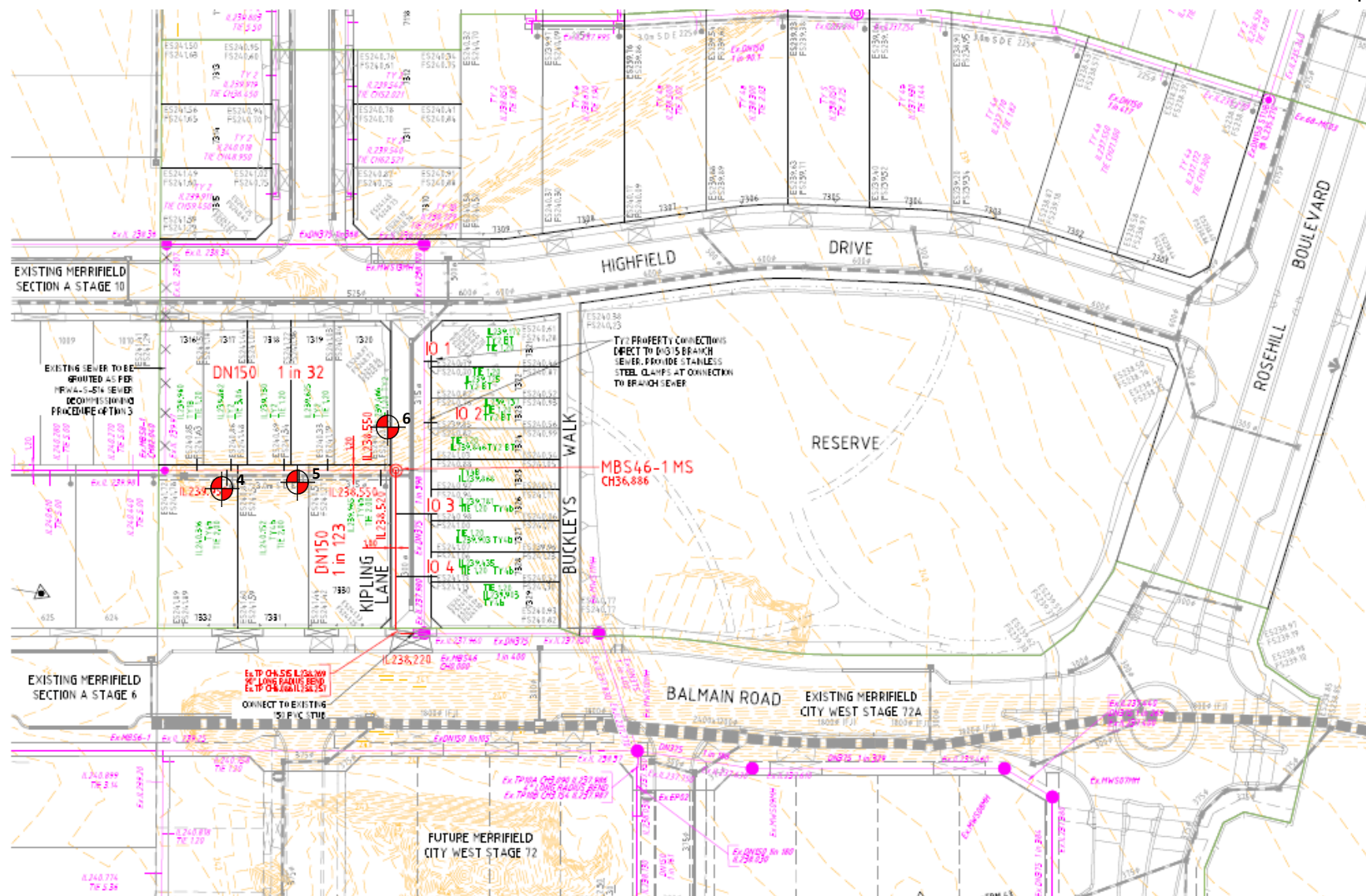
Moisture Ratio	%	86.5	91	89		
Moisture Variation	%	-3.0	-2.5	-3.0		
from OMC		Drier	Drier	Drier		
Density Ratio	%	98.0	95.5	97.0		


Specification:	95% STD	Test Selection:	N/A
Notes:	Ref: 1120 0236-1 (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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Test Location



PROJECT: Merrifield - Stage 73 - Swale Drain	CLIENT: BMD Urban	DATE: 28/04/2021	 A&Y ASSOCIATES GEOTECHNICAL ENGINEERING CONSULTANTS
LOCATION: Mickleham	PROJECT No: 1120 0236-1 (SI01)	SITE PLAN SKETCH—NOT TO SCALE	

