MORRISON GEOTECHNIC

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Gold Coast Office
Job No: GL20/023
Ref No: 20085
Author: Ian Masman

24th June 2020

Shadforths Civil
99 Sandalwood Lane
Forest Glen Qld 4556

ATTENTION: MR LUKE SANDERS
Email: luke.sanders@shadcivil.com.au

Dear Sir,

RE: LEVEL ONE COMPLIANCE REPORT FOR BULK EARTHWORKS FILLING OPERATIONS, EVERLEIGH PRECINCT 1.5A TEVIOT ROAD, GREENBANK.

Table of Contents

1.0 INTRODUCTION

1.1 General

This report presents results of Level One Earthworks Inspections and associated Compaction Compliance testing carried out on Earthworks Fill constructed at the Everleigh Estate – Precinct 1.5A Teviot Road, Greenbank.

Earthworks operations were constructed by Shadforths Civil.

Earthwork filling operations for Precinct 1.5A were carried between 25th March 2020 and 2nd June 2020.

The areas of fill covered by this report are presented as Figure 1 and Figure 2 below.

Figure 1 presents the extent of earthworks as shown on Premise Earthworks Drawings MIR001-05-C701A

Figure 2 presents the as constructed areas and actual areas of fill as shown on Shadforths Civil survey plan Drone Flight 200605.12.

Figure 1: Extent of Fill - Premise Earthworks Drawing MIR001-05-C701A – Orange Shade

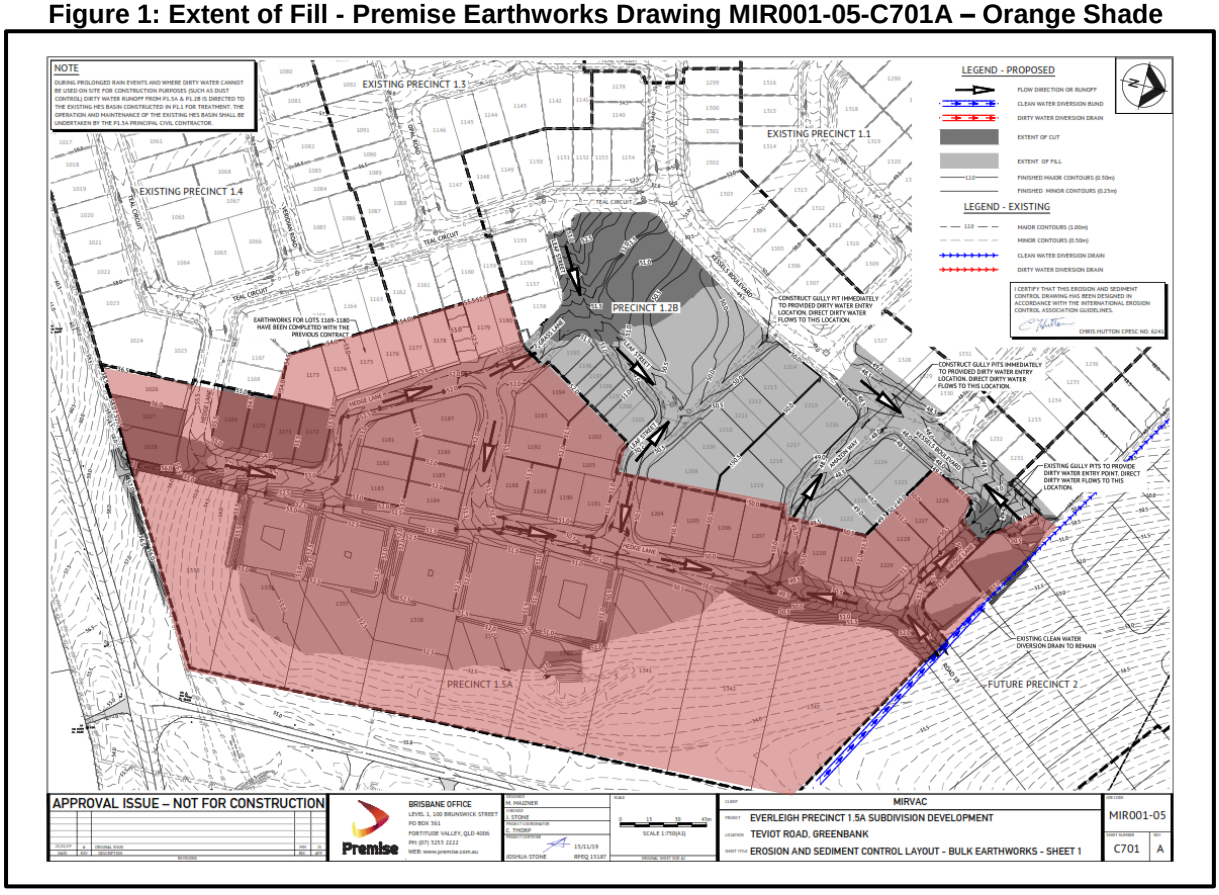
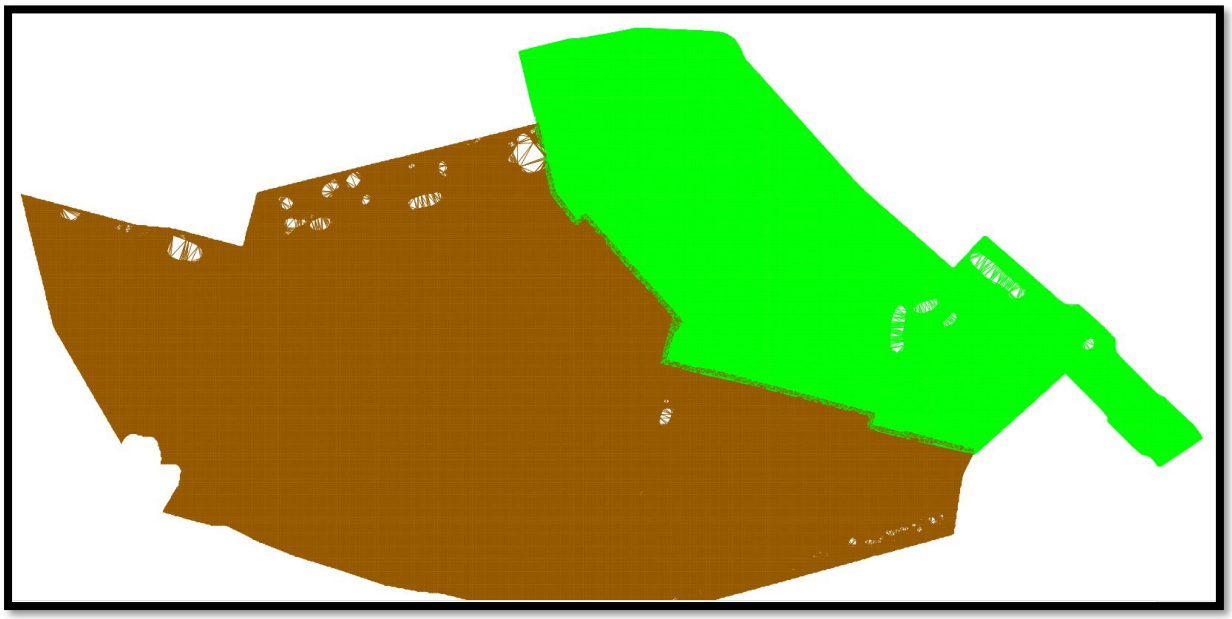


Figure 2: Actual Constructed Area of Fill – Shadforths Civil Survey Plan Drone Flight 200605.12.



1.2 Previous Earthworks

Previous Earthworks have been constructed at The Site. Details on previous earthworks are contained in the following reports attached as Appendix C:

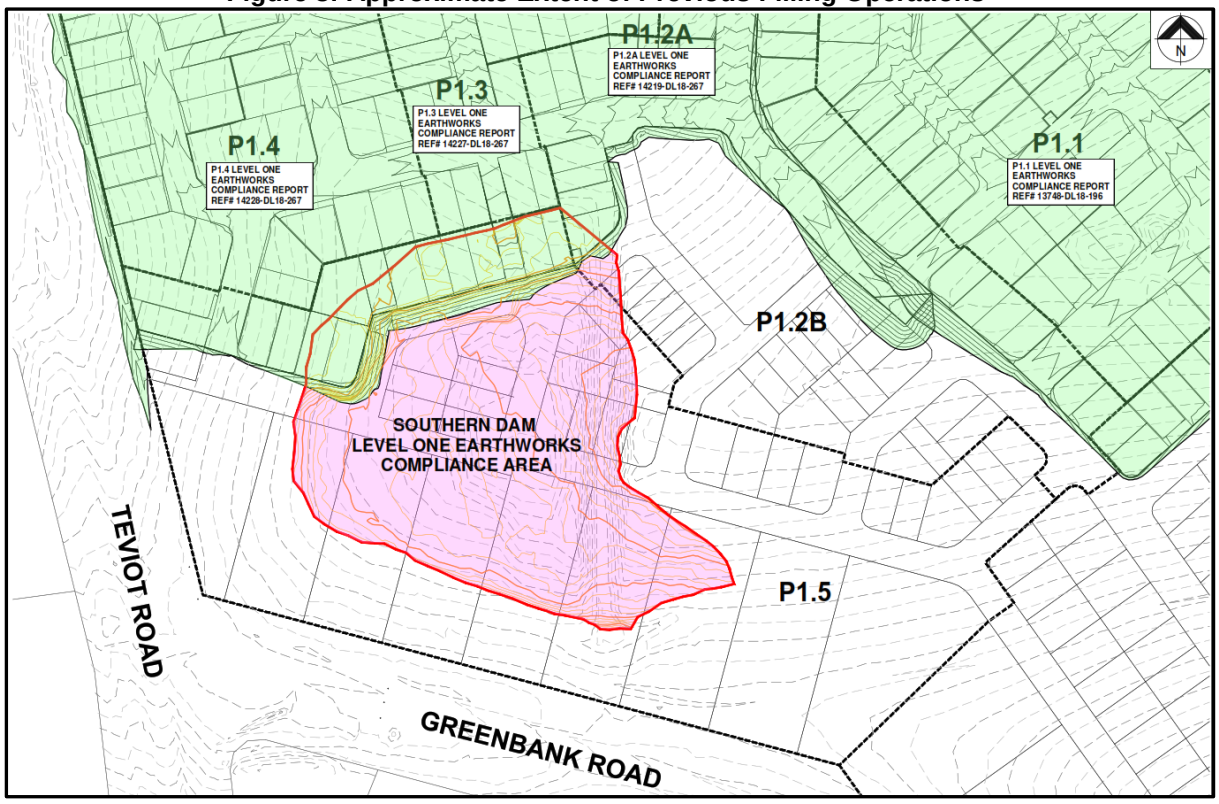
- DL19/454 – Partial Bulk Earthworks Filling Operations Southern Dam Everleigh Precinct 1.5 (Dated 2nd December 2019)
- DL19/447 - Partial Bulk Earthworks Filling Operations Southern Dam Everleigh Precinct 1.5 (Dated 27th March 2020)

The dam wall for the former dam contained existing fill. The fill in the dam wall was removed to depths exposing natural ground and the excavated materials were reused as compacted fill.

Silts from the existing dam were temporarily stored with the Precinct 1.2B area and were removed to expose competent natural ground.

The approximate extent of previous filling operations is shown as Figure 3 below.

Figure 3: Approximate Extent of Previous Filling Operations



1.3 The Project

The project includes filling operations to construct building platforms supporting proposed residences, new pavements and underground services. The Site is bounded by Precinct P1.2B, P1.3 and P1.4 to the north, Greenbank Road to the south, Teviot Road to the West and future stages to the east.

THE BRIEF

The Brief from the Client was limited to:

- Level One Inspection and Testing of the placement and compaction of fill materials in general accordance with AS3798 2007 – "Guidelines on Earthworks for Commercial and Residential Developments".
- Relative Density Control Testing in accordance with AS1289 – Testing of Soils for Engineering Purposes and at frequencies required in AS3798 Table 8.1.
- Logan City Council Requirements
- Notes On Premise Project Drawings

3.0 METHODOLOGY

Earthworks Inspections and Testing was carried out on the stripped ground surfaces and during the placement and compaction of fill materials.

Field and laboratory testing included a walk over assessments of the existing ground conditions, proof roll testing of the fill foundation, observation of filling and compaction activities and compaction testing.

3.1 Stripped Surface Assessment

The fill areas covered by this report was stripped and cleared of visible loose materials, uncontrolled fill in the existing dam, vegetation and topsoil.

The existing dam was dewatered and silts, sediments and water affected soils appropriately removed to expose competent natural ground.

Materials exposed after stripping and formed the fill foundation can be broadly summarised as:

- Existing controlled fill – compacted, Gravelly Clayey Sand (SC / GC), fine to coarse sand, fine to coarse gravel with cobbles, low to medium plasticity and moist.
- Natural - Silty Sand (SM) – At least dense, fine to medium grained sands, traces of low plasticity fines, grey – brown and moist.
- Natural – Sandy Clay (CI) – at least Very Stiff, medium plasticity, fine to medium grained sand, pale brown mottled orange and moist.
- Natural – Sandstone (XW-HW) – Extremely to Highly weathered, very low to low strength, orange – yellow brown

Following the stripped surface assessment of the fill areas, the foundation was approved for filling using the following process:

- Walk over assessments confirming that a competent natural foundation had been exposed.
- Proof roll testing using large sized truck carrying out multiple passes confirming no movement of the exposed natural foundation.
- Heavy compaction of the surface of the existing controlled fill

Picture 1: View of The Site During Stripping Operations

3.1.1 Crushed Rock Operations

Fill materials were sourced onsite and imported by Lantrak and can be broadly summarised as: -

- Import - Clayey Sand (SC), fine to coarse sand, medium plasticity fines, with fine to course gravel, yellow brown and moist.
    - Blending of silts from the existing dam were carried out at ratios appropriate for the fill profile.

- Onsite - Gravelly Sandy Clay (CI), medium plasticity fines, fine to coarse sand, fine to course gravel, yellow - brown and moist.

- Onsite - Crushed Rock with engineering properties of Gravelly Clayey Sand (SC), fine to coarse sand, fine to coarse gravel, low to medium plasticity fines with cobbles up to 200mm max.

Crushing operations were required to break down coarse rock. A large padfoot roller with vibration crusher drum was used to assist in breaking down the coarse rock.

Methodology for the rock crushing operations can be broadly summarised as: -

- Rock stockpiled in a square pattern no thicker than 400mm

- Large rock fragments were broken down by a large padfoot roller with vibration crusher drum

- Mechanical Crushing to reduce rock fragments to 200mm size or less.

- Mixing crushed product with onsite materials using a excavator and placed into stockpiles assessed to be suitable fill and earthwork operations.

Placement and compaction of the fill materials was carried out using the following plant:-

- Water Carts
- Pad Foot Roller
- Mechanical Rock Crusher
- Excavators
- Grader
- Body Trucks
- Cat 825 Compactor
- Dozer

The fill materials were moisture conditioned at the fill source and during placement to moisture contents suitable for compaction. Deleterious materials such as organics, sticks, roots and over size particles were sorted and removed during placement or were rejected for use. Occasional oversize particles including cobbles may be present in the deeper fill profile, however, are not considered to affect the fill as a mass.

Placement of the fill materials was carried out in layers appropriate for the above plant and compacted using the above plant carrying out multiple passes.

Our representative observed the filling process as described above and was assessed to be consistent for the entire thickness of fill.

Field density tests and laboratory compactions were carried out on the fill materials in accordance with Table 5.1 and 8.1 of AS3798 2007 (Guidelines on Earthworks for Commercial and Residential Developments) and tested to AS1289 test methods (Testing of Soils for Engineering Purposes).

Testing achieved the required specification of 95% of the Standard Hilf Density at the test locations.

Fill placed and compacted at measured density ratios less than 95% were tyned, moisture conditioned and re-compacted until the required specification was achieved. Retesting was carried out using Random Stratified Location methods.

The Location of the field density tests are shown on the Site Plans contained in Appendix A. These test locations and levels were not obtained by survey and therefore should only be considered as approximate.

Picture 3: View of the Site During Construction

Picture 4: View of the Site during Construction

4.0 STATEMENT OF COMPLIANCE

Our representatives observed the relevant earthworks operations including the stripped surface, fill placement and compaction operations and carried out field density tests and laboratory compaction tests in accordance with the required standard (AS3798, AS1289). Testing achieved the required specification of 95% Standard at the test locations.

It is confirmed that Level One Inspection and Testing has been carried out on the filling operation and limited to the extent shown in in Figure 2. Based on the observations made by our Geotechnicians and the results of the field and laboratory tests, the placed and compacted fill at the above project has, as far as we have been able to assess, been constructed in general accordance with the intent of AS3798.

The fill can be deemed to be “controlled” in accordance with AS2870.

5.0 EXCLUSIONS

This statement does not include any topsoil, which may be placed for use as dressing, trench backfill , areas outside the areas shown in Figures 2 or any other subsequent earthworks after May 2020.

Assessments of material quality such as soaked CBR and site classifications are excluded from this commission.

Our on-site attendance specifically excludes assessments of fill material quality and engineering properties that are outside the requirements of AS3798 – 2007.

Footings and ground slabs for any structures constructed over natural soils or controlled fill should be designed to accommodate the characteristic ground surface movements and settlement potential. Assessments of these design parameters are beyond the scope of this Report.

6.0 LIMITATIONS

This Report has been prepared by Morrison Geotechnic Pty Ltd (**Morrison Geotechnic**), and may include contributions from Morrison Geotechnic’s officers and employees, sub-contractors, sub-consultants or agents (**Contributors**).

This Report is for the sole benefit and use of Shadforths Civil Pty Ltd (**Client**), its designers, clients and relevant statutory authorities for the sole purpose of providing geotechnical advice and recommendations in respect of the Bulk Earthworks Filling Operations, Precinct 1.5A, Everleigh Estate **(Project)**. The Report is only intended to address those issues expressly described in the Brief/ Work Instructions in this Report.

This Report should not be used or relied upon for any other purpose without Morrison Geotechnic’s prior written consent. Morrison Geotechnic and the Contributors do not accept any responsibility or liability in any way whatsoever for the use or reliance of this Report by anyone other than Shadforths Civil Pty Ltd (**Client)**, its designers, its clients and relevant statutory authorities or by anyone else for any purpose other than that for which it has been prepared.

Except with Morrison Geotechnic’s prior written consent, this Report may not be:

(a) released to any other party, whether in whole or in part (other than to the Client’s officers, employees, advisers, designers, clients and relevant statutory authorities);

(b) used or relied upon by any other party.

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The information (including technical information and information obtained through discussions) on which this report is based has been provided by the Client and third parties. Morrison Geotechnic and the Contributors:

(a) have relied upon and presumed the accuracy of this information;
(b) have not verified the accuracy or reliability of this information (other than as expressly stated in this Report);
(c) have not made any independent investigations or enquiries in respect of those matters of which it has no actual knowledge at the time of giving this Report to the Client; and
(d) make no warranty or guarantee, expressed or implied, as to the accuracy or reliability of this information.

Morrison Geotechnic and the Contributors do not accept responsibility or liability for any incorrect assumptions related to this Report. For the avoidance of doubt, this Report:

(a) is not an environmental, contamination or hazardous materials assessment; may be invalid, incomplete or inaccurate (including errors in the scope of work, investigation methodology, observations, opinions and advice) where the information provided to Morrison Geotechnic was invalid, incomplete or inaccurate;
(b) is limited to observations of those parts of the site described in Section 1.0.

No warranty or guarantee, whether express or implied, is made in respect of the geotechnical data, information, advice, opinions and recommendations present in this Report.

If further information becomes available, or additional assumptions need to be made, Morrison Geotechnic reserves its right to amend this Report.

If you have any queries regarding the above, please contact our Brisbane office.

Yours faithfully

Ian Masman
For and on behalf of
MORRISON GEOTECHNIC PTY LIMITED

ATTACHMENTS:
Appendix A – Site Plans Showing Test Locations
Appendix B – Laboratory Test Results Reports
Appendix C – Previous Earthworks Reports.

Appendix A
(Site Plan showing Test Locations)

LEGEND

Test Location - GL20/023A

Test Location - GL20/023

PRECINCT 1.2B

PRECINCT 1.5A

FUTURE PRECINCT 2

EARTHWORKS FOR LOTS 1169-1180 HAVE BEEN COMPLETED WITH THE PREVIOUS CONTRACT

CONSTRUCT GULLY PIT IMMEDIATELY TO PROVIDED DIRTY WATER ENTRY LOCATION. DIRECT DIRTY WATER FLOWS TO THIS LOCATION.

CONSTRUCT GULLY PITS IMMEDIATELY TO PROVIDED DIRTY WATER ENTRY LOCATION. DIRECT DIRTY WATER FLOWS TO THIS LOCATION.

EXISTING GULLY PITS TO DIRTY WATER ENTRY PO DIRTY WATER FLOWS T LOCATION.

