Residential Subdivision The Gardens - Stage 2 Site Classification

Medowie Road, Medowie

NEW19P-0143A-AA 4 December 2020



**GEOTECHNICAL I LABORATORY I EARTHWORKS I QUARRY I CONSTRUCTION MATERIAL TESTING** 

4 December 2020

McCloy Project Management Pty Ltd Suite 2, Ground Floor, 317 Hunter Street NEWCASTLE NSW 2300

#### Attention: Mr Rylan Gibson

Dear Sir,

## RE: RESIDENTIAL SUBDIVISION – THE GARDENS – STAGE 2 Nos. 688 TO 730 MEDOWIE ROAD, MEDOWIE SITE CLASSIFICATION (LOTS 201 TO 223)

Please find enclosed our geotechnical report for Stage 2 of "The Gardens" residential subdivision, located at Nos. 688 to 730 Medowie Road, Medowie.

The report provides site classification with respect to reactive soils, in accordance with the requirements of AS2870-2011 '*Residential Slabs and Footings*', for Stage 2 (Lots 201 to 223), following completion of site regrade works.

If you have any questions regarding this report, please do not hesitate to contact Ben Bunting, Shannon Kelly, or the undersigned.

For and on behalf of Qualtest Laboratory (NSW) Pty Ltd

Jason Lee Principal Geotechnical Engineer

# Table of Contents:

| 1.0 |     | Introduction                       | 1  |
|-----|-----|------------------------------------|----|
| 2.0 |     | Desktop Study                      | 1  |
| 3.0 |     | Field Work                         | 1  |
| 4.0 |     | Site Description                   | 2  |
|     | 4.1 | Site Regrade Works                 | .2 |
|     | 4.2 | Surface Conditions                 | .2 |
|     | 4.3 | Subsurface Conditions              | .5 |
| 5.0 |     | Laboratory Testing                 | 7  |
| 6.0 |     | Site Classification to AS2870-2011 | 9  |
| 7.0 |     | Limitations                        | 11 |

## Attachments:

- Figure AA1: Site Plan and Approximate Test Locations
- Appendix A: Engineering Logs of Boreholes
- Appendix B: Results of Laboratory Testing
- Appendix C: CSIRO Sheet BTF 18 Foundation Maintenance and Footing Performance

# 1.0 Introduction

Qualtest Laboratory NSW Pty Ltd (Qualtest) is pleased to present this geotechnical report on behalf of McCloy Development Management Pty Ltd (McCloy), for Stage 2 of 'The Gardens' residential subdivision, located at Nos. 688 to 730 Medowie Road, Medowie.

Based on the brief and drawing provided by the client, Stage 2 is understood to include 23 residential allotments (Lots 201 to 223).

The scope of work for the geotechnical investigation included providing site classification with respect to reactive soils, in accordance with the requirements of AS2870-2011 '*Residential Slabs and Footings*', for Stage 2 following completion of site regrade works which included controlled filling of Lots 201 to 213 and 215 to 217.

This report presents the results of the field work investigations and laboratory testing, and provides recommendations for the scope outlined above.

## 2.0 Desktop Study

The scope of work has included a review of the following reports completed by Qualtest:

- Geotechnical Assessment, 'Proposed Residential Subdivision, Medowie Gardens, 688 to 730 Medowie Road, Medowie, (Report Reference: NEW19P-00143-AA, dated 27 November 2019);
- Site Classification, 'Residential Subdivision, Medowie Road, Medowie, (Report Reference: NEW19P-00143-AC, dated 1 July 2020); and,
- Level 1 Site Re-grade Assessment Report, 'The Gardens Subdivision Stage 2, Medowie Road, Medowie, (Qualtest Report Reference: NEW20P-0022A-AA, dated 1 December 2020).

This report includes a summary of selected results from the previous reports where applicable.

# 3.0 Field Work

Field work investigations were carried out on 16 November 2020, comprising

- of: Excavation of 12 boreholes (BH201 to BH212) using a 2.7 tonne excavator with a 300mm diameter auger, to depths of between 2.00m and 2.10m;
- Undisturbed samples (U50 tubes) were taken for subsequent laboratory testing; and,
- Boreholes were backfilled with the excavation spoil and compacted using the excavator auger and tracks.

Investigations were carried out by an experienced Geotechnical Engineer from Qualtest who located the boreholes, carried out the testing and sampling, produced field logs of the boreholes, and made observations of the site surface conditions.

Approximate borehole locations are shown on the attached Figure AA1.

Engineering logs of the boreholes are presented in Appendix A.

# 4.0 Site Description

## 4.1 Site Regrade Works

Site re-grading works were conducted between 20 August 2020 and 10 November 2020.

Re-grade works included filling within Lots 201 to 213 and 215 to 217, along with cut / fill works performed for the foundation of a proposed retaining wall, located along the back of Lot 203 to 211, adjacent to Medowie Road.

Prior to filling, re-grade areas were stripped of topsoil and unsuitable material to expose the suitable natural foundation profile. Re-grade works then consisted of a proof roll assessment of the foundation prior to filling with approved site fill to design finish levels.

Filling was performed using either imported material from a nearby site located at Raymond Terrace (Stage 6 of the Potters Lane development), and/or site material won from excavations cut from around the site.

The fill material could generally be described as mixtures of Residual (CI-CH) Sandy CLAY, medium to high plasticity, brown / grey / red / orange in colour, with fine to coarse grained Sand and fine to medium grained Gravel.

The approximate depth of fill placed ranged in the order of 0.1m to about 1.2m, with the deepest filling performed along the front of Lots 201 to 211. The approximate maximum depth of fill placed over the lots ranged in the order of:

- 1.2m on Lots 201 to 211;
- 0.3m on Lots 212 to 213 and 215 to 217.

The fill was compacted in maximum lifts of 0.3m thickness. Any unsuitable or deleterious material within the fill was removed by hand or mechanical means prior to final compaction of the material.

As the geotechnical testing authority engaged for the project, we state that the filling performed for the re-grade areas within Stage 2 was carried out to Level 1 criteria as defined in Clause 8.2 – Section 8 of AS3798-2007, "Guidelines on Earthworks for Commercial and Residential Developments".

At the time of the field investigations on 13 October 2020, regrade works had been completed; however, multiple lots were proposed to have between 0.20m and 0.30m of topsoil added. Some fill stockpiles (mostly trench backfill and sand) were still present on a number of lots. It is understood and expected that the remaining stockpiles will be removed prior to development on the lots.

The recommendations of this report are based on the understanding that any existing lot re-grade works are limited to the controlled earthworks works supervised by Qualtest, and placement of low reactivity topsoil material such that total topsoil depths do not exceed 0.4m. Qualtest should be informed without delay if additional earthworks are known to have been carried out.

## 4.2 Surface Conditions

The site is located east of Medowie Road, Medowie. The site comprises Stage 1 of the Medowie Gardens residential subdivision at 688 to 730 Medowie Rd, Medowie. The site comprises 23 proposed residential allotments and associated pavements, covering a total area of approximately 1.84ha. The site of the proposed development is shown on Figure AA1.

Stage 2 is bounded to the north by the existing Stage 1, to the east and south by future stages of The Gardens residential subdivision which currently comprises rural residential lots including sections of bushland, and to the west by Medowie Road.

Natural surface slopes are typically in the order of about 2° to 4° towards the west and northwest. Filling has been carried out within Stage 2 (as summarised in Section 4.1), resulting in gentler surface slopes, generally in the order of 1° to 2°.

At the time of inspection, the site had been cleared of trees and grass coverage was only observed to be present on Lots 220 to 221.

On the day of the investigation, stormwater systems had been installed, and the site was judged to be reasonably well drained.

Site access was from Medowie Road, with trafficability judged to be good by way of 4WD.

Photographs of the site taken on the day of the site investigations are shown below.



**Photograph 1:** From eastern boundary of Lot 201, facing south.





**Photograph 3:** From near western boundary of Lot 202, facing east.

**Photograph 2:** From eastern boundary of Lot 201, facing west.





**Photograph 5:** From near western boundary of Lots 205 and 206, facing southeast.

**Photograph 4:** From near western boundary of Lot 202, facing south.



**Photograph 6:** From near western boundary of Lots 205 and 206, facing south.



**Photograph 7:** From near western boundary of Lots 208 and 209, facing north.



**Photograph 9:** From northern corner of Lot 212, facing east.



**Photograph 11:** From near eastern boundary of Lots 214 and 218, facing southwest.



**Photograph 13:** From near eastern boundary of Lot 219, facing southwest.



**Photograph 8:** From near western boundary of Lots 208 and 209, facing east.



**Photograph 10:** From northern corner of Lot 212, facing south.



**Photograph 12:** From near eastern boundary of Lots 214 and 218, facing north.



**Photograph 14:** From near eastern boundary of Lot 219, facing north.



**Photograph 15:** From northeast corner of Lot 219, facing southwest.



**Photograph 16:** From northeast corner of Lot 219, facing northwest.



**Photograph 17:** From north-eastern corner of Lot 220, facing south.



**Photograph 19:** From north-western corner of Lot 223, facing east.

## 4.3 Subsurface Conditions



**Photograph 18:** From north-eastern corner of Lot 220, facing west.



**Photograph 20:** From north-western corner of Lot 223, facing south.

Reference to the 1:100,000 Newcastle Coalfield Regional Geology Sheet 9231 indicates the site to be underlain by the Permian Aged Tomago Coal Measures, which are characterised by Siltstone, Sandstone, Coal, Tuff and Claystone rock types.

Table 1 presents a summary of the typical soil types encountered on site during the field investigations, divided into representative geotechnical units.

