LOCAL GEOTECHNICS

Report on
Geotechnical Investigation
250 Anstey Road, Forrestdale WA

11 March 2020

Project:
LGK9752019GI REV_1

Client: **B & C Sorgiovanni**

Unit 12, 8 Production Road, Canning Vale WA 6155
PO Box 5050, Canning Vale South, WA 6155
08 9457 3517 (0), 0425 545 508 (M)
ABN 61 737 984 867
admin@localgeotechnics.com.au
localgeotechnics.com.au

LOCAL GEOTECHNICS

11 March 2020

To
B & C Sorgiovanni

Dear Sir/Madam,

RE: Geotechnical Investigation for 250 Anstey Road, Forrestdale WA

This letter presents our report on geotechnical investigation carried out at the above site. If you have any questions related to the report or we can be of further assistance, please do not hesitate to contact Local Geotechnics.

Sincerely yours

Dr. Harun Meer
Ph.D.(Geotech), M. Eng. (Geotech), B. Eng. (Civil), MIE Aust
Director
Local Geotechnics

Project	**LGK9752019GI** **Geotechnical Investigation**
Site Location	**250 Anstey Road, Forrestdale WA**

Rev	Description	Date	Prepared by	Approved by
0	Issued to client	16 february 2020	M Seet	H Meer
1	Issued to client	11 March 2020	M Seet	H Meer

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

EXECUTIVE SUMMARY

Local Geotechnics (LG) was engaged by B & C Sorgiovanni to undertake a geotechnical investigation for 250 Anstey Road, Forrestdale WA (the project). LG was given to understand by the client that the developed site will be used for light industrial constructions. The site will be developed in three (3) stages as shown in Figure 1. In this report, Stage 1, 2 and 3 will be designated as Area 1, 2 and 3 respectively.

The field works were carried out on 17 December 2019 and 5 March 2020. Weather was sunny during the investigation period. This report must be read or implemented in full, no partial implementation of this report is allowed.

Prior to the field works, underground utilities plans were obtained from Dial Before You Dig (DBYD). Field works included visual inspection, taking of photographs, twenty-one (21) testing pits to a depth of 2.0 m, Dynamic Cone Penetrometer (DCP) tests, soil profile logging and sampling for laboratory tests at a NATA accredited laboratory.

Findings of the investigation are presented in the following sections
Soil profile of the site, as observed during the sub-surface probing, is SAND, overlaying CLAY near bottom of the target investigation depth. A summary of the soil profile is described in Section 4.4 of this report and details of the soil profile are shown in test pit logs in Appendix B.

Groundwater was not encountered during the investigation.

Based on the site soil profile and surrounding condition, the site can be classified as ***"CLASS M"*** in accordance with the definitions provided in Australian Standard AS2870 - 2011.

Provided earthworks are completed as per the recommendations in Section 6.4 of this report, the site can be classified as ***"CLASS S"*** in accordance with the definitions provided in Australian Standard AS2870-2011. *However, after competition of earthworks, site classification needs to be verified by a competent geotechnical engineering company.*

Details of the engineering recommendations are presented in Section 6.0 of this report.

It is highly recommended that LG should supervise earthworks and compaction works to ensure that all organic, roots, demolition debris, uncontrolled fill material have been adequately removed from the area and that the subgrade and fill material are adequately compacted.

1.0 INTRODUCTION

Local Geotechnics (LG) was engaged by B & C Sorgiovanni to undertake a geotechnical investigation for 250 Anstey Road, Forrestdale WA (the project). The site location is shown in Figure 1.

Figure 1. Aerial view of the site location (Source: Landgate Map)

LG was given to understand by the client that the developed site will be used for light industrial constructions. The site will be developed in three (3) stages as shown in Figure 1. *In this report, Stage 1, 2 and 3 will be designated as Area 1, 2 and 3 respectively.*

Objectives of this investigation are to determine the sub-surface condition of the site and to provide recommendation on earthworks remedial works.

The proposed earthworks design levels for 250 Anstey Rd and depicted in the attached plans (Appendix A) are in accordance with the approved RPS UWMP for the FBPW industrial precinct and complement the Calibre proposed design levels of the overall FBPW development and drainage strategy for the area.

Field works for the site were conducted on 17 December 2019. Weather condition was sunny during the field works. Any environmental issues were not in the scope of this investigation. This report must be read or implemented in full. No partial implementation of this report is allowed.

2.0 SCOPE AND OBJECTIVE

The scope and objectives of the investigation are as follows:

- Mobilisation and demobilisation of an engineer to the site;
- Identifying any underground services crossing the proposed field investigation locations by conducting "Dial-Before-You-Dig" search;
- Undertaking Testing Pit (TP) digging at twenty-one (21) locations at the site to a target depth of 2.0 m, refusal or pit collapse, whichever is encountered first;
- Sampling and logging of USC soil samples and recording of water table from the test pits;
- Conducting of Dynamic Cone Penetrometer (DCP) tests alongside the testing pits, to a depth of 1.0 m from the ground surface or refusal;
- Recording of test locations by using a hand-held GPS;
- Backfilling of all test pits with the site materials;
- Conducting of laboratory tests at NATA accredited laboratory which included:
    - Particle Size Distribution Tests,
    - Atterberg Limit Tests.
    - Maximum Modified Dry Density (MMDD);
    - California Bearing Ratio (CBR), 4- Days Soaked
- Objectives of the investigation are to prepare an investigation report which included:
    - Details of investigation;
    - Desktop study information;
    - Site plan showing the locations of test pits;
    - Logging of soil strata and identify soil/rock layer profiles as per **AS1726;**
    - Water table information, if encountered;
    - Laboratory test data;
    - Interpretation of:
    - Site Classification as per AS**2870;**
    - Recommendations on site preparation including compaction criteria as per **AS 3798**;

3.0 SITE CONDITIONS

3.1 Surface Condition

The site is a farmland with one residential house at one corner (western side) of the block. The site level is undulating, and overall topography of the site surrounding is also undulating. No water ponding was observed during the field investigation.

The site photos taken during the field investigation are shown in Appendix D.

Area 1 (Stage 1):
Area 1 is a farmland and has lower elevation than the existing residential area. It is given to understand that Area 1 will be raised to the design level, as shown in Appendix A, from the existing surface level.

There is a Western Power (WP) high voltage electrical line, which passes over Area 1. There is also a transmission tower at the site. LG is given to understand that there will be 10 m exclusion zone (easement) at the both sides of the transmission line. Approximate area (7464 m^2) of the easement of the transmission line is marked in Figure 2. The site photos taken during the field investigation are shown in Appendix D (Photo 1 to 8).

Area 2 (Stage 2):
Area of Stage 2 is a farmland and is lower than the residential area. It is given to understand that Area 2 will be raised to the design level, as shown in Appendix A, from the existing surface level. Overall site condition of Area 2 is shown in Figure 3 and the site photos taken during the field investigation are shown in Appendix D (Photo 9 to 16).

Figure 2. Area 1

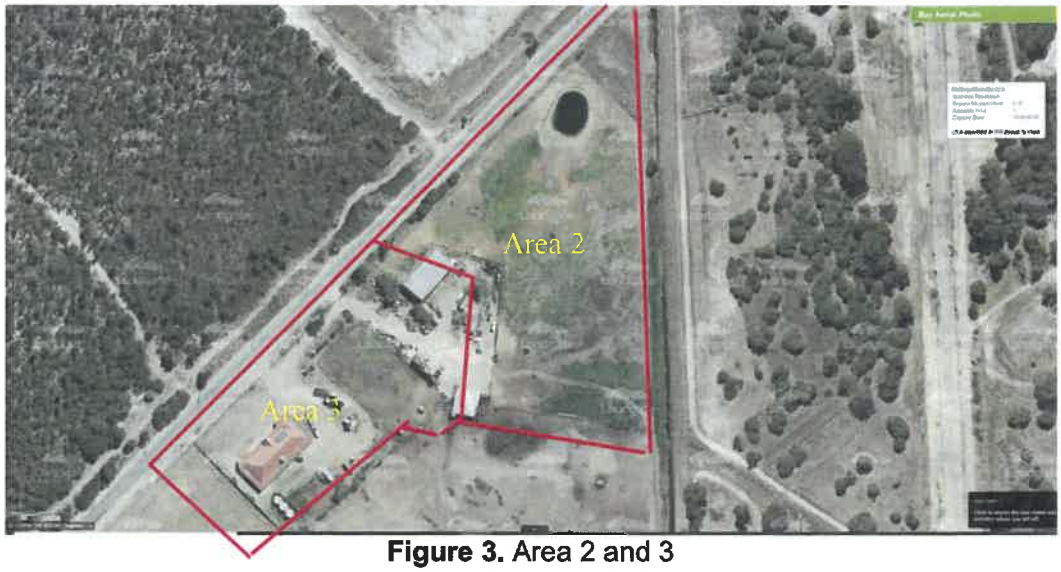


Figure 3. Area 2 and 3

Area 3 (Stage 3):
There is an existing house and a shed for farm supporting machinery in the area of Stage 3. Part of this area was backfilled by using concrete rubbles. Overall site condition of Area 3 is shown in Figure 3 and the site photos taken during the field investigation are shown in Appendix D (Photo 17 to 24).

3.2 *Subsurface Condition*

A review of Environmental Geological Western Australia survey Map of Armadale 1:50,000 (Part Sheet 2033 I to 2133 IV) was conducted before the site investigation. Environmental Geological map of Armadale revealed that the site is consisted of SAND white to pale grey, yellow at depth, fine to medium grained, moderately sorted, subangular to sub-rounded, minor heavy minerals, of eolian origin.

Environmental Geological map of Armadale also revealed that the site soil has medium to high permeability, low corrosion potential, medium slope stability, low shrink swell potential, medium to high bearing capacity. Depth of water table is variable, remobilised if devegetated, permanent cuts unstable, may have zones of coffee rock representing paleo water tables.

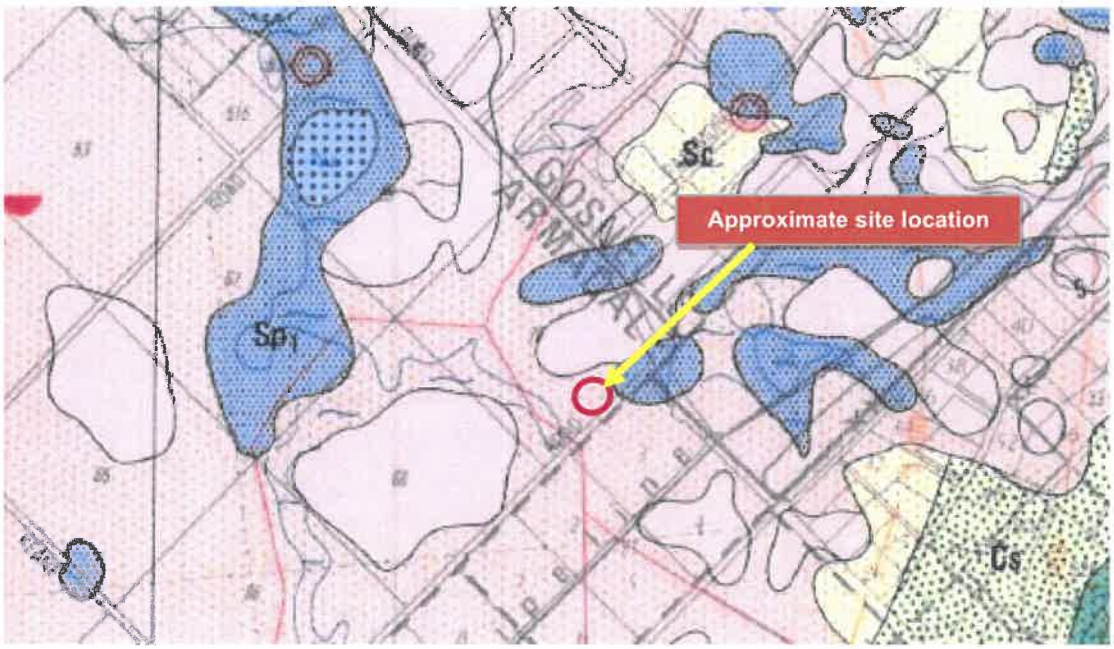


Figure 4. Extracted site geological map

3.3 *Water Table and Drainage*

A review of 'Perth Ground Water Atlas' of the Department of Water was carried out for this site. 'Perth Ground Water Atlas' revealed that the site has a natural elevation of approximately 23.0 to 24 m AHD, annual average water table of 21.0 m AHD and historical maximum groundwater elevation of 23.0 m as per Perth Ground Water Atlas, May 2003.

Natural Surface Level: 23.0 to 24 m AHD

Annual average water table Level: 21.0 m AHD

Ground water table: Not encountered during investigation

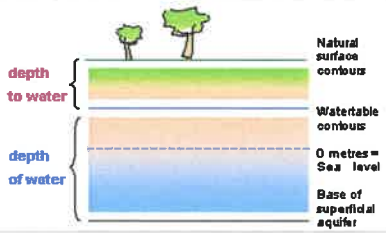


Figure 5. Water table information (Source: Perth Ground Water Atlas)

4.0 FIELD WORKS

4.1 General

The field investigation consists of Dial Before You Dig (DBYD) to check if there is any underground services, visual inspection of the site, sub-surface probing by using an excavator at twenty-one (21) locations at the site, up to a depth of 2.0 m or refusal, taking photographs, Dynamic Cone Penetrometer (DCP) testings alongside the test pits, soil sampling and laboratory testings.

The test locations are shown in the site sketch in Appendix A. The key information of the field tests is summarised in Table 1.