EXISTING CLEAN WATER DIVERSION DRAIN TO REMAIN

TEAL CIRCUIT

VERIDIAN ROAD

LEAF STREET

KESSELS BOULEVARD

GRASS LANE

HEDGE LANE

AMAZON WAY

ROAD 18

Appendix B
(Laboratory Test Reports)

Material Test Report

MORRISON GEOTECHNIC
Brisbane | Gold Coast | Maroochydore
Morrison Geotechnic Pty Ltd
ABN: 51 009 878 899
Gold Coast Laboratory
Unit 34A / 53-57 Link Drive Yatala QLD 4207
Phone: (07) 5596 1599
Email: ndobson@mgeo.com.au

Report Number: GL20/023-1
Issue Number: 1
Date Issued: 01/04/2020
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Contact: Luke, David
Project Number: GL20/023
Project Name: Everleigh Precinct 1.4 Trench Spoil - Level 1
Project Location: Everleigh Estate
Work Request: 2916
Dates Tested: 26/03/2020 - 31/03/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Remarks: AS 1289.5.7.1 and 1289.2.1.1 laboratory Testing carried out by Morrison Geotechnic's Darra Laboratory. NATA Accreditation No. 1169, Site No. 1162.
Specification: 95% STD
Site Selection: Selected by GTA
Material: General Fill
Material Source: Onsite

NATA WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Nick Dobson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1						
Sample Number	G20-2916A	G20-2916B	G20-2916C	G20-2916D	G20-2916E	G20-2916F
Test Number	1	2	3	4	5	6
Date Tested	26/03/2020	26/03/2020	26/03/2020	26/03/2020	26/03/2020	26/03/2020
Time Tested	10:00	10:05	10:10	10:15	10:20	10:25
Test Request #/Location	GENERAL FILL	GENERAL FILL	GENERAL FILL	GENERAL FILL	GENERAL FILL	GENERAL FILL
Easting	498683	498689	498715	498726	498722	498730
Northing	6931259	6931244	6931245	6931274	6931289	6931301
Elevation (m)	50.1	49.9	50.0	50.2	49.8	49.9
Soil Description	Gravelly Sandy Clay. Brown	Gravelly Sandy Clay. Brown	Gravelly Sandy Clay. Brown	Gravelly Sandy Clay. Brown	Gravelly Sandy Clay. Brown	Gravelly Sandy Clay. Brown
Test Depth (mm)	150	150	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	7.1	5.4	7.3	**	**	**
Field Wet Density (FWD) t/m^3	2.12	2.11	2.12	2.11	2.10	2.10
Field Moisture Content %	9.0	7.5	8.5	10.1	11.0	10.9
Field Dry Density (FDD) t/m^3	1.95	1.96	1.95	1.92	1.90	1.89
Peak Converted Wet Density t/m^3	**	**	**	2.08	2.07	2.09
Adjusted Peak Converted Wet Density t/m^3	2.14	2.14	2.12	**	**	**
Moisture Variation (Wv) %	**	**	**	2.0	2.0	2.0
Adjusted Moisture Variation %	2.5	2.5	2.5	**	**	**
Hilf Density Ratio (%)	**99.5**	**98.5**	**100.0**	**101.5**	**102.0**	**100.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

MORRISON GEOTECHNIC
Brisbane | Gold Coast | Maroochydore
Morrison Geotechnic Pty Ltd
ABN: 51 009 878 899
Gold Coast Laboratory
Unit 34A / 53-57 Link Drive Yatala QLD 4207
Phone: (07) 5596 1599
Email: ndobson@mgeo.com.au

Report Number: GL20/023-2
Issue Number: 1
Date Issued: 08/04/2020
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Contact: Luke
Project Number: GL20/023
Project Name: Everleigh Precinct 1.4 Trench Spoil - Level 1
Project Location: Everleigh Estate
Work Request: 2948
Dates Tested: 31/03/2020 - 02/04/2020
Sampling Method: AS 1289.1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Remarks: AS 1289.5.7.1 and 1289.2.1.1 laboratory Testing carried out by Morrison Geotechnic's Darra Laboratory. NATA Accreditation No. 1169, Site No. 1162.
Specification: 95% STD
Site Selection: Selected by GTA
Material: General Fill
Material Source: Onsite

NATA WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Nick Dobson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	G20-2948A	G20-2948B	G20-2948C	G20-2948D
Test Number	7	8	9	10
Date Tested	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Time Tested	10:00	10:05	10:10	10:15
Test Request #/Location	GENERAL FILL	GENERAL FILL	GENERAL FILL	GENERAL FILL
Easting	498741	498767	498794	498498
Northing	6931286	6931268	6931336	6931262
Elevation (m)	50.3	50.5	50.6	50.8
Soil Description	Gravelly Sandy Clay. Brown	Gravelly Sandy Clay. Brown	Gravelly Sandy Clay. Brown	Gravelly Sandy Clay. Brown
Test Depth (mm)	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	**	**	**	**
Field Wet Density (FWD) t/m^3	2.20	2.18	2.16	2.21
Field Moisture Content %	10.9	8.1	10.1	13.0
Field Dry Density (FDD) t/m^3	1.98	2.02	1.96	1.95
Peak Converted Wet Density t/m^3	2.03	2.05	2.06	2.07
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**
Moisture Variation (Wv) %	2.5	2.0	2.0	1.0
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	**108.0**	**106.0**	**104.5**	**106.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Appendix C
(Previous Earthworks Reports)

MORRISON GEOTECHNIC PTY LTD

SOLID THINKING // GROUNDED RESULTS

LEVEL ONE COMPLIANCE REPORT

Prepared for:

Shadforths Civil Pty Ltd

DL19/454 – *Partial Bulk Earthworks Filling Operations*

Southern Dam Everleigh Precinct 1.5

Teviot Road, Greenbank

Morrison Geotechnic Pty Ltd
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2nd December 2019

MORRISON GEOTECHNIC

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Brisbane Office
Job No: DL19-454
Ref No: 15645
Author: M. Morrison

2nd December 2019

Shadforths Civil Pty Ltd
99 Sandalwood Lane
Forest Glen Qld 4556

ATTENTION: MR DAVID BUGDEN
Email: david.bugden@shadcivil.com.au
Cc: leo.copelin@shadcivil.com.au

Dear Sir,

RE: LEVEL ONE COMPLIANCE REPORT FOR
PARTIAL BULK EARTHWORKS FILLING OPERATIONS
SOUTHERN DAM EVERLEIGH PRECINCT 1.5
TEVIOT ROAD, GREENBANK

Table of Contents

1.0 INTRODUCTION

1.1 General

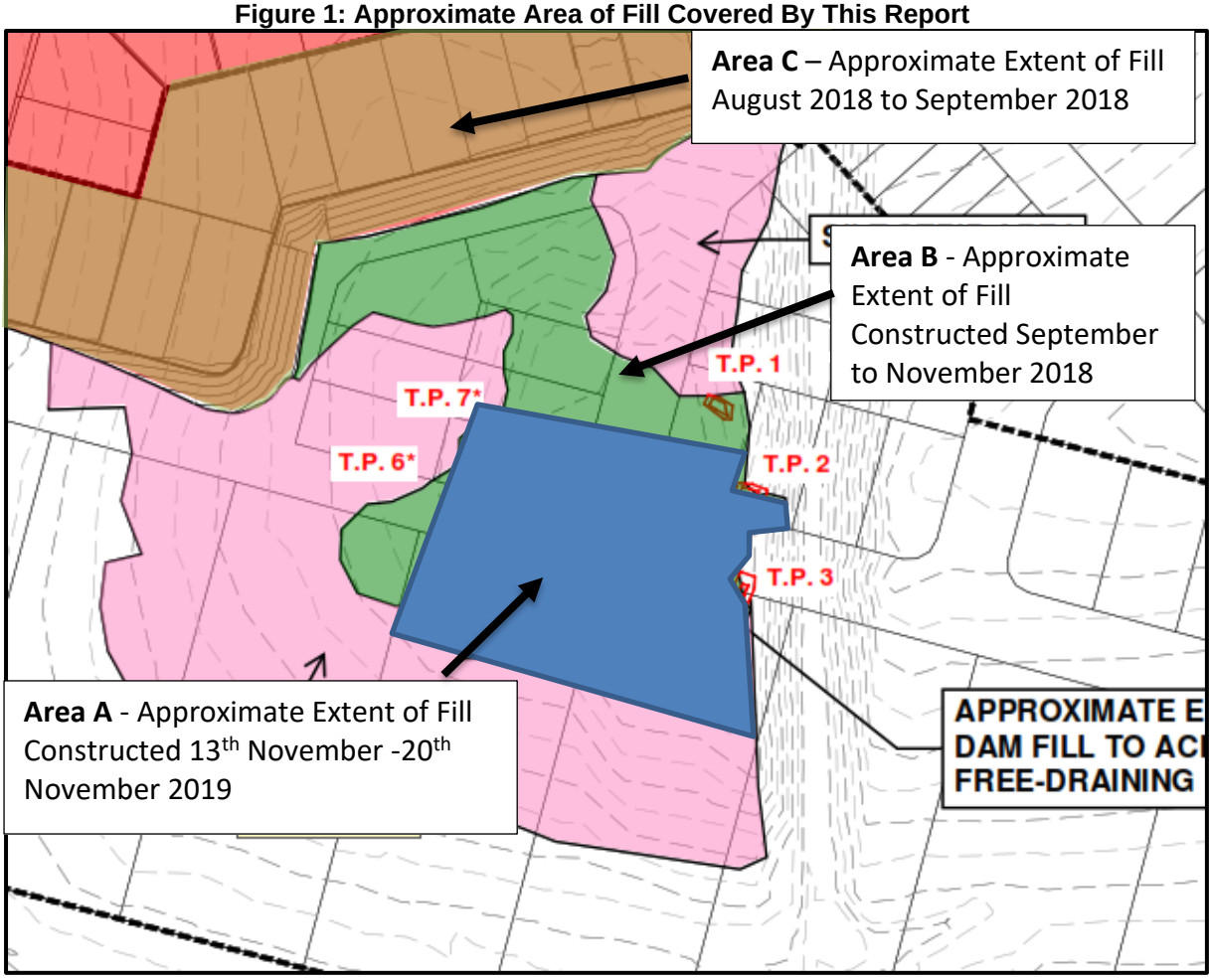
This report presents results of Level One Earthworks Inspections and associated Compaction Compliance testing carried out on Earthworks Fill constructed to partially backfill the southern Dam within Precinct 1.5 at the Everleigh Development.

Earthworks operations were constructed by Shadforths.

Partial earthworks filling operations for Precinct 1.5 were carried between the following dates: -

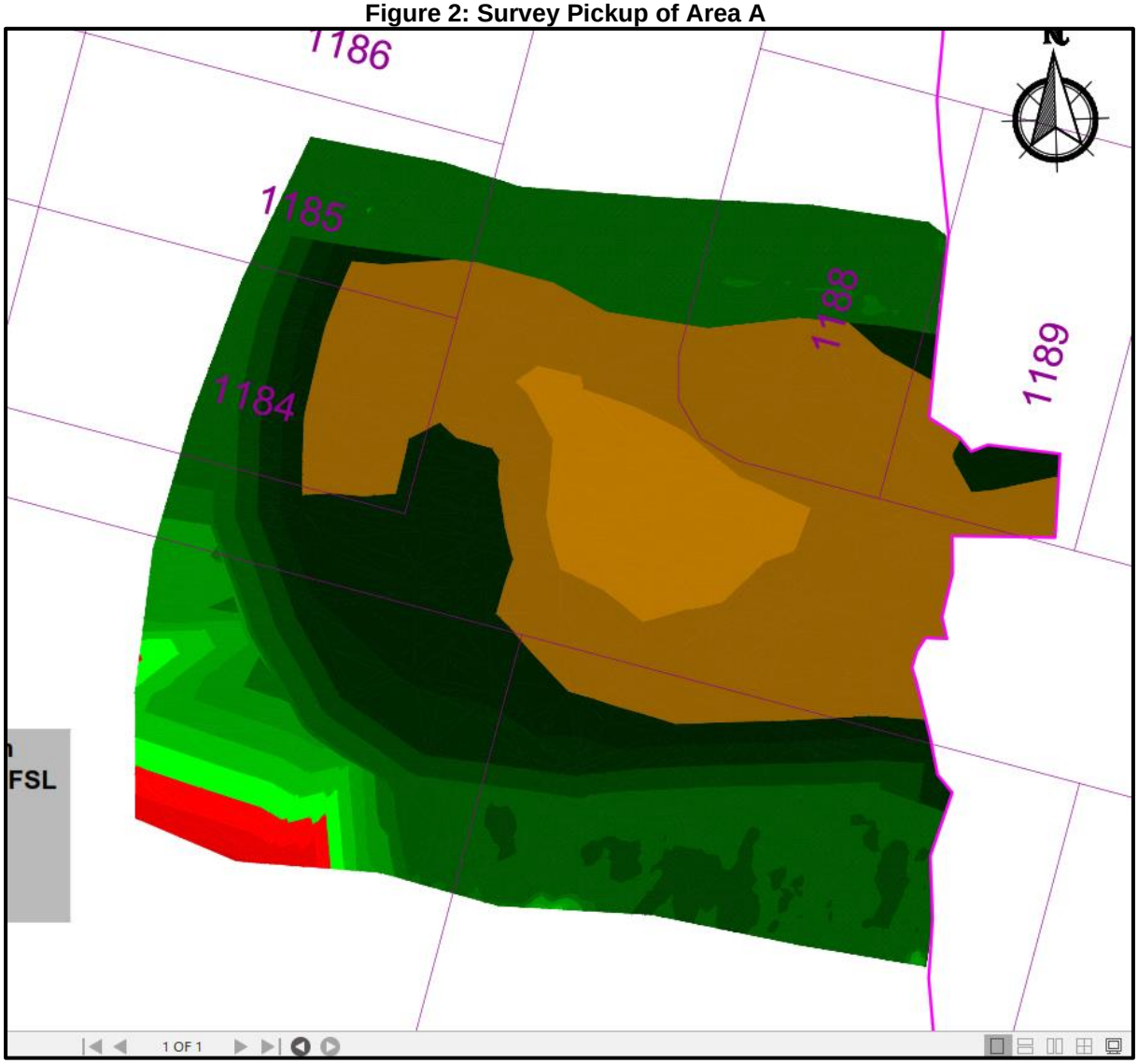
- Area A – Shown as Blue in Figure 1 - 13th November to 20th November 2019.
- Area B – Shown as Green in Figure 1 - Intermittently between September 2018 and November 2018 and
- Area C – Shown as brown in Figure 1 – intermittently between August 2018 and September 2018

Figure 1: Approximate Area of Fill Covered By This Report



A survey pickup of works carried out as a part of Area A is presented below as Figure 2.

Figure 2: Survey Pickup of Area A



1.2 Previous Earthworks

Previous earthworks filling was present at The Site. The existing fill was associated with the former Dam Wall. Fill associated with the Dam Walls is excluded from this report.

The site has also been used to stockpile rock and other materials. Rock and other material stockpiles are excluded from this report. Any fill within the pink areas in Figure 1 is excluded from this report.

1.3 The Project

The purpose for filling at The Site was to remediate and partially backfill the existing dam

2.0 THE BRIEF

The Brief from the Client was limited to:

- Level One Inspection and Testing of the placement and compaction of fill materials in general accordance with AS3798 2007 – “Guidelines on Earthworks for Commercial and Residential Developments”.

- Relative Density Control Testing in accordance with AS1289 – Testing of Soils for Engineering Purposes and at frequencies required in AS3798 Table 8.1.

3.0 METHODOLOGY

Earthworks Inspection and Testing was carried out on the excavated ground surfaces and during the placement and compaction of fill materials.

Field and laboratory testing included a walk over assessments of the existing ground conditions, observation of filling and compaction activities and field density testing using a nuclear soil moisture density gauge and Hilf compactions.

3.1 Stripped Surface Assessment

The area covered by this report was stripped and cleared of visible loose materials, vegetation and topsoil.

Materials exposed after stripping and formed the fill foundation can be broadly summarised as:

- Natural - Silty Sand (SM) – At least dense, fine to medium grained sands, traces of low plasticity clay, grey – brown and moist.
- Natural – Sandy Clay (CI) – Very stiff, medium plasticity, fine to medium grained sand, pale brown mottled orange and moist.
- Natural – Sandstone (XW-DW) – Extremely weathered to slightly weathered, low to medium strength, orange – yellow with red and grey streaks.

Following the stripped surface assessment of the fill areas, the foundation was approved for filling using the following process:

- Walk over assessments confirming that a competent natural foundation had been exposed.
- Proof roll testing using large sized truck carrying out multiple passes confirming no movement of the exposed natural foundation.

Picture 2: View of The Site During Stripping Operations

3.2 Filling Operations

Fill materials were sourced onsite and can be. broadly summarised as: -

- Crushed Rock – Limited to some of the fill areas within the old dam greater than 3.0m below the final earthworks levels
- Clayey Sand (SC), fine to coarse sand, medium plasticity fines, with fine to course gravel, yellow brown and moist.
- Gravelly Sandy Clay (CI), medium plasticity fines, fine to coarse sand, fine to course gravel, yellow - brown and moist.

Placement and compaction of the fill materials was carried out using the following plant:

- Water Cart
- Excavator
- 815 Compactor
- Pad Foot Roller
- Grader
- Articulated Dump Truck
- Dozer
- Scraper
- Mechanical Rock Crusher

The fill materials were moisture conditioned at the fill source and during placement to moisture contents suitable for compaction. Deleterious materials such as organics, sticks, roots and over size particles were sorted and removed during placement or were rejected for use. Occasional oversize particles including cobbles and boulders may be present in the deeper fill profile, however are not considered to affect the fill as a mass.

Placement of the fill materials was carried out in layers appropriate for the above plant and compacted using the above plant carrying out multiple passes.

Our representative observed the filling process as described above and was assessed to be consistent for the entire thickness of fill.

Field density tests and laboratory compactions were carried out on the fill materials in accordance with Table 5.1 and 8.1 of AS3798 2007 (Guidelines on Earthworks for Commercial and Residential Developments) and tested to AS1289 test methods (Testing of Soils for Engineering Purposes).

Testing achieved the required specification of 95% of the Hilf Density at the test locations.

Fill placed and compacted at measured density ratios less than 95% were tyned, moisture conditioned and re-compacted until the required specification was achieved. Retesting was carried out using Random Stratified Location methods.

The Location of the field density tests are shown on the Site Plans contained in Appendix A. These test locations and levels were not obtained by survey and therefore should only be considered as approximate.

3.2.1 Rock Fill Operations

In some fill areas within the dam and below 3.0m from the final earthworks levels, rock fill operations were undertaken.

Methodology for the rock filling operations was in performed in generally accordance with AS3798 - 2007 and can be summarised as: -

- Rock was placed in layers not exceeding 500mm before being moisture conditioned and heavily trafficked and compacted using an 825 Compactor.
- Rock was compacted to ensure it was well bedded and interlocked with no “stand-up” fragments or rock pieces protruding above the surface layer.
- The finished layer was then further trafficked by a pad foot vibrating compactor to provide a finish of well interlocked rock pieces.

Picture 4: View of the Site During Construction

Picture 5: View of the Site During Construction

4.0 STATEMENT OF COMPLIANCE

Our representatives observed the relevant earthworks operations including the stripped surface, fill placement and compaction operations and carried out field density tests and laboratory compaction tests in accordance with the required standard (AS3798, AS1289). Testing achieved the required specification of 95% Standard at the test locations.

It is confirmed that Level One Inspection and Testing has been carried out on the partial backfilling operation and limited to the extent shown in in Figure 1 and Figure 2 . Based on the observations made by our Geotechnicians and the results of the field and laboratory tests, the placed and compacted fill at the above project has, as far as we have been able to assess, been constructed in general accordance with the intent of AS3798.

The fill can be deemed to be “controlled” in accordance with AS2870.

It is understood that additional filling will be required to complete the earthworks to the final earthworks levels.

5.0 EXCLUSIONS

This statement does not include any top soil, which may be placed for use as dressing, trench backfill , areas outside the areas shown in Figure1 and Figure 2 or any other subsequent earthworks after November 2019.

Assessments of material quality such as soaked CBR and site classifications are excluded from this commission.

Our on-site attendance specifically excludes assessments of fill material quality and engineering properties that are outside the requirements of AS3798 – 2007.

Footings and ground slabs for any structures constructed over natural soils or controlled fill should be designed to accommodate the characteristic ground surface movements and settlement potential.

Assessments of these design parameters are beyond the scope of this Report.

6.0 LIMITATIONS

This Report has been prepared by Morrison Geotechnic Pty Ltd (**Morrison Geotechnic**), and may include contributions from Morrison Geotechnic’s officers and employees, sub-contractors, sub-consultants or agents (**Contributors**).

This Report is for the sole benefit and use of Shadforths Civil Pty Ltd (**Client**), its designers, clients and relevant statutory authorities for the sole purpose of providing geotechnical advice and recommendations in respect of the Partial Bulk Earthworks Filling Operations , Southern Dam Everleigh Precinct 1.5 **(Project)**. The Report is only intended to address those issues expressly described in the Brief/ Work Instructions in this Report.

This Report should not be used or relied upon for any other purpose without Morrison Geotechnic’s prior written consent. Morrison Geotechnic and the Contributors do not accept any responsibility or liability in any way whatsoever for the use or reliance of this Report by anyone other than Shadforth Civil Pty Ltd (**Client)**, its designers, its clients and relevant statutory authorities or by anyone else for any purpose other than that for which it has been prepared.

Except with Morrison Geotechnic’s prior written consent, this Report may not be:

(a) released to any other party, whether in whole or in part (other than to the Client’s officers, employees, advisers, designers, clients and relevant statutory authorities);

(b) used or relied upon by any other party.

Morrison Geotechnic and the Contributors, do not accept any liability or responsibility whatsoever for, or in respect of, any use or reliance upon this Report by any other party. Morrison Geotechnic is not obliged to enter into discussions with any third party in respect of this Report.

The information (including technical information and information obtained through discussions) on which this report is based has been provided by the Client and third parties. Morrison Geotechnic and the Contributors:

(a) have relied upon and presumed the accuracy of this information;
(b) have not verified the accuracy or reliability of this information (other than as expressly stated in this Report);
(c) have not made any independent investigations or enquiries in respect of those matters of which it has no actual knowledge at the time of giving this Report to the Client; and
(d) make no warranty or guarantee, expressed or implied, as to the accuracy or reliability of this information.

Morrison Geotechnic and the Contributors do not accept responsibility or liability for any incorrect assumptions related to this Report. For the avoidance of doubt, this Report:

(a) is not an environmental, contamination or hazardous materials assessment; may be invalid, incomplete or inaccurate (including errors in the scope of work, investigation methodology, observations, opinions and advice) where the information provided to Morrison Geotechnic was invalid, incomplete or inaccurate;
(b) is limited to observations of those parts of the site described in Section 1.0.

No warranty or guarantee, whether express or implied, is made in respect of the geotechnical data, information, advice, opinions and recommendations present in this Report.

If further information becomes available, or additional assumptions need to be made, Morrison Geotechnic reserves its right to amend this Report.

If you have any queries regarding the above, please contact our Brisbane office.

