

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

**Lot 301
Summerhill Estate Stage 3
Cranbourne**

Prepared for:

The Land Owner

Project 9821

16 February 2018

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

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Geotechnical Report Level One Inspection and Testing Summerhill Estate Stage 3 Lot 301

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 Summerhill Stage 3 Lot 301. This work was conducted over the period of 23/08/2017 to 15/2/2018.

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 301, 306 to 310 and 324 to 325. 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 estate) based on drawings prepared by GPR Consulting 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.

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:

- Pad Foot Roller
- Water Cart
- Excavator
- Trucks
- Dozer
- Dump Trucks

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 estate.

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

Test numbers 1, 3, 5, 6, 10 and 11 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 23/08/2017 or work completed after the 15/02/2018, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Managing Director

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

**Lot 306
Summerhill Estate Stage 3
Cranbourne**

Prepared for:

The Land Owner

Project 9821

16 February 2018

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

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Geotechnical Report Level One Inspection and Testing Summerhill Estate Stage 3 Lot 306

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 Summerhill Stage 3 Lot 306. This work was conducted over the period of 23/08/2017 to 15/2/2018.

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 301, 306 to 310 and 324 to 325. 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 estate) based on drawings prepared by GPR Consulting 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.

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:

- Pad Foot Roller
- Water Cart
- Excavator
- Trucks
- Dozer
- Dump Trucks

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 estate.

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

Test numbers 1, 3, 5, 6, 10 and 11 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 23/08/2017 or work completed after the 15/02/2018, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Managing Director

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

**Lot 307
Summerhill Estate Stage 3
Cranbourne**

Prepared for:

The Land Owner

Project 9821

16 February 2018

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

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Geotechnical Report Level One Inspection and Testing Summerhill Estate Stage 3 Lot 307

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 Summerhill Stage 3 Lot 307. This work was conducted over the period of 23/08/2017 to 15/2/2018.

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 301, 306 to 310 and 324 to 325. 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 estate) based on drawings prepared by GPR Consulting 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.

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:

- Pad Foot Roller
- Water Cart
- Excavator
- Trucks
- Dozer
- Dump Trucks

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 estate.

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

Test numbers 1, 3, 5, 6, 10 and 11 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 23/08/2017 or work completed after the 15/02/2018, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Managing Director

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

**Lot 308
Summerhill Estate Stage 3
Cranbourne**

Prepared for:

The Land Owner

Project 9821

16 February 2018

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

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Geotechnical Report Level One Inspection and Testing Summerhill Estate Stage 3 Lot 308

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 Summerhill Stage 3 Lot 308. This work was conducted over the period of 23/08/2017 to 15/2/2018.

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 301, 306 to 310 and 324 to 325. 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 estate) based on drawings prepared by GPR Consulting 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.

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:

- Pad Foot Roller
- Water Cart
- Excavator
- Trucks
- Dozer
- Dump Trucks

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 estate.

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

Test numbers 1, 3, 5, 6, 10 and 11 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 23/08/2017 or work completed after the 15/02/2018, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Managing Director

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

**Lot 309
Summerhill Estate Stage 3
Cranbourne**

Prepared for:

The Land Owner

Project 9821

16 February 2018

Prepared by:

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Geotechnical Report Level One Inspection and Testing Summerhill Estate Stage 3 Lot 309

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 Summerhill Stage 3 Lot 309. This work was conducted over the period of 23/08/2017 to 15/2/2018.

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 301, 306 to 310 and 324 to 325. 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 estate) based on drawings prepared by GPR Consulting 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.

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:

- Pad Foot Roller
- Water Cart
- Excavator
- Trucks
- Dozer
- Dump Trucks

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 estate.

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

Test numbers 1, 3, 5, 6, 10 and 11 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

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6 Clean Fill

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7 Statement of Compliance

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For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Managing Director

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Individual Lot Reports**

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Summerhill Estate Stage 3
Cranbourne**

Prepared for:

The Land Owner

Project 9821

16 February 2018

Prepared by:

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Geotechnical Report Level One Inspection and Testing Summerhill Estate Stage 3 Lot 310

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 Summerhill Stage 3 Lot 310. This work was conducted over the period of 23/08/2017 to 15/2/2018.

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

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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.

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

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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 estate.

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

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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 23/08/2017 or work completed after the 15/02/2018, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Managing Director

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

**Lot 324
Summerhill Estate Stage 3
Cranbourne**

Prepared for:

The Land Owner

Project 9821

16 February 2018

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

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

Geotechnical Report Level One Inspection and Testing Summerhill Estate Stage 3 Lot 324

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 Summerhill Stage 3 Lot 324. This work was conducted over the period of 23/08/2017 to 15/2/2018.

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 301, 306 to 310 and 324 to 325. 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 estate) based on drawings prepared by GPR Consulting 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.

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:

- Pad Foot Roller
- Water Cart
- Excavator
- Trucks
- Dozer
- Dump Trucks

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 estate.

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

Test numbers 1, 3, 5, 6, 10 and 11 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 23/08/2017 or work completed after the 15/02/2018, may be certified as being compliant with the specification.

For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Managing Director

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

**Lot 325
Summerhill Estate Stage 3
Cranbourne**

Prepared for:

The Land Owner

Project 9821

16 February 2018

Prepared by:

TERRA FIRMA LABORATORIES
Geotechnical Inspection and Testing Authority

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Geotechnical Report Level One Inspection and Testing Summerhill Estate Stage 3 Lot 325

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 Summerhill Stage 3 Lot 325. This work was conducted over the period of 23/08/2017 to 15/2/2018.

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 301, 306 to 310 and 324 to 325. 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 estate) based on drawings prepared by GPR Consulting 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.

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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.

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:

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

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7 Statement of Compliance

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For and on behalf of
Terra Firma Laboratories,



Tom Seymour
Managing Director