Table 1. Field Investigation Summary

Test ID	Coordinates (MGA94)		Termination Depth (m)	Remarks
	Northing (m)	Easting (m)		
Area 1 (Stage 1)				
TP1/DCP1	6 444 189	401 627	2.0	Reached target depth
TP2/DCP2	6 444 252	401 595	2.0	Reached target depth
TP3/DCP3	6 444 342	401 592	2.0	Reached target depth
TP4/DCP4	6 444 382	401 583	1.5	Refusal due to pit collapse
TP5/DCP5	6 444 383	404 487	2.0	Reached target depth
TP6/DCP6	6 444 352	401 463	2.0	Reached target depth
Area 2 (Stage 2)				
TP7/DCP7	6 444 542	401 591	2.0	Reached target depth
TP8/DCP8	6 444 483	401 594	2.0	Reached target depth
TP9/DCP9	6 444 435	401 598	1.6	Refusal due to pit collapse
TP10/DCP10	6 444 466	401 573	2.0	Reached target depth
TP11/DCP11	6 444 444	401 552	2.0	Reached target depth
TP12/DCP12	6 444 483	401 554	2.0	Reached target depth
TP13/DCP13	6 444 545	401 550	2.0	Reached target depth
Area 3 (Stage 3)				
TP14/DCP14	6 444 466	401 520	2.0	Reached target depth
TP15/DCP15	6 444 489	401 533	2.0	Reached target depth
TP16/DCP16	6 444 488	401 514	2.0	Reached target depth
TP17/DCP17	6 444 490	401 524	2.0	Reached target depth
TP18/DCP18	6 444 430	401 500	2.0	Reached target depth
TP19/DCP19	6 444 442	401 466	2.0	Reached target depth
TP20/DCP20	6 444 381	401 446	2.0	Reached target depth
TP21/DCP21	6 444 421	401 404	2.0	Reached target depth

4.2 Survey

Field investigation locations were determined at the site randomly and were recorded by using a Garmin 12 channel handheld GPS with a claimed accuracy of ±5m. Approximate coordinates (GDA94/MGA 94) of all tests are shown in Table 1. All fieldwork was carried out by or under the direction of LG in general accordance with AS1726 (2017).

4.3 Underground Service Location

Prior to commencement of the fieldwork, underground utilities plans were obtained from DBYD. Care was taken to avoid any damage of underground services during the field investigation works. An excavator was deployed on site to conduct the excavation work. All fieldworks were carried out by or under the direction of LG in accordance with AS1726. Care was taken to avoid any damage of underground services during the field investigation works.

4.4 Test Pit Logs

Twenty-one (21) Test Pits (TP1 to TP21) were conducted at the site by using an excavator. TP1 to TP6 were conducted at Area 1, TP7 to TP13 were conducted at Area 2, and TP14 to TP21 were conducted at Area 3.

The subsurface profile exposed in the test pits were logged in accordance with AS1726 and was photographed to provide a visual record of subsurface conditions encountered. Following these activities, test pits were progressively backfilled in the reverse order of the excavation works.

Subsurface conditions inferred from the site investigation can be described as follows:

Area 1 (Stage 1), TP1 to TP6:

- **(TOPSOIL) SAND-** fine to medium grained, light grey and brown in different locations, dry, medium dense to very dense, with grass, overlaying,
- **SAND-** fine to medium grained, yellow, light grey and brown at different locations, dry, dense, extending from a depth of 0.1 m to a depth of around 0.5 m to 1.0 m, followed by,
- **CLAY-** low to high plasticity in different locations, brown-yellow, dry to slightly moist, stiff to hard, extending to the target investigation depth.

Test pits, TP5 and TP6, consists of Sandy Clay as follows,

- **SANDY CLAY-** medium plasticity, light brown, dry to slightly moist, stiff to hard.

Test pit, TP4, was terminated at a depth of 1.5 m due to pit collapsing.

Area 2 (Stage 2) TP7 to TP13:

- **(TOPSOIL) SAND-** fine to medium grained, dark grey, dry, medium dense to very dense, with grass, overlaying,
- **SAND-** fine to medium grained, brown and light yellow in different locations, dry, medium dense to dense, extending from a depth of 0.2 m to a depth of around 1.0 m to 1.6 m, followed by,
- **CLAY-** medium to high plasticity, yellow and green in different locations, slightly moist, stiff, extending to the target investigation depth.

Test pits, TP7, TP9, and TP13 also contained coffee rock up to 20 mm in size.

Test pit, TP9, was terminated at a depth of 1.6 m due to pit collapsing.

Area 3 (Stage 3) TP14 to TP21:

- **(TOPSOIL) SAND-** fine to coarse grained, grey, dry, medium dense to dense, with gravel up to 50 mm in size, overlaying,
- **SAND-** fine to medium grained, grey and yellow in different locations, dry to moist, loose and dense in different locations, with gravel up to 50 mm in size, extending from a depth of 0.2 m to a depth of around 1.0 m to 1.7 m, followed by,
- **CLAY-** medium to high plasticity, green and brown in different locations, slightly moist, stiff, extending to the target investigation depth.

Test pits, TP16 and TP17, were terminated at target depth of 2.0 m. It was observed that this area had hardstand layer of approximately up to 40 mm.

Details of the soil profile logs are included in Appendix B.

Groundwater was not encountered during the field investigation.

4.5 Dynamic Cone Penetrometer (DCP) Tests

Dynamic Cone Penetrometer (DCP1-21) tests were conducted alongside the mechanical testing pits. DCP test data was used to determine the field density of soil materials by using Standard Australia HB 160-2006. It is observed from the DCP test that the site is in:

- Area 1 (Stage 1): medium dense to very dense and firm to hard condition
- Area 2 (Stage 2): medium dense to very dense condition
- Area 3 (Stage 3): loose to dense condition

DCP data are presented in Appendix B together with the soil logs.

5.0 LABORATORY TEST

5.1 General

Laboratory tests were conducted at SGS Australia Pty Ltd, Dampier, a NATA accredited laboratory. The following laboratory tests were scheduled and undertaken:

- Particle Size Distribution Test (AS 1289 3.6.1), and
- Plasticity Index - Atterberg Limit Test (AS 1289 3.1.2, 3.2.1, 3.3.1, 3.4.1)

5.2 Laboratory Test Results

The laboratory test results are summarised in Table 2. Laboratory test certificates are included in Appendix C.

Table 2. Summary of Laboratory Test Data

Sample Location	Stage 1: TP3 (1.0– 1.7) m	Stage 1: TP5 (0.5– 1.0) m	Stage 2: TP7 (1.2– 2.0) m	Stage 2: TP12 (1.2– 2.0) m	Stage 3: TP14 (1.5– 2.0) m
Particle Size Distribution (PSD)					
Gravel (%)	5	-	-	3	2
Sand (%)	74	72	97	78	65
Fines < 75µm (%)	21	28	3	19	33
Atterberg Limit Tests (PI)					
Liquid Limit (%)	50	43	41	42	37
Plastic Limit (%)	29	16	18	20	19
Plasticity Index (%)	21	27	23	22	18
Linear Shrinkage (%)	13.0	3.0	5.0	7.0	6.0

Particle size distribution testing was undertaken in accordance with Australian Standard, AS 1289.3.6.1. The soil samples comprise of approximately 3% to 33% fines in different locations.

Liquid limit, plastic limit, plasticity index and linear shrinkage tests were undertaken in accordance with AS1289.3.9.2, 3.2.1, 3.3.1 and 3.4.1, respectively on the materials passing the 0.425 mm size sieve. The test results indicate that the fines are of 'high to medium plasticity' for all three areas.

Linear shrinkage is reported as the decrease in length of a soil sample (portion finer than 0.425 mm) when oven-dried from the liquid limit for a period of 24 hours at 110°C. Shrinkage is expressed as a percentage of the original dimension. The test results indicate a linear shrinkage of Area 1: 3% to 13%; Area 2: 5% to 7% and Area 3: 6%.

6.0 ENGINEERING CONSIDERATIONS AND RECOMMENDATIONS

6.1 Inferred Subsurface Conditions

Soil profile as observed during sub-surface probing is SAND, overlaying CLAY near the bottom of the target investigation depth. Summary of soil profile is described in section 4.4 of this report and the details of the soil profile are shown in test pit logs in Appendix B.

6.2 DCP test certificates

DCP tests were conducted alongside the test pits using a dynamic cone penetrometer at the site. It was observed that the site is in:

- Area 1: medium dense to very dense and firm to hard condition
- Area 2: medium dense to very dense condition
- Area 3: loose to dense condition

Refusal due to concrete blocks was observed at some DCP test locations in Area 3. DCP test certificates are presented in Appendix B.

6.3 Groundwater Information

Groundwater was not encountered during the field investigation.

6.4 Earthworks

6.4.1 Suitability of Excavated Materials for use as Fill

Most of the soil encountered at the top within the site comprise clayey gravel or clay and are considered not suitable for reuse as structural fill material. Topsoil can be used for landscaping purpose only.

6.4.2 Structural Fill

Suitable materials for structural fill shall be a clean sand. The fill material at compaction should comprise sand that is free from oversized material (i.e. material > 75 mm in any dimension), less than 5% fines (material passing 0.075 mm sieve), foreign material, organic material or other deleterious material.

Recycled sand also can be used as backfill materials. However, materials must be non-plastic and should also be free from industrial waste, solid waste, or construction and demolition debris.

6.4.3 Site Preparation

Earthworks should be carried out in general accordance with the Australian Standard AS 3798-2007 "Guidelines on Earthworks for Commercial and Residential Developments".

The followings are general guidelines to be followed during preparation of the site areas within the proposed development footprints:

- Remove and grub all trees from site, including root masses and tree stumps, if any. Strip topsoil and any uncontrolled fill, paved materials, demolition debris or other deleterious material and stockpile separately.
- Compact the base of the excavation to 95% MMDD, followed by backfilling with loose layer with thicknesses not exceeding 300 mm and compact the layer to 95% of MMDD. The material at compaction should be moisture conditioned within -1% to +2% of its optimum moisture content. Alternatively, Perth Sand Penetrometer (PSP) test can be used during compaction inspection. The backfilled layers must be compaction to dense condition. If PSP is used for compaction inspection, LG recommends minimum of 8 PSP blows for every 300 mm of penetration.
- The proposed earthworks design levels for 250 Anstey Rd and depicted in the attached plans (Appendix A) are in accordance with the approved RPS UWMP for the FBPW industrial precinct and complement the Calibre proposed design levels of the overall FBPW development and drainage strategy for the area.
- Care will need to be taken when compacting in the vicinity of existing structures to avoid damage from excessive vibrations.
- It is recommended that a geotechnical engineer supervises the site activities to ensure that all organic, roots, demolition debris, loose material have been adequately removed from the area; the fill material is adequately compacted and that the excavation, pile or pad footing construction are carried out in accordance with the design.

In addition to the above recommendations, following area specific recommendations must be completed as a part of earthworks:

Area 1 (Stage 1):

- Topsoil in this area varies from 0 to 100 mm. Remove topsoil. Raise the site to the proposed design level.

- This area has Western Power easement, approximate area (7464 m^2). It is anticipated that there will not be any construction at the western power easement area. As such, screened topsoil (after removing unsuitable materials) can be used as backfill materials over the easement area.

Area 2 (Stage 2):

- Topsoil in this area varies up to 200 mm. Remove topsoil. Raise the site to the proposed design level.

Area 3 (Stage 3):

- Topsoil in this area varies up to 200 mm. Remove topsoil. It was given to understand that part of this area was raised and a layer of handstand were prepared. LG recommends this hardstand layer can remain.

6.5 Excavatability

The medium dense to very dense (and very stiff) state of the in-situ soils suggests that the materials should be excavatable with a standard earthmoving equipment (e.g., 5 to 10 tonne excavator).

6.6 *Cut and Fill Batters*

Temporary excavation up to 1 m depth can be conducted with a maximum dry slope angle of 1V: 1.5H. Cut and fill batters above groundwater table will be generally stable at 1V: 1.5H. Bench has to be created if excavation is deeper than 1.0 m. However, batters constructed at 1V: 3H will enable re-establishment of vegetation and be less prone to damage from wetting, drying and erosion. *Excavation below groundwater table will require proper retention system and dewatering.*

6.7 *Site Classification*

Based on the site soil profile and surrounding condition, the site can be classified as ***"CLASS M"*** in accordance with the definitions provided in Australian Standard AS2870-2011. The characteristics surface movement is considered to be Ys (20 mm < Ys ≤ 40 mm). An assumption of soil suction change of 2.5 m is made in this case.

Provided earthworks are completed as per the recommendations in Section 6.4 of this report, the site can be classified as ***"CLASS S"*** in accordance with the definitions provided in Australian Standard AS2870-2011. *However, after competition of earthworks, site classification needs to be verified by a competent geotechnical engineering company.*

General definition of 'Site Class' is shown in Table 3 (Source: AS 2870-2011).

Table 3. General Definition of Site Class (Source: AS 2870-2011)

Site Class	Soil Description	Characteristic Surface Movement (mm)
A	Most SAND and ROCK sites with little or no ground movement due to moisture content variation	little or no ground movement
S	Slightly reactive clayey or silty SAND, which will cause slight ground movement due to moisture content variation	0 < Ys ≤ 20
M	Moderately reactive clayey or silty soil which will cause moderate ground movement due to moisture content variation	20 < Ys ≤ 40
H1	Highly reactive clayey or silty soil which will cause high ground moved due to moisture content variation	40 < Ys ≤ 60
H2	Highly reactive clayey or silty soil which will cause high ground moved due to moisture content variation	60 < Ys ≤ 75
E	Extremely reactive clayey or silty soil which will cause extreme ground movement due to moisture content variation	Ys > 75
P	Problematic sites, sites consisted of soft soils, soft clay or silt or loose sand; landfills, mine subsidence, collapsing soils, very reactive soils, subjected to erosion and sites which cannot be classified as A to E.	-

6.8 *Earthquake Design Factor*

Australian Standard AS1170.4-2007 Structural design actions Part 4 "Earthquake actions in Australia" is recommended for earthquake consideration. AS1170.4-2007 outlines the design criteria required for a structure in consideration of the risk of being subjected to earthquake loads. Earthquake design factors are summarised in Table 5.

Table 5. Earthquake Design Factors

Factor/Class	Value/Name	Ref. AS1170.4- 2007
Hazard Factor (z), Perth	0.09	Section 3 Table 3.2
Site subsoil class	Class C_e – Shallow Soil	Section 4

7.0 LIMITATION OF USE

The ground is a product of continuing natural and man-made processes and therefore exhibits characteristics and properties which vary from place to place and can change with time. Geotechnical site investigation involves gathering and assimilating limited facts about these characteristics and properties in order to better understand or predict the behaviour of the ground at a particular site under certain conditions.