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:	BMD1595	
Project:	Merrifield - Stage 73 - Swale Drain (Level 1)			Report:	3	
Location:	Mickleham					

Sample No	7	8	9			
Date Tested	21/05/2021	21/05/2021	21/05/2021			
Time Tested	PM	PM	PM			

Test Location	Lot #7302 Refer to Plan	Lot #7302 Refer to Plan	Lot #7301 Refer to Plan			
Level/Layer	Layer 1	Layer 1	Layer 1			
Layer Thickness	mm 200	mm 200	mm 200			
Test Depth	mm 175	mm 175	mm 175			
Field Wet Density	t/m ³ 1.90	t/m ³ 1.92	t/m ³ 1.88			
Field Moisture Content	% 20.0	% 21.0	% 20.4			
Material:	Site Derived Clay	Site Derived Clay	Site Derived Clay			

Oversize Material	WET, % 0.0	WET, % 0.0	WET, % 0.0			
Sieve Size	mm 19	mm 19	mm 19			
Peak Converted Wet Density	t/m ³ 1.96	t/m ³ 1.98	t/m ³ 1.95			
Optimum Moisture Content	% 20	% 21	% 20.5			

Moisture Ratio	% 100	% 100	% 99.5			
Moisture Variation	% 0.0	% 0.0	% 0.0			
from OMC	OMC	OMC	OMC			
Density Ratio	% 97.0	% 97.0	% 96.5			

Specification:	95% STD	Test Selection:	N/A
Notes:	Ref: 1120 0236-1 (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)

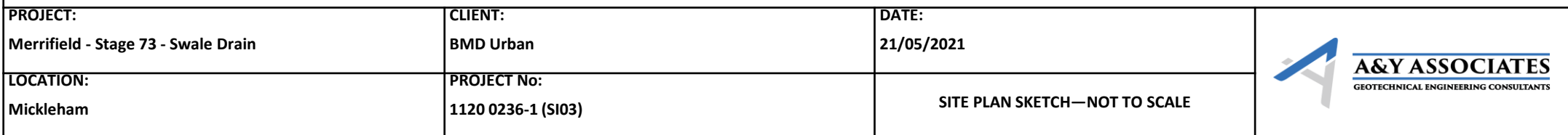
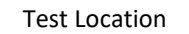


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Approved Signatory:



David Burns
Date: 06/09/2021



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:	BMD1595	
Project:	Merrifield - Stage 73 - Swale Drain (Level 1)			Report:	4	
Location:	Mickleham					



Sample No	10	11	12			
Date Tested	24/05/2021	24/05/2021	24/05/2021			
Time Tested	PM	PM	PM			

Test Location	Lot #7310 Refer to Plan	Lot #7307 Refer to Plan	Lot #7306 Refer to Plan			
Level/Layer	Layer 1	Layer 1	Layer 1			
Layer Thickness	mm 200	mm 200	mm 200			
Test Depth	mm 175	mm 175	mm 175			
Field Wet Density	t/m ³ 1.92	t/m ³ 1.90	t/m ³ 1.87			
Field Moisture Content	% 20.8	% 19.2	% 19.7			
Material:	Site Derived Clay	Site Derived Clay	Site Derived Clay			

Oversize Material	WET, % 0.0	WET, % 0.0	WET, % 0.0			
Sieve Size	mm 19	mm 19	mm 19			
Peak Converted Wet Density	t/m ³ 1.95	t/m ³ 1.93	t/m ³ 1.92			
Optimum Moisture Content	% 20.5	% 19.5	% 19.5			

