LEVEL 1 INSPECTION & TESTING

|Geotechnical |Environmental | Residential |Pavements |Investigations & Design|

A&Y ASSOCIATES

GEOTECHNICAL ENGINEERING CONSULTANTS

Site: Merrifield Estate - Stage 67, Mickleham

Project No: 1120 0202-1

Prepared for:

BMD Urban

December 2020

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Revision Chart

Version	Description	Author	Reviewer	Release Approval	Release Date	Client Copy
0	*Level 1 Inspection & Testing Report*	YZ	AT	AT	10/12/2020	Soft copy (email)

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ENGINEERS AUSTRALIA

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ENGINEERS AUSTRALIA

Table of 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 67, Mickleham.

2. Project Summary

It is understood that BMD Urban require the existing swale drains within Merrifield Estate - Stage 67 to be backfilled 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 3 working days on 20th of July 2020 to 22nd of July 2020.

This report is applicable for fill placed by BMD Urban to backfill the exisiting swale drains that intercepted the following locations in Merrifield Estate - Stage 67, Mickleham, as shown in Appendix A.

- Blackmore Road
- Separation Street
- Lot 6718 to Lot 6721
- Lot 6725 to Lot 6728 and
- Lot 6730 to Lot 6732

3. Project Specifications

No specification has been provided for the construction works in Merrifield Estate - Stage 67, Mickleham. The supervision and inspections were performed based on AS3798. A short summary of the requirements outlined 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 density ratio of at least 95% Standard.

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 17th of July 2020 as mentioned in report *1120 0202-1 (SSI1).*

The exposed subgrade material comprised 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 approximately 1200mm.

6. Fill Material

The fill material used for the platform consisted of site-derived material. The site-derived material was 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).

Test were performed using 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 test per day's production based on the minimum requirements of AS 3798-2007 and taken from each layer of fill placed.

A total of 9 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 9 field density tests are shown in Appendix B - Test Locations. A summary of the test results obtained from the filed 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.