This site investigation has been carried out by inspection, using a limited amount of pit excavation, sampling, testing or other means of investigation. Achieving a full coverage of the site to ensure all variations is not practical and is seldom done due to cost constraints as well as the impracticality.

It should be noted that the subsurface conditions encountered by the limited number of pit excavations as part of this geotechnical site investigation represent the ground conditions at the locations where the samples were taken and where tests have been undertaken and as such are an extremely small proportion of the site to be developed. The facts reported in this document are directly relevant only to the ground at the place where, and time when, the investigation was carried out and are believed to be reported accurately.

Given the limited number of test pits and limited field and laboratory testings carried out with respect to the overall site area, variations between investigation locations are likely and ground conditions different to those presented in this report may be present within the subject site area. The risk associated with this variability and the impact it will have on the proposed development should be carefully considered.

The level of geotechnical investigation that has been completed to date is considered appropriate for the project objectives. If the above mentioned client, its subcontractors, agents or employees use this factual information for any other purpose for which it was not intended, then the client, its subcontractors, agents or employees does so at their own risk and Local Geotechnics will not and cannot accept liability in respect of the advice, whether under law of contract, tort or otherwise.

Any interpretation or recommendation given in this report is based on judgement and experience and not on greater knowledge of the facts reported. Local Geotechnics does not represent that the information or interpretation contained in this report addresses completely the existing features, subsurface conditions or ground behaviour at the subject site.

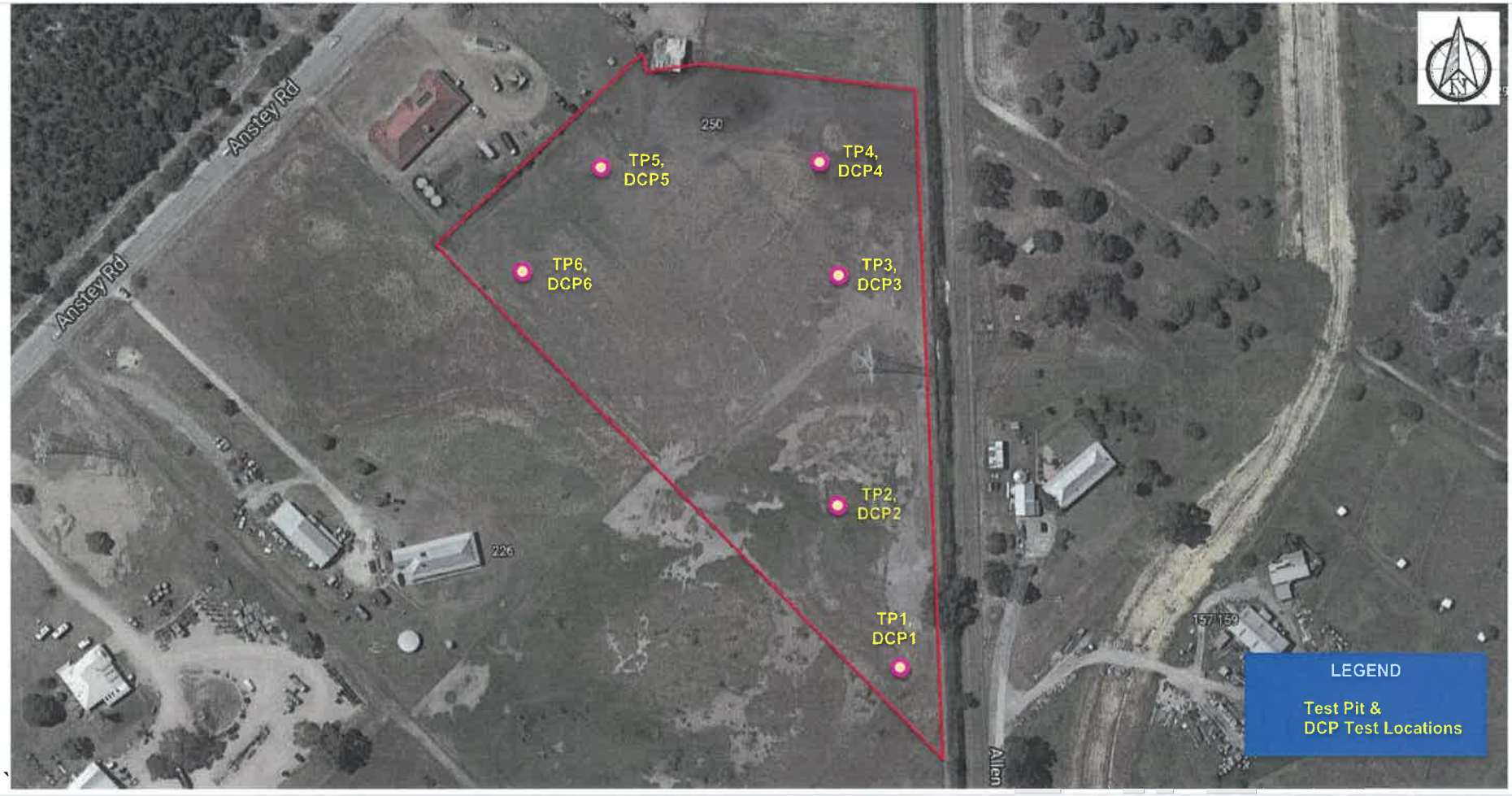
8.0 REFERENCES

- Geological Survey Map of Western Australia of *Armadale 1:50,000.*
- Australian Standard AS1170.4-2007, "Earthquake Actions in Australia".
- Australian Standard AS 1726-1993 *"Geotechnical Site Investigations".*
- Australian Standard AS 2870-2011, *"Residential Slabs and Footings".*
- Australian Standard AS 3798-2007, *"Guidelines on Earthworks for Commercial and Residential Developments".*
- Standards Australia, Hand Book HB 160-2006 *"Soil Testing".*
- 'Perth Ground Water Atlas' of the Department of Water.

APPENDIX A

SITE SKETCH AND SITE DESIGN LEVEL

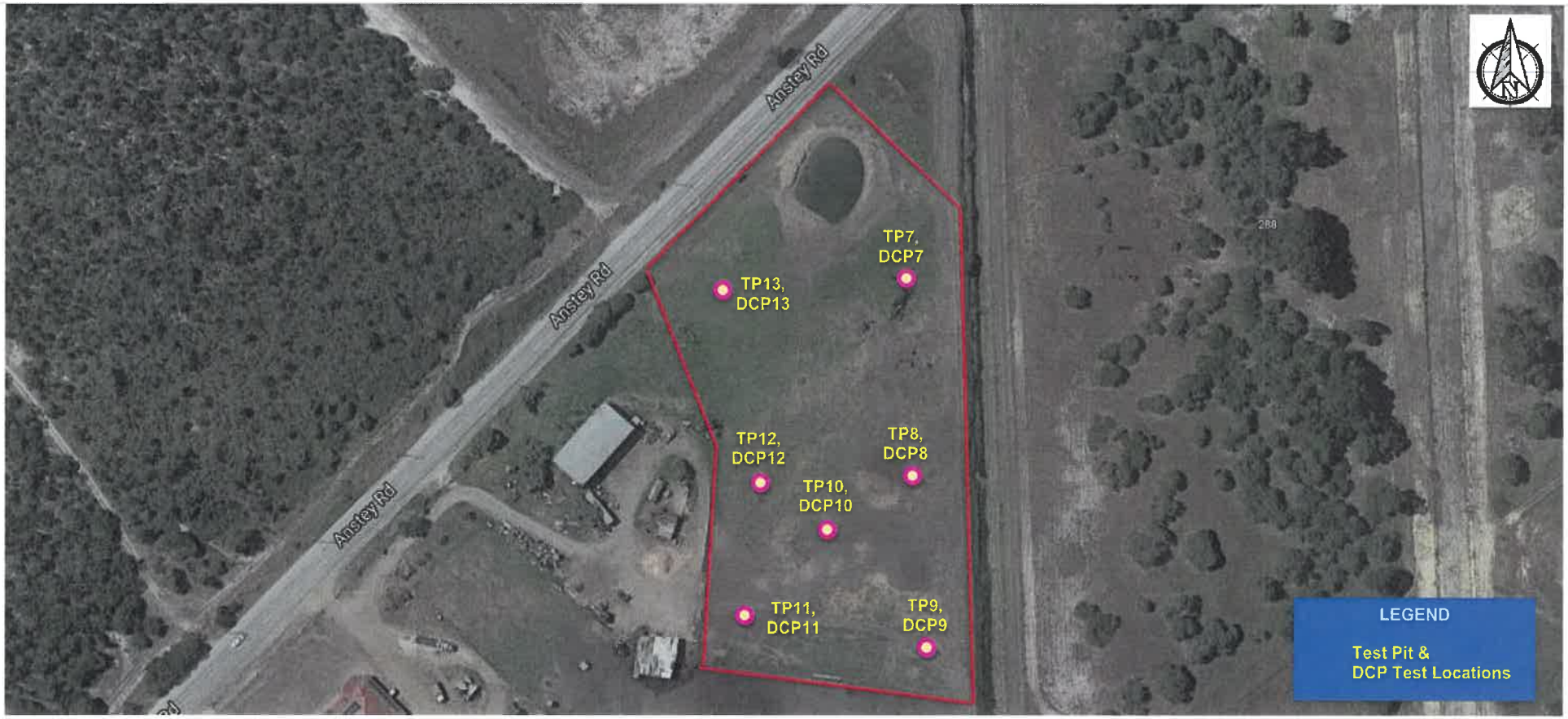
LOCAL GEOTECHNICS



Site Sketch : Test Pit and DCP Test Locations

Reference	LGK9752019GI
Client	B & C Sorgiovanni
Project	Geotechnical Investigation Location: 250 Anstey Road, Forrestdale WA

LOCAL GEOTECHNICS
Unit 12, 8 Production Road Canning Vale WA 6155
PO Box 5050, Canning Vale South WA 6155
Phone: 08 9457 3517
E-mail: admin@localgeotechnics.com.au
Web: www.localgeotechnics.com.au



Site Sketch : Test Pit and DCP Test Locations

Reference	LGK9752019GI
Client	B & C Sorgiovanni
Project	Geotechnical Investigation Location: 250 Anstey Road, Forrestdale WA

LOCAL GEOTECHNICS

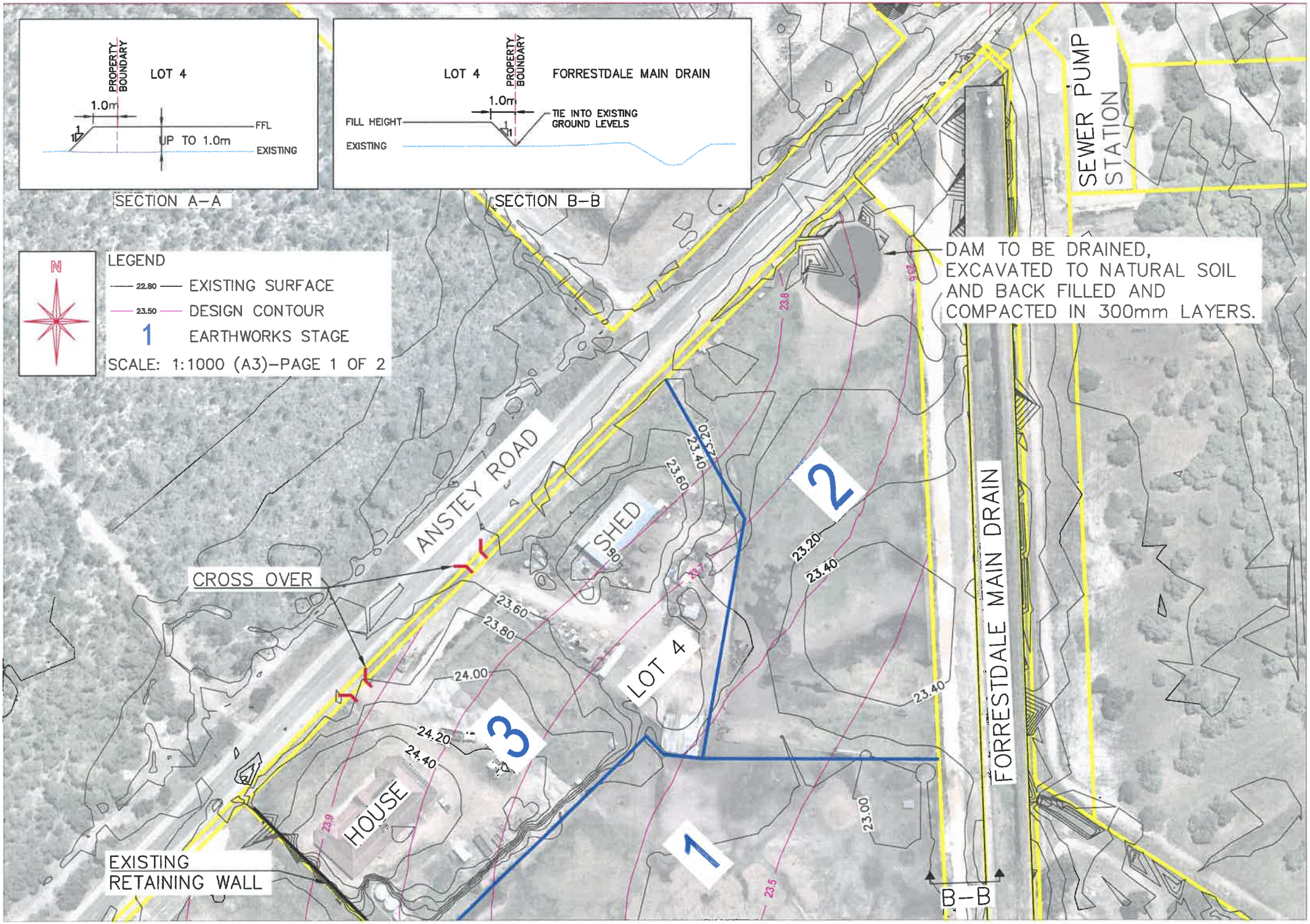
Unit 12, 8 Production Road Canning Vale WA 6155
PO Box 5050, Canning Vale South WA 6155
Phone: 08 9457 3517
E-mail: admin@localgeotechnics.com.au
Web: www.localgeotechnics.com.au