Table 2 contains a summary of the distribution of the above geotechnical units at the borehole locations.

| Unit | Soil Type   | Description  |  |  |  |  |  |  |
|------|---|--|--|--|--|--|--|--|
| 1A   | UNCONTROLLED FILL   | SAND – fine to medium grained, dark grey. (As a stockpile)   |  |  |  |  |  |  |
|      |   | Sandy CLAY – medium to high plasticity, grey to dark grey<br>and brown to pale brown, fine to coarse grained (mostly fine<br>to medium grained) sand, with some fine to coarse grained<br>rounded to sub-angular gravel in places. |  |  |  |  |  |  |
| 1B   | CONTROLLED FILL   | CLAY – medium to high plasticity, red-brown to brown and orange-brown, with some fine to medium grained sand.  |  |  |  |  |  |  |
|      |   | Gravelly Sandy CLAY – medium plasticity, grey with some<br>brown, fine to coarse grained sand, fine to coarse grained<br>rounded to sub-angular gravel.  |  |  |  |  |  |  |
| 2    | TOPSOIL   | Sandy CLAY – low plasticity, grey-brown, fine grained sand, root affected.   |  |  |  |  |  |  |
| 3    | COLLUVIUM   | Sandy CLAY – low to medium plasticity, pale brown, fine<br>grained sand.<br>CLAY – medium plasticity, pale brown trace red-brown, with<br>some fine grained sand.  |  |  |  |  |  |  |
| 4    | RESIDUAL SOIL   | CLAY – medium to high plasticity, pale orange-brown and<br>red-brown, with some fine grained sand.<br>Sandy CLAY – medium to high plasticity, pale orange-brown<br>and red-brown to pale brown, fine grained sand.                 |  |  |  |  |  |  |
| 5    | EXTREMELY<br>WEATHERED (XW)<br>ROCK with soil<br>properties | Not Encountered within investigation.  |  |  |  |  |  |  |

#### TABLE 1 – SUMMARY OF GEOTECHNICAL UNITS AND SOIL TYPES

No groundwater was encountered in the boreholes during the limited time that they remained open on the day of the field investigation.

It should be noted that groundwater conditions can vary due to rainfall and other influences including regional groundwater flow, temperature, permeability, recharge areas, surface condition, and subsoil drainage.

### TABLE 2 – SUMMARY OF GEOTECHNICAL UNITS ENCOUNTERED AT BOREHOLE LOCATIONS

|                       | Unit 1A              | Unit 1B            | Unit 2        | Unit 3        | Unit 4           | Unit 5      |  |  |  |  |  |
|-----------------------|----------------------|--------------------|---------------|---------------|------------------|-------------|--|--|--|--|--|
| Location              | Uncontrolled<br>Fill | Controlled<br>Fill | Topsoil       | Colluvium     | Residual<br>Soil | XW Rock     |  |  |  |  |  |
|                       |                      |                    | Depth in      | metres        |                  |             |  |  |  |  |  |
| Current Investigation |                      |                    |               |               |                  |             |  |  |  |  |  |
| TP201                 | -                    | 0.00 - 1.00        | -             | -             | 1.00 - 2.00      | -           |  |  |  |  |  |
| TP202                 | -                    | 0.00 – 1.20        | -             | -             | 1.20 – 2.10      | -           |  |  |  |  |  |
| TP203                 | -                    | 0.00 – 1.30        | -             | 1.30 – 1.50   | 1.50 – 2.00      | -           |  |  |  |  |  |
| TP204                 | -                    | 0.00 – 1.30        | -             | -             | 1.30 – 2.10      | -           |  |  |  |  |  |
| TP205                 | -                    | 0.00 - 1.20        | -             | -             | 1.20 - 2.00      | -           |  |  |  |  |  |
| TP206                 | -                    | -                  | 0.00 - 0.15   | -             | 0.15 – 2.10      | -           |  |  |  |  |  |
| TP207                 | -                    | 0.00 - 0.40        | -             | -             | 0.40 - 2.10      | -           |  |  |  |  |  |
| TP208                 | -                    | -                  | 0.00 - 0.15   | -             | 0.15 – 2.10      | -           |  |  |  |  |  |
| TP209                 | -                    | 0.00 – 0.45        | -             | -             | 0.45 – 2.10      | -           |  |  |  |  |  |
| TP210                 | 0.00 – 0.05          | -                  | -             | -             | 0.05 – 2.00      | -           |  |  |  |  |  |
| TP211                 | -                    | -                  | 0.00 - 0.20   | 0.20 – 0.50   | 0.50 – 2.00      | -           |  |  |  |  |  |
| TP212                 | -                    | -                  | 0.00 - 0.20   | 0.20 – 0.50   | 0.50 – 2.00      | -           |  |  |  |  |  |
|                       | Previous             | Investigation (    | NEW19P-0143-  | AC, dated 1 J | luly 2020)       |             |  |  |  |  |  |
| TP101                 | -                    | 0.00 - 1.70        | -             | -             | 1.70 - 2.00      | -           |  |  |  |  |  |
| TP104                 | -                    | 0.00 - 0.60        | -             | -             | 0.60 - 2.00      | -           |  |  |  |  |  |
| TP105                 | -                    | -                  | 0.00 - 0.35   | 0.35 - 0.60   | 0.60 - 2.00      | -           |  |  |  |  |  |
| TP106                 | -                    | -                  | 0.00 - 0.40   | 0.40 - 0.80   | 0.80 - 1.90      | 1.90 - 2.00 |  |  |  |  |  |
|                       | Previous Inve        | stigation (NEW     | /19P-0143-AA, | dated 27 Nov  | vember 2019)     |             |  |  |  |  |  |
| TP24                  | -                    | -                  | 0.00 - 0.30   | 0.30 - 0.70   | 0.70 - 2.00      | -           |  |  |  |  |  |
| TP25                  | -                    | -                  | 0.00 - 0.20   | 0.20 - 0.50   | 0.50 - 2.00      | -           |  |  |  |  |  |
| TP26                  | 0.00 - 0.30          | -                  | -             | -             | 0.30 - 2.00      | -           |  |  |  |  |  |
| TP27                  | -                    | -                  | 0.00 - 0.25   | -             | 0.25 - 2.00      | -           |  |  |  |  |  |
| TP34                  | -                    | -                  | 0.00 - 0.20   | -             | 0.20 - 2.00      | -           |  |  |  |  |  |

# 5.0 Laboratory Testing

Samples collected during the field investigations were returned to our NATA accredited Warabrook Laboratory for testing which comprised of:

- (10 no.) Shrink / Swell tests; and,
- (5 no.) Atterberg Limits tests.

Due to the friable nature of site soils, some samples were unsuitable for Shrink / Swell testing, and Atterberg Limits tests were substituted.

Results of the laboratory testing are included in Appendix B, with a summary of the Shrink/Swell test and Atterberg Limits test results presented in Table 3 and Table 4, respectively.

| Location | Depth (m)          | Material Description                       | lss (%) |
|----------|--------------------|--|---------|
| BH202    | 0.50 – 0.70        | FILL: (CI) Sandy CLAY                      | 1.5     |
| BH203    | 0.05 – 0.20        | FILL: (CH) Sandy CLAY                      | 1.2     |
| BH203    | 0.30 – 0.50        | FILL: (CI) Sandy CLAY                      | 1.5     |
| BH205    | 0.30 – 0.50        | FILL: (CH) Sandy CLAY                      | 2.2     |
| BH206    | 0.60 – 0.85        | (CH) CLAY                                  | 1.8     |
| BH207    | 0.20 – 0.50        | FILL: (CH) CLAY                            | 1.4     |
| BH208    | 1.10 – 1.30        | (CH) CLAY                                  | 1.9     |
| BH209    | 0.15 – 0.50        | FILL: (CH) Sandy CLAY                      | 1.4     |
| BH211    | 0.60 – 0.80        | (CH) Sandy CLAY                            | 1.7     |
| BH212    | 0.90 – 1.10        | (CH) CLAY                                  | 1.3     |
|          | Previous Inves     | tigation (NEW19P-0143-AC, dated 1 July 202 | 20)     |
| TP101    | 0.70 - 0.80        | FILL: (CH) Sandy CLAY                      | 1.0     |
| TP104    | 1.10 - 1.35        | (CH) CLAY                                  | 2.4     |
| TP106    | 1.10 - 1.25        | (CI) Sandy CLAY                            | 1.9     |
| I        | Previous Investigo | tion (NEW19P-0143-AA, dated 27 November    | r 2019) |
| TP24     | 0.90 - 1.05        | (CH) CLAY                                  | 1.5     |
| TP25     | 0.80 - 1.00        | (CH) CLAY                                  | 1.9     |
| TP26     | 0.30 - 0.55        | (CH) CLAY                                  | 1.5     |
| TP34     | 0.30 - 0.50        | (CI) Sandy CLAY                            | 1.0     |

### TABLE 3 – SUMMARY OF SHRINK / SWELL TESTING RESULTS

| Location | Sample<br>Depth (m) | Material Description          | Liquid<br>Limit<br>(%) | Plastic<br>limit<br>(%) | Plasticity<br>Index<br>(%) | Linear<br>Shrinkage<br>(%) |
|----------|---------------------|-------------------------------|------------------------|-------------------------|----------------------------|----------------------------|
| BH201    | 0.20 – 0.35         | FILL: (CI) Sandy CLAY         | 43                     | 17                      | 26                         | 13.0                       |
| BH201    | 0.90 - 1.00         | FILL: (CI) Sandy CLAY         | 37                     | 14                      | 23                         | 15.0                       |
| BH201    | 1.00 - 1.20         | (CH) CLAY                     | 58                     | 21                      | 37                         | 15.0                       |
| BH204    | 0.50 – 0.80         | FILL: (CH) Sandy CLAY         | 49                     | 14                      | 35                         | 12.5                       |
| BH210    | 0.70 – 0.90         | (CH) CLAY                     | 56                     | 28                      | 28                         | 12.5                       |
|          | Previo              | ous Investigation (NEW19P-014 | 3-AC, date             | ed 1 July               | 2020)                      |                            |
| TP104    | 0.05 - 0.15         | FILL: (CH) CLAY               | 59                     | 23                      | 36                         | 15.0                       |
| TP105    | 0.40 - 0.55         | (CI) Sandy CLAY               | 45                     | 22                      | 23                         | 12.0                       |

TABLE 4 – SUMMARY OF ATTERBERG LIMITS TESTING RESULTS

## 6.0 Site Classification to AS2870-2011

Based on the results of the field work and laboratory testing, residential lots located within Stage 2 of The Gardens residential subdivision located at 688 to 730 Medowie Road, Medowie, as shown on Figure AA1, are classified in their current condition in accordance with AS2870-2011 'Residential Slabs and Footings', as shown in Table 5.

### TABLE 5 – SITE CLASSIFICATION TO AS2870-2011

| Stage | Lot Numbers                | Site Classification |
|-------|----------------------------|---------------------|
| 2     | 201 to 213, and 215 to 217 | H1                  |
| Σ     | 214, and 218 to 223        | м                   |

A characteristic free surface movement in the range of 40mm to 60mm is estimated for lots classified as **Class 'H1'**.