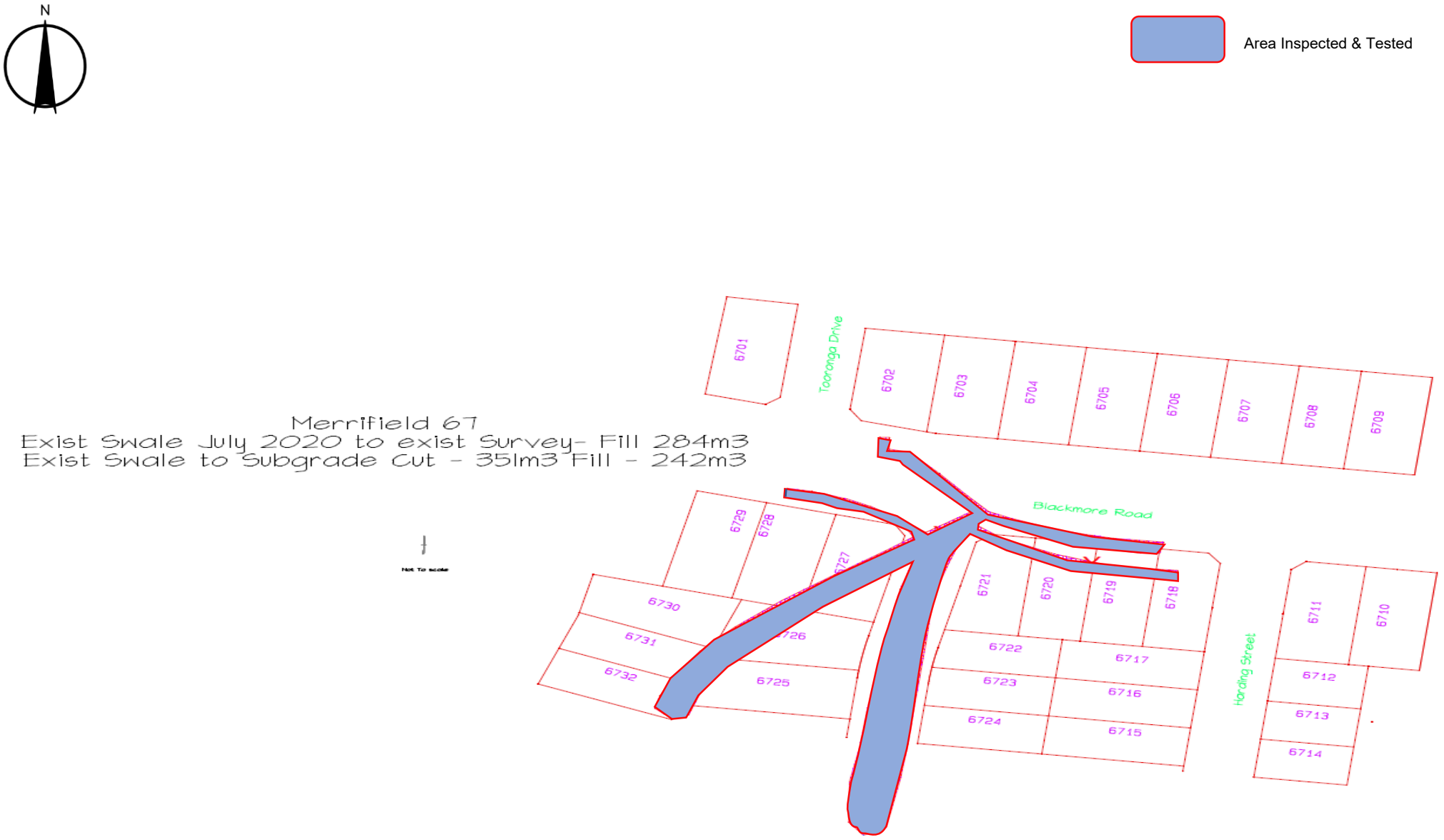
- Any trenches excavated and backfilled on site for the installation of underground services such as sewers, electrical conduits, water mains etc.
- Footpaths in front of the lots that may be excavated and filled after the Level 1 supervision conducted by A & Y Associates.
- Uncontrolled fill and topsoil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