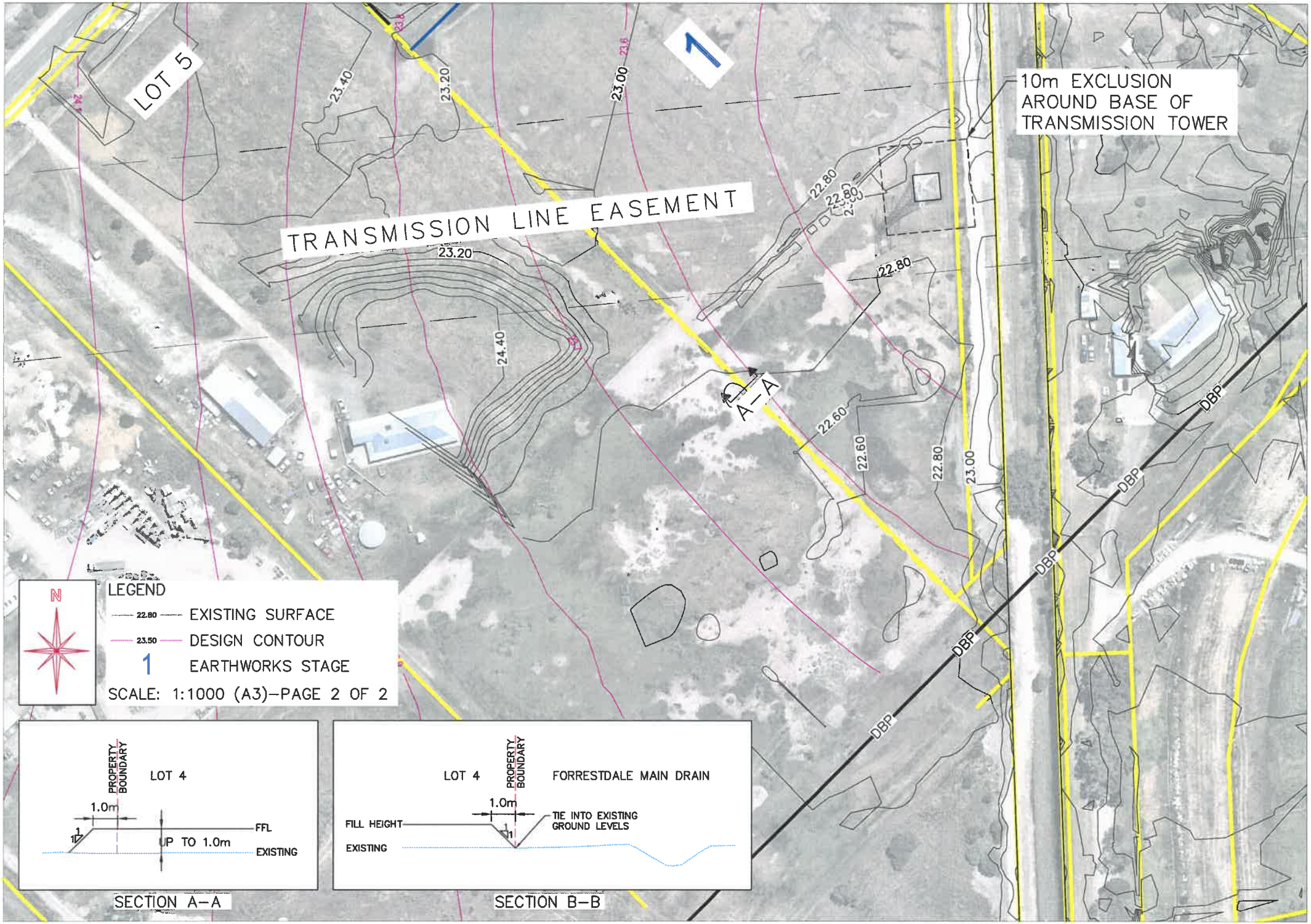
Site Sketch : Test Pit and DCP Test Locations

Reference	LGK9752019GI
Client	B & C Sorgiovanni
Project	Geotechnical Investigation Location: 250 Anstey Road, Forrestdale WA

LOCAL GEOTECHNICS

Unit 12, 8 Production Road Canning Vale WA 6155
PO Box 5050, Canning Vale South WA 6155
Phone: 08 9457 3517
E-mail: admin@localgeotechnics.com.au
Web: www.localgeotechnics.com.au


LOT 4
PROPERTY BOUNDARY
1.0m
FFL
UP TO 1.0m
EXISTING
SECTION A–A
LOT 4
PROPERTY BOUNDARY
FORRESTDALE MAIN DRAIN
1.0m
FILL HEIGHT
TIE INTO EXISTING GROUND LEVELS
EXISTING
SECTION B–B
N
LEGEND
22.80 EXISTING SURFACE
23.50 DESIGN CONTOUR
1 EARTHWORKS STAGE
SCALE: 1:1000 (A3)–PAGE 1 OF 2
DAM TO BE DRAINED, EXCAVATED TO NATURAL SOIL AND BACK FILLED AND COMPACTED IN 300mm LAYERS.
SEWER PUMP STATION
ANSTEY ROAD
SHED
CROSS OVER
LOT 4
HOUSE
EXISTING RETAINING WALL
FORRESTDALE MAIN DRAIN
B–B
1
2
3
23.20
23.40
23.60
23.80
24.00
24.20
24.40
23.00
23.5
23.9


LOT 5
TRANSMISSION LINE EASEMENT
10m EXCLUSION AROUND BASE OF TRANSMISSION TOWER
1
A
A
DBP
23.40
23.20
23.00
22.80
22.60
24.40
N
LEGEND
22.80 EXISTING SURFACE
23.50 DESIGN CONTOUR
1 EARTHWORKS STAGE
SCALE: 1:1000 (A3)–PAGE 2 OF 2
PROPERTY BOUNDARY
LOT 4
1.0m
FFL
UP TO 1.0m
EXISTING
SECTION A–A
LOT 4
PROPERTY BOUNDARY
FORRESTDALE MAIN DRAIN
1.0m
FILL HEIGHT
TIE INTO EXISTING GROUND LEVELS
EXISTING
SECTION B–B

APPENDIX B

TEST PIT LOGS &
DCP TEST CERTIFICATES

LOCAL GEOTECHNICS

Stage 1

ENGINEERING LOG

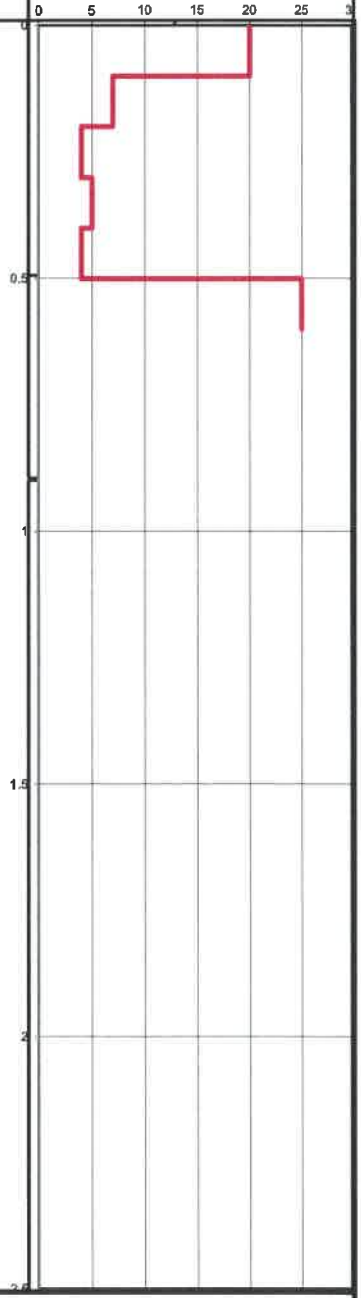
RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**01**
Client	: **B & C Sorgiovanni**	Date Excavated:	**17-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**17-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 189** **Easting: 401 627**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, light grey, dry and very dense, with grass	
0.1						SP	**SAND-** fine to medium grained, light grey, dry and dense	
0.4						SP	**SAND-** fine to medium grained, light brown, dry and dense	
0.5						CL	**CLAY-** low plasticity, light brown, dry and hard	
0.6						CH	**CLAY-** medium to high plasticity, brownish yellow slightly moist and hard	
1.0							**Terminated at a target depth of 2.0 m**	
1.5								
2.0								
2.5								

Dynamic Cone Penetrometer Test (Blows/100mm)



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

ENGINEERING LOG

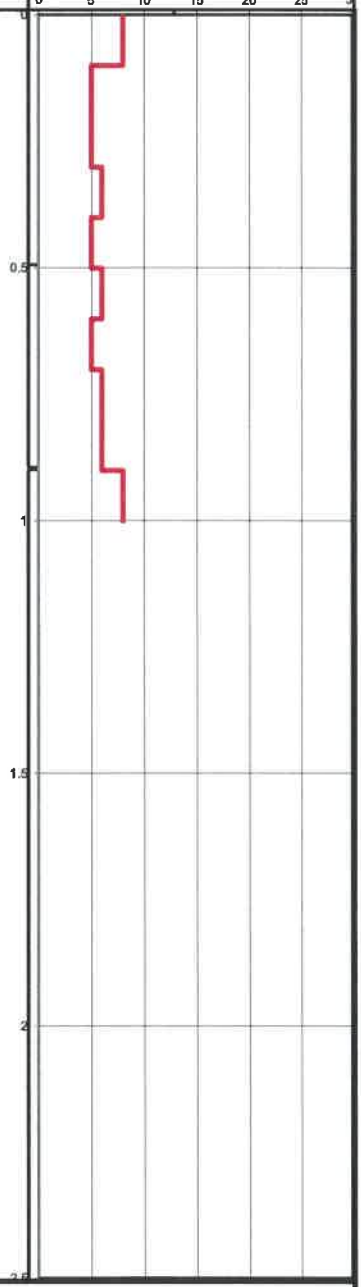
RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**02**
Client	: **B & C Sorgiovanni**	Date Excavated:	**17-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**17-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 252** **Easting: 401 595**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, brown, dry and dense, with grass	
0.15						SP	**SAND-** fine to medium grained, light grey, dry and dense	
0.4						SP	**SAND-** fine to medium grained, yellow, dry and dense	
0.5						CH	**CLAY-** medium to high plasticity, brownish yellow, slightly moist and very stiff	
0.6								
1.0								
1.5								
2.0							**Terminated at a target depth of 2.0 m**	
2.5								

Dynamic Cone Penetrometer Test (Blows/100mm)



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

ENGINEERING LOG

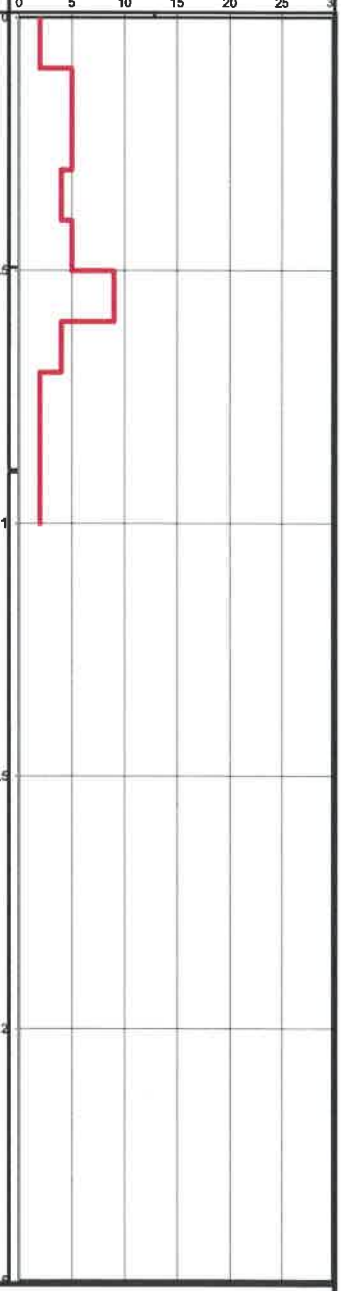
RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**03**
Client	: **B & C Sorgiovanni**	Date Excavated:	**17-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**17-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 342** **Easting: 401 592**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0								
0.1						SP	**TOPSOIL, SAND-** fine to medium grained, grey, dry and medium dense with grass	
						SP	**SAND-** fine to medium grained, light grey, dry, dense	
0.3						SP	**SAND-** fine to medium grained, brown, dry and dense	
0.5						CH	**CLAY-** medium to high plasticity, yellowish brown, slightly moist and very stiff	
1.0						CL	**SANDY CLAY-** low plasticity, light brown, dry and stiff with fine to medium grained sand	
1.5								
1.7						CH	**CLAY-** medium to high plasticity, brownish yellow, slightly moist and stiff	
2.0							**Terminated at a target depth of 2.0 m**	
2.5								

Dynamic Cone Penetrometer Test (Blows/100mm)