Yours faithfully

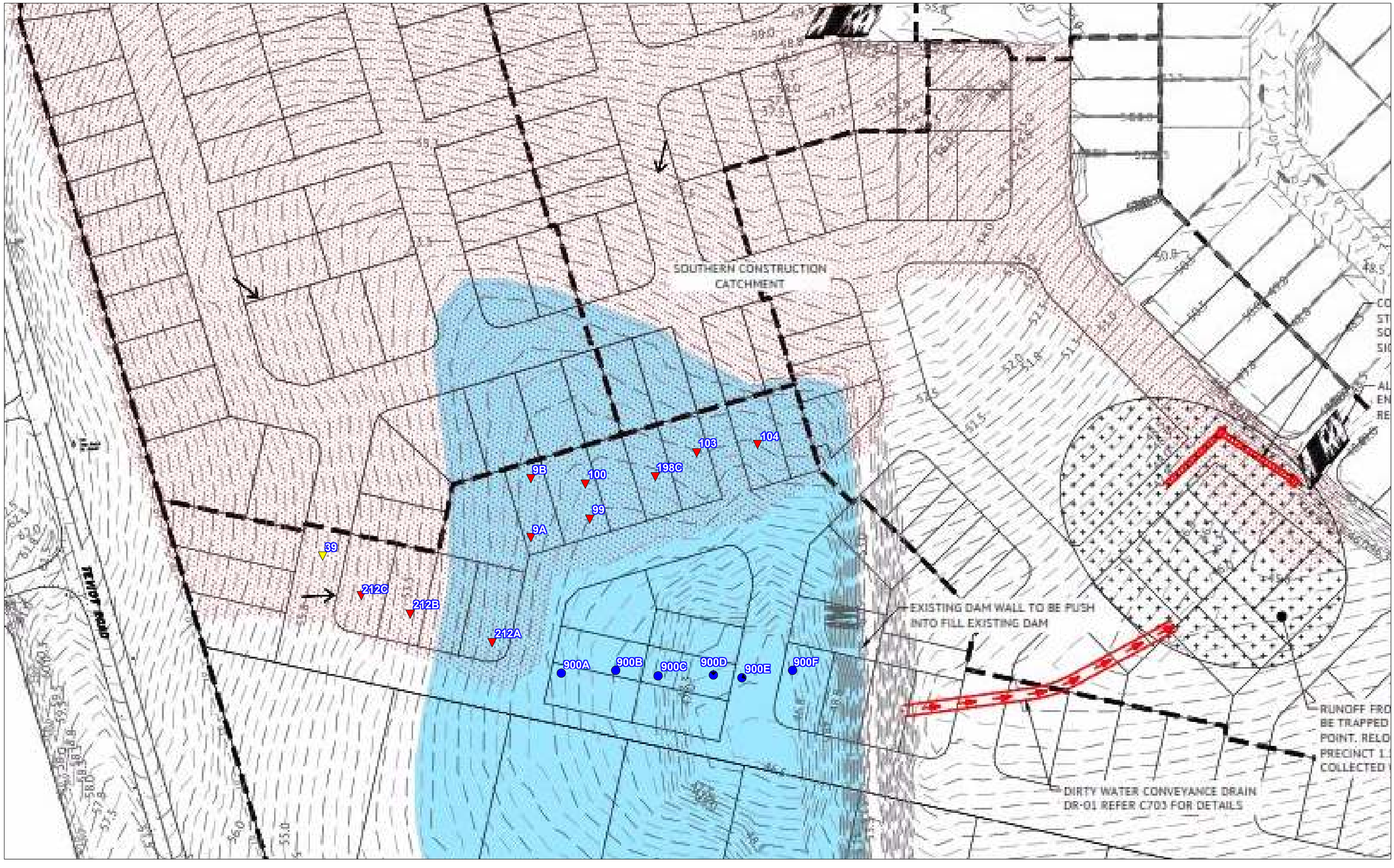
MICHALE MORRISON
For and on behalf of
MORRISON GEOTECHNIC PTY LIMITED

ATTACHMENTS:
Appendix A – Site Plans Showing Test Locations
Appendix B – Laboratory Test Results Reports

APPENDIX A

SITE PLAN

TEST LOCATIONS



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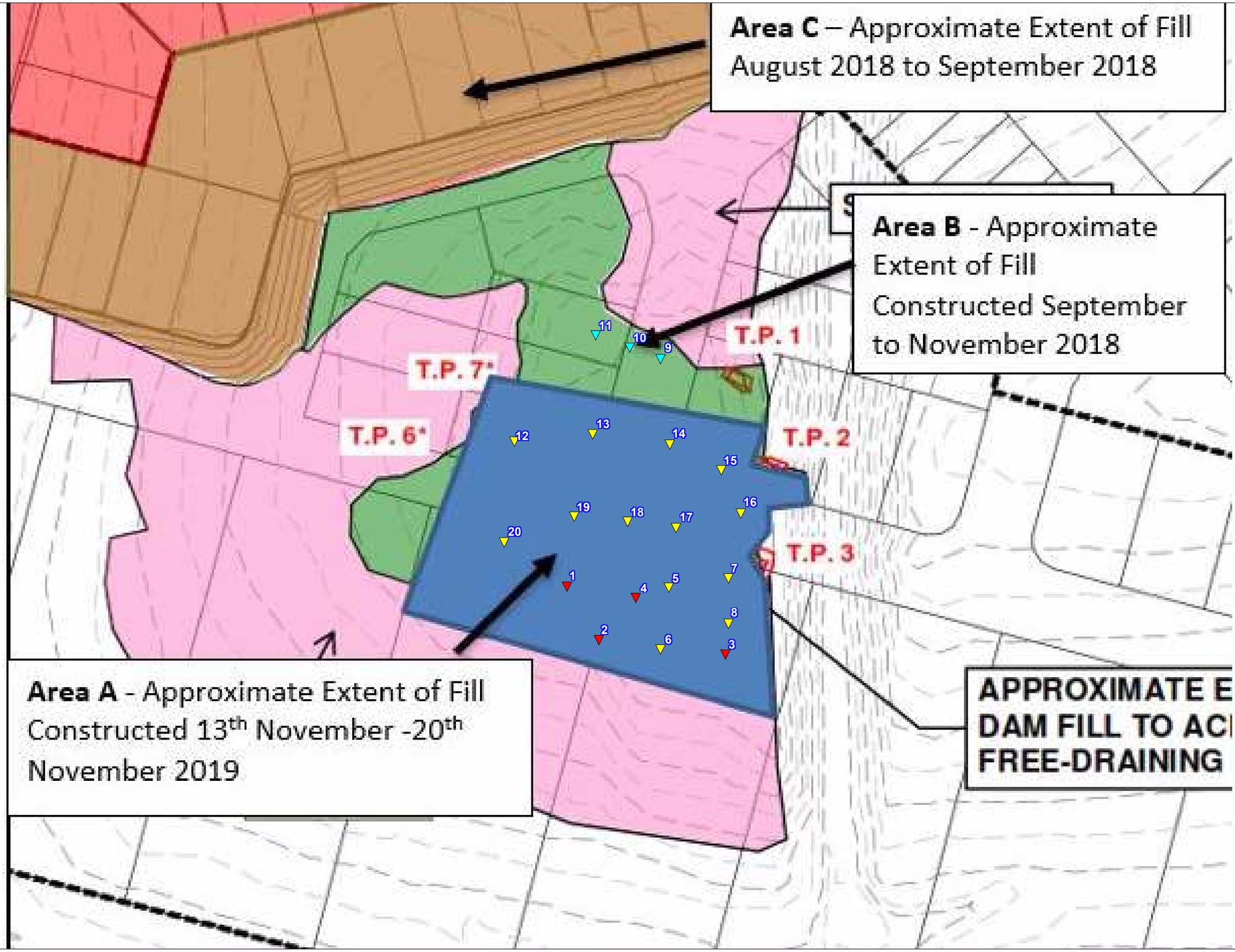
Email: brisbanelab@morrisongeo.com.au *Fax: 3279 0955*

Engineers: J. Daly, D.Dragun, & J Greentree
Geologists: R.Howchin
Laboratory: M.Morrison

LEGEND

- 0.0 - 0.99 Below Final Level
- 1.0 - 1.99 Below Final Level
- 2.0 - 2.99 Below Final Level
- 3.0 - 3.99 Below Final Level
- 4.0 - 4.99 Below Final Level
- Final Level

Map Description :	**EARTHWORKS FIELD DENSITY TESTING - Level 1 Inspection**				
Client :	SHADFORTHS CIVIL PTY LTD				
Project :	**EVERLEIGH PRECINCT 1.5 (PARTIAL)**				
Project No :	DL18/267	Drawing No :	DL18/267-01	Scale :	Not to Scale



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Geologists: R.Howchin
Laboratory: M.Morrison

LEGEND

- RL 45.00 - 46.99
- RL 47.00 - 48.99
- RL 49.00 - 50.99
- -
- ESL
- Final Level

Map Description :	**EARTHWORKS FIELD DENSITY TESTING - Level 1 Inspection**				
Client :	SHADFORTHS CIVIL PTY LTD				
Project :	**EVERLEIGH 1.5 (PARTIAL)**				
Project No :	DL19/454	Drawing No :	DL19/454-01	Scale :	Not to Scale

APPENDIX B

Laboratory Test Results Reports

Material Test Report

MORRISON GEOTECHNIC
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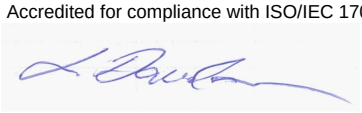
Report Number: DL19/454-1
Issue Number: 1
Date Issued: 22/11/2019
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL19/454
Project Name: EARTHWORKS SUPERVISION - BACKFILL TO DAM
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5805
Date Sampled: 16/11/2019
Dates Tested: 16/11/2019 - 19/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

NATA WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Liam Davidson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D19-5805A	D19-5805B	D19-5805C	D19-5805D
Test Number	1	2	3	4
Date Tested	16/11/2019	16/11/2019	16/11/2019	16/11/2019
Time Tested	15:01	15:06	15:12	15:17
Test Request #/Location	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area
Easting	498733	498732	498744	498746
Northing	6931275	6931264	6931265	6931275
Elevation (m)	46.57	46.90	46.34	46.21
Soil Description	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand
Test Depth (mm)	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	11.4	7.7	10.7	7.1
Field Wet Density (FWD) t/m^3	2.11	2.16	2.10	2.12
Field Moisture Content %	10.2	8.3	8.2	8.5
Field Dry Density (FDD) t/m^3	1.91	1.99	1.94	1.95
Peak Converted Wet Density t/m^3	**	**	**	**
Adjusted Peak Converted Wet Density t/m^3	2.20	2.14	2.16	2.15
Moisture Variation (Wv) %	**	**	**	**
Adjusted Moisture Variation %	0.5	2.0	2.0	2.5
Hilf Density Ratio (%)	**95.5**	**101.0**	**97.5**	**98.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: DL19/454-2
Issue Number: 1
Date Issued: 22/11/2019
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL19/454
Project Name: EARTHWORKS SUPERVISION - BACKFILL TO DAM
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5830
Date Sampled: 18/11/2019
Dates Tested: 18/11/2019 - 19/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

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Email: darralab@morrisongeo.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Liam Davidson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D19-5830A	D19-5830B	D19-5830C	D19-5830D
Test Number	5	6	7	8
Date Tested	18/11/2019	18/11/2019	18/11/2019	18/11/2019
Time Tested	11:50	11:58	12:05	12:11
Test Request #/Location	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area
Easting	498749	498744	477757	498731
Northing	6931279	6931262	6931268	6931281
Elevation (m)	47.1	47.4	47.0	47.2
Soil Description	Gravelly Silty Sand.	Gravelly Silty Sand.	Gravelly Silty Sand.	Gravelly Silty Sand.
Test Depth (mm)	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	1.6	3.5	2.0	8.7
Field Wet Density (FWD) t/m^3	2.18	2.15	2.06	2.08
Field Moisture Content %	11.9	9.4	10.4	11.6
Field Dry Density (FDD) t/m^3	1.95	1.97	1.87	1.86
Peak Converted Wet Density t/m^3	**	**	**	**
Adjusted Peak Converted Wet Density t/m^3	2.21	2.18	2.12	2.18
Moisture Variation (Wv) %	**	**	**	**
Adjusted Moisture Variation %	0.0	0.0	0.5	0.0
Hilf Density Ratio (%)	**99.0**	**98.5**	**97.5**	**95.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/454-3**
Issue Number: 1
Date Issued: 25/11/2019
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL19/454
Project Name: EARTHWORKS SUPERVISION - BACKFILL TO DAM
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5866
Date Sampled: 20/11/2019
Dates Tested: 20/11/2019 - 22/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by Client
Material: Stage 1.5 - Southern Dam Area (General Fill)
Material Source: Onsite

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Email: swoodley@mgeo.com.au

NATA WORLD RECOGNISED ACCREDITATION
Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1					
Sample Number	D19-5866A	D19-5866B	D19-5866C	D19-5866D	D19-5866E
Test Number	12	13	14	15	16
Date Tested	20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Tested	16:20	16:25	16:31	16:36	16:41
Test Request #/Location	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area
Easting	498617	498617	498616	498636	498655
Northing	6931084	6931075	6931063	6931058	6931053
Elevation (m)	48.17	48.42	48.01	48.23	48.12
Soil Description	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand
Test Depth (mm)	150	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	6.0	6.7	5.2	5.8	6.0
Field Wet Density (FWD) t/m^3	2.07	2.12	2.15	2.09	2.13
Field Moisture Content %	10.2	9.7	9.8	10.4	8.8
Field Dry Density (FDD) t/m^3	1.88	1.94	1.96	1.89	1.95
Peak Converted Wet Density t/m^3	**	**	**	**	**
Adjusted Peak Converted Wet Density t/m^3	2.17	2.18	2.17	2.17	2.17
Moisture Variation (Wv) %	**	**	**	**	**
Adjusted Moisture Variation %	-1.0	1.0	0.0	-0.5	2.5
Hilf Density Ratio (%)	**95.5**	**97.5**	**99.5**	**96.0**	**98.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/454-3**
Issue Number: 1
Date Issued: 25/11/2019
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL19/454
Project Name: EARTHWORKS SUPERVISION - BACKFILL TO DAM
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5866
Date Sampled: 20/11/2019
Dates Tested: 20/11/2019 - 22/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by Client
Material: Stage 1.5 - Southern Dam Area (General Fill)
Material Source: Onsite

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Email: swoodley@mgeo.com.au

NATA WORLD RECOGNISED ACCREDITATION
Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1					
Sample Number	D19-5866F	D19-5866G	D19-5866H	D19-5866I	
Test Number	17	18	19	20	
Date Tested	20/11/2019	20/11/2019	20/11/2019	20/11/2019	
Time Tested	16:44	16:49	16:54	17:00	
Test Request #/Location	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	
Easting	498653	498651	498638	498624	
Northing	6931073	6931086	6931096	6931093	
Elevation (m)	48.00	48.12	48.20	48.10	
Soil Description	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand	
Test Depth (mm)	150	150	150	150	
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	
Percentage of Wet Oversize (%)	7.6	6.8	5.4	6.7	
Field Wet Density (FWD) t/m^3	2.14	2.10	2.13	2.07	
Field Moisture Content %	11.5	9.2	10.8	9.6	
Field Dry Density (FDD) t/m^3	1.92	1.93	1.92	1.89	
Peak Converted Wet Density t/m^3	**	**	**	**	
Adjusted Peak Converted Wet Density t/m^3	2.20	2.17	2.20	2.17	
Moisture Variation (Wv) %	**	**	**	**	
Adjusted Moisture Variation %	0.5	1.5	0.0	1.0	
Hilf Density Ratio (%)	**97.5**	**97.0**	**96.5**	**95.5**	
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/454-4**
Issue Number: 1
Date Issued: 23/11/2019
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL19/454
Project Name: EARTHWORKS SUPERVISION - BACKFILL TO DAM
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5877
Date Sampled: 20/11/2019
Dates Tested: 20/11/2019 - 22/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Shadforth's Existing Controlled Fill
Material Source: Onsite

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NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D19-5877A	D19-5877B	D19-5877C
Test Number	9	10	11
Date Tested	20/11/2019	20/11/2019	20/11/2019
Time Tested	15:45	15:51	15:56
Test Request #/Location	Stage 1.5 - Existing Fill (West of North Bun)	Stage 1.5 - Existing Fill (West of North Bun)	Stage 1.5 - Existing Fill (West of North Bun)
Easting	498642	498639	498637
Northing	6931137	6931137	6931137
Layer / Reduced Level	**	**	**
Soil Description	Gravelly Sandy Clay	Gravelly Sandy Clay	Gravelly Sandy Clay
Test Depth (mm)	150	125	100
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	4.4	4.2	4.6
Field Wet Density (FWD) t/m^3	2.20	2.21	2.14
Field Moisture Content %	11.6	11.9	12.3
Field Dry Density (FDD) t/m^3	1.97	1.98	1.91
Peak Converted Wet Density t/m^3	**	**	**
Adjusted Peak Converted Wet Density t/m^3	2.21	2.21	2.20
Moisture Variation (Wv) %	**	**	**
Adjusted Moisture Variation %	-0.5	-0.5	-1.0
Hilf Density Ratio (%)	**99.5**	**100.0**	**97.5**
Compaction Method	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

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Hilf Density Ratio Report

Client :	**SHADFORTH'S CIVIL PTY LTD**	Report Number:	**DL18/267 - 11**
Address :	**99 SANDALWOOD LANE, FOREST GLEN, QLD, 4556**	Report Date :	**13/09/2018**
Project Name :	**EARTHWORKS SUPERVISION**	Order Number :	**361299**
Project Number :	**DL18/267**	Test Method :	**AS1289.5.8.1 & 5.7.1**
Location:	**EVERLEIGH PRECINCT 1.2 - 1.4 , GREENBANK**	**Page 1 of 1**	

Sample Number :	251910	251911	251912	251913
Test Number :	38	39	40	41
Sampling Method :	-	-	-	-
Date Sampled :	28/08/2018	28/08/2018	28/08/2018	28/08/2018
Date Tested :	28/08/2018	28/08/2018	28/08/2018	28/08/2018
Material Type :	**General Fill**	**General Fill**	**General Fill**	**General Fill**
Material Source :	**On Site**	**On Site**	**On Site**	**On Site**
Lot Number :	-	-	-	-
Sample Location :	E 8601.000 N 31422.000 RL 55.35	E 8600.000 N 31432.000 RL 55.48	E 8599.000 N 31451.000 RL 56.04	E 8603.000 N 31424.000 RL 55.53
Test Depth (mm) :	150	150	150	150
Layer Depth (mm) :	-	-	-	-
Maximum Size (mm) :	19	19	19	19
Oversize Wet (%) :	-	-	8	7
Oversize Dry (%) :	-	-	-	-
Oversize Density (t/m³) :	-	-	2.377	2.340
Field Moisture Content (%) :	11.4	13.9	59.1	13.4
Hilf MDR Number :	251910	251911	251912	251913
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1
Compactive Effort :	Standard	Standard	Standard	Standard
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Moisture Ratio (%) :	76.5	97	99	91.5
Field Wet Density (t/m³) :	2.068	2.080	2.116	2.102
Optimum Moisture Content (%) :	14.9	14.3	59.6	14.6
Moisture Variation :	3.5	0.5	0.3	1.2
Peak Converted Wet Density (t/m³) :	2.038	2.110	2.135*	2.091*
Hilf Density Ratio (%) :	**101.5**	**98.5**	**99.0**	**100.5**
Minimum Specification :	95	95	95	95
Moisture Specification :	-2% to +3%	-2% to +3%	-2% to +3%	-2% to +3%
Site Selection :	-	-	-	-
Soil Description :	Gravelly Sandy CLAY	Gravelly Sandy CLAY	Gravelly Sandy CLAY	Gravelly Sandy CLAY
Remarks :	-			

* - denotes adjusted for oversize

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WORLD RECOGNISED ACCREDITATION

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APPROVED SIGNATORY

Liam Mcdowall (Brisbane) - Branch Manager
NATA Accreditation Number
1162 / 1169

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Hilf Density Ratio Report

Client :	**SHADFORTH'S CIVIL PTY LTD**	Report Number:	**DL18/267 - 30**
Address :	**99 SANDALWOOD LANE, FOREST GLEN, QLD, 4556**	Report Date :	**10/10/2018**
Project Name :	**EARTHWORKS SUPERVISION**	Order Number :	**-**
Project Number :	**DL18/267**	Test Method :	**AS1289.5.8.1 & 5.7.1**
Location:	**EVERLEIGH PRECINCT 1.2 - 1.4 , GREENBANK**	**Page 1 of 1**	

Sample Number :	253525	253526	253527	253528
Test Number :	99	100	101	102
Sampling Method :	-	-	-	-
Date Sampled :	05/10/2018	05/10/2018	05/10/2018	05/10/2018
Date Tested :	05/10/2018	05/10/2018	05/10/2018	05/10/2018
Material Type :	**General Fill**	**General Fill**	**General Fill**	**General Fill**
Material Source :	**On Site**	**On Site**	**On Site**	**On Site**
Lot Number :	-	-	-	-
Sample Location :	E 8688.000 N 31361.000 RL 51.47	E 8687.000 N 31367.000 RL 51.91	E 8686.000 N 31374.000 RL 52.42	E 8688.000 N 31382.000 RL 52.85
Test Depth (mm) :	150	150	150	150
Layer Depth (mm) :	-	-	-	-
Maximum Size (mm) :	19	19	19	19
Oversize Wet (%) :	-	-	-	-
Oversize Dry (%) :	-	-	-	-
Oversize Density (t/m³) :	-	-	-	-
Field Moisture Content (%) :	11.1	12.6	10.3	13.4
Hilf MDR Number :	253525	253526	253527	253528
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1
Compactive Effort :	Standard	Standard	Standard	Standard
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Moisture Ratio (%) :	95.5	101.5	98.5	103.5
Field Wet Density (t/m³) :	2.155	2.109	2.183	2.130
Optimum Moisture Content (%) :	11.6	12.4	10.4	13.0
Moisture Variation :	0.6	-0.1	0.1	-0.5
Peak Converted Wet Density (t/m³) :	2.182	2.181	2.163	2.188
Hilf Density Ratio (%) :	**99.0**	**96.5**	**101.0**	**97.5**
Minimum Specification :	95	95	95	95
Moisture Specification :	-2% to +3%	-2% to +3%	-2% to +3%	-2% to +3%
Site Selection :	-	-	-	-
Soil Description :	Gravelly Sandy CLAY	Gravelly Sandy CLAY	Gravelly Sandy CLAY	Gravelly Sandy CLAY
Remarks :	-			

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APPROVED SIGNATORY

Liam Mcdowall (Brisbane) - Branch Manager
NATA Accreditation Number
1162 / 1169

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Hilf Density Ratio Report

Client :	**SHADFORTH'S CIVIL PTY LTD**	Report Number:	**DL18/267 - 31**
Address :	**99 SANDALWOOD LANE, FOREST GLEN, QLD, 4556**	Report Date :	**15/10/2018**
Project Name :	**EARTHWORKS SUPERVISION**	Order Number :	**-**
Project Number :	**DL18/267**	Test Method :	**AS1289.5.8.1 & 5.7.1**
Location:	**EVERLEIGH PRECINCT 1.2 - 1.4 , GREENBANK**	**Page 1 of 1**	