A characteristic free surface movement in the range of 20mm to 40mm is estimated for lots classified as **Class 'M'**.

The effects of changes to the soil profile by additional cutting and filling and the effects of past and future trees should be considered in selection of the design value for differential movement. If site re-grading works involving cutting or filling are performed after the date of this assessment the classification may change and further advice should be sought.

Final site classification will be dependent on the type of fill and level of supervision carried out. Re-classification of lots should be confirmed by the geotechnical authority at the time of construction following any site re-grade works. Footings for the proposed development should be designed and constructed in accordance with the requirements of AS2870-2011.

The classification presented above assumes that:

- All footings are founded in controlled fill (if applicable) or in the natural clayey soils or rock below all non-controlled fill, topsoil material and root zones, and fill under slab panels meets the requirements of AS2870-2011, in particular, the root zone must be removed prior to the placement of fill materials beneath slabs;
- The performance expectations set out in Appendix B of AS2870-2011 are acceptable, and that site foundation maintenance is undertaken to avoid extremes of wetting and drying;
- Footings are to be founded outside of or below all zones of influence resulting from existing or future service trenches;
- The constructional and architectural requirements for reactive clay sites set out in AS2870-2011 are followed;
- Adherence to the detailing requirement outlined in Section 5 of AS2870-2011 'Residential Slabs and Footings' is essential, in particular Section 5.6, 'Additional requirements for Classes M, H1, H2 and E sites' including architectural restrictions, plumbing and drainage requirements; and,
- Site maintenance complies with the provisions of CSIRO Sheet BTF 18, "Foundation Maintenance and Footing Performance: A Homeowner's Guide", a copy of which is attached in Appendix C.

All structural elements on all lots regardless of their site classification should be supported on footings founded beneath all uncontrolled fill, layers of inadequate bearing capacity, soft/loose, or other potentially deleterious material.

If any areas of uncontrolled fill of depths greater than 0.4m are encountered during construction, footings should be designed in accordance with engineering principles for Class 'P' sites.

# 7.0 Limitations

The findings presented in the report and used as the basis for recommendations presented herein were obtained using normal, industry accepted geotechnical design practices and standards. To our knowledge, they represent a reasonable interpretation of the general conditions of the site.

The extent of testing associated with this assessment is limited to discrete borehole locations. It should be noted that subsurface conditions between and away from the borehole locations may be different to those observed during the field work and used as the basis of the recommendations contained in this report.

If subsurface conditions encountered during construction differ from those given in this report, further advice should be sought without delay.

Data and opinions contained within the report may not be used in other contexts or for any other purposes without prior review and agreement by Qualtest. If this report is reproduced, it must be in full.

If you have any further questions regarding this report, please do not hesitate to contact Shannon Kelly or the undersigned.

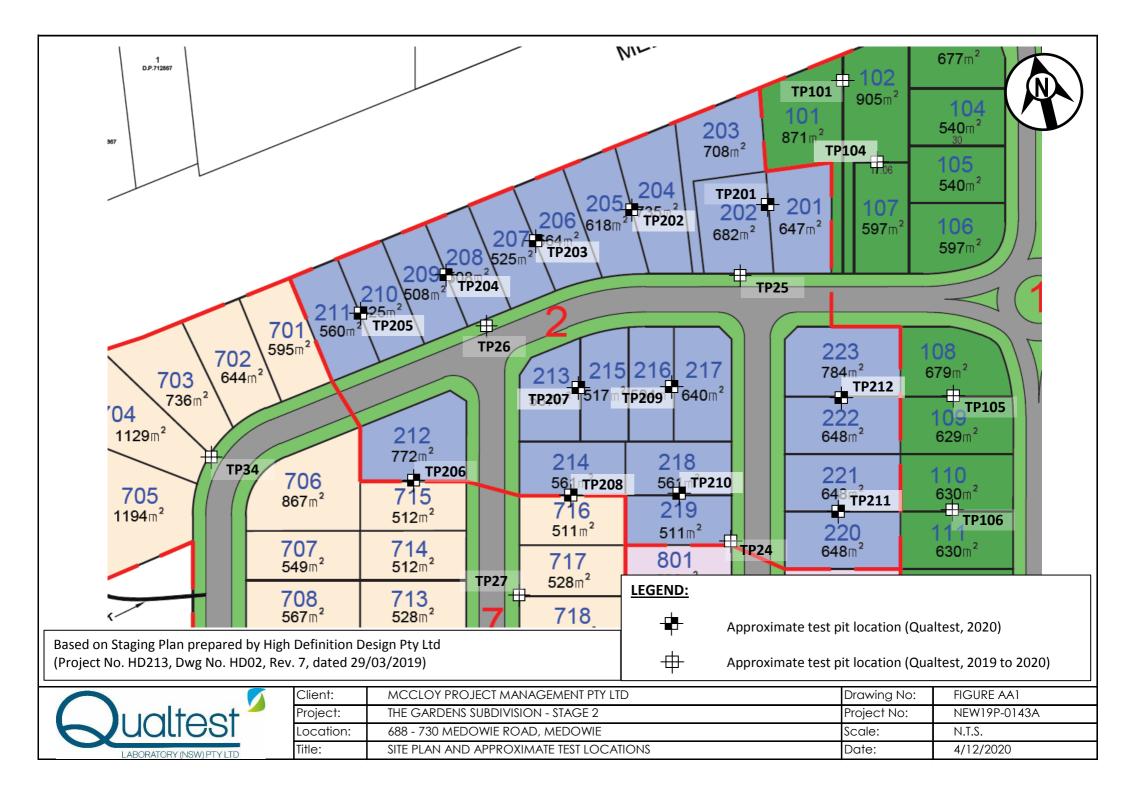
For and on behalf of Qualtest Laboratory (NSW) Pty Ltd.

an le.

Jason Lee Principal Geotechnical Engineer

# FIGURE AA1:

Site Plan and Approximate Test Locations



# **APPENDIX A:**

**Engineering Logs of Boreholes** 



**PROJECT:** MEDOWIE GARDENS - STAGE 2

LOCATION: 688 TO 730 MEDOWIE ROAD, MEDOWIE

CLIENT:

MCCLOY PROJECT MANAGEMENT PTY LTD

BOREHOLE NO:

BH201

1 OF 1

NEW19P-0143A

LOGGED BY:

PAGE:

DATE:

JOB NO:

BB 16/11/20

|                 |   | TYPE:<br>OLE DIAM   |           |   | EXCA<br>300 m  |  | R WITH AUGER SUR DAT  | FACE RL:<br>UM:                    |  |                        |  |  |  |
|-----------------|---|---|-----------|---|--|--|---|------------------------------------|--|------------------------|--|--|--|
|                 | Drill   | ling and San  | npling    |   |  |  | Material description and profile information  |                                    |  |                        | Fiel   | d Test   |  |
| METHOD          | WATER   | SAMPLES   | RL<br>(m) | DEPTH<br>(m)  | GRAPHIC<br>LOG   | CLASSIFICATION<br>SYMBOL   | MATERIAL DESCRIPTION: Soil type, plastici<br>characteristics,colour,minor componer  | ity/particle<br>hts                | MOISTURE<br>CONDITION  | CONSISTENCY<br>DENSITY | Test Type  | Result   | Structure and additional observations  |
|                 |   | 0.20m<br>U50<br>0.35m   |           | -<br>-<br>-<br>0.5_<br>-  |  | СІ   | FILL: Sandy CLAY - medium plasticity, bro<br>medium grained sand.   |                                    | M<br>«<br>M  | H / Fb                 |  |  | FILL - CONTROLLED  |
| AD/T            | Not Encountered   | 0.90m<br>U50<br>1.887   |           | -<br>-<br>1. <u>0</u>   |  |  | grey and brown, fine to coarse grained (m<br>medium grained) sand.<br>1.00m<br>CLAY - medium to high plasticity, pale ora<br>and red-brown, with some fine grained sar  | ostly fine to                      | <sup>d</sup> M ∼ W   | VSt                    | HP   | 380<br>380   | RESIDUAL SOIL  |
|                 |   | 1.20m   |           |   |  |  | Red-brown.  |                                    | M < W <sub>P</sub>   | Н                      | ΗP   | 550  |  |
|                 |   |   |           | -   |  |  | Hole Terminated at 2.00 m   |                                    |  |                        |  |  |  |
| <u>Wat</u><br>▲ | Wat<br>(Dat<br>Wat<br>I Wat<br>I Wat<br><u>Ita Cha</u><br>G | ter Level<br>te and time sł<br>ter Inflow<br>ter Outflow<br><b>anges</b><br>iradational or<br>ansitional stra<br>efinitive or dis | ita       | Notes, Sa<br>U <sub>50</sub><br>CBR<br>E<br>ASS<br>B<br>Field Test<br>PID<br>DCP(x-y)<br>HP | 50mm<br>Bulk s<br>Enviro<br>(Glass<br>Acid S<br>(Plasti<br>Bulk S<br>Bulk S<br>Photoi<br>Dynan | Diame<br>ample f<br>nmenta<br>jar, se<br>culfate S<br>c bag, a<br>ample<br>onisationic pen | ter tube sample<br>ter tube sample<br>or CBR testing<br>al sample<br>aled and chilled on site)<br>oil Sample<br>air expelled, chilled)<br>on detector reading (ppm)<br>etrometer test (test depth interval shown)<br>meter test (UCS kPa) | S S<br>F F<br>St S<br>VSt V<br>H H | /ery Soft<br>Soft<br>Stiff<br>/ery Stiff<br>/ard<br>Friable<br>V<br>L<br>D | Vi<br>La               | 25<br>25<br>50<br>10<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20 | CS (kPa<br>25<br>5 - 50<br>) - 100<br>)0 - 200<br>)0 - 200<br>)0 - 400<br>400<br>pose<br>n Dense | D Dry<br>M Moist<br>W Wet<br>W <sub>p</sub> Plastic Limit<br>U <sub>L</sub> Liquid Limit<br>Density Index <15%<br>Density Index 15 - 35% |



## **ENGINEERING LOG - BOREHOLE**

**PROJECT:** MEDOWIE GARDENS - STAGE 2

LOCATION: 688 TO 730 MEDOWIE ROAD, MEDOWIE

CLIENT: MCCLOY PROJECT MANAGEMENT PTY LTD BOREHOLE NO:

BH202

1 OF 1

NEW19P-0143A

JOB NO: LOGGED BY:

PAGE:

DATE:

BB 16/11/20

|                  |                 | YPE:<br>OLE DIAN  |           |   | EXCA<br>300 m   |   | DR WITH AUGER SURI  | FACE RL:<br>JM:                     |  |                        |                      |                          |   |
|------------------|-----------------|---|-----------|---|---|---|---|-------------------------------------|--|------------------------|----------------------|--------------------------|---|
|                  | Drill           | ing and San   | npling    |   |   |   | Material description and profile information  |                                     |  |                        | Fiel                 | d Test                   |   |
| METHOD           | WATER           | SAMPLES   | RL<br>(m) | DEPTH<br>(m)  | GRAPHIC<br>LOG  | CLASSIFICATION<br>SYMBOL  | MATERIAL DESCRIPTION: Soil type, plasticit<br>characteristics,colour,minor componer   | ty/particle<br>its                  | MOISTURE<br>CONDITION  | CONSISTENCY<br>DENSITY | Test Type            | Result                   | Structure and additional observations   |
| AD/T             | Not Encountered | 0.50m<br>U50<br>0.70m   |           |   |   | СІ  | FILL: Sandy CLAY - medium plasticity, bro<br>medium grained sand.<br>0.50m<br>FILL: Sandy CLAY - medium to high plasti<br>to dark grey with some brown, fine to coars<br>sand.<br>With some fine to coarse grained rounded<br>1.20m<br>CLAY - medium to high plasticity, pale orar<br>with some red-brown, with some fine grain | city, grey<br>se grained<br>gravel. | M > Wp   | VSt<br>St-<br>VSt      | HP<br>HP<br>HP<br>HP | 180<br>250<br>200<br>300 | FILL - CONTROLLED   |
|                  |                 |   |           | -   |   |   | Hole Terminated at 2.10 m   |                                     |  |                        |                      |                          |   |
| <u>Wate</u><br>► |                 | er Level<br>e and time sl<br>er Inflow<br>er Outflow<br>anges<br>radational or<br>ansitional stra<br>finitive or dis<br>rata change | ta        | I<br><u>Notes, Sa</u><br>U <sub>50</sub><br>CBR<br>E<br>ASS<br>B<br>Field Test<br>PID<br>DCP(x-y)<br>HP | 50mm<br>Bulk s<br>Enviro<br>(Glass<br>Acid S<br>(Plasti<br>Bulk S<br>S<br>Photoi<br>Dynan | Diame<br>ample f<br>nmenta<br>jar, se<br>ulfate S<br>c bag, a<br>ample<br>onisationic pendo | ts<br>ter tube sample<br>or CBR testing<br>al sample<br>aled and chilled on site)<br>Soil Sample<br>air expelled, chilled)<br>on detector reading (ppm)<br>etrometer test (test depth interval shown)<br>meter test (UCS kPa)   | S S<br>F F<br>St S<br>VSt V<br>H H  | I ncy<br>/ery Soft<br>Soft<br>irim<br>irim<br>lard<br>iriable<br>V<br>L<br>ME<br>D | V<br>Li<br>D M         | <2                   | n Dense                  | D Dry<br>M Moist<br>W Wet<br>W <sub>p</sub> Plastic Limit<br>Liquid Limit<br>Density Index <15%<br>Density Index 15 - 35% |



CLIENT: MCCLOY PROJECT MANAGEMENT PTY LTD

PROJECT: MEDOWIE GARDENS - STAGE 2

LOCATION: 688 TO 730 MEDOWIE ROAD, MEDOWIE

BOREHOLE NO: PAGE: JOB NO: LOGGED BY: DATE:

BH203 1 OF 1 NEW19P-0143A

BB

|   |   | iole diam  |                  |   | EXCA<br>300 m  |   | R WITH AUGER SURF   | FACE RL:<br>JM:             |  |                        |  |   |   |
|---|---|--|------------------|---|--|---|---|-----------------------------|--|------------------------|--|---|---|
|   | Dri   | lling and San  | npling           |   |  |   | Material description and profile information  | -                           |  |                        | Field                                  | d Test  |   |
| METHOD  | WATER   | SAMPLES  | RL<br>(m)        | DEPTH<br>(m)  | GRAPHIC<br>LOG   | CLASSIFICATION<br>SYMBOL  | MATERIAL DESCRIPTION: Soil type, plasticit<br>characteristics,colour,minor componen   |                             | MOISTURE<br>CONDITION  | CONSISTENCY<br>DENSITY | Test Type                              | Result  | Structure and additional observations             |
|   |   | 0.05m<br>U50<br>0.20m  |                  | -   |  | СН  | FILL: CLAY - medium to high plasticity, red<br>orange-brown, with some fine to medium g<br>sand.  |                             | M < Wp   | VSt -<br>H             |  |   | FILL - CONTROLLED                                 |
|   |   | 0.30m<br>U50<br>0.50m  |                  | -<br>-<br>0. <u>5</u>                                 |  | CI  | FILL: Sandy CLAY - medium plasticity, gre<br>some brown, fine to coarse grained sand, t<br>to coarse grained rounded to sub-angular g                                       | race fine                   | $M \sim w_{P}$   | St -<br>VSt            | HP                                     | 150<br>250<br>210   |   |
|   | Intered   |  |                  | -   |  |   | 0.90m   |                             |  |                        | HP                                     | 230   |   |
| Lab and In Situ Tool<br>AD/T  | Not Encountered   |  | 1. <u>0</u><br>- |   | CI   | FILL: Gravelly Sandy CLAY - medium plast<br>with some brown, fine to coarse grained sa<br>coarse grained rounded to sub-angular gra | ind, fine to  | M < w <sub>P</sub>          | VSt  | ΗP                     | 200                                    |   |   |
| 7 10.0.000 Datge  |   |  |                  | -<br>1. <u>5</u>                                      |  | CL  | Sandy CLAY - low to medium plasticity, pal fine grained sand.   | e brown,                    | M > w <sub>P</sub>   | St                     | HP                                     | 190   | COLLUVIUM/RESIDUAL<br>SOIL                        |
| ngFile>> 30/11/2020 15:3.   |   |  |                  | -   |  | СН  | CLAY - medium to high plasticity, red-brow<br>some fine grained sand.   | n, with                     | $M \sim w_P$   | VSt                    | HP                                     | 350   | RESIDUAL SOIL — — — —                             |
| DRAFT.GPJ < <drawi< td=""><td></td><td></td><td></td><td>2.0</td><td></td><td></td><td>2.00m<br/>Hole Terminated at 2.00 m</td><td></td><td></td><td></td><td>HP</td><td>380</td><td></td></drawi<> |   |  |                  | 2.0   |  |   | 2.00m<br>Hole Terminated at 2.00 m  |                             |  |                        | HP                                     | 380   |   |
| 7   | GEND  |  |                  |   | 50mm   | Diame   | ter tube sample   |                             | /ery Soft  |                        | <2                                     | <b>CS (kP</b> ?<br>25   | D Dry   |
|   | (Da<br>– Wa<br><b>⊲ Wa</b><br>m <u>ata Ch</u><br>–- C<br>tr | ter Level<br>te and time sh<br>ter Inflow<br>ter Outflow<br>anges<br>Gradational or<br>ansitional stra | hown)            | CBR<br>E<br>ASS<br>B<br>Field Test<br>PID<br>DCP(x-y) | Enviro<br>(Glass<br>Acid S<br>(Plasti<br>Bulk S<br>S<br>Photoi | nmenta<br>jar, se<br>culfate S<br>c bag, a<br>ample<br>onisatio   | or CBR testing<br>I sample<br>aled and chilled on site)<br>Soil Sample<br>air expelled, chilled)<br>on detector reading (ppm)<br>etrometer test (test depth interval shown) | F F<br>St S<br>VSt V<br>H F | Soft<br>Firm<br>Stiff<br>/ery Stiff<br>lard<br>Friable<br>V<br>L<br>MD | Lo                     | 50<br>10<br>20<br>>4<br>ery Lo<br>pose | 5 - 50<br>0 - 100<br>00 - 200<br>00 - 400<br>400<br>00se<br>n Dense | Density Index <15%<br>Density Index 15 - 35%      |
| QT LIB  |   | efinitive or dis<br>trata change   | SUCL             | HP  |  |   | meter test (UCS kPa)  |                             | D<br>VD  | D                      | ense<br>ery De                         |   | Density Index 65 - 85%<br>Density Index 85 - 100% |



**PROJECT:** MEDOWIE GARDENS - STAGE 2

CLIENT: MCCLOY PROJECT MANAGEMENT PTY LTD

BOREHOLE NO:

BH204

1 OF 1

NEW19P-0143A

LOCATION: 688 TO 730 MEDOWIE ROAD, MEDOWIE

JOB NO: LOGGED BY:

PAGE:

DATE:

BB 16/11/20

|  |                  | TYPE:<br>IOLE DIAN  |           |                                     | EXCA<br>300 m                                |  | R WITH AUGER SURF   | FACE RL:<br>JM:                    |  |                        |  |  |   |
|--|------------------|---|-----------|-------------------------------------|--|--|---|------------------------------------|--|------------------------|--|--|---|
|  | Dri              | lling and San   | npling    |                                     |  |  | Material description and profile information  |                                    |  |                        | Fiel                                       | d Test   |   |
| METHOD   | WATER            | SAMPLES   | RL<br>(m) | DEPTH<br>(m)                        | GRAPHIC<br>LOG                               | CLASSIFICATION<br>SYMBOL                                       | MATERIAL DESCRIPTION: Soil type, plasticit<br>characteristics,colour,minor componen   | y/particle<br>ts                   | MOISTURE<br>CONDITION  | CONSISTENCY<br>DENSITY | Test Type                                  | Result   | Structure and additional observations   |
|  |                  |   |           | -                                   |  | CI   | FILL: Sandy CLAY - medium plasticity, brow<br>medium grained sand, trace fine to medium<br>angular gravel.                          |                                    | M < Wp   | VSt                    |  |  | FILL - CONTROLLED   |
|  |                  | 0.50m<br>U50  |           | -<br>0. <u>5</u><br>-               |  |  | FILL: Sandy CLAY - medium to high plastic<br>fine to coarse grained sand, trace fine to m<br>grained roudned to sub-angular gravel. |                                    |  |                        | HP   | 170<br>260   |   |
| ool<br>AD/T  | Not Encountered  | 0.80m   |           | -<br>-<br>1.0_                      |  | СН   |   |                                    |  | St -<br>VSt            | HP   | 230  |   |
| 0.0.000 Datgel Lab and In Situ Toc $I$   | Not              |   |           | -                                   |  |  | 1.30m<br>Sandy CLAY - medium plasticity, pale brow<br>grained sand.   | <br>n, fine                        | M > w <sub>P</sub>   |                        | HP   | 210<br>210   | RESIDUAL SOIL   |
| 01 LIB 1.1GLB Log NON-CORED BOREHOLE - TEST PIT NEW19P-0143A-AA LOGS DRAFT GPJ < <drawingfile>&gt; 30/112020 15:37 10.0.000 Datget Lab and in Stu Tool</drawingfile> |                  |   |           | 1.5_<br>-<br>-<br>2.0_              |  | СІ   | 2.10m   |                                    |  | VSt                    | HP   | 230  |   |
| TEST PIT NEW19P-0143A-AALOC  |                  |   |           | -                                   |  |  | Hole Terminated at 2.10 m   |                                    |  |                        |  |  |   |
| g NON-CORED BOREHOLE -   | –<br>(Da<br>— Wa | ter Level<br>ite and time sl<br>ter Inflow<br>ter Outflow               | hown)     | Notes, Sa<br>U₅₀<br>CBR<br>E<br>ASS | 50mm<br>Bulk s<br>Enviro<br>(Glass<br>Acid S | Diame<br>ample f<br>nmenta<br>jar, sea<br>ulfate S<br>c bag, a | <b>s</b><br>er tube sample<br>or CBR testing<br>I sample<br>aled and chilled on site)<br>oil Sample<br>ir expelled, chilled)        | S S<br>F F<br>St S<br>VSt V<br>H F | ncy<br>/ery Soft<br>foft<br>irm<br>/tiff<br>/ery Stiff<br>lard<br>riable |                        | <2<br>25<br>50<br>10<br>20                 | <b>CS (kPa</b><br>25<br>5 - 50<br>0 - 100<br>00 - 200<br>00 - 400<br>400 | D Dry<br>M Moist<br>W Wet<br>W <sub>p</sub> Plastic Limit   |
| QT LIB 1.1.GLB Lo  | G<br>tr          | Gradational or<br>cansitional stra<br>Definitive or dis<br>trata change | ata       | Field Test<br>PID<br>DCP(x-y)<br>HP | i <b>s</b><br>Photoi<br>Dynan                | onisatio   | n detector reading (ppm)<br>trometer test (test depth interval shown)<br>meter test (UCS kPa)                                       | Density                            | V<br>L<br>D<br>VD  | Lo<br>M<br>D           | ery Lo<br>bose<br>lediun<br>ense<br>ery Do | n Dense  | Density Index <15%<br>Density Index 15 - 35%<br>Density Index 35 - 65%<br>Density Index 65 - 85%<br>Density Index 85 - 100% |



### **ENGINEERING LOG - BOREHOLE**

CLIENT: MCCLOY PROJECT MANAGEMENT PTY LTD

**PROJECT:** MEDOWIE GARDENS - STAGE 2

LOCATION: 688 TO 730 MEDOWIE ROAD, MEDOWIE

BOREHOLE NO: PAGE: JOB NO: LOGGED BY:

DATE:

BH205 1 OF 1

NEW19P-0143A

BB

|   |   | YPE:<br>OLE DIAN   |           |   | EXCA  | VATC  | R WITH AUGER SURI   | FACE RL:<br>JM:             |  |                        |   |  |  |
|---|---|--|-----------|---|---|---|---|-----------------------------|--|------------------------|---|--|--|
|   | Dril  | ling and San   | npling    |   |   |   | Material description and profile information  |                             |  |                        | Fiel  | d Test   |  |
| METHOD  | WATER   | SAMPLES  | RL<br>(m) | DEPTH<br>(m)  | GRAPHIC<br>LOG  | CLASSIFICATION<br>SYMBOL  | MATERIAL DESCRIPTION: Soil type, plasticit<br>characteristics,colour,minor componer   | ty/particle<br>ts           | MOISTURE<br>CONDITION  | CONSISTENCY<br>DENSITY | Test Type   | Result   | Structure and additional<br>observations   |
| NON-CORED BOREHOLE - TEST PIT NEW19P-0143A-AALOGS DRAFT.GPJ < <drawingfile>&gt; 30/11/2020 15:37 10.0.000 Daget Leb and In Situ Tool AD/T</drawingfile> | Not Encountered   | 0.30m<br>U50<br>0.55m                                    |           |   |   | СН  | FILL: CLAY - medium to high plasticity, brocorange-brown, with some fine to coarse grain (mostly fine grained) sand.         0.29m         FILL: Sandy CLAY - medium to high plasticity to dark grey and brown, fine to coarse grain with some fine to medium grained rounded sub-angular gravel.         1.20m         Sandy CLAY - medium to high plasticity, prifine grained sand.         1.20m         Hole Terminated at 2.00 m | ained                       | M > Wp M ~ Wp M < Wp   | H<br>St-<br>VSt        |   | >600<br>130<br>220<br>200<br>180<br>250<br>210 | FILL - CONTROLLED  |
|   | - Wat<br>(Da<br>- Wat<br>■ Wat<br><u>ata Ch</u><br>G<br>D | ter Level<br>te and time sl<br>ter Inflow<br>ter Outflow | ata       | Notes, Sa<br>U <sub>50</sub><br>CBR<br>E<br>ASS<br>B<br>Field Tes:<br>PID<br>DCP(x-y)<br>HP | 50mm<br>Bulk s<br>Envirc<br>(Glass<br>Acid S<br>(Plasti<br>Bulk S<br>Bulk S<br>Photo<br>Dynar | Diame<br>ample to<br>nmenta<br>s jar, se<br>culfate s<br>c bag, s<br>c bag, s<br>cample<br>tonisationic pen | is<br>ter tube sample<br>or CBR testing<br>al sample<br>aled and chilled on site)<br>Soil Sample<br>air expelled, chilled)<br>on detector reading (ppm)<br>etrometer test (test depth interval shown)<br>meter test (UCS kPa)   | S S<br>F I<br>St S<br>VSt V | Ancy<br>Very Soft<br>Firm<br>Stiff<br>Very Stiff<br>Hard<br>Friable<br>V<br>L<br>ME<br>D<br>V<br>D | Vi<br>La<br>D M        | 2!5010202122232425< | n Dense  | D Dry<br>M Moist<br>W Wet<br>W <sub>L</sub> Plastic Limit<br>W <sub>L</sub> Liquid Limit<br>Density Index <15%<br>Density Index 15 - 35% |



CLIENT: MCCLOY PROJECT MANAGEMENT PTY LTD

**PROJECT:** MEDOWIE GARDENS - STAGE 2

LOCATION: 688 TO 730 MEDOWIE ROAD, MEDOWIE

BOREHOLE NO: PAGE: JOB NO:

LOGGED BY:

DATE:

1 OF 1 NEW19P-0143A

**BH206** 

BB

|  |   | type:<br>Iole dian    |           |   | EXCA<br>300 m   |  | R WITH AUGER SURI   | FACE RL:<br>JM:                                    |   |                        |  |  |   |
|--|---|-----------------------|-----------|---|---|--|---|--|---|------------------------|--|--|---|
|  | Dri   | lling and San         | npling    |   |   |  | Material description and profile information  |  |   |                        | Fiel                                       | d Test   |   |
| METHOD   | WATER   | SAMPLES               | RL<br>(m) | DEPTH<br>(m)                            | GRAPHIC<br>LOG  | CLASSIFICATION<br>SYMBOL   | MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen                                      | y/particle<br>ts                                   | MOISTURE<br>CONDITION   | CONSISTENCY<br>DENSITY | Test Type                                  | Result   | Structure and additional observations   |
|  |   |                       |           | -                                       |   | CL   | TOPSOIL: Sandy CLAY - low plasticity, gre<br>fine grained sand, root affected.  | y-brown,   | M ~ W   |                        |  |  | TOPSOIL   |
| 0T LIB 1.1.G.LB Log NON-CORED BOREHOLE - TEST PIT NEW19P-0143A-AA LOGS DRAFT GPJ < <drawingfile>&gt; 30/112020 15:38 10.0.000 Daggel Lab and In Stu Tool I I IIO I ♥ I S T A</drawingfile> | Not Encountered   | 0.60m<br>U50<br>0.85m |           |   |   | СН   | CLAY - medium to high plasticity, red-brow<br>some fine grained sand.<br>Orange-brown to red-brown.                   |  | M ~ Wp  | VSt<br>H               |  | 300<br>320<br>350<br>500<br>530                        | RESIDUAL SOL  |
| ₽<br>4 L   | EGEND   | <br>:                 |           | Notes, Sa                               | mples a   | nd Test  | S   | Consiste   | ncy   |                        | U  | CS (kPa  | a) Moisture Condition   |
|  | <u>Water</u>  |                       | hown)     | U <sub>50</sub><br>CBR<br>E<br>ASS<br>B | 50mm<br>Bulk s<br>Enviro<br>(Glass<br>Acid S<br>(Plasti<br>Bulk S | Diamel<br>ample fi<br>nmenta<br>jar, sea<br>ulfate S<br>c bag, a | e<br>er tube sample<br>or CBR testing<br>I sample<br>aled and chilled on site)<br>oil Sample<br>ir expelled, chilled) | VS V<br>S S<br>F F<br>St S<br>VSt V<br>H H<br>Fb F | 'ery Soft<br>oft<br>irm<br>atiff<br>'ery Stiff<br>lard<br>iriable |                        | <2<br>25<br>50<br>10<br>20<br>>4           | 25<br>5 - 50<br>0 - 100<br>00 - 200<br>00 - 400<br>400 | D Dry<br>M Moist<br>W Wet<br>W <sub>p</sub> Plastic Limit<br>W <sub>L</sub> Liquid Limit                                    |
| QT LIB 1.1.GLB LI  | Gradational or<br>transitional strata<br>Definitive or distict<br>strata change |                       |           | Field Test<br>PID<br>DCP(x-y)<br>HP     | Photoi<br>Dynan   | nic pene   | n detector reading (ppm)<br>trometer test (test depth interval shown)<br>meter test (UCS kPa)                         | <u>Density</u>                                     | V<br>L<br>D<br>VD   | La<br>D M<br>D         | ery Lo<br>bose<br>lediun<br>ense<br>ery Do | n Dense  | Density Index <15%<br>Density Index 15 - 35%<br>Density Index 35 - 65%<br>Density Index 65 - 85%<br>Density Index 85 - 100% |