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged: SK
Checked: AR

ENGINEERING LOG

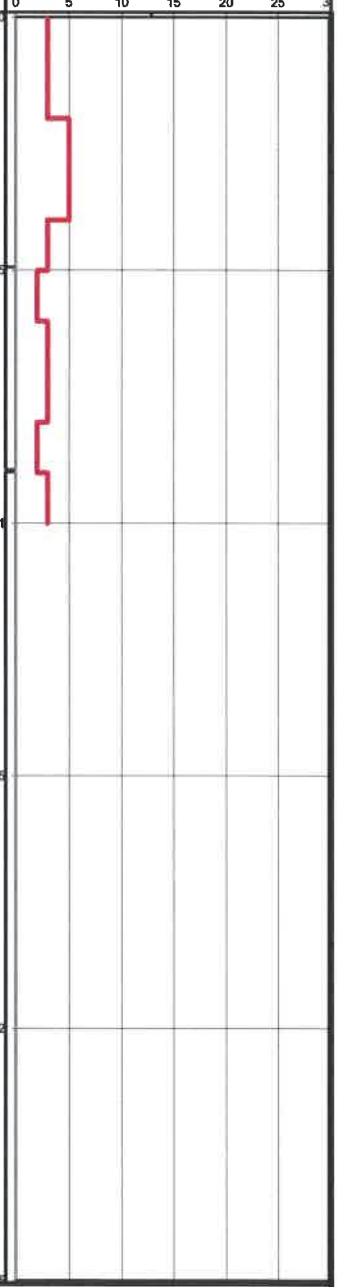
RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**04**
Client	: **B & C Sorgiovanni**	Date Excavated:	**17-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**17-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 382** **Easting: 401 583**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, brown, dry and medium dense	
0.1						SP	**SAND-** fine to medium grained, light grey, dry and medium dense	
0.5								
1.0						CH	**CLAY-** medium to high plasticity, brownish yellow, slightly moist and stiff	
1.5							**Terminated at a depth of 1.5 m due to pit collapse**	
2.0								
2.5								

Dynamic Cone Penetrometer Test (Blows/100mm)



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged: SK
Checked: AR

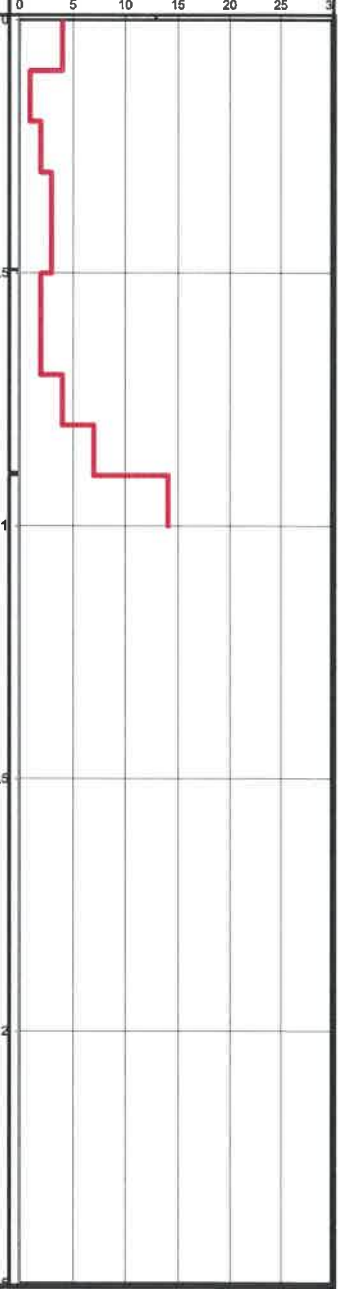
ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**05**
Client	: **B & C Sorgiovanni**	Date Excavated:	**17-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**17-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 383** **Easting: 401 487**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, light grey, dry and dense	
0.2						CL	**CLAY-** medium plasticity, light brown, slightly moist and firm	
0.5						CL	**CLAY-** medium plasticity, light yellow, slightly moist and firm	
1.0						CL	**SANDY CLAY-** medium plasticity, light brown, dry and hard	
1.5								
1.6						CH	**CLAY-** medium to high plasticity, brownish yellow, slightly moist and stiff	
2.0							**Terminated at a target depth of 2.0 m**	
2.5								



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

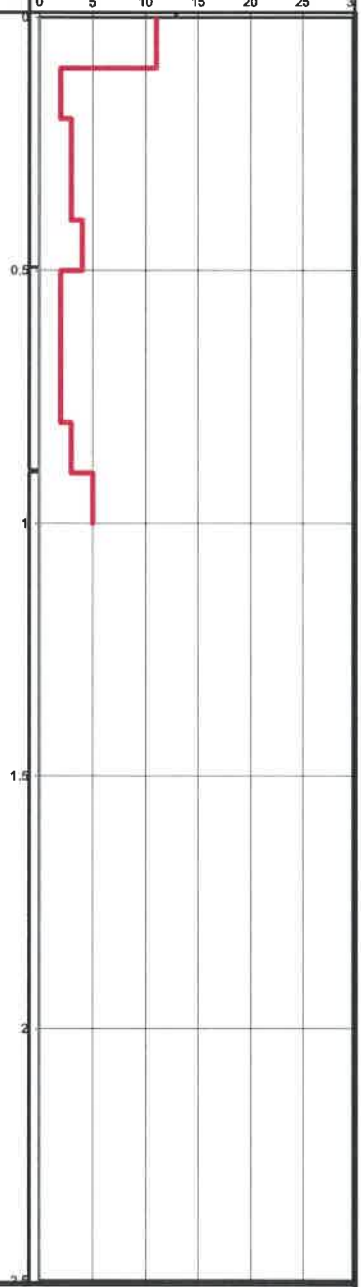
ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**06**
Client	: **B & C Sorgiovanni**	Date Excavated:	**17-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**17-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 352** **Easting: 401 463**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						CL	**TOPSOIL, CLAY-** low plasticity, light grey, dry and hard	
0.1						CL	**CLAY-** medium plasticity, light yellow, dry and firm	
0.5								
1.0						CL	**SANDY CLAY-** medium plasticity, light brown, slightly moist and stiff	
1.5								
1.6						CH	**CLAY-** medium to high plasticity, brownish yellow, slightly moist and stiff	
2.0							**Terminated at a target depth of 2.0 m**	
2.5								



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

Stage 2

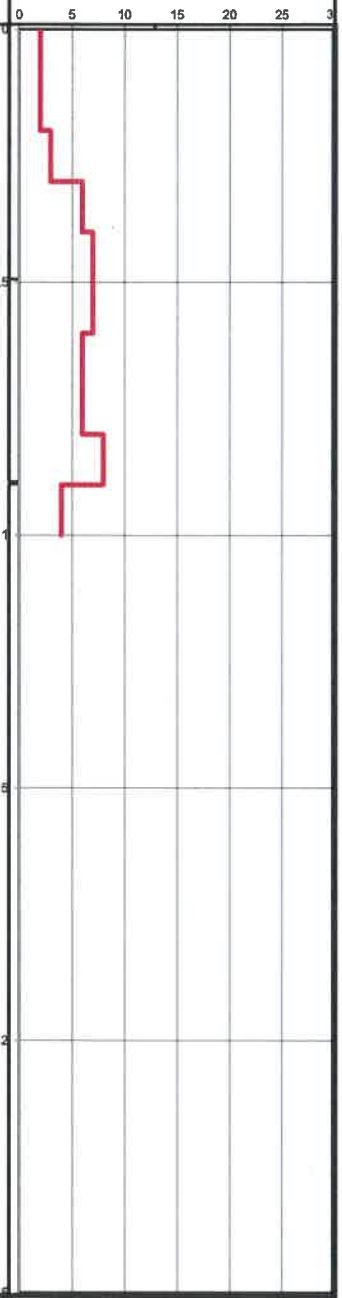
ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**7**
Client	: **B & C Sorgiovanni**	Date Excavated:	**17-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**17-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 542** **Easting: 401 591**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, dark grey, dry and medium dense	
0.2						SP	**SAND-** fine to medium grained, dark brown, dry and medium dense colour change to white yellow at 0.4m	
0.5								
1.0						SP	**SAND-** fine to medium grained, brown, dry and dense with coffee rock up to 20 mm in size	
1.2						CH	**CLAY-** medium to high plasticity, green, slightly moist and stiff	
1.5								
2.0							**Terminated at a target depth of 2.0 m**	
2.5								



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged: SK
Checked: AR

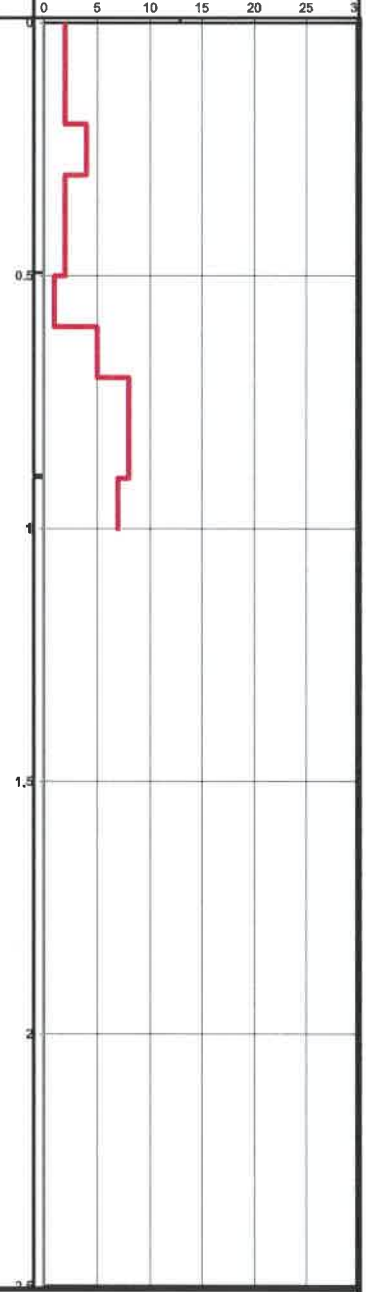
ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**8**
Client	: **B & C Sorgiovanni**	Date Excavated:	**18-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**18-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 483** **Easting: 401 594**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, dark grey, dry and medium dense	
0.2						SP	**SAND-** fine to medium grained, dark brown, dry and medium dense	
0.5							colour change to light yellow at 0.5m	
1.0								
1.5								
1.6						CH	**CLAY-** medium to high plasticity, light yellow, slightly moist and stiff	
2.0							**Terminated at a target depth of 2.0 m**	
2.5								



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

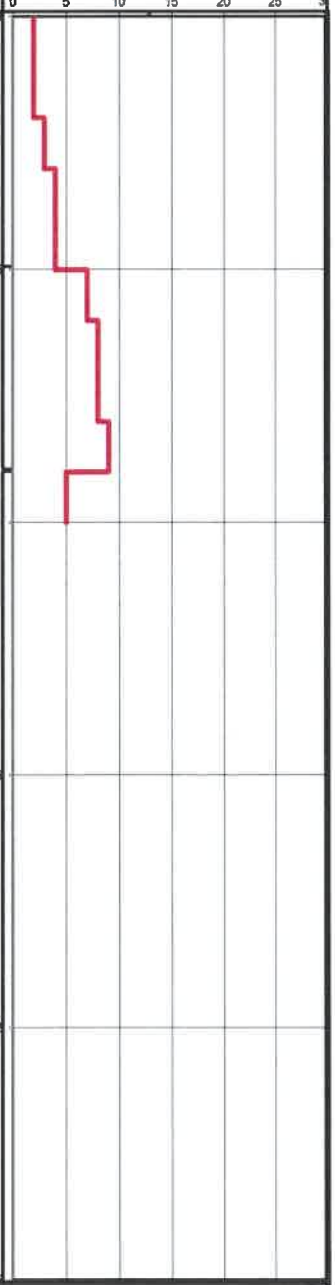
ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**9**
Client	: **B & C Sorgiovanni**	Date Excavated:	**18-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**18-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 435** **Easting: 401 598**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, dark grey, dry and medium dense with grass	
0.2						SP	**SAND-** fine to medium grained, dark brown, dry and medium dense	
0.5							colour change to light grey at 0.5m	
1.0								
1.4						CH	**CLAY-** medium to high plasticity,brown, slightly moist and stiff with trace of coffee rock	
1.5								
1.6							**Terminated at a depth of 1.6 m due to pit collapse**	
2.0								
2.5								



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

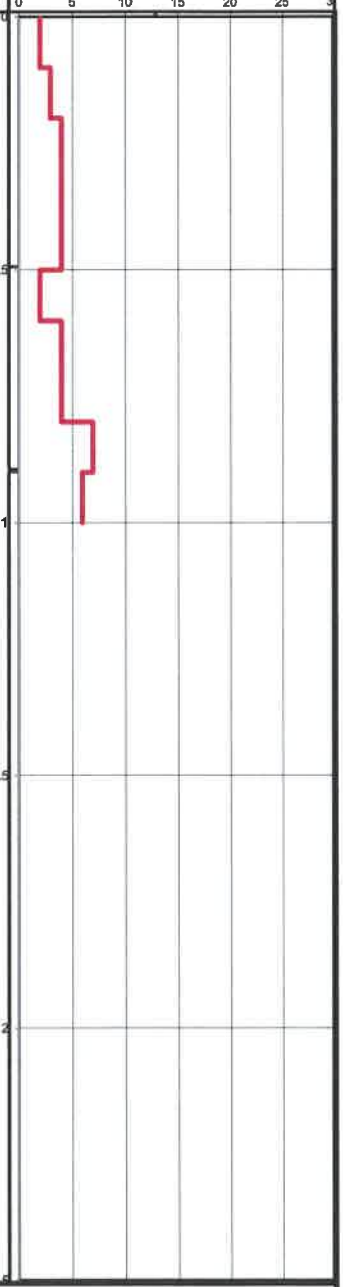
ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**10**
Client	: **B & C Sorgiovanni**	Date Excavated:	**18-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**18-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 466** **Easting: 401 573**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, dark grey, dry and medium dense with grass	
0.2						SP	**SAND-** fine to medium grained, dark brown, dry and medium dense	
0.5							colour change to light yellow at 0.6m	
							colour change to brown at 0.8m	
1.0								
1.2						CH	**CLAY-** medium to high plasticity, yellow, slightly moist and stiff	
1.5							colour change to light yellow at 1.6m	
2.0							**Terminated at a target depth of 2.0 m**	
2.5								