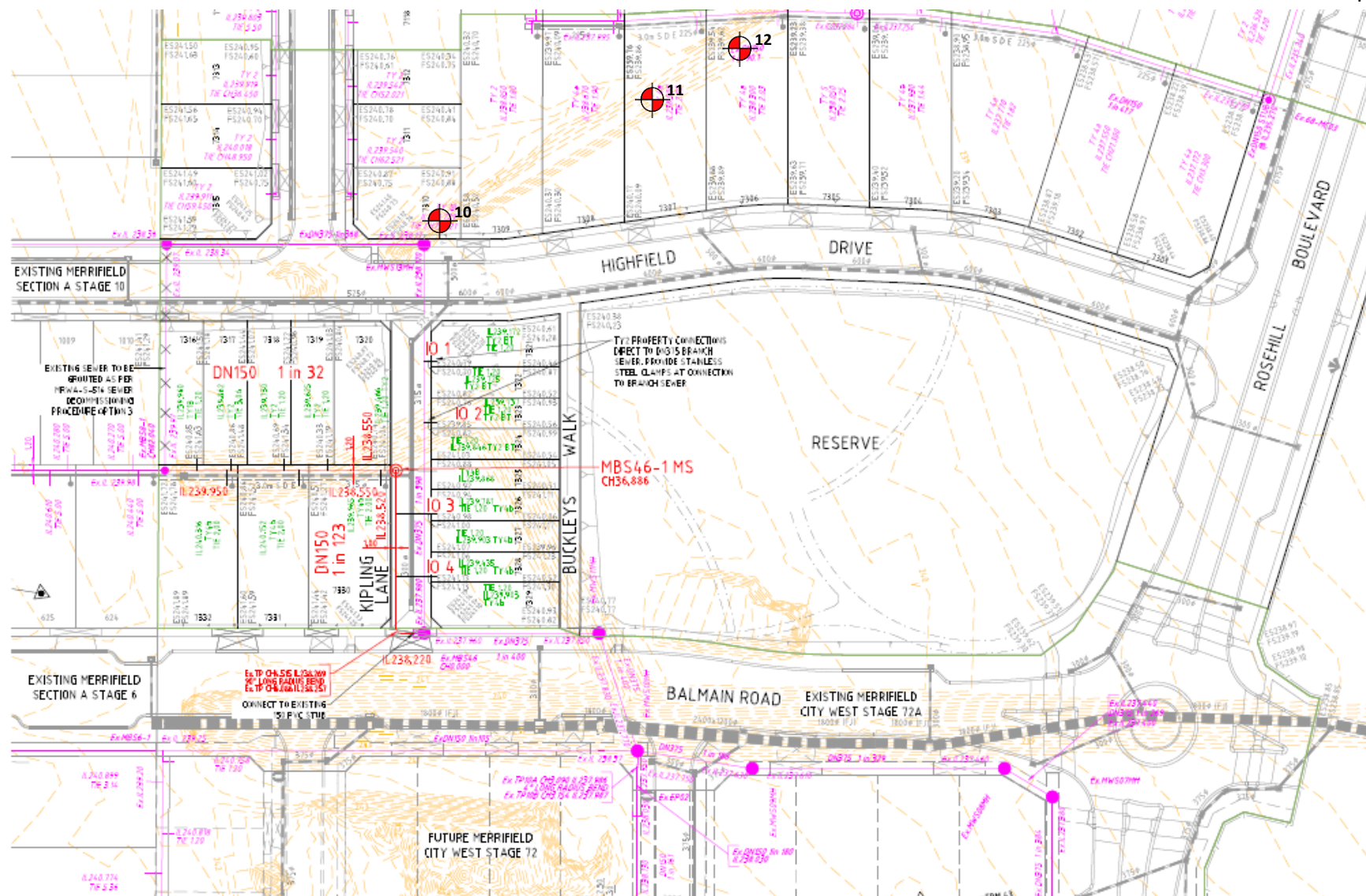
Moisture Ratio	% 101.5	% 98.5	% 101			
Moisture Variation	% 0.0	% 0.0	% 0.0			
from OMC	OMC	OMC	OMC			
Density Ratio	% 98.5	% 98.5	% 97.5			


Specification:	95% STD	Test Selection:	N/A
Notes:	Ref: 1120 0236-1 (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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	Accreditation for compliance with ISO/IEC 17025 - Testing	
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Test Location



PROJECT: Merrifield - Stage 73 - Swale Drain	CLIENT: BMD Urban	DATE: 24/05/2021	 A&Y ASSOCIATES GEOTECHNICAL ENGINEERING CONSULTANTS
LOCATION: Mickleham	PROJECT No: 1120 0236-1 (SI04)	SITE PLAN SKETCH—NOT TO SCALE	

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:	BMD1595	
Project:	Merrifield - Stage 73 - Swale Drain (Level 1)			Report:	5	
Location:	Mickleham					



Sample No	13	14	15			
Date Tested	25/05/2021	25/05/2021	25/05/2021			
Time Tested	PM	PM	PM			

Test Location	Lot #7309 Refer to Plan	Lot #7311 Refer to Plan	Lot #7312 Refer to Plan			
Level/Layer	Layer 1	Layer 1	Layer 1			
Layer Thickness	mm 200	mm 200	mm 200			
Test Depth	mm 175	mm 175	mm 175			
Field Wet Density	t/m ³ 1.88	t/m ³ 1.94	t/m ³ 1.92			
Field Moisture Content	% 18.5	% 19.3	% 20.0			
Material:	Site Derived Clay	Site Derived Clay	Site Derived Clay			

Oversize Material	WET, % 0.0	WET, % 0.0	WET, % 0.0			
Sieve Size	mm 19	mm 19	mm 19			
Peak Converted Wet Density	t/m ³ 1.93	t/m ³ 1.97	t/m ³ 2.00			
Optimum Moisture Content	% 18.5	% 19	% 20			