Sample Number :	253569	253570	253571	
Test Number :	103	104	105	
Sampling Method :	-	-	-	
Date Sampled :	10/10/2018	10/10/2018	10/10/2018	
Date Tested :	10/10/2018	10/10/2018	10/10/2018	
Material Type :	**General Fill**	**General Fill**	**General Fill**	
Material Source :	**On Site**	**On Site**	**On Site**	
Lot Number :	-	-	-	
Sample Location :	E 8720.000 N 31375.000 RL 52.68	E 8719.000 N 31384.000 RL 53.08	E 8719.000 N 31391.000 RL 53.29	
Test Depth (mm) :	150	150	150	
Layer Depth (mm) :	-	-	-	
Maximum Size (mm) :	19	19	19	
Oversize Wet (%) :	7	12	12	
Oversize Dry (%) :	-	-	-	
Oversize Density (t/m³) :	2.500	2.498	2.507	
Field Moisture Content (%) :	11.8	13.5	13.9	
Hilf MDR Number :	253569	253570	253571	
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	
Compactive Effort :	Standard	Standard	Standard	
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	
Moisture Ratio (%) :	101	102	101	
Field Wet Density (t/m³) :	2.160	2.182	2.138	
Optimum Moisture Content (%) :	11.7	13.2	13.8	
Moisture Variation :	-0.1	-0.2	-0.1	
Peak Converted Wet Density (t/m³) :	2.198*	2.199*	2.195*	
Hilf Density Ratio (%) :	**98.5**	**99.0**	**97.5**	
Minimum Specification :	95	95	95	
Moisture Specification :	-2% to +3%	-2% to +3%	-2% to +3%	
Site Selection :	-	-	-	
Soil Description :	Gravelly Sandy CLAY	Gravelly Sandy CLAY	Gravelly Sandy CLAY	
Remarks :	-			

* - denotes adjusted for oversize

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APPROVED SIGNATORY

Liam Mcdowall (Brisbane) - Branch Manager
NATA Accreditation Number
1162 / 1169

Material Test Report

Report Number: DL18/267-36
Issue Number: 1
Date Issued: 09/11/2018
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL18/267
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.2 - 1.4, GREENBANK
Work Request: 212
Date Sampled: 06/11/2018
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD +/-2% OMC
Site Selection: Selected by GTA
Material: General Fill
Material Source: Onsite

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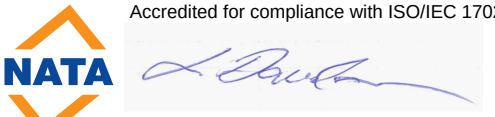

Approved Signatory: Liam Davidson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D18-212A	D18-212B	D18-212C
Date Tested	06/11/2018	06/11/2018	06/11/2018
Time Tested	14:00	14:10	14:20
Test Request #/Location	General Fill	General Fill	General Fill
Easting	8655.100	8649.600	8644.900
Northing	31310.600	31311.900	31313.300
Elevation (m)	53.43	53.66	54.00
Thickness of Layer (mm)	-	-	-
Soil Description	Gravelly Sandy Clay	Gravelly Sandy Clay	Gravelly Sandy Clay
Test Depth (mm)	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	7.4	0.0
Field Wet Density (FWD) t/m^3	2.08	2.11	2.09
Field Moisture Content %	9.0	9.4	10.2
Field Dry Density (FDD) t/m^3	1.91	1.93	1.90
Peak Converted Wet Density t/m^3	2.18	**	2.16
Adjusted Peak Converted Wet Density t/m^3	**	2.05	**
Moisture Variation (Wv) %	2.0	**	1.0
Adjusted Moisture Variation %	**	1.0	**
Hilf Density Ratio (%)	**95.5**	**103.0**	**96.5**
Compaction Method	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: DL18/267-37
Issue Number: 1
Date Issued: 13/11/2018
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL18/267
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.2 - 1.4, GREENBANK
Work Request: 198
Date Sampled: 05/11/2018
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD +/-2% OMC
Site Selection: Selected by GTA
Material: General Fill
Material Source: Onsite

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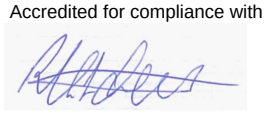

Approved Signatory: Rhys Mitchell
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D18-198A	D18-198B	D18-198C
Date Tested	05/11/2018	05/11/2018	05/11/2018
Time Tested	14:00	14:10	14:20
Test Request #/Location	General Fill	General Fill	General Fill
Easting	8720.600	8713.400	8707.300
Northing	31373.600	31370.400	31368.800
Elevation (m)	52.90	52.90	53.00
Thickness of Layer (mm)	-	-	-
Soil Description	Gravelly Sandy Clay	Gravelly Sandy Clay	Gravelly Sandy Clay
Test Depth (mm)	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	12.7	0.0
Field Wet Density (FWD) t/m^3	2.18	2.17	2.10
Field Moisture Content %	9.9	6.3	8.0
Field Dry Density (FDD) t/m^3	1.98	2.04	1.95
Peak Converted Wet Density t/m^3	2.17	**	2.10
Adjusted Peak Converted Wet Density t/m^3	**	2.15	**
Moisture Variation (Wv) %	0.5	**	3.0
Adjusted Moisture Variation %	**	2.0	**
Hilf Density Ratio (%)	**100.5**	**101.0**	**100.5**
Compaction Method	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

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Report Number: DL18/267-31 GT
Issue Number: 1
Date Issued: 26/10/2018
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL18/267
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.2 - 1.4, GREENBANK
Work Request: 9
Date Sampled: 23/10/2018
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD +/-2% OMC
Site Selection: Selected by Local Authority
Material: General Fill - Everleigh 1.2 - 1.4
Material Source: Onsite

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Approved Signatory: Rhys Mitchell
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D18-9A	D18-9B	D18-9C
Date Tested	23/10/2018	23/10/2018	23/10/2018
Time Tested	14:00	14:10	14:20
Test Request #/Location	General Fill	General Fill	General Fill
Easting	8676.800	8674.500	8671.700
Northing	31356.400	31367.400	31378.900
Elevation (m)	53.07	53.53	54.29
Thickness of Layer (mm)	-	-	-
Soil Description	Gravelly Sandy Clay	Gravelly Sandy Clay	Gravelly Sandy Clay
Test Depth (mm)	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	**	1.9
Field Wet Density (FWD) t/m^3	2.15	2.13	2.14
Field Moisture Content %	11.8	11.4	9.9
Field Dry Density (FDD) t/m^3	1.92	1.91	1.94
Peak Converted Wet Density t/m^3	2.18	2.15	**
Adjusted Peak Converted Wet Density t/m^3	**	**	2.16
Moisture Variation (Wv) %	0.5	0.0	**
Adjusted Moisture Variation %	**	**	0.0
Hilf Density Ratio (%)	**98.5**	**98.5**	**99.0**
Compaction Method	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: DL18/267-42
Issue Number: 1
Date Issued: 16/01/2019
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL18/267
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.2 - 1.4, GREENBANK
Work Request: 900
Date Sampled: 11/01/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: General Fill (Capping over Rockfill)
Material Source: Onsite

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Approved Signatory: Liam McDowall
Branch Manager

NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1						
Sample Number	D19-900A	D19-900B	D19-900C	D19-900D	D19-900E	D19-900F
Date Tested	11/01/2019	11/01/2019	11/01/2019	11/01/2019	11/01/2019	11/01/2019
Time Tested	12:40	12:45	12:50	12:55	13:00	13:05
Test Request #/Location	General Fill	General Fill	General Fill	General Fill	General Fill	General Fill
Easting	8685.2	8704.8	8721.5	8739.5	8748.7	8764.0
Northing	31297.6	31297.8	31291.5	31285.0	31283.3	31282.7
Elevation (m)	49.16	48.17	47.60	47.35	47.38	47.34
Thickness of Layer (mm)	-	-	-	-	-	-
Soil Description	Gravelly Clayey Sand	Gravelly Clayey Sand	Gravelly Clayey Sand	Gravelly Clayey Sand	Gravelly Clayey Sand	Gravelly Clayey Sand
Test Depth (mm)	150	150	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	5.2	10.0	6.7	6.8	0.0	8.9
Field Wet Density (FWD) t/m^3	2.08	2.20	2.21	2.10	2.19	2.19
Field Moisture Content %	6.6	6.5	6.5	10.0	8.2	7.7
Field Dry Density (FDD) t/m^3	1.95	2.06	2.08	1.91	2.03	2.03
Peak Converted Wet Density t/m^3	**	**	**	**	2.10	**
Adjusted Peak Converted Wet Density t/m^3	2.00	2.14	2.14	2.16	**	2.13
Moisture Variation (Wv) %	**	**	**	**	2.0	**
Adjusted Moisture Variation %	2.0	1.5	1.5	1.5	**	1.5
Hilf Density Ratio (%)	**104.0**	**102.5**	**103.5**	**97.0**	**104.5**	**103.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

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SOLID THINKING // GROUNDED RESULTS

LEVEL ONE COMPLIANCE REPORT

Prepared for:

Golding Urban Pty Ltd

DL19/447 – *Partial Bulk Earthworks Filling Operations*

Southern Dam Everleigh Precinct 1.5

Teviot Road, Greenbank

REV C

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27th March 2020

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Brisbane Office
Job No: DL19-447
Ref No: 15719 Rev C
Author: M. Morrison

27th March 2020

Golding Urban
58 Union Circuit
Yatala Qld 4207

ATTENTION: MR CAMERON MCCLURE
Email: Cameron.McClure@golding.com.au
Cc: Derek.Hennessy@golding.com.au

Dear Sir,

RE: LEVEL ONE COMPLIANCE REPORT FOR
PARTIAL BULK EARTHWORKS FILLING OPERATIONS
SOUTHERN DAM EVERLEIGH PRECINCT 1.5
TEVIOT ROAD, GREENBANK

Table of Contents

1.0 INTRODUCTION

1.1 General

This report presents results of Level One Earthworks Inspections and associated Compaction Compliance testing carried out on Earthworks Fill constructed to partially backfill the southern Dam within Precinct 1.5 at the Everleigh Development.

Earthworks operations were constructed by Golding.

Earthworks covered by this report were carried out between 22nd November 2019 and 6th December 2019.

The extent and completed levels of fill covered by this report are presented as Figure 1 below. Ground surface levels prior to filling are presented as Figure 2 below. The extent of fill covered by this report overlayed on the lot layout plan is presented as Figure 3.

Figure 1: Approximate Area of Fill Covered By This Report – Shade Orange

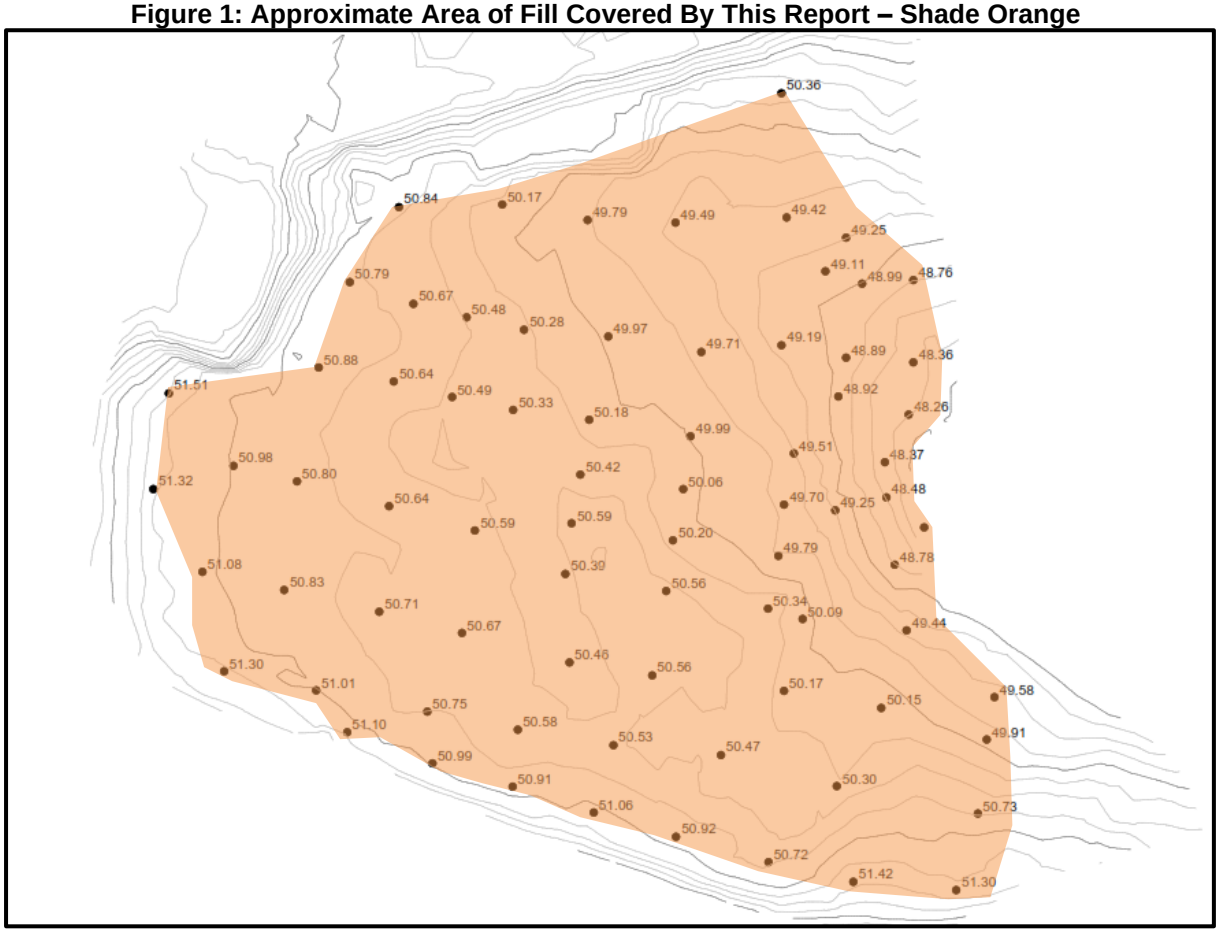


Figure 2: Ground Surface Levels Prior to Earthworks.

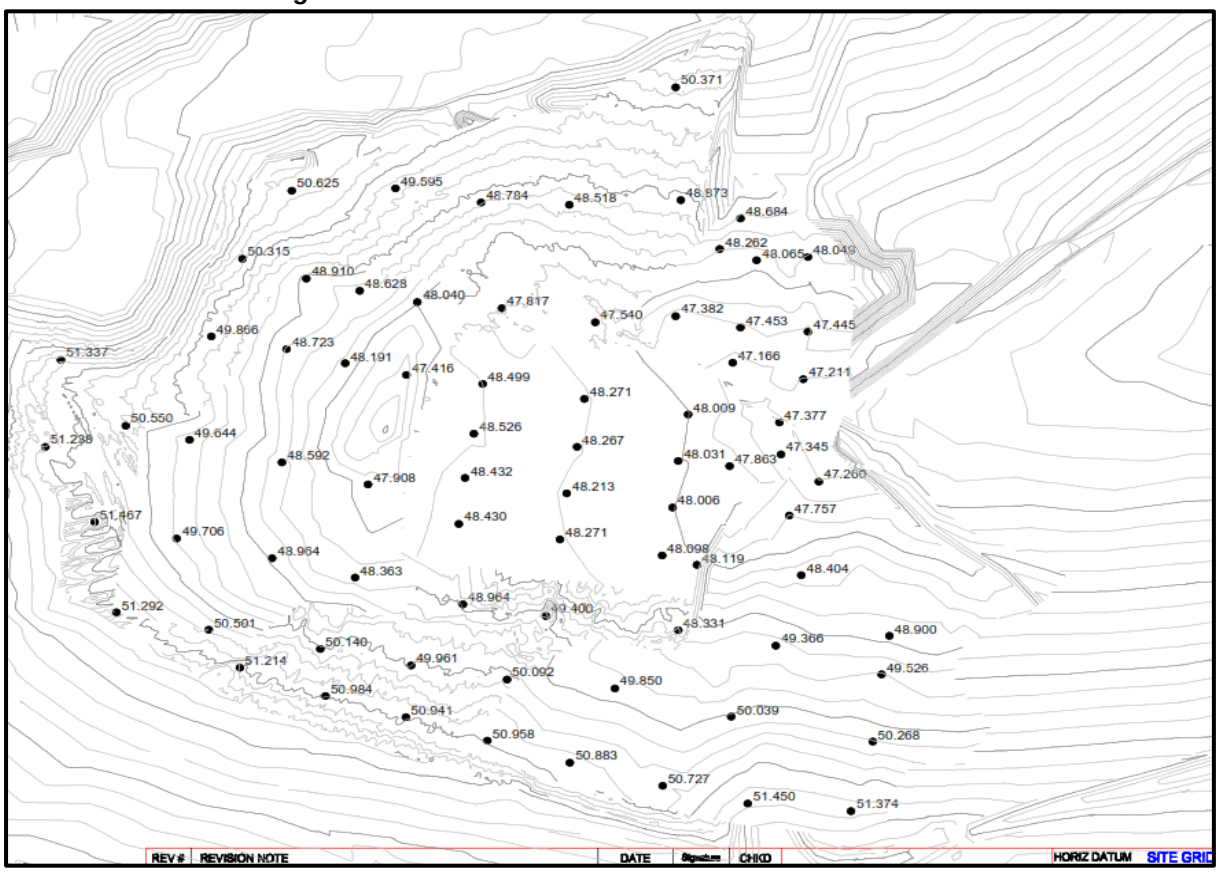
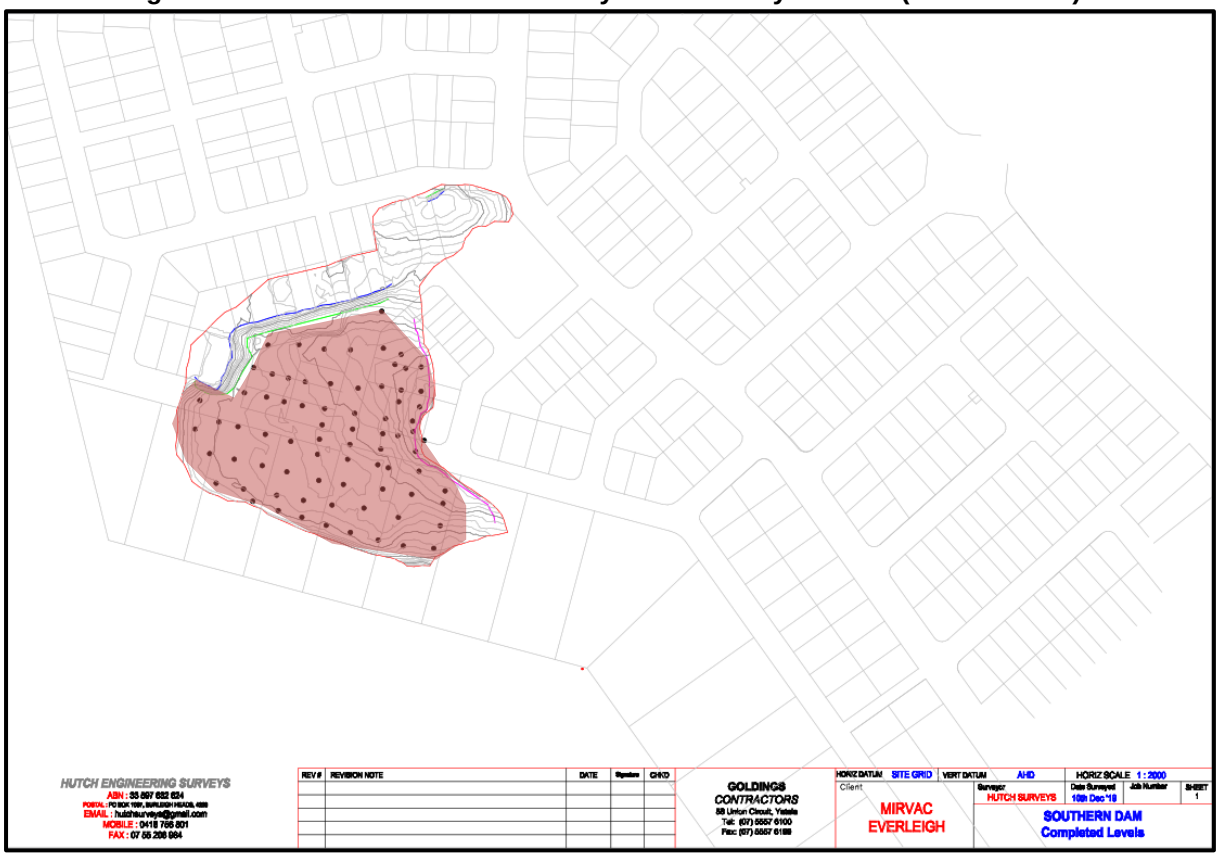


Figure 3: Extent of Earthworks Overlayed on Lot Layout Plan (Shaded Area).



1.2 Previous Earthworks

Previous earthworks filling was present at The Site.

The existing fill included: -

- Existing Uncontrolled Fill associated with former Dam Wall. Fill associated with the Dam Wall.
    - The majority fill in the former dam wall was observed to be removed to depths exposing natural ground and reused as controlled fill.
    - There may be a small portion of the existing uncontrolled fill at the northern extremity of the existing dam wall.
- Existing Controlled Fill
    - Constructed by Shadforths intermittently between August 2018 and November 2019.
    - Details on the previous earthworks are contained in “Level One Compliance Report, Partial Bulk Earthworks Filling Operations, Southern Dam Everleigh” dated 2nd December 2019. This report is attached as Appendix C.

1.3 The Project

The purpose for filling at The Site was to remediate and partially backfill the existing dam. It is understood that additional filling is required to achieve the design earthworks levels.

2.0 THE BRIEF

The Brief from the Client was limited to:

- Level One Inspection and Testing of the placement and compaction of fill materials in general accordance with AS3798 2007 – “Guidelines on Earthworks for Commercial and Residential Developments”.
- Relative Density Control Testing in accordance with AS1289 – Testing of Soils for Engineering Purposes and at frequencies required in AS3798 Table 8.1.

3.0 METHODOLOGY

Earthworks Inspection and Testing was carried out on the excavated ground surfaces and during the placement and compaction of fill materials.