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

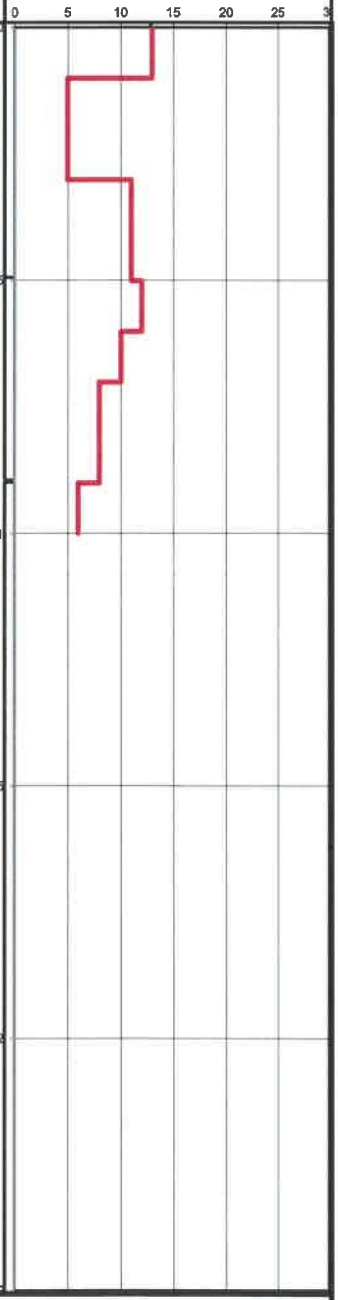
ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**11**
Client	: **B & C Sorgiovanni**	Date Excavated:	**18-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**18-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 444** **Easting: 401 552**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, dark grey, dry and very dense	
0.2						SP	**SAND-** fine to medium grained, dark brown, dry and dense	
							colour change to light yellow at 0.4m	
0.5								
							colour change to brown at 0.8m	
1.0						CH	**CLAY-** medium to high plasticity, yellow, slightly moist and stiff	
1.5							colour change to light yellow at 1.5 m	
2.0							**Terminated at a target depth of 2.0 m**	
2.5								



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

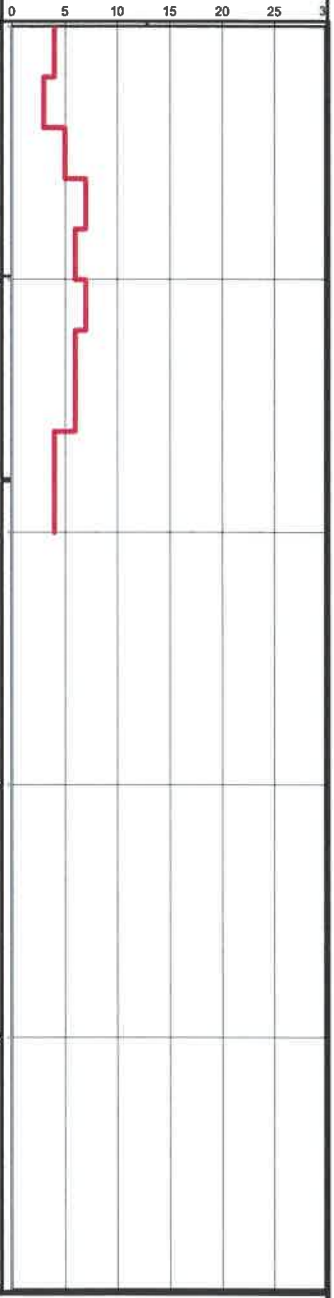
ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**12**
Client	: **B & C Sorgiovanni**	Date Excavated:	**18-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**18-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 483** **Easting: 401 554**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, dark grey, dry and dense	
0.2						SP	**SAND-** fine to medium grained, dark brown, dry and medium dense	
							colour change to light yellow at 0.4m	
0.5							colour change to brown at 0.6m	
1.0						CH	**CLAY-** medium to high plasticity, yellow, slightly moist and stiff	
1.5							colour change to light yellow at 1.5 m	
2.0							**Terminated at a target depth of 2.0 m**	
2.5								



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

ENGINEERING LOG

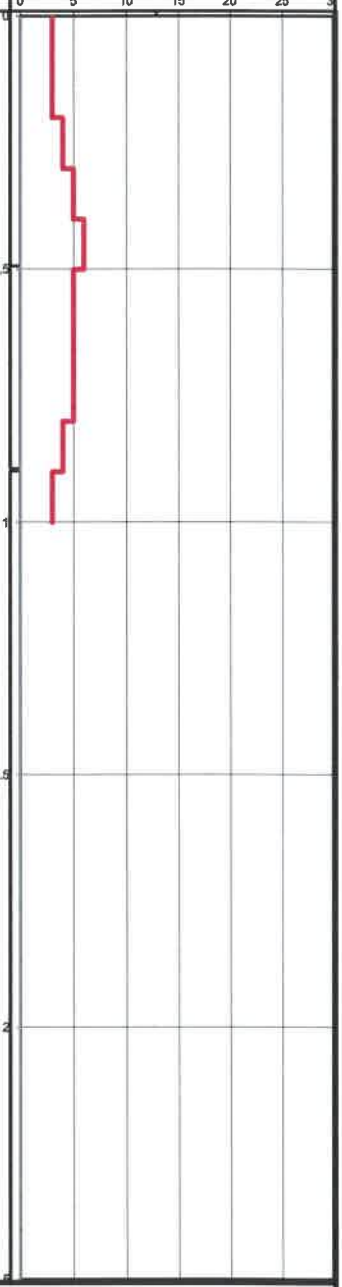
RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**13**
Client	: **B & C Sorgiovanni**	Date Excavated:	**18-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**18-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 545** **Easting: 401 550**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, dark grey, dry and medium dense with grass	
0.2						SP	**SAND-** fine to medium grained, dark brown, dry and dense	
							colour change to brown with coffee rock at 0.4m	
0.5							colour change to light grey at 0.6m	
							colour change to yellow at 0.8m	
1.0						CH	**CLAY-** medium to high plasticity, yellow, slightly moist and stiff	
							colour change to green at 1.2m	
1.5								
2.0							**Terminated at a target depth of 2.0 m**	
2.5								

Dynamic Cone Penetrometer Test (Blows/100mm)



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

Stage 3

ENGINEERING LOG

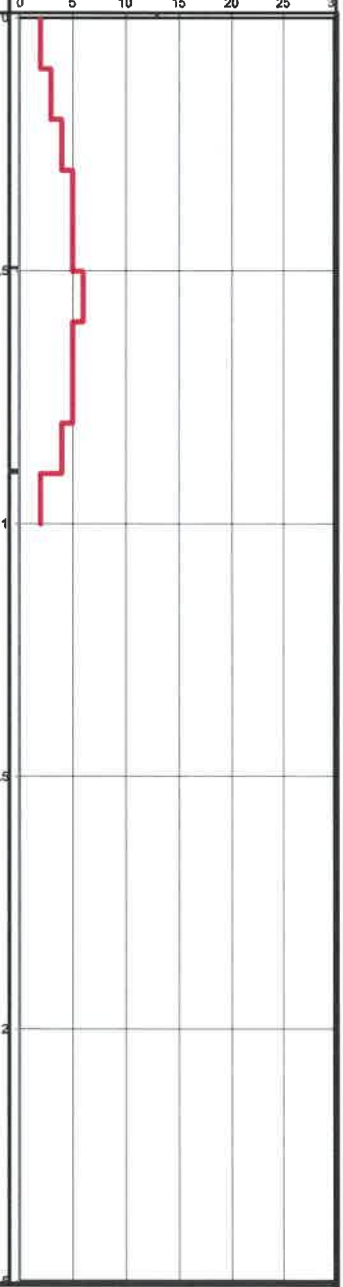
RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**14**
Client	: **B & C Sorgiovanni**	Date Excavated:	**18-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**18-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 466** **Easting: 401 520**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to coarse grained, grey, dry and medium dense with gravel up to 50mm in size	
0.2						SP	**SAND-** fine to medium grained, grey, dry and dense with gravel up to 50mm in size	
0.5							colour change to dark brown without gravel at 0.6m	
							colour change to light grey and moist at 0.8m	
1.0								
1.5						CH	**CLAY-** medium to high plasticity, green, slightly moist and stiff	
2.0							**Terminated at a target depth of 2.0 m**	
2.5								

Dynamic Cone Penetrometer Test (Blows/100mm)



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**15**
Client	: **B & C Sorgiovanni**	Date Excavated:	**18-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**18-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 489** **Easting: 401 533**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations	Dynamic Cone Penetrometer Test (Blows/100mm)
0.0						SP	**TOPSOIL, SAND-** fine to coarse grained, grey, dry and dense with gravel up to 50mm in size		0
0.2						SP	**SAND-** fine to medium grained, yellow, dry and dense		
0.5							colour change to light yellow and moist at 0.5m		0.5
1.0						CH	**CLAY-** medium to high plasticity, green, slightly moist and stiff		1
1.5									1.5
2.0							**Terminated at a target depth of 2.0 m**		2
2.5									2.5

Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: LGK9752019GI	Test Pit/BH No.:	16
Client	: B & C Sorgiovanni	Date Excavated:	18-Dec-2019
Project	: Geotechnical Investigation	Date completed:	18-Dec-2019
Location	: 250 Anstey Road, Forrestdale WA	Equipment Type:	Excavator
GPS Zone 50	: Northing: 6 444 488 Easting: 401 514	Water Table:	NA

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations	Dynamic Cone Penetrometer Test (Blows/100mm)
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, brown, dry, loose, with organics, with sub rounded gravel 50 mm in size		0
0.1							**UNCONTROLLED FILL, CONCRETE-** pink		
0.5									0.5
0.6						SC	**CLAYEY SAND-** fine to medium grained, dark brown, slightly moist, loose, low to medium plasticity clay		
1.0									1
1.4						SM	**SILTY SAND-** fine to medium grained, light grey, slightly moist, loose, silt fines		
1.5									1.5
2.0							**Terminated at a target depth of 2.0 m**		2
2.5									2.5

Notes:

Sampling Type :
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**17**
Client	: **B & C Sorgiovanni**	Date Excavated:	**18-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**18-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 490** **Easting: 401 524**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations	Dynamic Cone Penetrometer Test (Blows/100mm)
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, brown, dry, loose, with organics, with sub rounded gravel 50 mm in size		0
0.1							**UNCONTROLLED FILL, CONCRETE-** pink		
0.5									0.5
0.7						SC	**CLAYEY SAND-** fine to medium grained, dark brown, slightly moist, loose, low to medium plasticity clay		
1.0									1
1.5									1.5
1.6						SM	**SILTY SAND-** fine to medium grained, light grey, slightly moist, loose, silt fines		
2.0							**Terminated at a target depth of 2.0 m**		2
2.5									

Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged: SK
Checked: AR

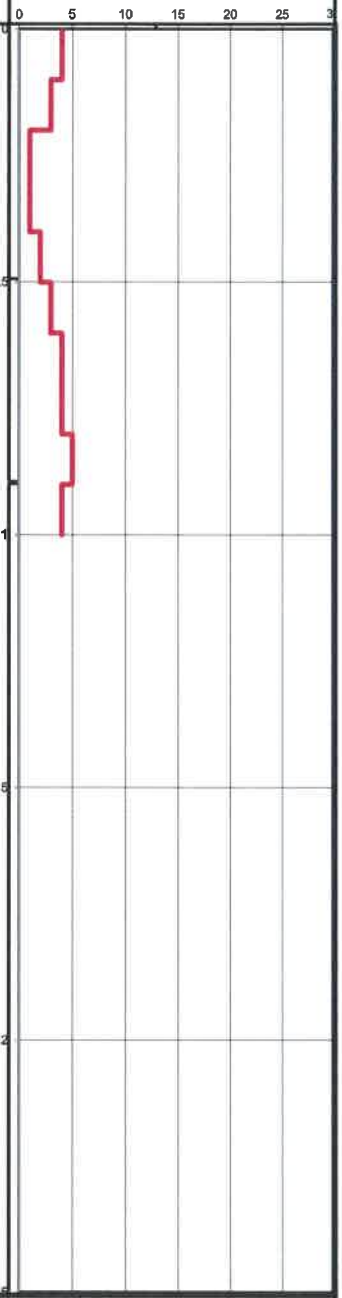
ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**18**
Client	: **B & C Sorgiovanni**	Date Excavated:	**18-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**18-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 430** **Easting: 401 500**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, dark grey, dry and dense	
0.2						SP	**SAND-** fine to medium grained, dark grey, dry and loose	
0.5							colour change to light grey and moist at 0.6m	
1.0						SP	**SAND-** fine to medium grained, black, moist and loose with stone chips up to 150mm in size	
1.1						SP	**SAND-** fine to medium grained, dark brown, moist and loose with coffee rock up to 50mm in size	
1.3						CH	**CLAY-** medium to high plasticity, brown, slightly moist and stiff	
1.5							**Terminated at a target depth of 2.0 m**	
1.7								
2.0								
2.5								



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged: SK
Checked: AR

ENGINEERING LOG

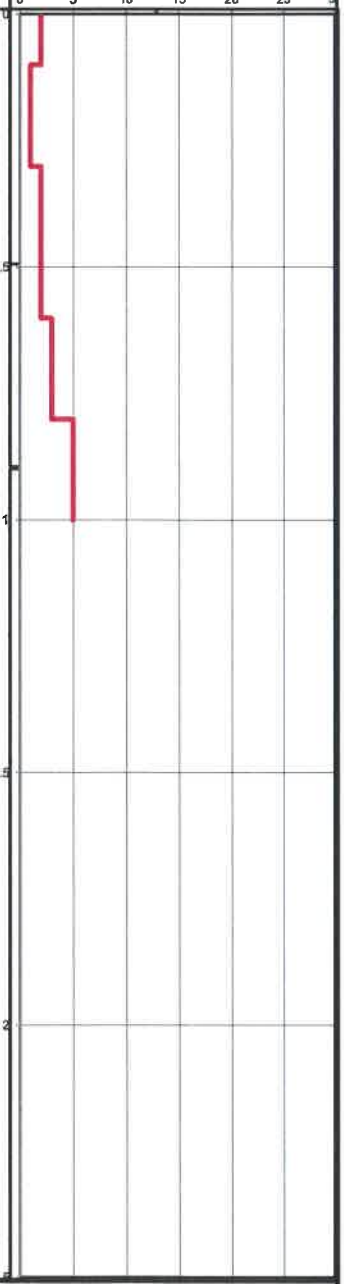
RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**19**
Client	: **B & C Sorgiovanni**	Date Excavated:	**18-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**18-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 442** **Easting: 401 466**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, dark grey, dry and medium dense	
0.2						SP	**SAND-** fine to medium grained, dark grey, dry and loose	
0.5							colour change to yellow at 0.4m	
1.0							colour change to light grey and moist at 0.6m	
1.5								
2.0							**Terminated at a target depth of 2.0 m**	
2.5								

