



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 601**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 601

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 601. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



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Pakenham VIC 3810

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mob: 0417 004 072
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www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 602**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

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Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 602

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 602. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



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ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 603**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 603

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 603. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 604**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 604

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 604. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



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mob: 0417 004 072
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ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 605**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 605

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 605. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

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A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
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- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



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**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 606**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

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Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 606

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 606. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 607**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 607

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 607. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 608**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 608

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 608. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 609**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 609

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 609. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 624**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 624

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 624. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 625**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 625

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 625. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 626**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 626

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 626. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 627**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 627

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 627. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 628**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 628

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 628. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 629**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 629

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 629. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 630**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 630

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 630. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 631**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 631

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 631. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 632**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 632

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 632. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 633**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 633

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 633. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 634**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 634

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 634. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 635**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 635

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 635. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 636**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 636

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 636. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 637**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 637

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 637. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 638**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 638

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 638. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 639**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 639

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 639. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager



47 National Avenue,
Pakenham VIC 3810

ph: 03 9769 5799
fax: 03 9769 4799
mob: 0417 004 072
tseymour@terrafirmalabs.com.au

www.terrafirmalabs.com.au

ABN: 11 925 206 385

**Geotechnical Report
Level One Inspection and Testing
Individual Lot Report**

**Acacia Ridge Stage 6
Cranbourne
Lot 640**

Prepared for:

The Land Owner

Project 9608

19 September 2017.

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

47 National Avenue,
Pakenham VIC 3810
Phone: 03 9769 5799 Fax: 03 9769 4799
Email: tseymour@terrafirmalabs.com.au

Geotechnical Report Level One Inspection and Testing Acacia Estate Stage 6 Lot 640

1. Introduction

Terra Firma Laboratories was engaged by Streetworks Pty Ltd as the geotechnical inspection and testing authority to provide Level 1 supervision and testing works on the earthworks component for Acacia Stage 6 Lot 640. This work was conducted over the period of 16/05/2017 to 22/08/2017.

This report presents that the allotment earthworks was carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development* and in compliance with the compaction control specifications established by the contractor.

2. Scope of Works

2.1. Areas of work

The areas of work included lots 601 to 609 and 624 to 640. The site will be a residential estate.

The area on which fill was placed is shown on site plan (Appendix 1 as shown in the level one report for the entire stage) based on drawings prepared by Smec Urban Development and provided by Streetworks Pty Ltd.

The supervision work by *Terra Firma Laboratories* involved both inspection of sub grade preparation work and full time inspection and testing of fill placement.

2.2. Specification

The placement of fill on the areas of work was to be carried out in accordance with *AS3798-2007 Guidelines for Earthworks for Commercial and Residential Development*, as directed by Streetworks Pty Ltd. At all times during placement of fill materials Terra Firma Laboratories maintained a Geotechnical Technician on site to perform the supervision and testing as required by AS3798-2007.

A technical specification for compaction control requirements was provided by Streetworks Pty Ltd and established that:

As referenced from AS3798-2007 (Section 5.2) establishes a specification requirement for a minimum density ratio of not less than 95% noting that soils containing more than 20% of particles coarser than 37.5mm cannot be tested for relative compaction using the procedures of AS1289.

Field density testing shall be undertaken at a frequency of not less than 3 tests per visit.

Test Rolling is required for all layers of structural fill and materials within 150mm of permanent subgrade level so as to withstand test rolling without visible deformation or springing. Corrective action is required where unstable areas exceed 20% of the area being considered by test rolling.

3. Inspection and Testing

3.1. Sub-Grade Preparation

Subgrade preparation involved stripping the site down of topsoil and organic matter to a depth of approximately 200mm below existing levels detailed on the site plans. The sub-grade area was then proof-rolled to determine soft or otherwise unsuitable zones and such zones rectified as necessary. The sub-grade was watered and scarified prior to fill placement to aid layer bonding.

3.2. Fill materials

The materials used as fill were locally sourced and observed to generally consist of Silty Clay, sourced from stockpiled materials on site. No particles greater than 150mm were observed. The fill was nominated as clean fill by the contractor.

3.3. Fill Construction

The contractor had the following plant available on-site during the construction period for use in the fill placement:

- *Dump Truck*
- *Dozer*
- *Pad Foot Roller*
- *Excavator*
- *Smooth Drum Roller*
- *Scraper*
- *Compactor*

All fill was placed in layers of thicknesses not exceeding 300mm. *The work area was typically a 2 or 3 lot area on any one particular day.* At the completion of a placed layer, compaction testing was performed to confirm appropriate compaction had been achieved and supported the observations made.

It was observed that finished levels were in accordance with levels marked on site by survey. These levels are shown on site plans attached in Appendix 1 as shown in the level one report for the entire stage as shown in the level one report for the entire stage.

The final 300mm of fill placed across the site was placed as a topsoil layer/ growing medium and should be considered as non-structural, as it was placed in an uncontrolled manner, as allowed by specifications.

4. Compaction Control Testing

Testing comprised of a total of 41 in-situ density tests, with a summary of results included in Appendix 2 as shown in the level one report for the entire stage. Test Reports are referenced in Appendix 3 as shown in the level one report for the entire stage.

Test numbers 2, 5, 6, 8, 9, 10, 12, 16, 18, 19, 20, 21, 23, 25 and 29 originally failed to meet specification. Streetworks Pty Ltd were Notified and asked to rework the area appropriately. Upon adequate reworking *Terra Firma Laboratories* would perform a re-test.; this process would continue until a minimum compaction effort of 95% was achieved.

It should be noted that the tests are a representation of the fill placed and support the visual assessment of the works completed. Each lot does not necessarily require a compaction test to comply. The compaction control testing indicated that the engineered fill on all lots complied with the technical specification.

5. Uncontrolled Works

Terra Firma Laboratories cannot verify any works completed by others after the final date specified in the introduction. Uncontrolled works may include, but not limited to trenching for services, cut and fill works for slab preparation or subsequent removal of vegetation and back fill of holes.

6. Clean Fill

Terra Firma Laboratories cannot guarantee that the material used as a filling medium is free from chemical or other contamination.

7. Statement of Compliance

Inspections and testing of the fill areas at this site indicate that both sub grade preparation and fill placement have been conducted in accordance with the specification and that the completed fill areas of greater than 300mm, as shown on the site plan attached, and not any preceding the 26/10/2016 or work completed after the 16/08/2017, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Lab Manager