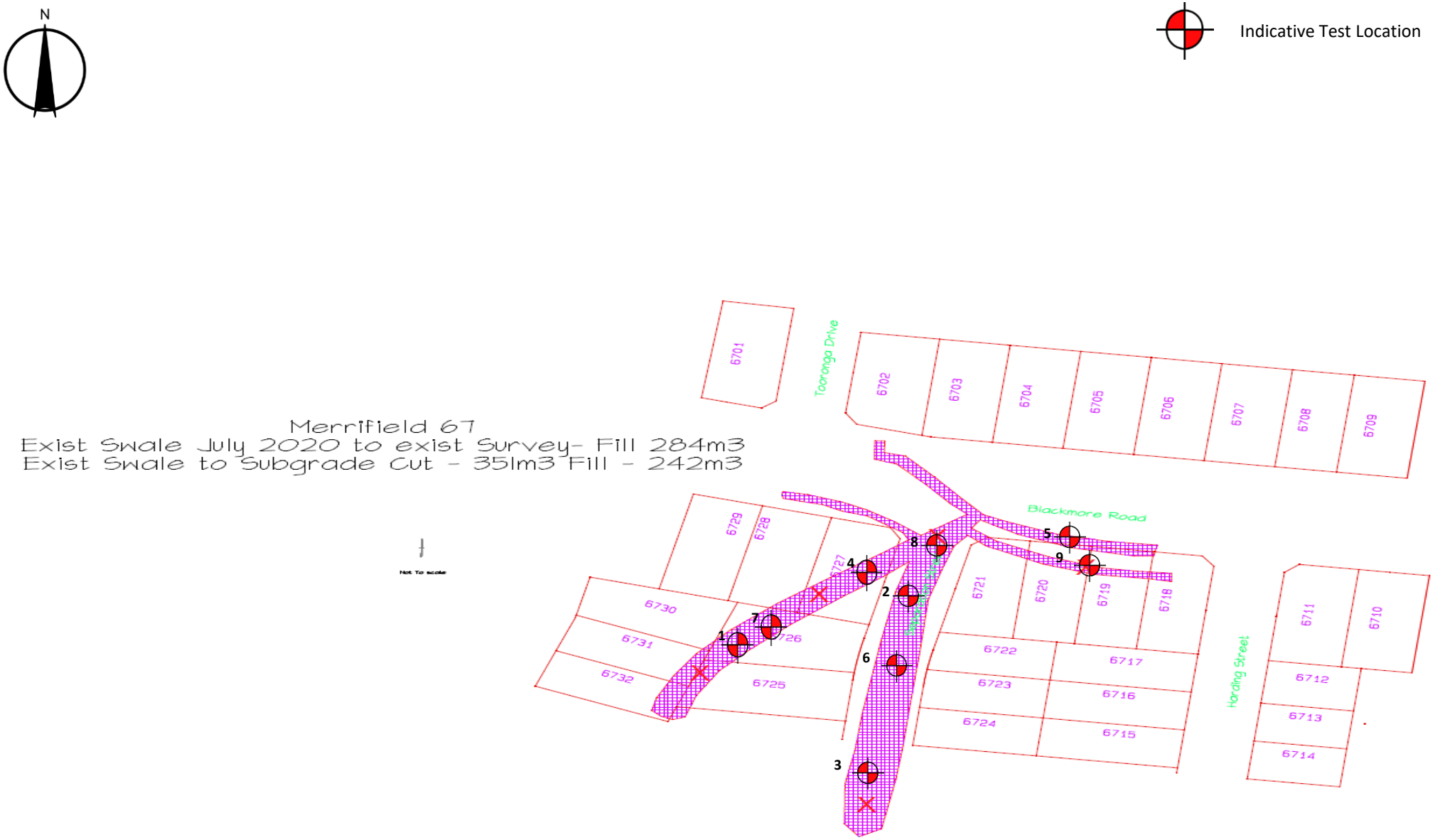
This report has been prepared for the benefit of our client with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement. No responsibility for this report will be taken by A & Y Associates if it is altered in any way, or not reproduced in full.

Appendix A – Site Plan



PROJECT: **Merrifield Estate – Stage 67**	**CLIENT:** **BMD Urban**	**SITE PLAN SKETCH—NOT TO SCALE**	A&Y ASSOCIATES GEOTECHNICAL ENGINEERING CONSULTANTS
LOCATION: **Mickleham**	**PROJECT No:** **1120 0202-1**		

Appendix B – Test Locations



PROJECT: **Merrifield Estate – Stage 67**	**CLIENT:** **BMD Urban**	**SITE PLAN SKETCH—NOT TO SCALE**	A&Y ASSOCIATES GEOTECHNICAL ENGINEERING CONSULTANTS
LOCATION: **Mickleham**	**PROJECT No:** **1120 0202-1**		

Appendix C – Test Results Summary

Project No	1120 0202-1				Client	BMD Urban				
Project Name	Merrifield Estate - Stage 67				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	-	20/07/2020	-	1	0.0	97.5	87.0	-3.0	Pass	-
2	-	20/07/2020	-	1	0.0	99.5	88.5	-3.0	Pass	-
3	-	20/07/2020	-	1	0.0	100.0	88.5	-2.5	Pass	-
4	-	21/07/2020	-	2	0.0	99.5	88.5	-3.0	Pass	-
5	-	21/07/2020	-	2	0.0	96.0	97.0	-0.5	Pass	-
6	-	21/07/2020	-	3	0.0	98.0	92.0	-2.5	Pass	-
7	-	22/07/2020	-	3	0.0	99.0	89.0	-3.0	Pass	-
8	-	22/07/2020	-	4	0.0	98.0	89.0	-3.0	Pass	-
9	-	22/07/2020	-	4	0.0	99.0	90.0	-2.5	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

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info@ayassociates.com.au

Client:	BMD Urban	**Job No:**	BMD1407
Project:	Merrifield Estate - Stage 67 (Level 1)	**Report:**	1
Location:	Swale Drains		