Field and laboratory testing included a walk over assessments of the existing ground conditions, observation of filling and compaction activities and compaction testing.

3.1 Stripped Surface Assessment

The area covered by this report was stripped and cleared of visible loose materials, soil stockpiles, rock stockpiles, uncontrolled fill, vegetation and topsoil.

Materials exposed after stripping and formed the fill foundation can be broadly summarised as:

- Existing Fill – Gravelly Clayey Sand (SC) - Controlled Fill, fine to coarse grained sands, fine to coarse gravel, low to medium plasticity fines, occasional cobbles grey – brown and moist.
- Natural – Sandy Clay (CI - CH) – at least stiff, medium and medium to high plasticity fine to medium grained sand, pale orange brown and moist.

- Natural – Clayey Sand (SC), fine to coarse sand, low plasticity fines, grey and moist.
- Natural – Sandstone (XW-DW) – Extremely weathered to distinctly weathered, very low to medium strength, orange – yellow with red and grey streaks.

Following the stripped surface assessment of the fill areas, the foundation was approved for filling using the following process:

- Walk over assessments confirming that a competent natural foundation had been exposed.
- Proof roll testing using an articulated dump truck carrying out multiple passes confirming no movement of the exposed natural foundation.
- Heavy compaction and compaction testing of the surface of the existing controlled fill.

Picture 2: View of The Site During Stripping Operations

3.2 Filling Operations

Fill materials were sourced onsite and can be. broadly summarised as: -

- Gravelly Clayey Sand (SC) Processed rock and general fill, fine to coarse gravel, fine to coarse sand, low plasticity fines with cobbles, grey brown and moist.
- Clayey Sand (SC), fine to coarse sand, medium plasticity fines, with fine to course gravel, with cobbles, yellow grey brown and moist.
- Gravelly Sandy Clay (CI), medium plasticity fines, fine to coarse sand, fine to course gravel, grey brown and moist.

Placement and compaction of the fill materials was carried out using the following plant:

- Excavator
- Mechanical Rock Crusher
- Excavator with Rock Hammer Attachments.
- Articulated Dump Trucks
- D7, D8 and D10 Dozer
- Pad Foot Roller
- Water Cart
- 825 Compactor
- 815 Compactor

The fill materials were moisture conditioned at the fill source and during placement to moisture contents suitable for compaction. Deleterious materials such as organics, sticks, roots and over size particles were sorted and removed during placement or were rejected for use.

Placement of the fill materials was carried out in layers appropriate for the above plant and compacted using the above plant carrying out multiple passes.

Our representative observed the filling process as described above and was assessed to be consistent for the entire thickness of fill.

Field density tests and laboratory compactions were carried out on the fill materials in accordance with Table 5.1 and 8.1 of AS3798 2007 (Guidelines on Earthworks for Commercial and Residential Developments) and tested to AS1289 test methods (Testing of Soils for Engineering Purposes).

Testing achieved the required specification of 95% of the Hilf Density at the test locations.

Fill placed and compacted at measured density ratios less than 95% were tyned, moisture conditioned and re-compacted until the required specification was achieved. Retesting was carried out using Random Stratified Location methods.

The Location of the field density tests are shown on the Site Plans contained in Appendix A. These test locations and levels were not obtained by survey and therefore should only be considered as approximate.

Picture 4: View of the Site During Construction

Picture 5: View of the Site During Construction

4.0 STATEMENT OF COMPLIANCE

Our representatives observed the relevant earthworks operations including the stripped surface, fill placement and compaction operations and carried out field density tests and laboratory compaction tests in accordance with the required standard (AS3798, AS1289). Testing achieved the required specification of 95% Standard at the test locations.

It is confirmed that Level One Inspection and Testing has been carried out on the partial backfilling operation and limited to the extent shown in in Figure 1 and Figure 2 . Based on the observations made by our Geotechnicians and the results of the field and laboratory tests, the placed and compacted fill at the above project has, as far as we have been able to assess, been constructed in general accordance with the intent of AS3798.

The fill can be deemed to be “controlled” in accordance with AS2870.

It is understood that additional filling will be required to complete the earthworks to the final earthworks levels.

5.0 EXCLUSIONS

This statement does not include any top soil, which may be placed for use as dressing, trench backfill , areas outside the areas shown in Figure 1 and Figure 2 or any other subsequent earthworks after December 2019.

Assessments of material quality such as soaked CBR and site classifications are excluded from this commission.

Our on-site attendance specifically excludes assessments of fill material quality and engineering properties that are outside the requirements of AS3798 – 2007.

Footings and ground slabs for any structures constructed over natural soils or controlled fill should be designed to accommodate the characteristic ground surface movements and settlement potential.

Assessments of these design parameters are beyond the scope of this Report.

6.0 LIMITATIONS

This Report has been prepared by Morrison Geotechnic Pty Ltd (**Morrison Geotechnic**), and may include contributions from Morrison Geotechnic's officers and employees, sub-contractors, sub-consultants or agents (**Contributors**).

This Report is for the sole benefit and use of Golding (**Client**), its designers, clients and relevant statutory authorities for the sole purpose of providing geotechnical advice and recommendations in respect of the Partial Bulk Earthworks Filling Operations , Southern Dam Everleigh Precinct 1.5 **(Project)**. The Report is only intended to address those issues expressly described in the Brief/ Work Instructions in this Report.

This Report should not be used or relied upon for any other purpose without Morrison Geotechnic's prior written consent. Morrison Geotechnic and the Contributors do not accept any responsibility or liability in any way whatsoever for the use or reliance of this Report by anyone other than Shadforth Civil Pty Ltd (**Client)**, its designers, its clients and relevant statutory authorities or by anyone else for any purpose other than that for which it has been prepared.

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(a) released to any other party, whether in whole or in part (other than to the Client's officers, employees, advisers, designers, clients and relevant statutory authorities);

(b) used or relied upon by any other party.

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The information (including technical information and information obtained through discussions) on which this report is based has been provided by the Client and third parties. Morrison Geotechnic and the Contributors:

(a) have relied upon and presumed the accuracy of this information;
(b) have not verified the accuracy or reliability of this information (other than as expressly stated in this Report);
(c) have not made any independent investigations or enquiries in respect of those matters of which it has no actual knowledge at the time of giving this Report to the Client; and
(d) make no warranty or guarantee, expressed or implied, as to the accuracy or reliability of this information.

Morrison Geotechnic and the Contributors do not accept responsibility or liability for any incorrect assumptions related to this Report. For the avoidance of doubt, this Report:

(a) is not an environmental, contamination or hazardous materials assessment; may be invalid, incomplete or inaccurate (including errors in the scope of work, investigation methodology, observations, opinions and advice) where the information provided to Morrison Geotechnic was invalid, incomplete or inaccurate;

(b) is limited to observations of those parts of the site described in Section 1.0.

No warranty or guarantee, whether express or implied, is made in respect of the geotechnical data, information, advice, opinions and recommendations present in this Report.

If further information becomes available, or additional assumptions need to be made, Morrison Geotechnic reserves its right to amend this Report.

If you have any queries regarding the above, please contact our Brisbane office.

Yours faithfully

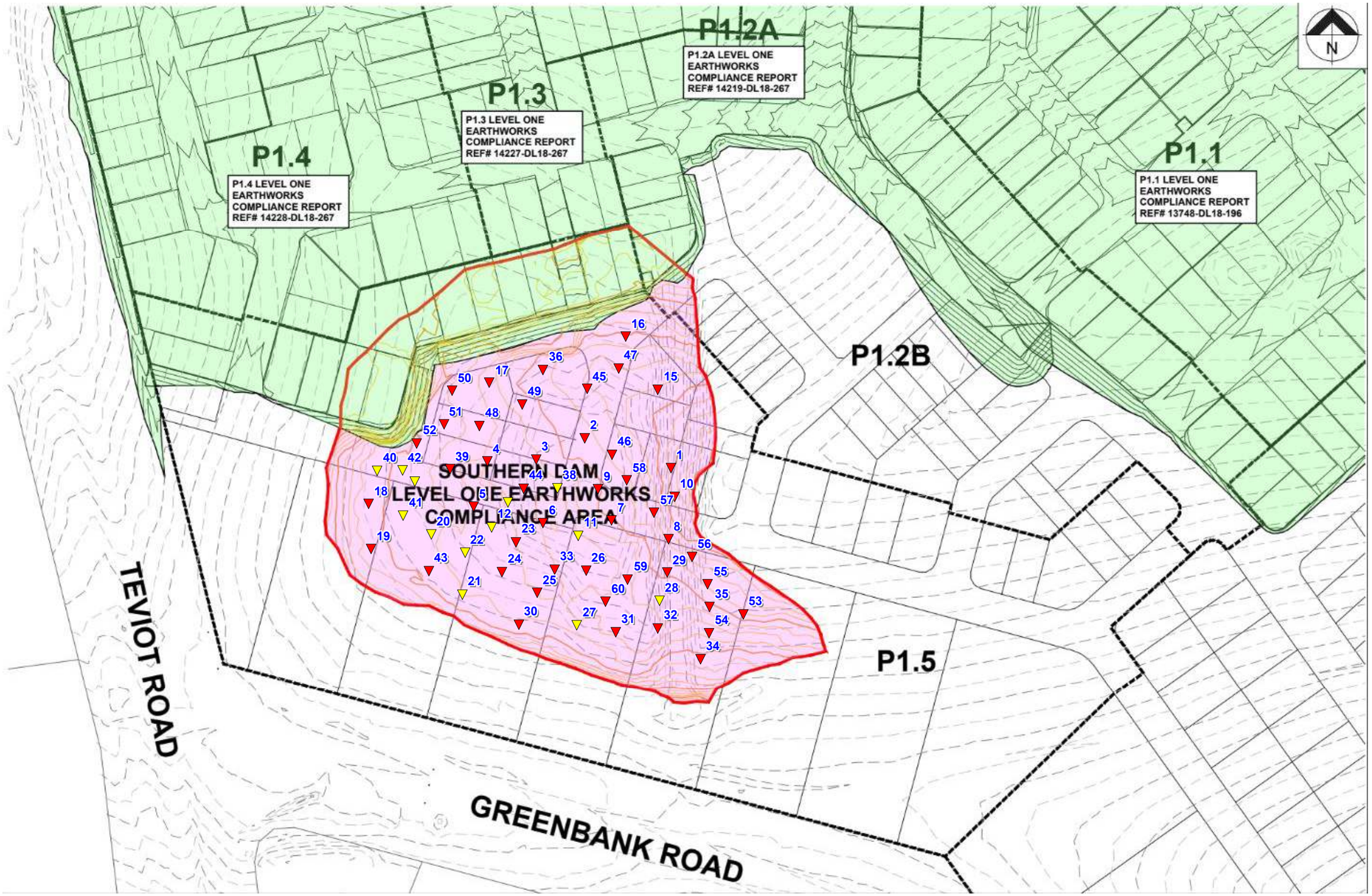
MICHALE MORRISON
For and on behalf of
MORRISON GEOTECHNIC PTY LIMITED

ATTACHMENTS:
Appendix A – Site Plans Showing Test Locations
Appendix B – Laboratory Test Results Reports
Appendix C – Previous Level One Report.

APPENDIX A

SITE PLAN

TEST LOCATIONS



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Engineers: M. Ballard, D.Dragun,
Geologists: R.Howchin
Laboratory: M.Morrison

LEGEND

- R.L 45.00 - 49.99
- R.L 50.00 - 54.99

Map Description :	**EARTHWORKS FIELD DENSITY TESTING - Level 1 Inspection**				
Client :	LEND LEASE COMMUNITIES (SPRINGFIELD) PTY LTD				
Project :	**LAKES ENTRANCE STAGE 11**				
Project No :	DL19/447	Drawing No :	DL19/447 - 01	Scale :	Not to Scale

APPENDIX B

Laboratory Test Results Reports

Material Test Report

Report Number: **DL19/447-9**
Issue Number: 1
Date Issued: 18/12/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 6117
Date Sampled: 04/12/2019
Dates Tested: 04/12/2019 - 16/12/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Shadforths Existing Fill
Material Source: Onsite

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Accredited for compliance with ISO/IEC 17025 - Testing

NATA WORLD RECOGNISED ACCREDITATION

Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1					
Sample Number	D19-6117A	D19-6117B	D19-6117C	D19-6117D	D19-6117E
Test Number	48	49	50	51	52
Date Tested	04/12/2019	04/12/2019	04/12/2019	04/12/2019	04/12/2019
Time Tested	13:03	13:08	13:12	13:17	13:22
Test Request #/Location	Stage 1.5 - Southern Dam (Worked shadforths Fill Area)	Stage 1.5 - Southern Dam (Worked shadforths Fill Area)	Stage 1.5 - Southern Dam (Worked shadforths Fill Area)	Stage 1.5 - Southern Dam (Worked shadforths Fill Area)	Stage 1.5 - Southern Dam (Worked shadforths Fill Area)
Easting	8716.465	8720.500	8739.560	8700.050	8743.519
Northing	31318.009	31311.205	31307.713	31322.363	31340.495
Elevation (m)	48.864	48.906	48.847	49.444	49.640
Soil Description	Silty Sandy Clay	Silty Sandy Clay	Crushed Sandstone	Crushed Sandstone	Crushed Sandstone
Test Depth (mm)	150	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.8	10.0	10.2	11.5
Field Wet Density (FWD) t/m^3	2.03	2.07	2.18	2.18	2.26
Field Moisture Content %	10.8	8.1	10.0	11.0	9.8
Field Dry Density (FDD) t/m^3	1.83	1.91	1.99	1.96	2.06
Peak Converted Wet Density t/m^3	2.13	**	**	**	**
Adjusted Peak Converted Wet Density t/m^3	**	2.18	2.18	2.21	2.22
Moisture Variation (Wv) %	0.5	**	**	**	**
Adjusted Moisture Variation %	**	2.0	2.0	0.5	0.5
Hilf Density Ratio (%)	**95.5**	**95.0**	**100.0**	**98.5**	**102.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

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NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Report Number: **DL19/447-10**
Issue Number: 1
Date Issued: 18/12/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 6075
Date Sampled: 03/12/2019
Dates Tested: 03/12/2019 - 17/12/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1						
Sample Number	D19-6075A	D19-6075B	D19-6075C	D19-6075D	D19-6075E	D19-6075F
Test Number	37	38	39	40	41	42
Date Tested	03/12/2019	03/12/2019	03/12/2019	03/12/2019	03/12/2019	03/12/2019
Time Tested	09:32	09:36	09:41	13:05	13:12	13:18
Test Request #/Location	Stage 1.5 Southern Dam	Stage 1.5 Southern Dam	Stage 1.5 Southern Dam	Stage 1.5 Southern Dam	Stage 1.5 Southern Dam	Stage 1.5 Southern Dam
Easting	31258.675	31267.507	31280.176	31280.737	31293.546	31295.997
Northing	8714.233	8717.934	8725.491	8669.240	8676.692	8688.065
Elevation (m)	50.609	50.213	49.950	50.446	50.441	50.112
Soil Description	Silty Sandy Clay	Silty Sandy Clay	Silty Sandy Clay	Crushed Sandstone	Crushed Sandstone	Crushed Sandstone
Test Depth (mm)	150	150	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	**	0.0	0.0	12.5	8.7	14.4
Field Wet Density (FWD) t/m^3	2.14	2.11	2.16	2.17	2.15	2.15
Field Moisture Content %	10.2	10.0	9.8	10.5	10.5	11.0
Field Dry Density (FDD) t/m^3	1.94	1.92	1.97	1.96	1.95	1.94
Peak Converted Wet Density t/m^3	2.18	2.20	2.19	**	**	**
Adjusted Peak Converted Wet Density t/m^3	**	**	**	2.23	2.21	2.26
Moisture Variation (Wv) %	1.0	0.5	0.5	**	**	**
Adjusted Moisture Variation %	**	**	**	0.5	1.0	0.5
Hilf Density Ratio (%)	**98.0**	**95.5**	**98.5**	**97.5**	**97.5**	**95.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/447-8**
Issue Number: 1
Date Issued: 10/12/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 6098
Date Sampled: 04/12/2019
Dates Tested: 04/12/2019 - 06/12/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - East of Temporary Buns (General Fill)
Material Source: Onsite

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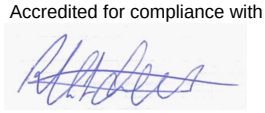

Approved Signatory: Rhys Mitchell
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1					
Sample Number	D19-6098A	D19-6098B	D19-6098C	D19-6098D	D19-6098E
Test Number	43	44	45	46	47
Date Tested	04/12/2019	04/12/2019	04/12/2019	04/12/2019	04/12/2019
Time Tested	07:10	07:15	07:21	07:25	07:30
Test Request #/Location	Stage 1.5	Stage 1.5	Stage 1.5	Stage 1.5	Stage 1.5
Easting	31248.92	31244.67	31243.15	31236.23	31234.87
Northing	8775.02	8789.30	8774.61	8788.07	8799.36
Elevation (m)	48.86	48.87	49.13	49.45	49.43
Soil Description	Silty Sandy Clay trace Gravel	Silty Sandy Clay trace Gravel	Silty Sandy Clay trace Gravel	Silty Sandy Clay trace Gravel	Silty Sandy Clay trace Gravel
Test Depth (mm)	150	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	12.0	0.0	0.0	0.0
Field Wet Density (FWD) t/m^3	2.14	2.10	2.14	2.13	2.09
Field Moisture Content %	13.2	11.8	10.6	10.8	11.3
Field Dry Density (FDD) t/m^3	1.89	1.88	1.94	1.92	1.88
Peak Converted Wet Density t/m^3	2.15	**	2.19	2.15	2.17
Adjusted Peak Converted Wet Density t/m^3	**	2.20	**	**	**
Moisture Variation (Wv) %	0.5	**	0.0	0.0	0.5
Adjusted Moisture Variation %	**	0.0	**	**	**
Hilf Density Ratio (%)	**99.5**	**95.0**	**97.5**	**99.0**	**96.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/447-2**
Issue Number: 1
Date Issued: 28/11/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5964
Date Sampled: 26/11/2019
Dates Tested: 26/11/2019 - 27/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

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Approved Signatory: Liam Davidson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D19-5964A	D19-5964B	D19-5964C	D19-5964D
Test Number	8	9	10	11
Date Tested	26/11/2019	26/11/2019	26/11/2019	26/11/2019
Time Tested	11:02	11:08	11:13	13:03
Test Request #/Location	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam
Easting	8751.57	8749.85	8760.62	8741.33
Northing	31274.69	31258.09	31267.16	31226.02
Elevation (m)	49.60	49.52	49.43	50.6
Soil Description	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand
Test Depth (mm)	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	16.3	0.0	3.6	0.0
Field Wet Density (FWD) t/m^3	2.10	2.06	2.08	2.11
Field Moisture Content %	9.5	7.7	9.8	10.4
Field Dry Density (FDD) t/m^3	1.92	1.91	1.89	1.92
Peak Converted Wet Density t/m^3	**	2.14	**	2.16
Adjusted Peak Converted Wet Density t/m^3	2.19	**	2.18	**
Moisture Variation (Wv) %	**	2.0	**	1.0
Adjusted Moisture Variation %	0.5	**	0.0	**
Hilf Density Ratio (%)	**96.0**	**96.0**	**95.0**	**98.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/447-2**
Issue Number: 1
Date Issued: 28/11/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5964
Date Sampled: 26/11/2019
Dates Tested: 26/11/2019 - 27/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

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Approved Signatory: Liam Davidson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D19-5964E	D19-5964F	D19-5964G	
Test Number	12	13	14	
Date Tested	26/11/2019	26/11/2019	26/11/2019	
Time Tested	13:09	13:14	13:19	
Test Request #/Location	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	
Easting	8740.15	8729.05	8725.97	
Northing	31236.03	31235.36	31244.47	
Elevation (m)	50.10	50.20	50.17	
Soil Description	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand	
Test Depth (mm)	150	150	150	
Sieve used to determine oversize (mm)	19.0	19.0	19.0	
Percentage of Wet Oversize (%)	0.0	0.0	0.0	
Field Wet Density (FWD) t/m^3	2.15	2.11	2.11	
Field Moisture Content %	10.4	9.1	9.8	
Field Dry Density (FDD) t/m^3	1.95	1.94	1.92	
Peak Converted Wet Density t/m^3	2.14	2.10	2.16	
Adjusted Peak Converted Wet Density t/m^3	**	**	**	
Moisture Variation (Wv) %	1.5	1.0	1.0	
Adjusted Moisture Variation %	**	**	**	
Hilf Density Ratio (%)	**100.5**	**100.5**	**97.5**	
Compaction Method	**Standard**	**Standard**	**Standard**	

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/447-1**
Issue Number: 1
Date Issued: 28/11/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5948
Date Sampled: 25/11/2019
Dates Tested: 25/11/2019 - 27/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

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Approved Signatory: Liam Davidson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D19-5948A	D19-5948B	D19-5948C	D19-5948D
Test Number	1	2	3	4
Date Tested	25/11/2019	25/11/2019	25/11/2019	25/11/2019
Time Tested	12:25	12:31	15:20	15:26
Test Request #/Location	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam
Easting	8736.98	8723.84	8744.20	8731.80
Northing	31234.89	31240.17	31248.91	31254.35
Elevation (m)	49.22	49.18	49.25	49.22
Soil Description	Gravelly Sand	Gravelly Sand	Silty Sandy Clay	Silty Sandy Clay
Test Depth (mm)	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	17.0	10.5	0.0	0.0
Field Wet Density (FWD) t/m^3	2.07	2.11	2.09	2.08
Field Moisture Content %	9.4	8.4	11.3	11.4
Field Dry Density (FDD) t/m^3	1.89	1.95	1.88	1.87
Peak Converted Wet Density t/m^3	**	**	2.14	2.14
Adjusted Peak Converted Wet Density t/m^3	2.18	2.14	**	**
Moisture Variation (Wv) %	**	**	0.0	0.0
Adjusted Moisture Variation %	0.5	2.5	**	**
Hilf Density Ratio (%)	**95.0**	**98.5**	**98.0**	**97.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/447-1**
Issue Number: 1
Date Issued: 28/11/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5948
Date Sampled: 25/11/2019
Dates Tested: 25/11/2019 - 27/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