Dynamic Cone Penetrometer Test (Blows/100mm)



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

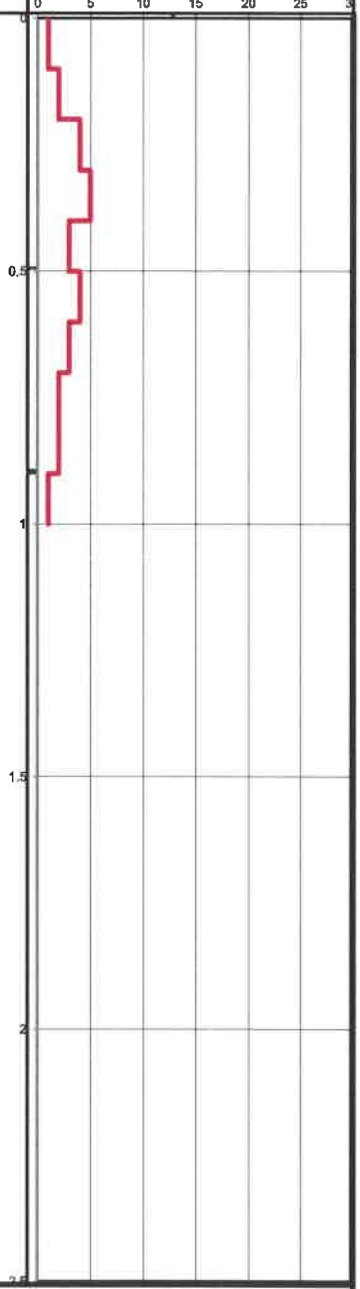
ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: LGK9752019GI	Test Pit/BH No.:	20
Client	: B & C Sorgiovanni	Date Excavated:	18-Dec-2019
Project	: Geotechnical Investigation	Date completed:	18-Dec-2019
Location	: 250 Anstey Road, Forrestdale WA	Equipment Type:	Excavator
GPS Zone 50	: Northing: 6 444 381 Easting: 401 446	Water Table:	NA

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, grey, dry and loose	
0.2						SP	**SAND-** fine to medium grained, grey, dry and medium dense	
0.5							colour change to brown at 0.4m	
1.0							moist at 1.0m	
1.5						CH	**CLAY-** medium to high plasticity, green, slightly moist and stiff	
2.0							**Terminated at a target depth of 2.0 m**	
2.5								



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged : SK
Checked: AR

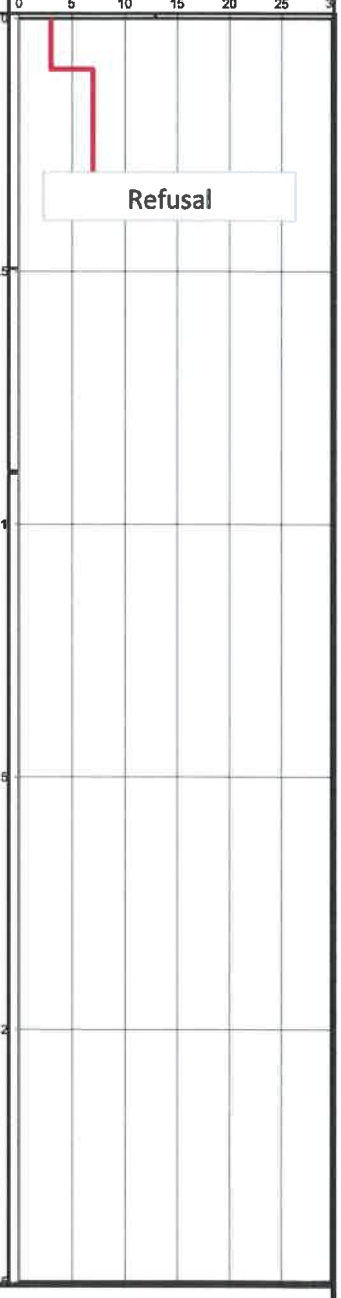
ENGINEERING LOG

RESULT OF TEST HOLES/PITS

LOCAL GEOTECHNICS
ABN:61 737 984 867
12/8 Production Road, Canning Vale WA 6155
PO Box 5050 Canning Vale South WA 6155
admin@localgeotechnics.com.au

Reference	: **LGK9752019GI**	Test Pit/BH No.:	**21**
Client	: **B & C Sorgiovanni**	Date Excavated:	**18-Dec-2019**
Project	: **Geotechnical Investigation**	Date completed:	**18-Dec-2019**
Location	: **250 Anstey Road, Forrestdale WA**	Equipment Type:	**Excavator**
GPS Zone 50	: **Northing: 6 444 421** **Easting: 401 404**	Water Table:	**NA**

Depth (m)	RL (m)	Method	Penetration resistance	Sampling Type	Graphic Log	Classification Symbol	Description of Soil Strata	Additional observations
0.0						SP	**TOPSOIL, SAND-** fine to medium grained, yellow, dry and loose with grass	
0.2						SP	**SAND-** fine to medium grained, grey, dry and loose with gravel up to 50mm	
0.5						CL	**GRAVELLY CLAY-** low plasticity, yellow, dry and hard	
0.8						SP	**SAND-** fine to medium grained, grey, dry and loose	
1.0								
1.5								
2.0							**Terminated at a target depth of 2.0 m**	
2.5								



Notes:

Sampling Type:
B - Bulk/Disturbed Sample,
UD - Undisturbed Sample

Method:
HA - Hand Auger
E - Excavator
BH - Backhoe Bucket

Moisture:
D - Dry
M - Moist
W - Wet

Logged: SK
Checked: AR

LOCAL GEOTECHNICS

ABN: 61 737 984 867
PO Box 5050
Canning Vale South, WA 6155

PERTH SAND PENETROMETER (PSP) TEST CERTIFICATES (AS 1289.6.3.2)

Density Correlation - Table 6.4.6.1 (A) & (B) HB 160-2006

Reference	LGK9752019EW	Test ID	01-06
Client	B&C Sorgiovanni	Date tested	17/12/2019
Project	Earthworks	Tested by	S Kim
Site Address	250 Anstey Road, Forrestdale WA	Checked by	A Rahman

DCP No	DCP 1		DCP 2		DCP 3		DCP 4		DCP 5	
Depth below ground level (mm)	Penetration Resistance - Blows/100mm | Density Classification									
0-100	20	VD	8	D	2	MD	3	MD	4	D
100-200	7	D	5	D	5	D	3	MD	1	L
200-300	4	D	5	D	5	D	5	D	2	F
300-400	5	D	6	D	4	D	5	D	3	St
400-500	4	D	5	D	5	D	3	MD	3	St
500-600	>25	VD	6	D	9	VSt	2	MD	2	F
600-700	R		5	VSt	4	St	3	MD	2	F
700-800			6	VSt	2	F	3	MD	4	St
800-900			6	VSt	2	F	2	MD	7	VSt
900-1000			8	VSt	2	F	3	MD	14	H

DCP No	DCP 6	
Depth below ground level (mm)	Penetration Resistance - Blows/100mm | Density Classification	
0-100	11	H
100-200	2	F
200-300	3	St
300-400	3	St
400-500	4	St
500-600	2	F
600-700	2	F
700-800	2	F
800-900	3	St
900-1000	5	VSt

R = Refusal

Very Soft to Soft (VS	Firm (F)	Stiff (St)	Very Stiff (VSt)	Hard (H)
<1	1-2	3-4	5-10	>10

R = Refusal

Very Loose (VL)	Loose (L)	Medium Dense (MD)	Dense (D)	Very Dense (VD)
<1	1	2-3	4-8	>8

LOCAL GEOTECHNICS

ABN: 61 737 984 867
PO Box 5050
Canning Vale South, WA 6155

PERTH SAND PENETROMETER (PSP) TEST CERTIFICATES (AS 1289.6.3.2)

Density Correlation - Table 6.4.6.1 (A) & (B) HB 160-2006

Reference	**LGK9752019EW**	Test ID	**07-13**
Client	**B&C Sorgiovanni**	Date tested	**17/12/2019**
Project	**Earthworks**	Tested by	**S Kim**
Site Address	**250 Anstey Road, Forrestdale WA**	Checked by	**A Rahman**

DCP No	DCP 7		DCP 8		DCP 9		DCP 10		DCP 11	
Depth below ground level (mm)	**Penetration Resistance - Blows/100mm | Density Classification**									
0-100	2	MD	2	MD	2	MD	2	MD	13	VD
100-200	2	MD	2	MD	2	MD	3	MD	5	D
200-300	3	MD	4	D	3	MD	4	D	5	D
300-400	6	D	2	MD	4	D	4	D	11	VD
400-500	7	D	2	MD	4	D	4	D	11	VD
500-600	7	D	1	L	7	D	2	MD	12	VD
600-700	6	D	5	D	8	D	4	D	10	VD
700-800	6	D	8	D	8	D	4	D	8	D
800-900	8	D	8	D	9	VD	7	D	8	D
900-1000	4	D	7	D	5	D	6	D	6	D

DCP No	DCP 12		DCP 13							
Depth below ground level (mm)	**Penetration Resistance - Blows/100mm | Density Classification**									
0-100	4	D	3	MD						
100-200	3	MD	3	MD						
200-300	5	D	4	D						
300-400	7	D	5	D						
400-500	6	D	6	D						
500-600	7	D	5	D						
600-700	6	D	5	D						
700-800	6	D	5	D						
800-900	4	D	4	D						
900-1000	4	D	3	MD						

R = Refusal

Very Soft to Soft (VS	Firm (F)	Stiff (St)	Very Stiff (VSt)	Hard (H)
<1	1-2	3-4	5-10	>10

R = Refusal

Very Loose (VL)	Loose (L)	Medium Dense (MD)	Dense (D)	Very Dense (VD)
<1	1	2-3	4-8	>8

LOCAL GEOTECHNICS

ABN: 61 737 984 867
PO Box 5050
Canning Vale South, WA 6155

PERTH SAND PENETROMETER (PSP) TEST CERTIFICATES (AS 1289.6.3.2)

Density Correlation - Table 6.4.6.1 (A) & (B) HB 160-2006

Reference	**LGK9752019EW**	Test ID	**14-21**
Client	**B&C Sorgiovanni**	Date tested	**17/12/2019**
Project	**Earthworks**	Tested by	**S Kim**
Site Address	**250 Anstey Road, Forrestdale WA**	Checked by	**A Rahman**

DCP No	DCP 14		DCP 15		DCP 16		DCP 17		DCP 18	
Depth below ground level (mm)	Penetration Resistance - Blows/100mm | Density Classification									
0-100	2	MD	R		R		R		4	D
100-200	3	MD							3	MD
200-300	4	D							1	L
300-400	5	D							1	L
400-500	5	D							2	MD
500-600	6	D							3	MD
600-700	5	D							4	D
700-800	5	D							4	D
800-900	4	D							5	D
900-1000	2	MD							4	D

DCP No	DCP 19		DCP 20		DCP 21					
Depth below ground level (mm)	Penetration Resistance - Blows/100mm | Density Classification									
0-100	2	MD	1	L	3	MD				
100-200	1	L	2	MD	7	D				
200-300	1	L	4	D	7	D				
300-400	2	MD	5	D	R					
400-500	2	MD	3	MD						
500-600	2	MD	4	D						
600-700	3	MD	3	MD						
700-800	3	MD	2	MD						
800-900	5	D	2	MD						
900-1000	5	D	1	L						

R = Refusal

Very Soft to Soft (VS	Firm (F)	Stiff (St)	Very Stiff (VSt)	Hard (H)
<1	1-2	3-4	5-10	>10

R = Refusal

Very Loose (VL)	Loose (L)	Medium Dense (MD)	Dense (D)	Very Dense (VD)
<1	1	2-3	4-8	>8

APPENDIX C

LABORATORY TEST CERTIFICATES

LOCAL GEOTECHNICS

Material Test Report

Report Number:	**BL20121-1**
Issue Number:	1
Date Issued:	24/01/2020
Client:	Local Geotechnics
	12/8 Production Road Canning Vale, Perth WA 6155
Contact:	Harun Meer
Project Number:	BL20121
Project Name:	LGK9752019GI
Project Location:	250 Anstey Road, Forrestdale WA
Work Request:	2737
Sample Number:	BL20-2737A
Date Sampled:	19/12/2019
Dates Tested:	08/01/2020 - 09/01/2020
Sampling Method:	Sampled by Client
	The results apply to the sample as received
Material:	Red Clayey Gravel (brown clayey sand)
Material Source:	TP3- 1.0- 1.7m

terra firma laboratories

Perth Laboratory
Unit 2/16 Kalmia Road Bibra Lake WA 6163
Phone: (08) 9395 7220
Email: mhitchens@terrafirmalabs.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

NATA
WORLD RECOGNISED ACCREDITATION

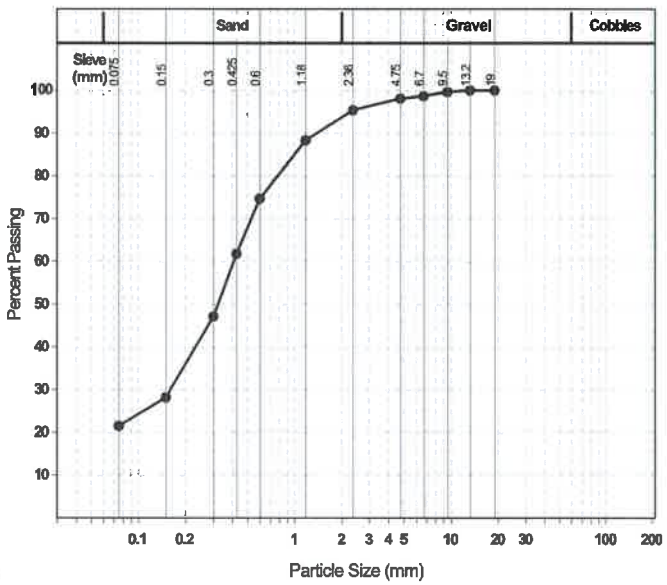
Approved Signatory: Matthew Hitchens
Laboratory Manager
NATA Accredited Laboratory Number: 15357