Sample No		1	2	3			
Date Tested		20/07/2020	20/07/2020	20/07/2020			
Time Tested		PM	PM	PM			
Test Location		Refer to Plan	Refer to Plan	Refer to Plan			
Level/Layer		1	1	1			
Layer Thickness	mm	300	300	300			
Test Depth	mm	275	275	275			
Field Wet Density	t/m^3	1.86	1.89	1.94			
Field Moisture Content	%	22.2	21.2	19.5			
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	1.91	1.90	1.94			
Optimum Moisture Content	%	25.5	24	22			
Moisture Ratio	%	87	88.5	88.5			
Moisture Variation from OMC	%	-3.0 Drier	-3.0 Drier	-2.5 Drier			
Density Ratio	%	97.5	99.5	100.0			

Specification:	95% STD	**Test Selection:**	N/A
Notes:	Ref: 1120 0202-1 (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)

NATA
WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory No. 20172

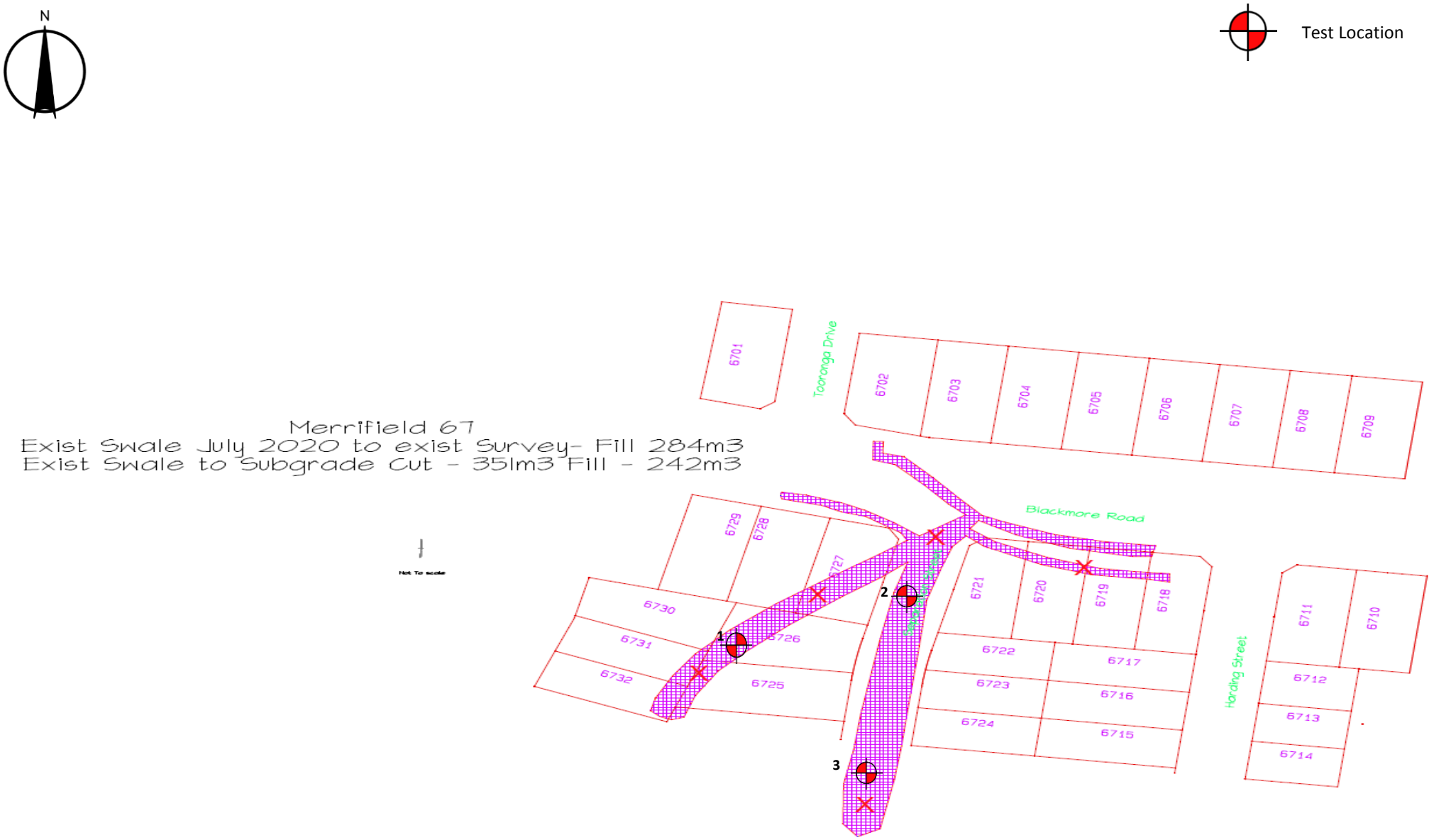
Accreditation for compliance with ISO/IEC 17025 - Testing