MORRISON GEOTECHNIC
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Morrison Geotechnic Pty Ltd
ABN: 51 009 878 899
Brisbane Laboratory
Unit 1, 35 Limestone Darra QLD 4076
Phone: (07) 3279 0900
Email: darralab@morrisongeo.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Liam Davidson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D19-5948E	D19-5948F	D19-5948G	
Test Number	5	6	7	
Date Tested	25/11/2019	25/11/2019	25/11/2019	
Time Tested	**	**	**	
Test Request #/Location	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	
Easting	8761.74	8752.43	8743.85	
Northing	31260.37	31257.36	31268.50	
Elevation (m)	48.92	49.10	49.16	
Soil Description	Silty Clay	Silty Clay	Silty Sand	
Test Depth (mm)	150	150	150	
Sieve used to determine oversize (mm)	19.0	19.0	19.0	
Percentage of Wet Oversize (%)	0.1	0.0	0.0	
Field Wet Density (FWD) t/m^3	2.04	2.10	2.02	
Field Moisture Content %	7.7	10.2	7.0	
Field Dry Density (FDD) t/m^3	1.89	1.90	1.89	
Peak Converted Wet Density t/m^3	**	2.17	2.08	
Adjusted Peak Converted Wet Density t/m^3	2.12	**	**	
Moisture Variation (Wv) %	**	-0.5	3.0	
Adjusted Moisture Variation %	1.5	**	**	
Hilf Density Ratio (%)	**96.0**	**97.0**	**97.0**	
Compaction Method	**Standard**	**Standard**	**Standard**	

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

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Report Number: **DL19/447-3**
Issue Number: 1
Date Issued: 30/11/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 6013
Date Sampled: 28/11/2019
Dates Tested: 28/11/2019 - 29/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

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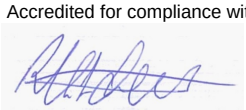

Approved Signatory: Rhys Mitchell
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D19-6013A	D19-6013B	D19-6013C
Test Number	15	16	17
Date Tested	28/11/2019	28/11/2019	28/11/2019
Time Tested	11:02	11:07	11:12
Test Request #/Location	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam
Easting	31254.870	31264.508	31252.652
Northing	8708.191	8696.720	8683.702
Elevation (m)	48.520	48.304	48.502
Soil Description	Silty Sandy Clay Trace Gravel	Silty Sandy Clay Trace Gravel	Silty Sandy Clay Trace Gravel
Test Depth (mm)	150	150	150
Sieve used to determine oversize (mm)	19.0	37.5	19.0
Percentage of Wet Oversize (%)	**	5.2	**
Field Wet Density (FWD) t/m^3	2.15	2.14	2.11
Field Moisture Content %	10.0	9.6	10.4
Field Dry Density (FDD) t/m^3	1.96	1.96	1.91
Peak Converted Wet Density t/m^3	2.15	**	2.18
Adjusted Peak Converted Wet Density t/m^3	**	2.18	**
Moisture Variation (Wv) %	0.5	**	0.5
Adjusted Moisture Variation %	**	1.0	**
Hilf Density Ratio (%)	**100.0**	**98.5**	**97.0**
Compaction Method	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

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Email: swoodley@mgeo.com.au

Report Number: DL19/447-4
Issue Number: 1
Date Issued: 04/12/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 6029
Date Sampled: 29/11/2019
Dates Tested: 29/11/2019 - 04/12/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

NATA WORLD RECOGNISED ACCREDITATION

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Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1					
Sample Number	D19-6029A	D19-6029B	D19-6029C	D19-6029D	D19-6029E
Test Number	18	19	20	21	22
Date Tested	29/11/2019	29/11/2019	29/11/2019	29/11/2019	29/11/2019
Time Tested	07:10	07:16	13:00	13:05	13:11
Test Request #/Location	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam
Easting	31246.58	31257.36	31249.24	31254.10	31261.01
Northing	8700.30	8703.23	8660.87	8673.86	8687.25
Elevation (m)	49.20	49.09	50.24	50.03	50.00
Soil Description	Crushed Sandstone	Crushed Sandstone	Silty Sandy Clay	Silty Sandy Clay	Silty Sandy Clay
Test Depth (mm)	150	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	18.8	19.6	0.0	0.0	3.6
Field Wet Density (FWD) t/m^3	2.14	2.18	2.14	2.11	2.14
Field Moisture Content %	9.9	10.1	11.1	11.3	10.2
Field Dry Density (FDD) t/m^3	1.95	1.98	1.93	1.90	1.94
Peak Converted Wet Density t/m^3	**	**	2.21	2.16	**
Adjusted Peak Converted Wet Density t/m^3	2.22	2.23	**	**	2.16
Moisture Variation (Wv) %	**	**	0.5	0.0	**
Adjusted Moisture Variation %	1.0	0.5	**	**	1.0
Hilf Density Ratio (%)	**96.5**	**97.5**	**96.5**	**98.0**	**98.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/447-4**
Issue Number: 1
Date Issued: 04/12/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 6029
Date Sampled: 29/11/2019
Dates Tested: 29/11/2019 - 04/12/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

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NATA WORLD RECOGNISED ACCREDITATION
Accredited for compliance with ISO/IEC 17025 - Testing
Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1					
Sample Number	D19-6029F	D19-6029G	D19-6029H	D19-6029I	
Test Number	23	24	25	26	
Date Tested	29/11/2019	29/11/2019	29/11/2019	29/11/2019	
Time Tested	13:16	13:20	13:26	13:32	
Test Request #/Location	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	
Easting	31247.69	31238.52	31235.43	31266.48	
Northing	8680.18	8691.32	8705.35	8686.71	
Elevation (m)	49.88	49.87	49.83	49.76	
Soil Description	Silty Sandy Clay	Silty Sandy Clay	Silty Sandy Clay	Silty Sandy Clay	
Test Depth (mm)	150	150	150	150	
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	
Percentage of Wet Oversize (%)	0.0	0.0	0.0	0.0	
Field Wet Density (FWD) t/m^3	2.12	2.08	2.10	2.09	
Field Moisture Content %	11.9	9.4	9.7	11.1	
Field Dry Density (FDD) t/m^3	1.89	1.90	1.92	1.88	
Peak Converted Wet Density t/m^3	2.17	2.19	2.18	2.08	
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**	
Moisture Variation (Wv) %	0.0	1.0	1.0	1.0	
Adjusted Moisture Variation %	**	**	**	**	
Hilf Density Ratio (%)	**97.5**	**95.0**	**96.5**	**100.0**	
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/447-5**
Issue Number: 1
Date Issued: 04/12/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 6047
Date Sampled: 30/11/2019
Dates Tested: 30/11/2019 - 04/12/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

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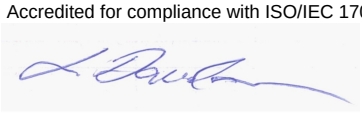

Approved Signatory: Liam Davidson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D19-6047A	D19-6047B	
Test Number	27	28	
Date Tested	30/11/2019	30/11/2019	
Time Tested	07:00	07:08	
Test Request #/Location	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	
Easting	31257.07	31268.05	
Northing	8711.39	8768.47	
Elevation (m)	50.21	50.18	
Soil Description	Crushed Sandstone	Crushed Sandstone	
Test Depth (mm)	150	150	
Sieve used to determine oversize (mm)	19.0	19.0	
Percentage of Wet Oversize (%)	2.0	10.0	
Field Wet Density (FWD) t/m^3	2.08	2.09	
Field Moisture Content %	8.7	8.8	
Field Dry Density (FDD) t/m^3	1.92	1.92	
Peak Converted Wet Density t/m^3	**	**	
Adjusted Peak Converted Wet Density t/m^3	2.14	2.16	
Moisture Variation (Wv) %	**	**	
Adjusted Moisture Variation %	2.0	2.0	
Hilf Density Ratio (%)	**97.5**	**97.0**	
Compaction Method	**Standard**	**Standard**	

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/447-7**
Issue Number: 1
Date Issued: 09/12/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 6094
Date Sampled: 03/12/2019
Dates Tested: 03/12/2019 - 06/12/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Existing Shadforths Fill
Material Source: Onsite

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Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D19-6094A		
Test Number	36		
Date Tested	03/12/2019		
Time Tested	16:02		
Test Request #/Location	Stage 1.5 - Northern Southern Dam		
Easting	31310.375		
Northing	8734.474		
Elevation (m)	47.402		
Soil Description	Crushed Sandstone		
Test Depth (mm)	150		
Sieve used to determine oversize (mm)	19.0		
Percentage of Wet Oversize (%)	7.1		
Field Wet Density (FWD) t/m^3	2.15		
Field Moisture Content %	10.0		
Field Dry Density (FDD) t/m^3	1.95		
Peak Converted Wet Density t/m^3	**		
Adjusted Peak Converted Wet Density t/m^3	2.19		
Moisture Variation (Wv) %	**		
Adjusted Moisture Variation %	1.0		
Hilf Density Ratio (%)	**98.0**		
Compaction Method	**Standard**		

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/447-6**
Issue Number: 1
Date Issued: 06/12/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 6048
Date Sampled: 02/12/2019
Dates Tested: 02/12/2019 - 04/12/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

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NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D19-6048A	D19-6048B	D19-6048C	D19-6048D
Test Number	29	30	31	32
Date Tested	02/12/2019	02/12/2019	02/12/2019	02/12/2019
Time Tested	11:35	11:41	11:47	11:53
Test Request #/Location	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam
Easting	31279.99	31271.58	31289.16	31284.23
Northing	8676.68	8689.76	8683.76	8701.48
Elevation (m)	49.43	48.92	49.02	48.90
Soil Description	Crushed Sandstone	Crushed Sandstone	Crushed Sandstone	Crushed Sandstone
Test Depth (mm)	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	19.6	19.5	5.3	19.5
Field Wet Density (FWD) t/m^3	2.14	2.14	2.16	2.13
Field Moisture Content %	10.1	8.9	13.4	9.3
Field Dry Density (FDD) t/m^3	1.95	1.97	1.90	1.95
Peak Converted Wet Density t/m^3	**	**	**	**
Adjusted Peak Converted Wet Density t/m^3	2.22	2.20	2.16	2.20
Moisture Variation (Wv) %	**	**	**	**
Adjusted Moisture Variation %	1.0	2.0	-0.5	1.5
Hilf Density Ratio (%)	**96.5**	**97.5**	**100.0**	**96.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/447-6**
Issue Number: 1
Date Issued: 06/12/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 6048
Date Sampled: 02/12/2019
Dates Tested: 02/12/2019 - 04/12/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

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NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D19-6048E	D19-6048F	D19-6048G	
Test Number	33	34	35	
Date Tested	02/12/2019	02/12/2019	02/12/2019	
Time Tested	11:58	12:03	12:07	
Test Request #/Location	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	
Easting	31271.53	31298.07	31299.00	
Northing	8714.95	8689.07	8703.33	
Elevation (m)	48.82	49.49	48.80	
Soil Description	Crushed Sandstone	Crushed Sandstone	Crushed Sandstone	
Test Depth (mm)	150	150	150	
Sieve used to determine oversize (mm)	19.0	19.0	19.0	
Percentage of Wet Oversize (%)	15.2	12.8	19.2	
Field Wet Density (FWD) t/m^3	2.16	2.16	2.16	
Field Moisture Content %	11.6	12.2	10.9	
Field Dry Density (FDD) t/m^3	1.93	1.92	1.94	
Peak Converted Wet Density t/m^3	**	**	**	
Adjusted Peak Converted Wet Density t/m^3	2.22	2.22	2.22	
Moisture Variation (Wv) %	**	**	**	
Adjusted Moisture Variation %	0.0	0.0	0.0	
Hilf Density Ratio (%)	**97.5**	**97.0**	**97.0**	
Compaction Method	**Standard**	**Standard**	**Standard**	

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/447-11**
Issue Number: 1
Date Issued: 19/12/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 6171
Date Sampled: 06/12/2019
Dates Tested: 06/12/2019 - 18/12/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam
Material Source: Onsite

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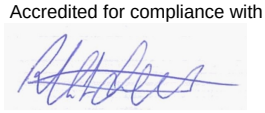


Approved Signatory: Rhys Mitchell
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D19-6171A	D19-6171B	D19-6171C	D19-6171D
Test Number	53	54	55	56
Date Tested	06/12/2019	06/12/2019	06/12/2019	06/12/2019
Time Tested	09:15	09:21	09:26	14:31
Test Request #/Location	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam
Easting	8744.027	8741.951	8757.590	8757.087
Northing	31301.010	31321.424	31324.799	31297.208
Elevation (m)	49.509	49.191	49.356	49.186
Soil Description	Silty Sandy Clay	Silty Sandy Clay	Silty Sandy Clay	Silty Sandy Clay
Test Depth (mm)	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	4.8	0.0	0.0	4.8
Field Wet Density (FWD) t/m^3	2.24	2.03	2.05	2.15
Field Moisture Content %	9.9	8.5	14.1	9.6
Field Dry Density (FDD) t/m^3	2.04	1.87	1.79	1.96
Peak Converted Wet Density t/m^3	**	2.13	2.08	**
Adjusted Peak Converted Wet Density t/m^3	2.18	**	**	2.19
Moisture Variation (Wv) %	**	2.0	-0.5	**
Adjusted Moisture Variation %	0.0	**	**	-0.5
Hilf Density Ratio (%)	**102.5**	**95.5**	**98.5**	**98.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**

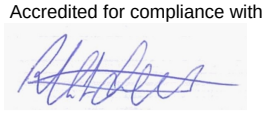
Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/447-11**
Issue Number: 1
Date Issued: 19/12/2019
Client: GOLDING CONTRACTORS PTY LTD
P O BOX 1643, MILTON QLD 4064
Project Number: DL19/447
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 6171
Date Sampled: 06/12/2019
Dates Tested: 06/12/2019 - 18/12/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam
Material Source: Onsite

MORRISON GEOTECHNIC
Brisbane | Gold Coast | Maroochydore
Morrison Geotechnic Pty Ltd
ABN: 51 009 878 899
Brisbane Laboratory
Unit 1, 35 Limestone Darra QLD 4076
Phone: (07) 3279 0900
Email: darralab@morrisongeo.com.au

Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Rhys Mitchell
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D19-6171E	D19-6171F	D19-6171G	D19-6171H
Test Number	57	58	59	60
Date Tested	06/12/2019	06/12/2019	06/12/2019	06/12/2019
Time Tested	14:36	14:42	14:50	14:55
Test Request #/Location	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam	Stage 1.5 - Southern Dam
Easting	8784.419	8770.419	8768.281	8766.853
Northing	31311.009	31307.305	31267.255	31279.943
Elevation (m)	49.611	48.989	49.383	49.250
Soil Description	Silty Sandy Clay	Silty Sandy Clay	Silty Sandy Clay	Silty Sandy Clay
Test Depth (mm)	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	0.0	0.0	0.0
Field Wet Density (FWD) t/m^3	2.03	2.15	2.11	2.14
Field Moisture Content %	7.2	8.3	7.0	7.4
Field Dry Density (FDD) t/m^3	1.90	1.98	1.97	1.99
Peak Converted Wet Density t/m^3	2.13	2.19	2.15	2.19
Adjusted Peak Converted Wet Density t/m^3	**	**	**	**
Moisture Variation (Wv) %	2.0	2.5	2.0	2.0
Adjusted Moisture Variation %	**	**	**	**
Hilf Density Ratio (%)	**95.5**	**98.0**	**98.0**	**97.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

APPENDIX C

Previous Level

One Report

MORRISON GEOTECHNIC PTY LTD

SOLID THINKING // GROUNDED RESULTS

LEVEL ONE COMPLIANCE REPORT

Prepared for:

Shadforths Civil Pty Ltd

DL19/454 – *Partial Bulk Earthworks Filling Operations*

Southern Dam Everleigh Precinct 1.5

Teviot Road, Greenbank

Morrison Geotechnic Pty Ltd
ABN: 51 009 878 899
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a: Unit 1, 35 Limestone Street
Darra, Qld, 4076
Ph: (07) 3279 0900

2nd December 2019

MORRISON GEOTECHNIC

Brisbane | Gold Coast | Maroochydore
Unit 1, 35 Limestone Street (PO Box 3063), Darra Q 4076 P (07) 3279 0900 F (07) 3279 0955
ABN 51 009 878 899
www.morrisongeo.com.au

Brisbane Office
Job No: DL19-454
Ref No: 15645
Author: M. Morrison

2nd December 2019

Shadforths Civil Pty Ltd
99 Sandalwood Lane
Forest Glen Qld 4556

ATTENTION: MR DAVID BUGDEN
Email: david.bugden@shadcivil.com.au
Cc: leo.copelin@shadcivil.com.au

Dear Sir,

RE: LEVEL ONE COMPLIANCE REPORT FOR
PARTIAL BULK EARTHWORKS FILLING OPERATIONS
SOUTHERN DAM EVERLEIGH PRECINCT 1.5
TEVIOT ROAD, GREENBANK

Table of Contents

1.0 INTRODUCTION

1.1 General

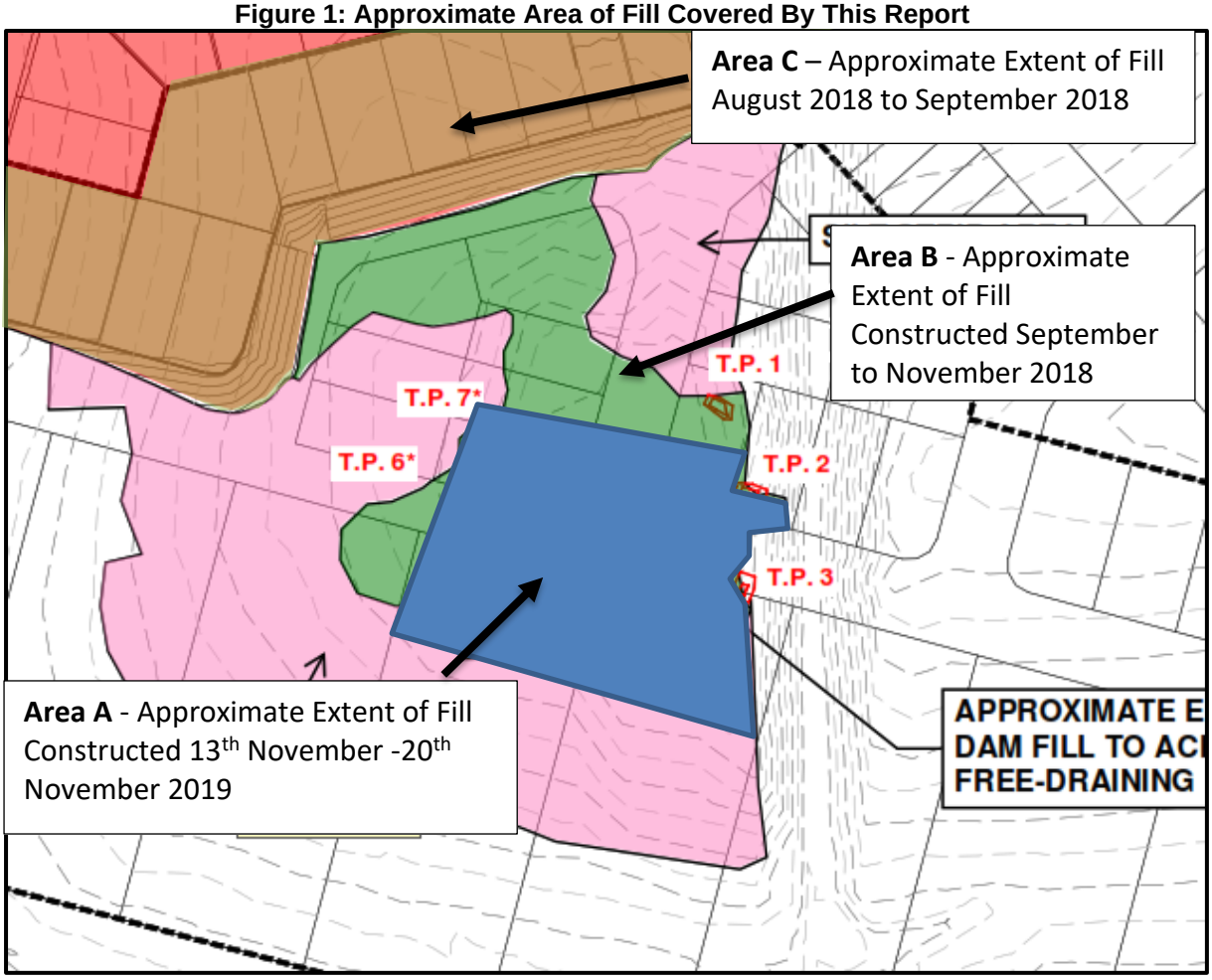
This report presents results of Level One Earthworks Inspections and associated Compaction Compliance testing carried out on Earthworks Fill constructed to partially backfill the southern Dam within Precinct 1.5 at the Everleigh Development.

Earthworks operations were constructed by Shadforths.