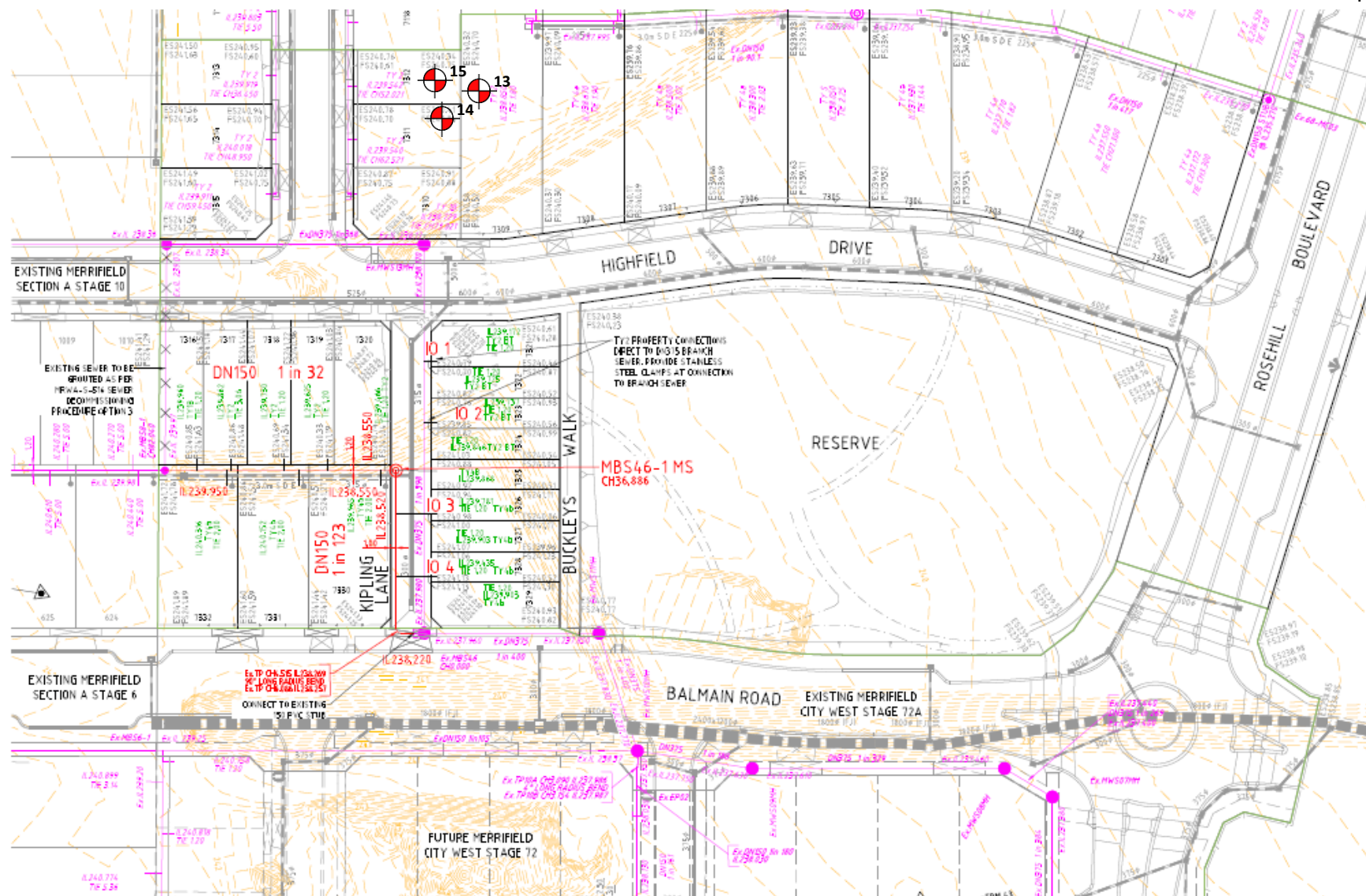
Moisture Ratio	% 100	% 101.5	% 100			
Moisture Variation	% 0.0	% 0.5	% 0.0			
from OMC	OMC	Wetter	OMC			
Density Ratio	% 97.5	% 98.5	% 96.0			


Specification:	95% STD	Test Selection:	N/A
Notes:	Ref: 1120 0236-1 (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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Test Location



PROJECT: Merrifield - Stage 73 - Swale Drain	CLIENT: BMD Urban	DATE: 25/05/2021	 A&Y ASSOCIATES GEOTECHNICAL ENGINEERING CONSULTANTS
LOCATION: Mickleham	PROJECT No: 1120 0236-1 (SI05)	SITE PLAN SKETCH—NOT TO SCALE	