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

Approved Signatory:

David Burns

Date: 22/07/2020



PROJECT: **Merrifield Estate – Stage 67 (Level 1)**	**CLIENT:** **BMD Urban**	**DATE:** **20/07/2020**	A&Y ASSOCIATES GEOTECHNICAL ENGINEERING CONSULTANTS
LOCATION: **Mickleham**	**PROJECT No:** **1120 0202-1 (SI01)**	**SITE PLAN SKETCH—NOT TO SCALE**	

A&Y ASSOCIATES
GEOTECHNICAL ENGINEERING CONSULTANTS

Field Density Test Results
AS1289.5.7.1

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Client:	BMD Urban	**Job No:**	BMD1407
Project:	Merrifield Estate - Stage 67 (Level 1)	**Report:**	2
Location:	Swale Drains		

Sample No		4	5	6			
Date Tested		21/07/2020	21/07/2020	21/07/2020			
Time Tested		PM	PM	PM			
Test Location		Refer to Plan	Refer to Plan	Refer to Plan			
Level/Layer		2	2	3			
Layer Thickness	mm	300	300	300			
Test Depth	mm	275	275	275			
Field Wet Density	t/m^3	1.87	1.85	1.89			
Field Moisture Content	%	21.2	24.2	25.8			
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	1.88	1.92	1.92			
Optimum Moisture Content	%	24	25	28			
Moisture Ratio	%	88.5	97	92			
Moisture Variation from OMC	%	-3.0 Drier	-0.5 Drier	-2.5 Drier			
Density Ratio	%	99.5	96.0	98.0			