Partial earthworks filling operations for Precinct 1.5 were carried between the following dates: -

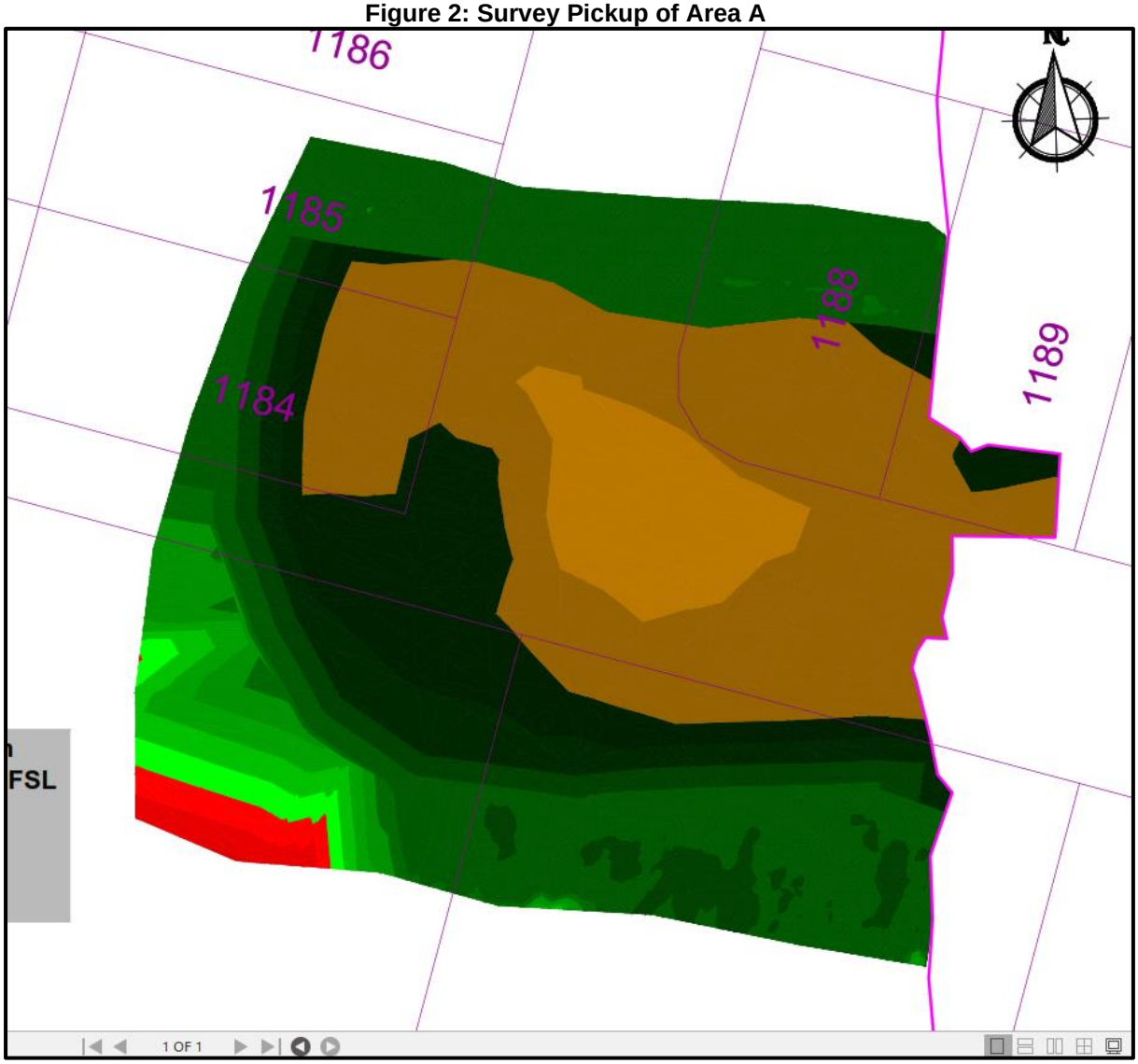
- Area A – Shown as Blue in Figure 1 - 13th November to 20th November 2019.
- Area B – Shown as Green in Figure 1 - Intermittently between September 2018 and November 2018 and
- Area C – Shown as brown in Figure 1 – intermittently between August 2018 and September 2018

Figure 1: Approximate Area of Fill Covered By This Report



A survey pickup of works carried out as a part of Area A is presented below as Figure 2.

Figure 2: Survey Pickup of Area A



1.2 Previous Earthworks

Previous earthworks filling was present at The Site. The existing fill was associated with the former Dam Wall. Fill associated with the Dam Walls is excluded from this report.

The site has also been used to stockpile rock and other materials. Rock and other material stockpiles are excluded from this report. Any fill within the pink areas in Figure 1 is excluded from this report.

1.3 The Project

The purpose for filling at The Site was to remediate and partially backfill the existing dam

2.0 THE BRIEF

The Brief from the Client was limited to:

- Level One Inspection and Testing of the placement and compaction of fill materials in general accordance with AS3798 2007 – “Guidelines on Earthworks for Commercial and Residential Developments”.

- Relative Density Control Testing in accordance with AS1289 – Testing of Soils for Engineering Purposes and at frequencies required in AS3798 Table 8.1.

3.0 METHODOLOGY

Earthworks Inspection and Testing was carried out on the excavated ground surfaces and during the placement and compaction of fill materials.

Field and laboratory testing included a walk over assessments of the existing ground conditions, observation of filling and compaction activities and field density testing using a nuclear soil moisture density gauge and Hilf compactions.

3.1 Stripped Surface Assessment

The area covered by this report was stripped and cleared of visible loose materials, vegetation and topsoil.

Materials exposed after stripping and formed the fill foundation can be broadly summarised as:

- Natural - Silty Sand (SM) – At least dense, fine to medium grained sands, traces of low plasticity clay, grey – brown and moist.
- Natural – Sandy Clay (CI) – Very stiff, medium plasticity, fine to medium grained sand, pale brown mottled orange and moist.
- Natural – Sandstone (XW-DW) – Extremely weathered to slightly weathered, low to medium strength, orange – yellow with red and grey streaks.

Following the stripped surface assessment of the fill areas, the foundation was approved for filling using the following process:

- Walk over assessments confirming that a competent natural foundation had been exposed.
- Proof roll testing using large sized truck carrying out multiple passes confirming no movement of the exposed natural foundation.

Picture 2: View of The Site During Stripping Operations

3.2 Filling Operations

Fill materials were sourced onsite and can be. broadly summarised as: -

- Crushed Rock – Limited to some of the fill areas within the old dam greater than 3.0m below the final earthworks levels
- Clayey Sand (SC), fine to coarse sand, medium plasticity fines, with fine to course gravel, yellow brown and moist.
- Gravelly Sandy Clay (CI), medium plasticity fines, fine to coarse sand, fine to course gravel, yellow - brown and moist.

Placement and compaction of the fill materials was carried out using the following plant:

- Water Cart
- Excavator
- 815 Compactor
- Pad Foot Roller
- Grader
- Articulated Dump Truck
- Dozer
- Scraper
- Mechanical Rock Crusher

The fill materials were moisture conditioned at the fill source and during placement to moisture contents suitable for compaction. Deleterious materials such as organics, sticks, roots and over size particles were sorted and removed during placement or were rejected for use. Occasional oversize particles including cobbles and boulders may be present in the deeper fill profile, however are not considered to affect the fill as a mass.

Placement of the fill materials was carried out in layers appropriate for the above plant and compacted using the above plant carrying out multiple passes.

Our representative observed the filling process as described above and was assessed to be consistent for the entire thickness of fill.

Field density tests and laboratory compactions were carried out on the fill materials in accordance with Table 5.1 and 8.1 of AS3798 2007 (Guidelines on Earthworks for Commercial and Residential Developments) and tested to AS1289 test methods (Testing of Soils for Engineering Purposes).

Testing achieved the required specification of 95% of the Hilf Density at the test locations.

Fill placed and compacted at measured density ratios less than 95% were tyned, moisture conditioned and re-compacted until the required specification was achieved. Retesting was carried out using Random Stratified Location methods.

The Location of the field density tests are shown on the Site Plans contained in Appendix A. These test locations and levels were not obtained by survey and therefore should only be considered as approximate.

3.2.1 Rock Fill Operations

In some fill areas within the dam and below 3.0m from the final earthworks levels, rock fill operations were undertaken.

Methodology for the rock filling operations was in performed in generally accordance with AS3798 - 2007 and can be summarised as: -

- Rock was placed in layers not exceeding 500mm before being moisture conditioned and heavily trafficked and compacted using an 825 Compactor.
- Rock was compacted to ensure it was well bedded and interlocked with no “stand-up” fragments or rock pieces protruding above the surface layer.
- The finished layer was then further trafficked by a pad foot vibrating compactor to provide a finish of well interlocked rock pieces.

Picture 4: View of the Site During Construction

Picture 5: View of the Site During Construction

4.0 STATEMENT OF COMPLIANCE

Our representatives observed the relevant earthworks operations including the stripped surface, fill placement and compaction operations and carried out field density tests and laboratory compaction tests in accordance with the required standard (AS3798, AS1289). Testing achieved the required specification of 95% Standard at the test locations.

It is confirmed that Level One Inspection and Testing has been carried out on the partial backfilling operation and limited to the extent shown in in Figure 1 and Figure 2 . Based on the observations made by our Geotechnicians and the results of the field and laboratory tests, the placed and compacted fill at the above project has, as far as we have been able to assess, been constructed in general accordance with the intent of AS3798.

The fill can be deemed to be “controlled” in accordance with AS2870.

It is understood that additional filling will be required to complete the earthworks to the final earthworks levels.

5.0 EXCLUSIONS

This statement does not include any top soil, which may be placed for use as dressing, trench backfill , areas outside the areas shown in Figure1 and Figure 2 or any other subsequent earthworks after November 2019.

Assessments of material quality such as soaked CBR and site classifications are excluded from this commission.

Our on-site attendance specifically excludes assessments of fill material quality and engineering properties that are outside the requirements of AS3798 – 2007.

Footings and ground slabs for any structures constructed over natural soils or controlled fill should be designed to accommodate the characteristic ground surface movements and settlement potential.

Assessments of these design parameters are beyond the scope of this Report.

6.0 LIMITATIONS

This Report has been prepared by Morrison Geotechnic Pty Ltd (**Morrison Geotechnic**), and may include contributions from Morrison Geotechnic’s officers and employees, sub-contractors, sub-consultants or agents (**Contributors**).

This Report is for the sole benefit and use of Shadforths Civil Pty Ltd (**Client**), its designers, clients and relevant statutory authorities for the sole purpose of providing geotechnical advice and recommendations in respect of the Partial Bulk Earthworks Filling Operations , Southern Dam Everleigh Precinct 1.5 **(Project)**. The Report is only intended to address those issues expressly described in the Brief/ Work Instructions in this Report.

This Report should not be used or relied upon for any other purpose without Morrison Geotechnic’s prior written consent. Morrison Geotechnic and the Contributors do not accept any responsibility or liability in any way whatsoever for the use or reliance of this Report by anyone other than Shadforth Civil Pty Ltd (**Client)**, its designers, its clients and relevant statutory authorities or by anyone else for any purpose other than that for which it has been prepared.

Except with Morrison Geotechnic’s prior written consent, this Report may not be:

(a) released to any other party, whether in whole or in part (other than to the Client’s officers, employees, advisers, designers, clients and relevant statutory authorities);

(b) used or relied upon by any other party.

Morrison Geotechnic and the Contributors, do not accept any liability or responsibility whatsoever for, or in respect of, any use or reliance upon this Report by any other party. Morrison Geotechnic is not obliged to enter into discussions with any third party in respect of this Report.

The information (including technical information and information obtained through discussions) on which this report is based has been provided by the Client and third parties. Morrison Geotechnic and the Contributors:

(a) have relied upon and presumed the accuracy of this information;
(b) have not verified the accuracy or reliability of this information (other than as expressly stated in this Report);
(c) have not made any independent investigations or enquiries in respect of those matters of which it has no actual knowledge at the time of giving this Report to the Client; and
(d) make no warranty or guarantee, expressed or implied, as to the accuracy or reliability of this information.

Morrison Geotechnic and the Contributors do not accept responsibility or liability for any incorrect assumptions related to this Report. For the avoidance of doubt, this Report:

(a) is not an environmental, contamination or hazardous materials assessment; may be invalid, incomplete or inaccurate (including errors in the scope of work, investigation methodology, observations, opinions and advice) where the information provided to Morrison Geotechnic was invalid, incomplete or inaccurate;
(b) is limited to observations of those parts of the site described in Section 1.0.

No warranty or guarantee, whether express or implied, is made in respect of the geotechnical data, information, advice, opinions and recommendations present in this Report.

If further information becomes available, or additional assumptions need to be made, Morrison Geotechnic reserves its right to amend this Report.

If you have any queries regarding the above, please contact our Brisbane office.

Yours faithfully

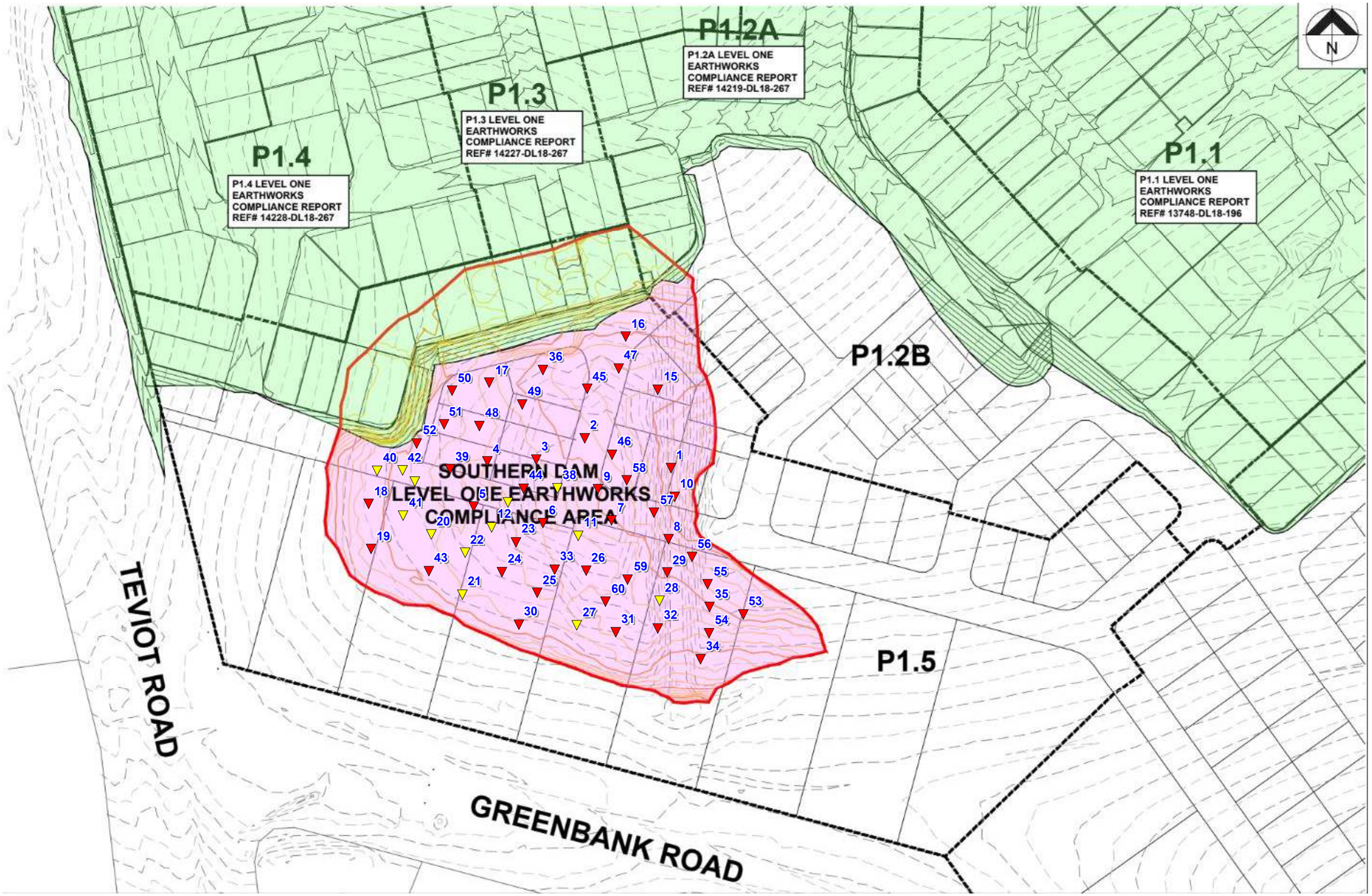
MICHALE MORRISON
For and on behalf of
MORRISON GEOTECHNIC PTY LIMITED

ATTACHMENTS:
Appendix A – Site Plans Showing Test Locations
Appendix B – Laboratory Test Results Reports

APPENDIX A

SITE PLAN

TEST LOCATIONS



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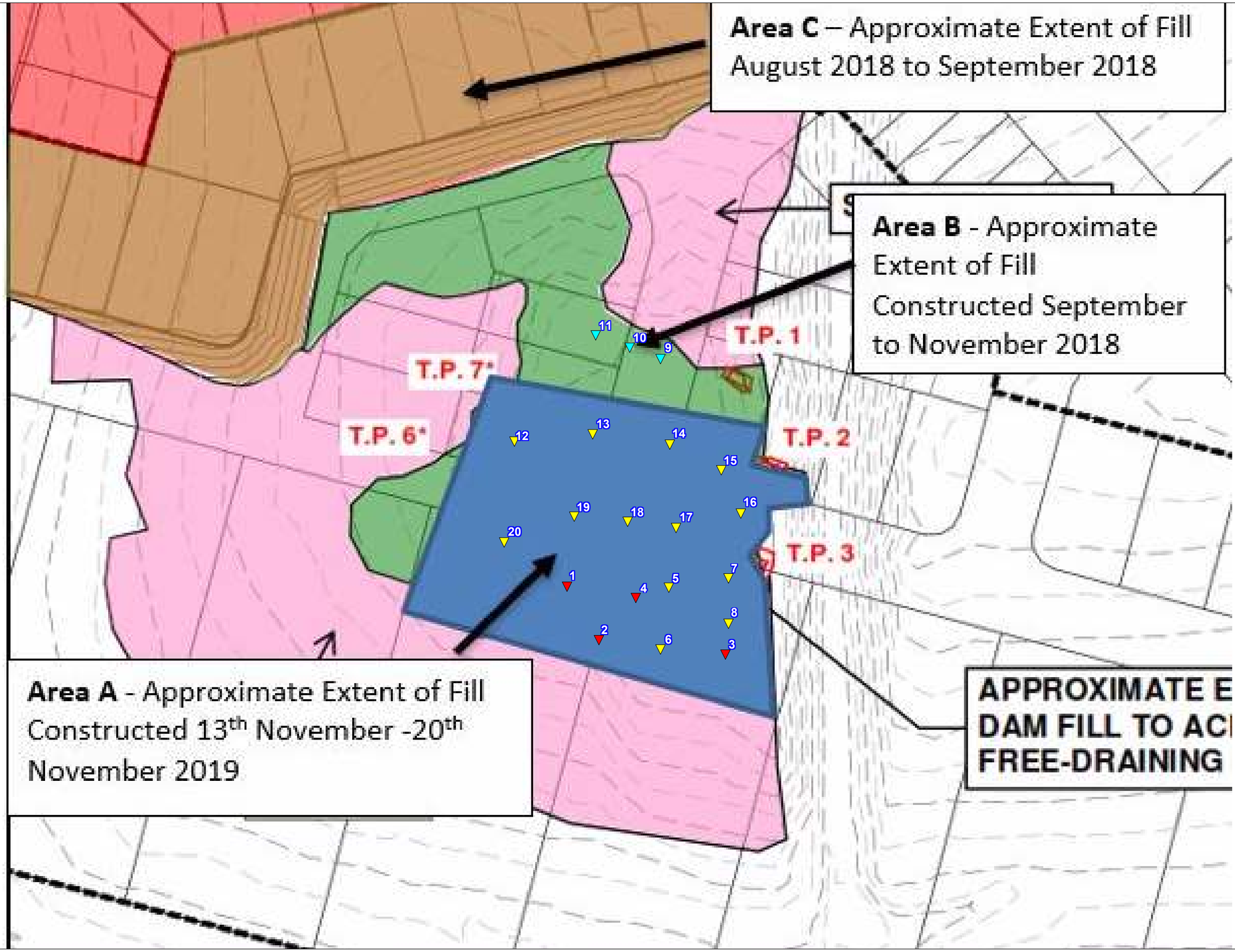
Unit 1/ 35 Limestone St, Darra 4076 *Ph: 3279 0900*
Email: brisbanelab@morrisongeo.com.au

Engineers: M. Ballard, D.Dragun,
Geologists: R.Howchin
Laboratory: M.Morrison

LEGEND

- R.L 45.00 - 49.99
- R.L 50.00 - 54.99

Map Description :	**EARTHWORKS FIELD DENSITY TESTING - Level 1 Inspection**				
Client :	GOLDING CONTRACTORS PTY LTD				
Project :	**EVERLEIGH - STAGE 1.5**				
Project No :	DL19/447	Drawing No :	DL19/447 - 01	Scale :	Not to Scale



MORRISON GEOTECHNIC PTY LTD
ABN: 51 009 878 899

Unit 1/ 35 Limestone St, Darra 4076 Ph: 3279 0900
Email: brisbanelab@morrisongeo.com.au Fax: 3279 0955

Engineers: J. Daly, D.Dragun, & J Greentree
Geologists: R.Howchin
Laboratory: M.Morrison

LEGEND

- RL 45.00 - 46.99
- RL 47.00 - 48.99
- RL 49.00 - 50.99
- -
- ESL
- Final Level

Map Description :	**EARTHWORKS FIELD DENSITY TESTING - Level 1 Inspection**				
Client :	SHADFORTHS CIVIL PTY LTD				
Project :	**EVERLEIGH 1.5 (PARTIAL)**				
Project No :	DL19/454	Drawing No :	DL19/454-01	Scale :	Not to Scale

APPENDIX B

Laboratory Test Results Reports

Material Test Report

MORRISON GEOTECHNIC
Brisbane | Gold Coast | Maroochydore
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Brisbane Laboratory
Unit 1, 35 Limestone Darra QLD 4076
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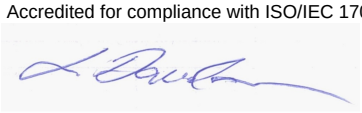
Email: darralab@morrisongeo.com.au

Report Number: DL19/454-1
Issue Number: 1
Date Issued: 22/11/2019
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL19/454
Project Name: EARTHWORKS SUPERVISION - BACKFILL TO DAM
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5805
Date Sampled: 16/11/2019
Dates Tested: 16/11/2019 - 19/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

NATA WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing



Approved Signatory: Liam Davidson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D19-5805A	D19-5805B	D19-5805C	D19-5805D
Test Number	1	2	3	4
Date Tested	16/11/2019	16/11/2019	16/11/2019	16/11/2019
Time Tested	15:01	15:06	15:12	15:17
Test Request #/Location	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area
Easting	498733	498732	498744	498746
Northing	6931275	6931264	6931265	6931275
Elevation (m)	46.57	46.90	46.34	46.21
Soil Description	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand
Test Depth (mm)	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	11.4	7.7	10.7	7.1
Field Wet Density (FWD) t/m^3	2.11	2.16	2.10	2.12
Field Moisture Content %	10.2	8.3	8.2	8.5
Field Dry Density (FDD) t/m^3	1.91	1.99	1.94	1.95
Peak Converted Wet Density t/m^3	**	**	**	**
Adjusted Peak Converted Wet Density t/m^3	2.20	2.14	2.16	2.15
Moisture Variation (Wv) %	**	**	**	**
Adjusted Moisture Variation %	0.5	2.0	2.0	2.5
Hilf Density Ratio (%)	**95.5**	**101.0**	**97.5**	**98.5**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: DL19/454-2
Issue Number: 1
Date Issued: 22/11/2019
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL19/454
Project Name: EARTHWORKS SUPERVISION - BACKFILL TO DAM
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5830
Date Sampled: 18/11/2019
Dates Tested: 18/11/2019 - 19/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Southern Dam (General Fill)
Material Source: Onsite