Particle Size Distribution (AS1289 3.6.1)			
Sieve	**Passed %**	**Passing Limits**	
19 mm	**100**		
13.2 mm	**100**		
9.5 mm	**100**		
6.7 mm	**99**		
4.75 mm	**98**		
2.36 mm	**95**		
1.18 mm	**88**		
0.6 mm	**75**		
0.425 mm	**62**		
0.3 mm	**47**		
0.15 mm	**28**		
0.075 mm	**21**		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	62		
Liquid Limit (%)	50		
Plastic Limit (%)	29		
Plasticity Index (%)	**21**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	13.0		
Cracking Crumbling Curling	Cracking & Curling		

Particle Size Distribution



Material Test Report

Report Number:	**BL20121-1**
Issue Number:	1
Date Issued:	24/01/2020
Client:	Local Geotechnics
	12/8 Production Road Canning Vale, Perth WA 6155
Contact:	Harun Meer
Project Number:	BL20121
Project Name:	LGK9752019GI
Project Location:	250 Anstey Road, Forrestdale WA
Work Request:	2737
Sample Number:	BL20-2737B
Date Sampled:	19/12/2019
Dates Tested:	09/01/2020 - 09/01/2020
Sampling Method:	Sampled by Client
	The results apply to the sample as received
Material:	Red Clayey Gravel
Material Source:	TP5- 0.5-1.0 (yellow clayey sand)

terra firma laboratories

Perth Laboratory
Unit 2/16 Kalmia Road Bibra Lake WA 6163
Phone: (08) 9395 7220
Email: mhitchens@terrafirmalabs.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

NATA
WORLD RECOGNISED ACCREDITATION

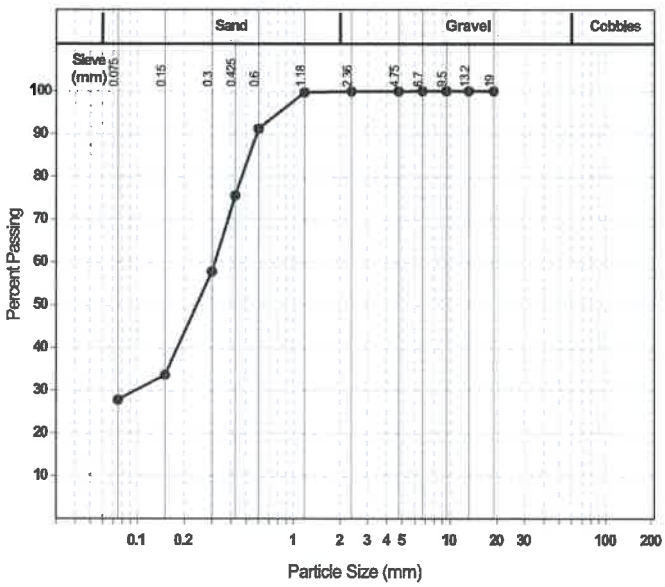
Approved Signatory: Matthew Hitchens
Laboratory Manager
NATA Accredited Laboratory Number: 15357

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
13.2 mm	**100**		
9.5 mm	**100**		
6.7 mm	**100**		
4.75 mm	**100**		
2.36 mm	**100**		
1.18 mm	**100**		
0.6 mm	**91**		
0.425 mm	**76**		
0.3 mm	**58**		
0.15 mm	**34**		
0.075 mm	**28**		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	76		
Liquid Limit (%)	43		
Plastic Limit (%)	16		
Plasticity Index (%)	**27**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	3.0		
Cracking Crumbling Curling	None		

Particle Size Distribution



Material Test Report

Report Number: BL20121-1
Issue Number: 1
Date Issued: 24/01/2020
Client: Local Geotechnics
12/8 Production Road Canning Vale, Perth WA 6155
Contact: Harun Meer
Project Number: BL20121
Project Name: LGK9752019GI
Project Location: 250 Anstey Road, Forrestdale WA
Work Request: 2737
Sample Number: BL20-2737C
Date Sampled: 19/12/2019
Dates Tested: 09/01/2020 - 14/01/2020
Sampling Method: Sampled by Client
The results apply to the sample as received
Material: Red Clayey Gravel
Material Source: TP7- 1.2-2.0m (yellow clayey sand)

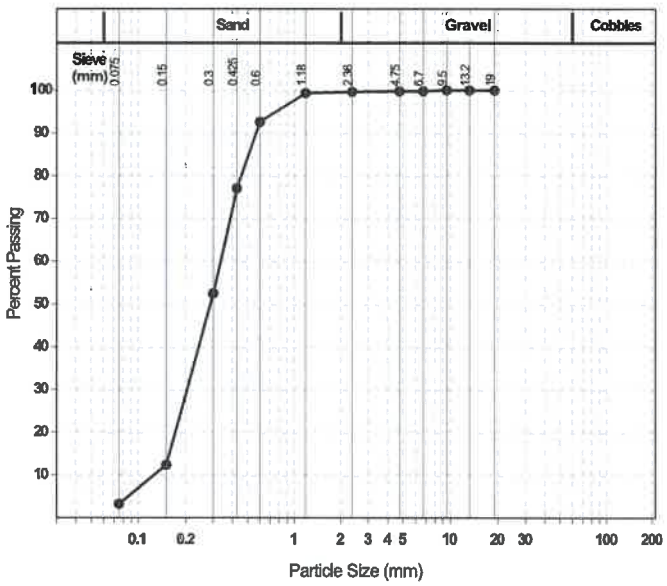
terra firma laboratories
Perth Laboratory
Unit 2/16 Kalmia Road Bibra Lake WA 6163
Phone: (08) 9395 7220
Email: mhitchens@terrafirmalabs.com.au
Accredited for compliance with ISO/IEC 17025 - Testing
NATA WORLD RECOGNISED ACCREDITATION
Approved Signatory: Matthew Hitchens
Laboratory Manager
NATA Accredited Laboratory Number: 15357

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	100		
13.2 mm	100		
9.5 mm	100		
6.7 mm	100		
4.75 mm	100		
2.36 mm	100		
1.18 mm	99		
0.6 mm	93		
0.425 mm	77		
0.3 mm	52		
0.15 mm	12		
0.075 mm	3		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	77		
Liquid Limit (%)	41		
Plastic Limit (%)	18		
Plasticity Index (%)	**23**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	5.0		
Cracking Crumbling Curling	None		

Particle Size Distribution



Material Test Report

Report Number:	**BL20121-1**
Issue Number:	1
Date Issued:	24/01/2020
Client:	Local Geotechnics
	12/8 Production Road Canning Vale, Perth WA 6155
Contact:	Harun Meer
Project Number:	BL20121
Project Name:	LGK9752019GI
Project Location:	250 Anstey Road, Forrestdale WA
Work Request:	2737
Sample Number:	BL20-2737D
Date Sampled:	19/12/2019
Dates Tested:	08/01/2020 - 09/01/2020
Sampling Method:	Sampled by Client
	The results apply to the sample as received
Material:	Red Clayey Gravel
Material Source:	TP12- 1.2- 2.0m

terra firma laboratories

Perth Laboratory
Unit 2/16 Kalmia Road Bibra Lake WA 6163
Phone: (08) 9395 7220
Email: mhitchens@terrafirmalabs.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

NATA
WORLD RECOGNISED ACCREDITATION

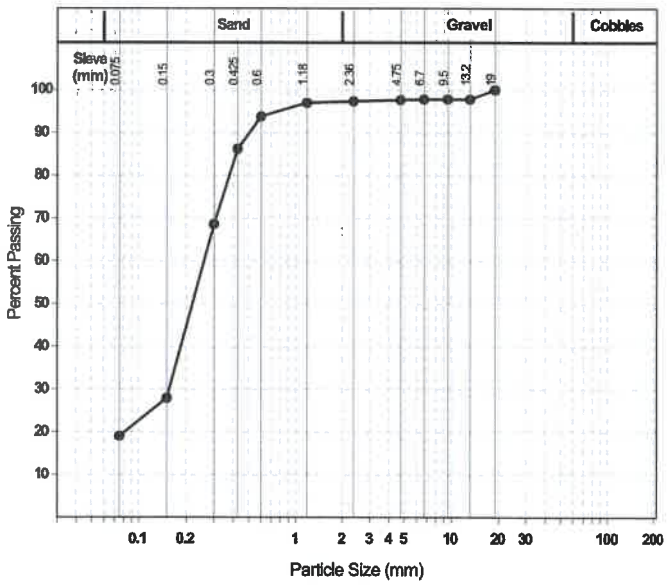
Approved Signatory: Matthew Hitchens
Laboratory Manager
NATA Accredited Laboratory Number: 15357

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	100		
13.2 mm	98		
9.5 mm	98		
6.7 mm	98		
4.75 mm	98		
2.36 mm	97		
1.18 mm	97		
0.6 mm	94		
0.425 mm	86		
0.3 mm	69		
0.15 mm	28		
0.075 mm	19		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	86		
Liquid Limit (%)	42		
Plastic Limit (%)	20		
Plasticity Index (%)	22		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	7.0		
Cracking Crumbling Curling	None		

Particle Size Distribution



Material Test Report

Report Number:	**BL20121-1**
Issue Number:	1
Date Issued:	24/01/2020
Client:	Local Geotechnics
	12/8 Production Road Canning Vale, Perth WA 6155
Contact:	Harun Meer
Project Number:	BL20121
Project Name:	LGK9752019GI
Project Location:	250 Anstey Road, Forrestdale WA
Work Request:	2737
Sample Number:	BL20-2737E
Date Sampled:	19/12/2019
Dates Tested:	08/01/2020 - 09/01/2020
Sampling Method:	Sampled by Client
	The results apply to the sample as received
Material:	Red Clayey Gravel
Material Source:	TP14- 1.5-2.0m (black clayey sand, organic)

terra firma laboratories

Perth Laboratory
Unit 2/16 Kalmia Road Bibra Lake WA 6163
Phone: (08) 9395 7220
Email: mhitchens@terrafirmalabs.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

NATA
WORLD RECOGNISED ACCREDITATION

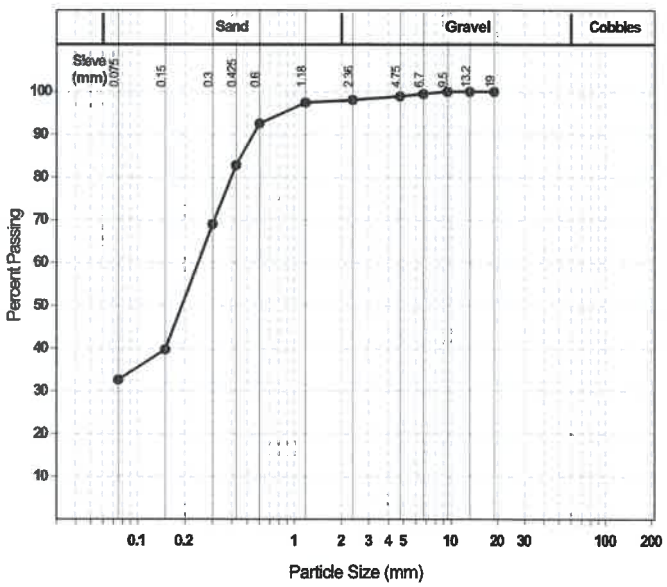
Approved Signatory: Matthew Hitchens
Laboratory Manager
NATA Accredited Laboratory Number: 15357

Particle Size Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
13.2 mm	**100**		
9.5 mm	**100**		
6.7 mm	**99**		
4.75 mm	**99**		
2.36 mm	**98**		
1.18 mm	**97**		
0.6 mm	**93**		
0.425 mm	**83**		
0.3 mm	**69**		
0.15 mm	**40**		
0.075 mm	**33**		

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	83		
Liquid Limit (%)	37		
Plastic Limit (%)	19		
Plasticity Index (%)	**18**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	6.0		
Cracking Crumbling Curling	Curling		

Particle Size Distribution



APPENDIX D

SITE PHOTOS

LOCAL GEOTECHNICS

Photo 1. Site Stage1, view from North to South bound

Photo 2 Test Location 01 (DCP1), Testing by a Dynamic Cone Penetrometer

Photo 3. Soil from Test Location 02 (TH2)

Photo 4. Soil from Test Location 03 (TH3)

Photo 5. Test Location 04 (TH4), Sub-surface probing by an excavator

Photo 6. Soil from Test Location 05 (TH5)

Photo 7. Test Location 05 (DCP5), Testing by a Dynamic Cone Penetrometer

Photo 8. Test Location 06 (DCP6), Testing by a Dynamic Cone Penetrometer

Photo 9. Test Location 07 (TH7), Sub-surface probing by an excavator

Photo 10 Test Location 08 (DCP8), Testing by a Dynamic Cone Penetrometer

Photo 11. Test Location 09 (DCP9), Testing by a Dynamic Cone Penetrometer

Photo 12. Soil from Test Location 10 (TH10)

Photo 13. Test Location 11 (DCP11), Testing by a Dynamic Cone Penetrometer

Photo 14. Soil from Test Location 12 (TH12)

Photo 15. Soil from Test Location 13 (TH13)

Photo 16. Test Location 13 (DCP13), Testing by a Dynamic Cone Penetrometer

Photo 17. Test Location 14 (TH14), Soil from Test Location 14 (TH14)

Photo 18 Test Location 15 (DCP15), Sub-surface probing by an excavator

Photo 19. Soil from Test Location 16 (TH16)

Photo 20. Test Location 18 (DCP18), Testing by a Dynamic Cone Penetrometer

Photo 21. Test Location 19 (DCP19), Testing by a Dynamic Cone Penetrometer

Photo 22. Soil from Test Location 20 (TH20)

Photo 23. Soil from Test Location 21 (TH21)

Photo 24. Test Location 21 (DCP21), Testing by a Dynamic Cone Penetrometer