Specification:	95% STD	**Test Selection:**	N/A
Notes:	Ref: 1120 0202-1 (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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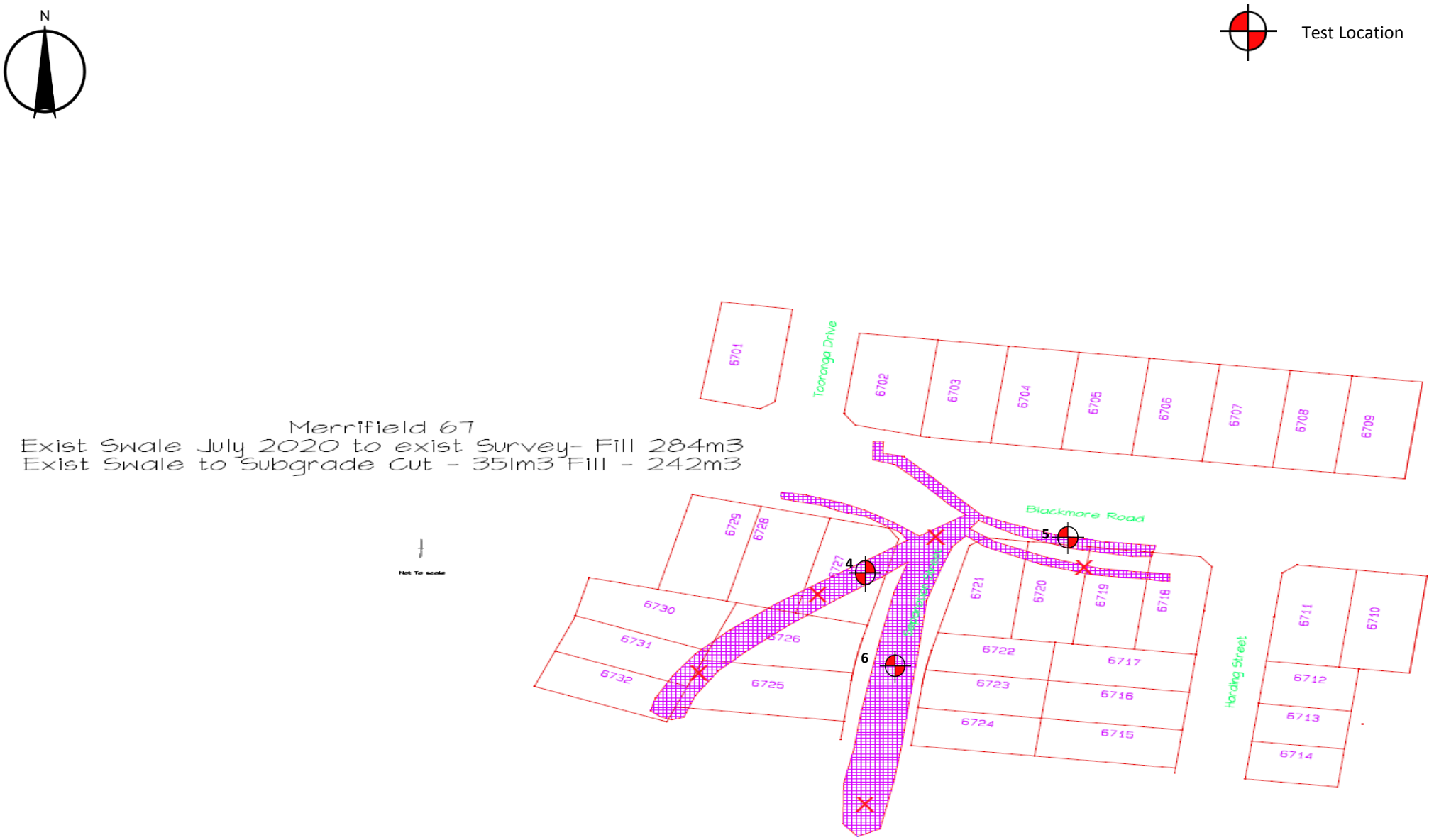
Date: 22/07/2020



PROJECT: **Merrifield Estate – Stage 67 (Level 1)**	**CLIENT:** **BMD Urban**	**DATE:** **21/07/2020**	A&Y ASSOCIATES GEOTECHNICAL ENGINEERING CONSULTANTS
LOCATION: **Mickleham**	**PROJECT No:** **1120 0202-1 (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:**	BMD1407
Project:	Merrifield Estate - Stage 67 (Level 1)	**Report:**	3
Location:	Swale Drains		

Sample No		7	8	9			
Date Tested		22/07/2020	22/07/2020	22/07/2020			
Time Tested		PM	PM	PM			
Test Location		Refer to Plan	Refer to Plan	Refer to Plan			
Level/Layer		3	4	4			
Layer Thickness	mm	300	300	300			
Test Depth	mm	275	275	275			
Field Wet Density	t/m^3	1.98	1.90	1.87			
Field Moisture Content	%	23.2	25.4	21.2			
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	2.00	1.94	1.89			
Optimum Moisture Content	%	26	28.5	23.5			
Moisture Ratio	%	89	89	90			
Moisture Variation from OMC	%	-3.0 Drier	-3.0 Drier	-2.5 Drier			
Density Ratio	%	99.0	98.0	99.0			