MORRISON GEOTECHNIC
Brisbane | Gold Coast | Maroochydore
Morrison Geotechnic Pty Ltd
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Email: darralab@morrisongeo.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Liam Davidson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1				
Sample Number	D19-5830A	D19-5830B	D19-5830C	D19-5830D
Test Number	5	6	7	8
Date Tested	18/11/2019	18/11/2019	18/11/2019	18/11/2019
Time Tested	11:50	11:58	12:05	12:11
Test Request #/Location	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area
Easting	498749	498744	477757	498731
Northing	6931279	6931262	6931268	6931281
Elevation (m)	47.1	47.4	47.0	47.2
Soil Description	Gravelly Silty Sand.	Gravelly Silty Sand.	Gravelly Silty Sand.	Gravelly Silty Sand.
Test Depth (mm)	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	1.6	3.5	2.0	8.7
Field Wet Density (FWD) t/m^3	2.18	2.15	2.06	2.08
Field Moisture Content %	11.9	9.4	10.4	11.6
Field Dry Density (FDD) t/m^3	1.95	1.97	1.87	1.86
Peak Converted Wet Density t/m^3	**	**	**	**
Adjusted Peak Converted Wet Density t/m^3	2.21	2.18	2.12	2.18
Moisture Variation (Wv) %	**	**	**	**
Adjusted Moisture Variation %	0.0	0.0	0.5	0.0
Hilf Density Ratio (%)	**99.0**	**98.5**	**97.5**	**95.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/454-3**
Issue Number: 1
Date Issued: 25/11/2019
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL19/454
Project Name: EARTHWORKS SUPERVISION - BACKFILL TO DAM
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5866
Date Sampled: 20/11/2019
Dates Tested: 20/11/2019 - 22/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by Client
Material: Stage 1.5 - Southern Dam Area (General Fill)
Material Source: Onsite

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NATA WORLD RECOGNISED ACCREDITATION
Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1					
Sample Number	D19-5866A	D19-5866B	D19-5866C	D19-5866D	D19-5866E
Test Number	12	13	14	15	16
Date Tested	20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Tested	16:20	16:25	16:31	16:36	16:41
Test Request #/Location	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area
Easting	498617	498617	498616	498636	498655
Northing	6931084	6931075	6931063	6931058	6931053
Elevation (m)	48.17	48.42	48.01	48.23	48.12
Soil Description	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand
Test Depth (mm)	150	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	6.0	6.7	5.2	5.8	6.0
Field Wet Density (FWD) t/m^3	2.07	2.12	2.15	2.09	2.13
Field Moisture Content %	10.2	9.7	9.8	10.4	8.8
Field Dry Density (FDD) t/m^3	1.88	1.94	1.96	1.89	1.95
Peak Converted Wet Density t/m^3	**	**	**	**	**
Adjusted Peak Converted Wet Density t/m^3	2.17	2.18	2.17	2.17	2.17
Moisture Variation (Wv) %	**	**	**	**	**
Adjusted Moisture Variation %	-1.0	1.0	0.0	-0.5	2.5
Hilf Density Ratio (%)	**95.5**	**97.5**	**99.5**	**96.0**	**98.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/454-3**
Issue Number: 1
Date Issued: 25/11/2019
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL19/454
Project Name: EARTHWORKS SUPERVISION - BACKFILL TO DAM
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5866
Date Sampled: 20/11/2019
Dates Tested: 20/11/2019 - 22/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by Client
Material: Stage 1.5 - Southern Dam Area (General Fill)
Material Source: Onsite

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Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1					
Sample Number	D19-5866F	D19-5866G	D19-5866H	D19-5866I	
Test Number	17	18	19	20	
Date Tested	20/11/2019	20/11/2019	20/11/2019	20/11/2019	
Time Tested	16:44	16:49	16:54	17:00	
Test Request #/Location	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	Stage 1.5 - Southern Dam Area	
Easting	498653	498651	498638	498624	
Northing	6931073	6931086	6931096	6931093	
Elevation (m)	48.00	48.12	48.20	48.10	
Soil Description	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand	Gravelly Silty Sand	
Test Depth (mm)	150	150	150	150	
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	
Percentage of Wet Oversize (%)	7.6	6.8	5.4	6.7	
Field Wet Density (FWD) t/m^3	2.14	2.10	2.13	2.07	
Field Moisture Content %	11.5	9.2	10.8	9.6	
Field Dry Density (FDD) t/m^3	1.92	1.93	1.92	1.89	
Peak Converted Wet Density t/m^3	**	**	**	**	
Adjusted Peak Converted Wet Density t/m^3	2.20	2.17	2.20	2.17	
Moisture Variation (Wv) %	**	**	**	**	
Adjusted Moisture Variation %	0.5	1.5	0.0	1.0	
Hilf Density Ratio (%)	**97.5**	**97.0**	**96.5**	**95.5**	
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: **DL19/454-4**
Issue Number: 1
Date Issued: 23/11/2019
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL19/454
Project Name: EARTHWORKS SUPERVISION - BACKFILL TO DAM
Project Location: EVERLEIGH PRECINCT 1.5
Work Request: 5877
Date Sampled: 20/11/2019
Dates Tested: 20/11/2019 - 22/11/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: Stage 1.5 - Shadforth's Existing Controlled Fill
Material Source: Onsite

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Approved Signatory: Sam Woodley
Laboratory Manager
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D19-5877A	D19-5877B	D19-5877C
Test Number	9	10	11
Date Tested	20/11/2019	20/11/2019	20/11/2019
Time Tested	15:45	15:51	15:56
Test Request #/Location	Stage 1.5 - Existing Fill (West of North Bun)	Stage 1.5 - Existing Fill (West of North Bun)	Stage 1.5 - Existing Fill (West of North Bun)
Easting	498642	498639	498637
Northing	6931137	6931137	6931137
Layer / Reduced Level	**	**	**
Soil Description	Gravelly Sandy Clay	Gravelly Sandy Clay	Gravelly Sandy Clay
Test Depth (mm)	150	125	100
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	4.4	4.2	4.6
Field Wet Density (FWD) t/m^3	2.20	2.21	2.14
Field Moisture Content %	11.6	11.9	12.3
Field Dry Density (FDD) t/m^3	1.97	1.98	1.91
Peak Converted Wet Density t/m^3	**	**	**
Adjusted Peak Converted Wet Density t/m^3	2.21	2.21	2.20
Moisture Variation (Wv) %	**	**	**
Adjusted Moisture Variation %	-0.5	-0.5	-1.0
Hilf Density Ratio (%)	**99.5**	**100.0**	**97.5**
Compaction Method	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

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Hilf Density Ratio Report

Client :	**SHADFORTH'S CIVIL PTY LTD**	Report Number:	**DL18/267 - 11**
Address :	**99 SANDALWOOD LANE, FOREST GLEN, QLD, 4556**	Report Date :	**13/09/2018**
Project Name :	**EARTHWORKS SUPERVISION**	Order Number :	**361299**
Project Number :	**DL18/267**	Test Method :	**AS1289.5.8.1 & 5.7.1**
Location:	**EVERLEIGH PRECINCT 1.2 - 1.4 , GREENBANK**	**Page 1 of 1**	

Sample Number :	251910	251911	251912	251913
Test Number :	38	39	40	41
Sampling Method :	-	-	-	-
Date Sampled :	28/08/2018	28/08/2018	28/08/2018	28/08/2018
Date Tested :	28/08/2018	28/08/2018	28/08/2018	28/08/2018
Material Type :	**General Fill**	**General Fill**	**General Fill**	**General Fill**
Material Source :	**On Site**	**On Site**	**On Site**	**On Site**
Lot Number :	-	-	-	-
Sample Location :	E 8601.000 N 31422.000 RL 55.35	E 8600.000 N 31432.000 RL 55.48	E 8599.000 N 31451.000 RL 56.04	E 8603.000 N 31424.000 RL 55.53
Test Depth (mm) :	150	150	150	150
Layer Depth (mm) :	-	-	-	-
Maximum Size (mm) :	19	19	19	19
Oversize Wet (%) :	-	-	8	7
Oversize Dry (%) :	-	-	-	-
Oversize Density (t/m³) :	-	-	2.377	2.340
Field Moisture Content (%) :	11.4	13.9	59.1	13.4
Hilf MDR Number :	251910	251911	251912	251913
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1
Compactive Effort :	Standard	Standard	Standard	Standard
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Moisture Ratio (%) :	76.5	97	99	91.5
Field Wet Density (t/m³) :	2.068	2.080	2.116	2.102
Optimum Moisture Content (%) :	14.9	14.3	59.6	14.6
Moisture Variation :	3.5	0.5	0.3	1.2
Peak Converted Wet Density (t/m³) :	2.038	2.110	2.135*	2.091*
Hilf Density Ratio (%) :	**101.5**	**98.5**	**99.0**	**100.5**
Minimum Specification :	95	95	95	95
Moisture Specification :	-2% to +3%	-2% to +3%	-2% to +3%	-2% to +3%
Site Selection :	-	-	-	-
Soil Description :	Gravelly Sandy CLAY	Gravelly Sandy CLAY	Gravelly Sandy CLAY	Gravelly Sandy CLAY
Remarks :	-			

* - denotes adjusted for oversize

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APPROVED SIGNATORY

Liam Mcdowall (Brisbane) - Branch Manager
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Hilf Density Ratio Report

Client :	**SHADFORTH'S CIVIL PTY LTD**	Report Number:	**DL18/267 - 30**
Address :	**99 SANDALWOOD LANE, FOREST GLEN, QLD, 4556**	Report Date :	**10/10/2018**
Project Name :	**EARTHWORKS SUPERVISION**	Order Number :	**-**
Project Number :	**DL18/267**	Test Method :	**AS1289.5.8.1 & 5.7.1**
Location:	**EVERLEIGH PRECINCT 1.2 - 1.4 , GREENBANK**	**Page 1 of 1**	

Sample Number :	253525	253526	253527	253528
Test Number :	99	100	101	102
Sampling Method :	-	-	-	-
Date Sampled :	05/10/2018	05/10/2018	05/10/2018	05/10/2018
Date Tested :	05/10/2018	05/10/2018	05/10/2018	05/10/2018
Material Type :	**General Fill**	**General Fill**	**General Fill**	**General Fill**
Material Source :	**On Site**	**On Site**	**On Site**	**On Site**
Lot Number :	-	-	-	-
Sample Location :	E 8688.000 N 31361.000 RL 51.47	E 8687.000 N 31367.000 RL 51.91	E 8686.000 N 31374.000 RL 52.42	E 8688.000 N 31382.000 RL 52.85
Test Depth (mm) :	150	150	150	150
Layer Depth (mm) :	-	-	-	-
Maximum Size (mm) :	19	19	19	19
Oversize Wet (%) :	-	-	-	-
Oversize Dry (%) :	-	-	-	-
Oversize Density (t/m³) :	-	-	-	-
Field Moisture Content (%) :	11.1	12.6	10.3	13.4
Hilf MDR Number :	253525	253526	253527	253528
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1
Compactive Effort :	Standard	Standard	Standard	Standard
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Moisture Ratio (%) :	95.5	101.5	98.5	103.5
Field Wet Density (t/m³) :	2.155	2.109	2.183	2.130
Optimum Moisture Content (%) :	11.6	12.4	10.4	13.0
Moisture Variation :	0.6	-0.1	0.1	-0.5
Peak Converted Wet Density (t/m³) :	2.182	2.181	2.163	2.188
Hilf Density Ratio (%) :	**99.0**	**96.5**	**101.0**	**97.5**
Minimum Specification :	95	95	95	95
Moisture Specification :	-2% to +3%	-2% to +3%	-2% to +3%	-2% to +3%
Site Selection :	-	-	-	-
Soil Description :	Gravelly Sandy CLAY	Gravelly Sandy CLAY	Gravelly Sandy CLAY	Gravelly Sandy CLAY
Remarks :	-			

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NATA Accreditation Number
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Hilf Density Ratio Report

Client :	**SHADFORTH'S CIVIL PTY LTD**	Report Number:	**DL18/267 - 31**
Address :	**99 SANDALWOOD LANE, FOREST GLEN, QLD, 4556**	Report Date :	**15/10/2018**
Project Name :	**EARTHWORKS SUPERVISION**	Order Number :	**-**
Project Number :	**DL18/267**	Test Method :	**AS1289.5.8.1 & 5.7.1**
Location:	**EVERLEIGH PRECINCT 1.2 - 1.4 , GREENBANK**	**Page 1 of 1**	

Sample Number :	253569	253570	253571	
Test Number :	103	104	105	
Sampling Method :	-	-	-	
Date Sampled :	10/10/2018	10/10/2018	10/10/2018	
Date Tested :	10/10/2018	10/10/2018	10/10/2018	
Material Type :	**General Fill**	**General Fill**	**General Fill**	
Material Source :	**On Site**	**On Site**	**On Site**	
Lot Number :	-	-	-	
Sample Location :	E 8720.000 N 31375.000 RL 52.68	E 8719.000 N 31384.000 RL 53.08	E 8719.000 N 31391.000 RL 53.29	
Test Depth (mm) :	150	150	150	
Layer Depth (mm) :	-	-	-	
Maximum Size (mm) :	19	19	19	
Oversize Wet (%) :	7	12	12	
Oversize Dry (%) :	-	-	-	
Oversize Density (t/m³) :	2.500	2.498	2.507	
Field Moisture Content (%) :	11.8	13.5	13.9	
Hilf MDR Number :	253569	253570	253571	
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	
Compactive Effort :	Standard	Standard	Standard	
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	
Moisture Ratio (%) :	101	102	101	
Field Wet Density (t/m³) :	2.160	2.182	2.138	
Optimum Moisture Content (%) :	11.7	13.2	13.8	
Moisture Variation :	-0.1	-0.2	-0.1	
Peak Converted Wet Density (t/m³) :	2.198*	2.199*	2.195*	
Hilf Density Ratio (%) :	**98.5**	**99.0**	**97.5**	
Minimum Specification :	95	95	95	
Moisture Specification :	-2% to +3%	-2% to +3%	-2% to +3%	
Site Selection :	-	-	-	
Soil Description :	Gravelly Sandy CLAY	Gravelly Sandy CLAY	Gravelly Sandy CLAY	
Remarks :	-			

* - denotes adjusted for oversize

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APPROVED SIGNATORY

Liam Mcdowall (Brisbane) - Branch Manager
NATA Accreditation Number
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Material Test Report

Report Number: DL18/267-36
Issue Number: 1
Date Issued: 09/11/2018
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL18/267
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.2 - 1.4, GREENBANK
Work Request: 212
Date Sampled: 06/11/2018
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD +/-2% OMC
Site Selection: Selected by GTA
Material: General Fill
Material Source: Onsite

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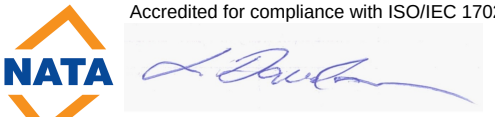

Approved Signatory: Liam Davidson
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D18-212A	D18-212B	D18-212C
Date Tested	06/11/2018	06/11/2018	06/11/2018
Time Tested	14:00	14:10	14:20
Test Request #/Location	General Fill	General Fill	General Fill
Easting	8655.100	8649.600	8644.900
Northing	31310.600	31311.900	31313.300
Elevation (m)	53.43	53.66	54.00
Thickness of Layer (mm)	-	-	-
Soil Description	Gravelly Sandy Clay	Gravelly Sandy Clay	Gravelly Sandy Clay
Test Depth (mm)	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	7.4	0.0
Field Wet Density (FWD) t/m^3	2.08	2.11	2.09
Field Moisture Content %	9.0	9.4	10.2
Field Dry Density (FDD) t/m^3	1.91	1.93	1.90
Peak Converted Wet Density t/m^3	2.18	**	2.16
Adjusted Peak Converted Wet Density t/m^3	**	2.05	**
Moisture Variation (Wv) %	2.0	**	1.0
Adjusted Moisture Variation %	**	1.0	**
Hilf Density Ratio (%)	**95.5**	**103.0**	**96.5**
Compaction Method	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: DL18/267-37
Issue Number: 1
Date Issued: 13/11/2018
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL18/267
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.2 - 1.4, GREENBANK
Work Request: 198
Date Sampled: 05/11/2018
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD +/-2% OMC
Site Selection: Selected by GTA
Material: General Fill
Material Source: Onsite

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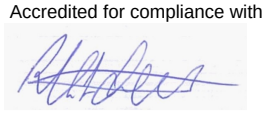

Approved Signatory: Rhys Mitchell
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D18-198A	D18-198B	D18-198C
Date Tested	05/11/2018	05/11/2018	05/11/2018
Time Tested	14:00	14:10	14:20
Test Request #/Location	General Fill	General Fill	General Fill
Easting	8720.600	8713.400	8707.300
Northing	31373.600	31370.400	31368.800
Elevation (m)	52.90	52.90	53.00
Thickness of Layer (mm)	-	-	-
Soil Description	Gravelly Sandy Clay	Gravelly Sandy Clay	Gravelly Sandy Clay
Test Depth (mm)	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	12.7	0.0
Field Wet Density (FWD) t/m^3	2.18	2.17	2.10
Field Moisture Content %	9.9	6.3	8.0
Field Dry Density (FDD) t/m^3	1.98	2.04	1.95
Peak Converted Wet Density t/m^3	2.17	**	2.10
Adjusted Peak Converted Wet Density t/m^3	**	2.15	**
Moisture Variation (Wv) %	0.5	**	3.0
Adjusted Moisture Variation %	**	2.0	**
Hilf Density Ratio (%)	**100.5**	**101.0**	**100.5**
Compaction Method	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

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Report Number: DL18/267-31 GT
Issue Number: 1
Date Issued: 26/10/2018
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL18/267
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.2 - 1.4, GREENBANK
Work Request: 9
Date Sampled: 23/10/2018
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD +/-2% OMC
Site Selection: Selected by Local Authority
Material: General Fill - Everleigh 1.2 - 1.4
Material Source: Onsite

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Approved Signatory: Rhys Mitchell
Senior Technician
NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1			
Sample Number	D18-9A	D18-9B	D18-9C
Date Tested	23/10/2018	23/10/2018	23/10/2018
Time Tested	14:00	14:10	14:20
Test Request #/Location	General Fill	General Fill	General Fill
Easting	8676.800	8674.500	8671.700
Northing	31356.400	31367.400	31378.900
Elevation (m)	53.07	53.53	54.29
Thickness of Layer (mm)	-	-	-
Soil Description	Gravelly Sandy Clay	Gravelly Sandy Clay	Gravelly Sandy Clay
Test Depth (mm)	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0
Percentage of Wet Oversize (%)	0.0	**	1.9
Field Wet Density (FWD) t/m^3	2.15	2.13	2.14
Field Moisture Content %	11.8	11.4	9.9
Field Dry Density (FDD) t/m^3	1.92	1.91	1.94
Peak Converted Wet Density t/m^3	2.18	2.15	**
Adjusted Peak Converted Wet Density t/m^3	**	**	2.16
Moisture Variation (Wv) %	0.5	0.0	**
Adjusted Moisture Variation %	**	**	0.0
Hilf Density Ratio (%)	**98.5**	**98.5**	**99.0**
Compaction Method	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC

Material Test Report

Report Number: DL18/267-42
Issue Number: 1
Date Issued: 16/01/2019
Client: SHADFORTH'S CIVIL PTY LTD
99 SANDALWOOD LANE, FOREST GLEN QLD 4556
Project Number: DL18/267
Project Name: EARTHWORKS SUPERVISION
Project Location: EVERLEIGH PRECINCT 1.2 - 1.4, GREENBANK
Work Request: 900
Date Sampled: 11/01/2019
Sampling Method: AS1289 1.2.1 6.4 (b) - Sampling from layers in earthworks or pavement - compacted
Specification: 95% STD
Site Selection: Selected by GTA
Material: General Fill (Capping over Rockfill)
Material Source: Onsite

MORRISON GEOTECHNIC
Brisbane | Gold Coast | Maroochydore
Morrison Geotechnic Pty Ltd
ABN: 51 009 878 899
Brisbane Laboratory
Unit 1, 35 Limestone Darra QLD 4076
Phone: (07) 3279 0900
Email: darralab@morrisongeo.com.au

NATA WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Liam McDowall
Branch Manager

NATA Accredited Laboratory Number: 1169

Compaction Control AS 1289 5.7.1 & 5.8.1 & 2.1.1						
Sample Number	D19-900A	D19-900B	D19-900C	D19-900D	D19-900E	D19-900F
Date Tested	11/01/2019	11/01/2019	11/01/2019	11/01/2019	11/01/2019	11/01/2019
Time Tested	12:40	12:45	12:50	12:55	13:00	13:05
Test Request #/Location	General Fill	General Fill	General Fill	General Fill	General Fill	General Fill
Easting	8685.2	8704.8	8721.5	8739.5	8748.7	8764.0
Northing	31297.6	31297.8	31291.5	31285.0	31283.3	31282.7
Elevation (m)	49.16	48.17	47.60	47.35	47.38	47.34
Thickness of Layer (mm)	-	-	-	-	-	-
Soil Description	Gravelly Clayey Sand	Gravelly Clayey Sand	Gravelly Clayey Sand	Gravelly Clayey Sand	Gravelly Clayey Sand	Gravelly Clayey Sand
Test Depth (mm)	150	150	150	150	150	150
Sieve used to determine oversize (mm)	19.0	19.0	19.0	19.0	19.0	19.0
Percentage of Wet Oversize (%)	5.2	10.0	6.7	6.8	0.0	8.9
Field Wet Density (FWD) t/m^3	2.08	2.20	2.21	2.10	2.19	2.19
Field Moisture Content %	6.6	6.5	6.5	10.0	8.2	7.7
Field Dry Density (FDD) t/m^3	1.95	2.06	2.08	1.91	2.03	2.03
Peak Converted Wet Density t/m^3	**	**	**	**	2.10	**
Adjusted Peak Converted Wet Density t/m^3	2.00	2.14	2.14	2.16	**	2.13
Moisture Variation (Wv) %	**	**	**	**	2.0	**
Adjusted Moisture Variation %	2.0	1.5	1.5	1.5	**	1.5
Hilf Density Ratio (%)	**104.0**	**102.5**	**103.5**	**97.0**	**104.5**	**103.0**
Compaction Method	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**

Moisture Variation Note:
Positive values = test is dry of OMC
Negative values = test is wet of OMC