Specification:	95% STD	**Test Selection:**	N/A
Notes:	Ref: 1120 0202-1 (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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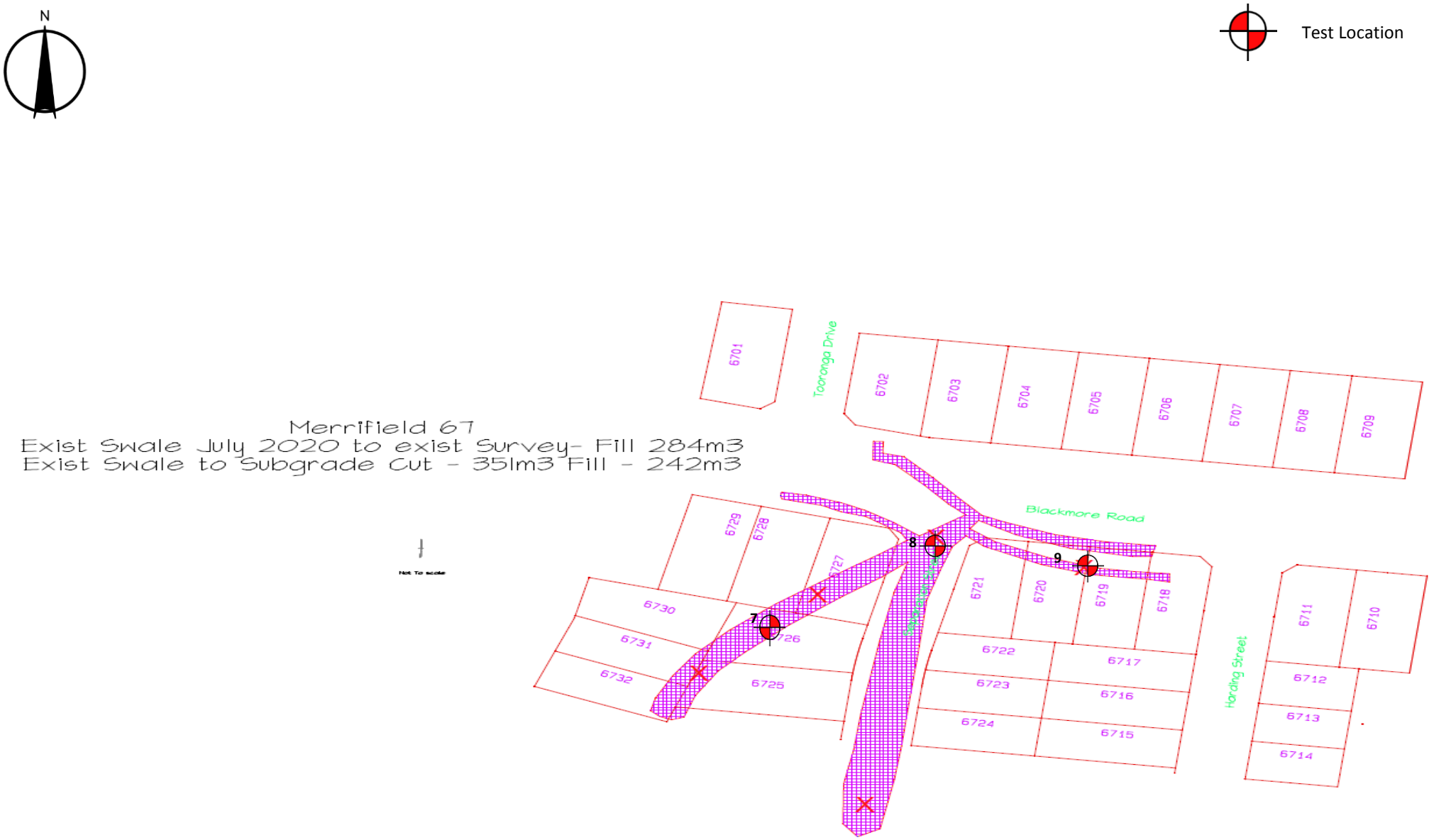
Approved Signatory:

David Burns

Date: 23/07/2020



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LOCATION: **Mickleham**	**PROJECT No:** **1120 0202-1 (SI03)**	**SITE PLAN SKETCH—NOT TO SCALE**	