**PROJECT:** MEDOWIE GARDENS - STAGE 2

LOCATION: 688 TO 730 MEDOWIE ROAD, MEDOWIE

CLIENT: MCCLOY PROJECT MANAGEMENT PTY LTD

BOREHOLE NO: PAGE:

JOB NO:

DATE:

LOGGED BY:

BH207

1 OF 1 NEW19P-0143A

BB

|        |  | YPE:<br>Ole dian  |           |  | 300 m   |  | OR WITH AUGER SUR DAT  | FACE RL:<br>UM:                    |   |                        | -                          |   |  |
|--------|--|---|-----------|--|---|--|--|------------------------------------|---|------------------------|----------------------------|---|--|
|        | Drill  | ing and Sar   | npling    |  |   |  | Material description and profile information   |                                    |   |                        | Fiel                       | d Test  |  |
| METHOD | WATER  | SAMPLES   | RL<br>(m) | DEPTH<br>(m)   | GRAPHIC<br>LOG  | CLASSIFICATION<br>SYMBOL   | MATERIAL DESCRIPTION: Soil type, plastic<br>characteristics,colour,minor compone   | ity/particle<br>nts                | MOISTURE<br>CONDITION   | CONSISTENCY<br>DENSITY | Test Type                  | Result  | Structure and additiona observations   |
|        |  | 0.20m<br>U50<br>0.50m   |           | -<br>-<br>-<br>0. <u>5</u>   |   | CI   | FILL: CLAY - medium plasticity, brown wit<br>red-brown, with some fine to medium grai  | ned sand.                          | M ~ Wp  |                        | HP                         | 350   | FILL - CONTROLLED  |
|        | Not Encountered  |   |           | -<br>-<br>1. <u>0</u>  |   |  |  |                                    |   |                        | HP                         | 400   |  |
| AD/T   | Not E  |   |           | -<br>-<br>1. <u>5</u><br>-   |   | СН   |  |                                    | M > wp  | VSt                    | HP                         | 300   |  |
|        |  |   |           | 2.0  |   |  | Orange-brown to red-brown.   |                                    |   |                        | HP<br>HP                   | 320<br>500  |  |
|        |  |   |           | -  |   |  | Hole Terminated at 2.10 m  |                                    |   |                        |                            |   |  |
| ►<br>- | e <b>r</b><br>Wat<br>(Dai<br>Wat<br>Wat<br><b>a Ch</b> a | er Level<br>te and time s<br>er Inflow<br>er Outflow<br><u>anges</u><br>radational or | ,         | Notes, Sa<br>U <sub>50</sub><br>CBR<br>E<br>ASS<br>B<br>Field Tes<br>PID | 50mm<br>Bulk s<br>Enviro<br>(Glass<br>Acid S<br>(Plasti<br>Bulk S | i Diame<br>ample f<br>onmenta<br>s jar, se<br>Sulfate S<br>ic bag, a<br>Sample | ts<br>ter tube sample<br>for CBR testing<br>al sample<br>aled and chilled on site)<br>Soil Sample<br>air expelled, chilled)<br>on detector reading (ppm) | S S<br>F F<br>St S<br>VSt N<br>H H | I<br>Pincy<br>Very Soft<br>Soft<br>Firm<br>Stiff<br>Very Stiff<br>Hard<br>Friable<br>V<br>L | Ve                     | <2<br>25<br>50<br>10<br>20 | <b>CS (kPa</b><br>25<br>5 - 50<br>0 - 100<br>00 - 200<br>00 - 400<br>400<br>xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx | ) Moisture Condition<br>D Dry<br>M Moist<br>W Wet<br>W <sub>p</sub> Plastic Limit<br>W <sub>L</sub> Liquid Limit<br>Density Index <15%<br>Density Index 15 - 35% |
|        | <u>a Cha</u><br>G<br>tra<br>D                            | anges   |           | Field Test   | Bulk S<br><u>s</u><br>Photo<br>Dynar                              | Sample<br>ionisationisation  |  | Fb F                               | Friable<br>V  | Lo<br>M<br>De          | ery Lo<br>bose             | oose<br>n Dense   | Density Index 1  |



CLIENT: MCCLOY PROJECT MANAGEMENT PTY LTD

PROJECT: MEDOWIE GARDENS - STAGE 2

LOCATION: 688 TO 730 MEDOWIE ROAD, MEDOWIE

BOREHOLE NO: PAGE: JOB NO: LOGGED BY:

DATE:

NEW19P-0143A BB

16/11/20

**BH208** 

1 OF 1

|  |  | YPE:<br>OLE DIAN  |           |   | EXCA<br>300 m   |  | R WITH AUGER SURI  | FACE RL:<br>JM:                    |   |                        |  |  |  |
|--|--|---|-----------|---|---|--|--|------------------------------------|---|------------------------|--|--|--|
|  | Dril   | ling and San  | npling    |   |   |  | Material description and profile information   |                                    |   |                        | Fiel   | d Test   |  |
| METHOD   | WATER  | SAMPLES   | RL<br>(m) | DEPTH<br>(m)  | GRAPHIC<br>LOG  | CLASSIFICATION<br>SYMBOL   | MATERIAL DESCRIPTION: Soil type, plasticit<br>characteristics,colour,minor componer  |                                    | MOISTURE<br>CONDITION   | CONSISTENCY<br>DENSITY | Test Type  | Result   | Structure and additional observations  |
|  |  |   |           | -   |   | CL   | TOPSOIL: Sandy CLAY - low plasticity, gre<br>fine grained sand, root affected.   | ey-brown,                          | M < W   |                        |  |  | FILL - CONTROLLED  |
| OT LB 1.1G.B. Log NON-CORED BORKHOLE - TEST PTI NEW19P-0143A-ALLOGS DRAFT GPJ < <drawngfile>&gt; 30/11/2020 15:38 10.0000 Datyal Lab and in Stu Tool P I 등 1 T IA 등 页</drawngfile> | Not Encountered  | 1.10m<br>U50<br>1.30m   |           |   |   | СН   | CLAY - medium to high plasticity, red-brow<br>some fine grained sand.  | n, with                            | M < Wp<br>M ~ Wp  | VSt                    |  | 380<br>350<br>370<br>420                         | RESIDUAL SOL   |
| -0143A-AA LOG  |  |   |           | -   |   |  | Hole Terminated at 2.10 m  |                                    |   |                        |  |  |  |
|  | . Wat<br>(Da<br>- Wat<br>■ Wat<br>ata Ch<br>ata Ch<br>tra<br>G | ter Level<br>te and time si<br>ter Inflow<br>ter Outflow<br>anges<br>radational or<br>ansitional stra<br>efinitive or dist<br>rata change | hown)     | Notes, Sa<br>U <sub>50</sub><br>CBR<br>E<br>ASS<br>B<br>Field Test<br>PID<br>DCP(x-y)<br>HP | 50mm<br>Bulk s<br>Enviro<br>(Glass<br>Acid S<br>(Plast<br>Bulk S<br>S<br>Photo<br>Dynar | Diame<br>ample f<br>nmenta<br>g jar, se<br>Gulfate S<br>c bag, a<br>c bag, a<br>c bag, a<br>conisationic pendo | <b>S</b><br>ter tube sample<br>or CBR testing<br>I sample<br>aled and chilled on site)<br>toil Sample<br>air expelled, chilled)<br>an detector reading (ppm)<br>etrometer test (test depth interval shown)<br>meter test (UCS kPa) | S S<br>F F<br>St S<br>VSt V<br>H F | ncy<br>/ery Soft<br>Soft<br>Stiff<br>/ery Stiff<br>lard<br>Friable<br>V<br>L<br>ME<br>D | Vi<br>La<br>D M        | 25<br>25<br>50<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20 | 5 - 50<br>0 - 100<br>00 - 200<br>00 - 400<br>400 | D     Dry       M     Moist       W     Wet       Wp     Plastic Limit       WL     Liquid Limit       Density Index <15%       Density Index 15 - 35% |



#### **ENGINEERING LOG - BOREHOLE**

CLIENT: MCCLOY PROJECT MANAGEMENT PTY LTD BOREHOLE NO: PAGE:

BH209

1 OF 1

NEW19P-0143A

LOCATION: 688 TO 730 MEDOWIE ROAD, MEDOWIE

**PROJECT:** MEDOWIE GARDENS - STAGE 2 JOB NO:

LOGGED BY:

DATE:

BB 16/11/20

|            | Drill                               | ing and Sam  | pling     |   |   |  | Material description and profile information   |                          |   |                        | Fiel                       | d Test   |   |
|------------|-------------------------------------|--|-----------|---|---|--|--|--------------------------|---|------------------------|----------------------------|--|---|
| MEIHOU     | WATER                               | SAMPLES  | RL<br>(m) | DEPTH<br>(m)  | GRAPHIC<br>LOG  | CLASSIFICATION<br>SYMBOL   | MATERIAL DESCRIPTION: Soil type, plastic<br>characteristics,colour,minor compone                                       | ity/particle<br>nts      | MOISTURE<br>CONDITION   | CONSISTENCY<br>DENSITY | Test Type                  | Result   | Structure and additiona<br>observations                   |
|            |                                     | <u>0.15m</u><br>U50<br><u>0.50m</u>  |           | -<br>-<br>0.5_  |   | CI   | FILL: Sandy CLAY - medium plasticity, br<br>brown, fine grained sand.  |                          | M > Wp  | VSt                    | HP                         | 300  | FILL - CONTROLLED   |
| AU/I       | Not Encountered                     |  |           | -<br>-<br>1.0   |   |  |  |                          |   |                        | HP                         | 410<br>390   |   |
|            |                                     |  |           | -<br>-<br>1. <u>5</u><br>-                                    |   | СН   |  |                          | $M \sim W_P$  | VSt -<br>H             | HP                         | 380  |   |
|            |                                     |  |           | <br>2.0   |   |  | Orange-brown to red-brown.   |                          |   |                        | HP                         | 430  |   |
|            | END                                 |  |           | -<br>-  | mplace  | nd Too   | Hole Terminated at 2.10 m  | Coppie                   |   |                        |                            | CS (PB-  | a) Mojeturo Condition                                     |
| <u>Nat</u> | Wat<br>(Dat<br>Wat<br>Wat<br>ta Cha | er Level<br>te and time sh<br>er Inflow<br>er Outflow<br>anges<br>radational or<br>ansitional stra | iown)     | Notes, Sai<br>U₅<br>CBR<br>E<br>ASS<br>B<br>Field Test<br>PID | 50mm<br>Bulk s<br>Enviro<br>(Glass<br>Acid S<br>(Plasti<br>Bulk S | Diame<br>ample f<br>nmenta<br>jar, se<br>culfate \$<br>c bag,<br>ample | ter tube sample<br>for CBR testing<br>al sample<br>valed and chilled on site)<br>Soil Sample<br>air expelled, chilled) | S<br>F<br>St<br>VSt<br>H | very Soft<br>Soft<br>Firm<br>Stiff<br>Very Stiff<br>Hard<br>Friable<br>V<br>L | V                      | <2<br>25<br>50<br>10<br>20 | CS (kPa<br>25<br>5 - 50<br>0 - 100<br>00 - 200<br>00 - 400<br>400<br>posse | D Dry<br>M Moist<br>W Wet<br>W <sub>p</sub> Plastic Limit |



CLIENT: MCCLOY PROJECT MANAGEMENT PTY LTD

PROJECT: MEDOWIE GARDENS - STAGE 2

LOCATION: 688 TO 730 MEDOWIE ROAD, MEDOWIE

BOREHOLE NO: PAGE: JOB NO: LOGGED BY: DATE: **BH210** 1 OF 1

NEW19P-0143A

BB 16/11/20

|  |  | TYPE:<br>OLE DIAM   |           |  | EXCA<br>300 m   |   | R WITH AUGER SURI  | FACE RL:<br>JM:                    |  |                        |  |                           |  |
|--|--|---|-----------|--|---|---|--|------------------------------------|--|------------------------|--|---------------------------|--|
|  | Dril                                       | ling and Sam  | pling     |  |   |   | Material description and profile information   |                                    |  |                        | Fiel   | d Test                    |  |
| METHOD   | WATER                                      | SAMPLES   | RL<br>(m) | DEPTH<br>(m)   | GRAPHIC<br>LOG  | CLASSIFICATION<br>SYMBOL  | MATERIAL DESCRIPTION: Soil type, plasticit<br>characteristics,colour,minor componen  |                                    | MOISTURE<br>CONDITION  | CONSISTENCY<br>DENSITY | Test Type  | Result                    | Structure and additional observations  |
| 0GS DRAFT.GFU < <drawingfile>&gt; 30/11/2020 15:38 10:0:000 Datget Lab and In Situ Tool<br/>AD/T</drawingfile> | Not Encountered                            | 0.70m<br>U50<br>0.90m   |           |  |   | CH  | 0.05m       FILL: SAND - fine to medium grained, dark         CLAY - medium to high plasticity, red-brow         some fine grained sand.   |                                    | M ~ W M  | VSt                    | HP<br>HP<br>HP   | 300<br>350<br>500<br>>600 | FILL - STOCKPILE<br>RESIDUAL SOIL  |
|  | <br>(Da<br>Wa<br>■<br><br><br><br><br><br> | ter Level<br>te and time sh<br>ter Inflow<br>ter Outflow<br><b>anges</b><br>rradational or<br>ansitional stra<br>efinitive or dis<br>rrata change | ta        | -<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- | 50mm<br>Bulk s<br>Enviro<br>(Glass<br>Acid S<br>(Plasti<br>Bulk S<br>S<br>Photoi<br>Dynan | Diame<br>ample f<br>nmenta<br>jar, se<br>ulfate S<br>c bag, a<br>ample<br>onisationic pen | <b>§</b><br>ter tube sample<br>or CBR testing<br>I sample<br>aled and chilled on site)<br>toil Sample<br>air expelled, chilled)<br>an detector reading (ppm)<br>etrometer test (test depth interval shown)<br>meter test (UCS kPa) | S S<br>F F<br>St S<br>VSt V<br>H F | Pincy<br>Very Soft<br>Soft<br>Firm<br>Stiff<br>Very Stiff<br>Hard<br>Friable<br>V<br>L<br>ME<br>D<br>V<br>VD | Vi<br>La<br>D<br>D     | 25<br>25<br>50<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20 | n Dense                   | D     Dry       M     Moist       W     Wet       Wp     Plastic Limit       WL     Liquid Limit       Density Index <15%       Density Index 15 - 35% |



CLIENT: MCCLOY PROJECT MANAGEMENT PTY LTD

**PROJECT:** MEDOWIE GARDENS - STAGE 2

LOCATION: 688 TO 730 MEDOWIE ROAD, MEDOWIE

BOREHOLE NO: PAGE: JOB NO: LOGGED BY: DATE:

BH211 1 OF 1 NEW19P-0143A

16/11/20

BB

|   |   | TYPE:<br>Ole diam  |           |  | EXCA<br>300 m  |  | R WITH AUGER SURI   | FACE RL:<br>JM:                    |   |                        |                            |  |  |
|---|---|--|-----------|--|--|--|---|------------------------------------|---|------------------------|----------------------------|--|--|
|   | Dri   | ling and San   | npling    |  |  |  | Material description and profile information  |                                    |   |                        | Fiel                       | d Test   |  |
| METHOD  | WATER   | SAMPLES  | RL<br>(m) | DEPTH<br>(m)   | GRAPHIC<br>LOG   | CLASSIFICATION<br>SYMBOL                           | MATERIAL DESCRIPTION: Soil type, plasticit<br>characteristics,colour,minor componen   | y/particle<br>ts                   | MOISTURE<br>CONDITION   | CONSISTENCY<br>DENSITY | Test Type                  | Result   | Structure and additional observations  |
|   |   |  |           | -  |  | CL   | TOPSOIL: Sandy CLAY - low plasticity, gre<br>fine grained sand, root affected.  | ey-brown,                          | M ~ W   |                        |                            |  | TOPSOIL  |
|   |   |  |           | -  |  | CL   | <sup>0.20m</sup> Sandy CLAY - low to medium plasticity, pa<br>fine grained sand.  | <br>le brown,                      |   |                        | HP                         | 230  |  |
|   |   | <u>0.60m</u><br>U50  |           | 0. <u>5</u><br>-   |  |  | <sup>0.50m</sup> Sandy CLAY - medium plasticity, pale oran<br>and red-brown, fine grained sand.                               | <br>ige-brown                      |   |                        | HP                         | 300  | RESIDUAL SOIL  |
| itu Tool<br>AD/T  | Not Encountered                                   | <u>0.80m</u>   |           | -<br>-<br>1. <u>0</u><br>-   |  | C  |   |                                    | M > W <sub>P</sub>  | VSt                    | HP                         | 350  |  |
| File>> 30/11/2020 15:38 10.0.000 Datgel Lab and In Stu Tool |   |  |           | -<br>-<br>1.5_   |  | CI   |   |                                    |   |                        | HP                         | 320<br>450   |  |
| < <drawingfile>&gt; 30/11/2020 15:</drawingfile>            |   |  |           | -  |  | — — -  | 1.80m<br>Sandy CLAY - medium to high plasticity, re<br>and orange-brown, fine grained sand.                                   |                                    | M ~ w <sub>P</sub>  | н                      | HP                         | 500  |  |
| LOGS DRAFT.GPJ  |   |  |           | 2.0  |  |  | 2.00m<br>Hole Terminated at 2.00 m  |                                    |   |                        |                            |  |  |
| TEST PIT NEW19P-0143A-A                                     |   |  |           | -  |  |  |   |                                    |   |                        |                            |  |  |
|   | -<br>(Da<br>– Wa<br><b>⊲</b> Wa<br><b>rata Ch</b> |  | hown)     | Notes, Sa<br>U <sub>50</sub><br>CBR<br>E<br>ASS<br>B<br>Field Test | 50mm<br>Bulk s<br>Enviro<br>(Glass<br>Acid S<br>(Plast<br>Bulk S | Diame<br>ample f<br>nmenta<br>jar, se<br>sulfate S | <u>s</u><br>er tube sample<br>or CBR testing<br>I sample<br>aled and chilled on site)<br>ioil Sample<br>ir expelled, chilled) | S S<br>F F<br>St S<br>VSt V<br>H F | I<br>/ery Soft<br>Soft<br>Firm<br>Stiff<br>/ery Stiff<br>lard<br>Friable<br>V |                        | <2<br>25<br>50<br>10<br>20 | <b>CS (kPa</b><br>25<br>5 - 50<br>0 - 100<br>00 - 200<br>00 - 400<br>400 | Moisture Condition           D         Dry           M         Moist           W         Wet           Wp.         Plastic Limit           WL         Liquid Limit |
| QT LIB 1.1.GLB  | tr<br>D   | radational or<br>ansitional stra<br>efinitive or dis<br>trata change |           | PID<br>DCP(x-y)<br>HP  | Photo<br>Dynar   | nic pene   | n detector reading (ppm)<br>etrometer test (test depth interval shown)<br>meter test (UCS kPa)                                |                                    | L<br>ME<br>D<br>VD  | Lo<br>D M<br>D         | oose                       | n Dense  | Density Index 15 - 35%   |



CLIENT: MCCLOY PROJECT MANAGEMENT PTY LTD

**PROJECT:** MEDOWIE GARDENS - STAGE 2

LOCATION: 688 TO 730 MEDOWIE ROAD, MEDOWIE

BOREHOLE NO: PAGE: JOB NO: LOGGED BY: DATE:

BH212 1 OF 1 NEW19P-0143A BB

|   |                             | YPE:<br>OLE DIAN  |           |                                     | EXCA<br>300 m  |  | R WITH AUGER SURI   | FACE RL:<br>JM:                    |   |                        |   |  |   |
|---|-----------------------------|---|-----------|-------------------------------------|--|--|---|------------------------------------|---|------------------------|---|--|---|
|   | Drill                       | ing and San   | npling    |                                     |  |  | Material description and profile information  |                                    |   |                        | Fiel                                      | d Test   |   |
| METHOD  | WATER                       | SAMPLES   | RL<br>(m) | DEPTH<br>(m)                        | GRAPHIC<br>LOG   | CLASSIFICATION<br>SYMBOL                                 | MATERIAL DESCRIPTION: Soil type, plasticit<br>characteristics,colour,minor componer   |                                    | MOISTURE<br>CONDITION   | CONSISTENCY<br>DENSITY | Test Type                                 | Result   | Structure and additional observations   |
|   |                             |   |           | -                                   |  | CL   | TOPSOIL: Sandy CLAY - low plasticity, Igre<br>fine grained sand, root affected.   | ey-brown,                          |   |                        |   |  | TOPSOIL   |
|   |                             |   |           | -                                   |  | <br>CI   | 0.20m<br>CLAY - medium plasticity, pale brown trace<br>red-brown, with some fine grained sand.                                  |                                    | ~ Wp  |                        | HP  | 320  | COLLUVIUM   |
|   |                             |   |           | 0.5                                 |  |  | Sandy CLAY - medium to high plasticity, re<br>and pale orange-brown, fine grained sand.   | <br>d-brown                        | 2   | VSt                    |   |  | RESIDUAL SOIL   |
|   | tered                       | 0.90m   |           | -                                   |  |  | 0.80m<br>CLAY - medium to high plasticity, red-brow<br>orange-brown, with some fine grained same                                |                                    |   |                        | HP  | 350  |   |
| Stu Tool<br>AD/T  | Not Encountered             | U50<br>1.10m  |           | 1.0                                 |  |  |   |                                    |   |                        | HP  | 500  |   |
| :38 10.0.000 Datgel Lab and In  |                             |   |           | -<br>-<br>1.5_                      |  | СН   |   |                                    | M < w <sub>P</sub>  | н                      | HP  | 550  |   |
| 01 LIB LI3 LIB Log NON-CORED BOREHOLE - TEST PIT NEW19P-0143A-AA LOGS DRAFT GPJ < <drawingfile>&gt; 30/112020 15:38 10.0.000 Datgel Lab and in Stu Tool</drawingfile> |                             |   |           |                                     |  |  |   |                                    |   |                        | HP  | 580  |   |
| 3A-AA LOGS DRAFT.   |                             |   |           | 2.0                                 |  |  | Hole Terminated at 2.00 m   |                                    |   |                        |   |  |   |
| TEST PIT NEW19P-014   |                             |   |           | -                                   |  |  |   |                                    |   |                        |   |  |   |
| 9 NON-CORED BOREHOLE -  | <br>:<br>(Dat<br>Wat<br>Wat | er Level<br>e and time sl<br>er Inflow<br>er Outflow<br>anges       | nown)     | Notes, Sa<br>U₅₀<br>CBR<br>E<br>ASS | 50mm<br>Bulk s<br>Enviro<br>(Glass<br>Acid S<br>(Plast | i Diame<br>ample f<br>onmenta<br>s jar, sea<br>Sulfate S | <u>s</u><br>ter tube sample<br>or CBR testing<br>I sample<br>aled and chilled on site)<br>ioil Sample<br>air expelled, chilled) | S S<br>F F<br>St S<br>VSt V<br>H F | /ery Soft<br>Soft<br>Firm<br>Stiff<br>/ery Stiff<br>lard<br>Friable |                        | <2<br>2<br>50<br>10<br>20                 | <b>CS (kPa</b><br>25<br>5 - 50<br>5 - 100<br>00 - 200<br>00 - 200<br>00 - 400<br>400 | D Dry<br>M Moist<br>W Wet<br>W <sub>p</sub> Plastic Limit   |
| QT LIB 1.1.GLB Log  | <br>Gi<br>tra               | radational or<br>ansitional stra<br>efinitive or dis<br>rata change | ita       | Field Test<br>PID<br>DCP(x-y)<br>HP | <u>:s</u><br>Photo<br>Dynar                            | ionisatio  | n detector reading (ppm)<br>etrometer test (test depth interval shown)<br>meter test (UCS kPa)                                  | <u>Density</u>                     | V<br>L<br>ME<br>D<br>VD   | Lo<br>M<br>D           | ery Lo<br>bose<br>lediun<br>ense<br>ery D | n Dense  | Density Index <15%<br>Density Index 15 - 35%<br>Density Index 35 - 65%<br>Density Index 65 - 85%<br>Density Index 65 - 100% |

# **APPENDIX B:**

**Results of Laboratory Testing** 



| rin  |   |   |                                 | 51/1/1     |           |                                 |  |                                |  |   |  |
|--|---|---|---------------------------------|------------|-----------|---------------------------------|--|--------------------------------|--|---|--|
| nt:  | McC<br>PO   | Cloy Project<br>Box 2214<br>gar NSW 2               | Manageme                        | -          | •         |                                 | N  | $\wedge$                       | Accredited for complian<br>The results of the tests<br>his document are trace<br>Results provided relate<br>This report shall not be | a, calibrations and/or r<br>eable to Australian/na<br>e only to the items tes | measurements inclue<br>ational standards.<br>ted or sampled. |
| ect No<br>ect Na                                     |   | V19P-0143A<br>bosed Subdi                           |                                 | e Gardens, | Stage 2   |                                 |  | RECOGNISED                     | Approved Signate<br>Senior Geotechr<br>NATA Accredited<br>Date of Issue: 30  | nician)<br>I Laboratory Nur   |  |
| n <b>ple</b><br>ple ID:                              | Details   |   | 0.000                           |            |           | Complin                         | a Mathadu  | 0 1                            | . En súa e súa   | Denset  | -4   |
| rial:  |   | EW20W-392<br>andy CLAY                              | 3803                            |            |           | Date Sa                         | g Method:  | Sampled by                     | -  | g Departmei   | nt   |
| ce:  |   | n-Site  |                                 |            |           | Date Sul                        | •  | 18/11/2020                     |  |   |  |
| ce.<br>ificatio                                      |   | o Specificatio                                      | n                               |            |           | 2410 041                        |  |                                |  |   |  |
|  |   | 88 - 730 Med  |                                 | Medowie    |           |                                 |  |                                |  |   |  |
|  |   | H202 - 0.50 t                                       |                                 |            |           |                                 |  |                                |  |   |  |
| Teste  | <b>d:</b> 2   | 4/11/2020   |                                 |            |           |                                 |  |                                |  |   |  |
| ell Te   | st  |   |                                 | AS 12      | 89.7.1.1  | Shrink                          | Test   |                                |  | ۵S  | 1289.7.  |
|  | aturation   | (%):  | -0                              |            | 00.7.1.1  |                                 | on drying (  | <b>%):</b>                     | 2.7  |   | 1200.7.  |
| I on Sa  | acaración   |   | 0                               |            |           |                                 | , a. j   | -                              |  |   |  |
|  | ontent be   |   | 17                              | ′ 1        |           | Shrinka                         | ae Moistur   | e Content                      | (%): 19.9  |   |  |
| ture C   | ontent be   | fore (%):   |                                 | '.1<br>? 7 |           |                                 | ge Moistur<br>rt material (                            |                                |  |   |  |
| ture C<br>ture C                                     | ontent af   | fore (%):<br>ter (%):                               | 22                              | 2.7        |           | Est. ine                        | rt material  | (%):                           | 5%   |   |  |
| ture C<br>ture C<br>Unc. C                           | ontent aft<br>comp. Stre  | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  |           | Est. iner<br>Crumbli            | rt material  | (%):<br>shrinkage              | 5%   | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C                 | ontent aff<br>comp. Stre<br>comp. Stre  | fore (%):<br>ter (%):                               | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  |           | Est. iner<br>Crumbli            | rt material  | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C                           | ontent aff<br>comp. Stre<br>comp. Stre  | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C                 | ontent aff<br>comp. Stre<br>comp. Stre  | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material  | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C                 | ontent aff<br>comp. Stre<br>comp. Stre<br>comp. Stre  | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C                 | ontent aff<br>comp. Stre<br>comp. Stre  | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br><b>ink S</b> | ontent aff<br>comp. Stre<br>comp. Stre<br>comp. Stre  | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br><b>ink S</b> | tontent aff<br>comp. Stre<br>comp. Stre | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br><b>ink S</b> | ontent aff<br>comp. Stre<br>comp. Stre<br>comp. Stre  | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br><b>ink S</b> | tontent aff<br>comp. Stre<br>comp. Stre | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br>Ms3 (%) IIa/ | 10.0         -         -           5.0         -         -  | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br>Ms3 (%) IIa/ | tontent aff<br>comp. Stre<br>comp. Stre | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br>Ms3 (%) IIa/ | 10.0         -         -           5.0         -         -  | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br>Ms3 (%) IIa/ | intent aff         comp. Stress         comp. Stress         intent aff         intent aff      <   | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br>Ms3 (%) IIa/ | 10.0         -         -           5.0         -         -  | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  | ·····  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br>Ms3 (%) IIa/ | intent aff         comp. Stress         comp. Stress         intent aff         intent aff      <   | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br><b>ink S</b> | intent aff         comp. Stress         comp. Stress         intent aff         intent aff      <   | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br>Ms3 (%) IIa/ | intent aff         comp. Stress         comp. Stress         intent aff         intent aff      <   | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  |  |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br>Ms3 (%) IIa/ | intent aff         comp. Stress         comp. Stress         intent aff         intent aff      <   | fore (%):<br>ter (%):<br>ength befor                | 22<br><b>re (kPa):</b> 37       | 2.7<br>70  | Shrinkage | Est. iner<br>Crumbli<br>Crackin | rt material<br>ing during s<br>g during st             | (%):<br>shrinkage              | 5%<br>: Nil  | rate  | 50.0   |
| ture C<br>ture C<br>Unc. C<br>Unc. C<br>Ms3 (%) IIa/ | 10.0  | fore (%):<br>ter (%):<br>ength befor<br>ength after | 22<br>re (kPa): 37<br>(kPa): 15 | 2.7        | 20.0      | Est. ine<br>Crumbli<br>Crackin  | rt material (<br>ing during s<br>g during sh<br>Sw ell | (%):<br>shrinkage<br>irinkage: | 5%<br>Nil<br>Mode  |   | 50.0   |

#### Comments



|   | k Sw   | ••••••                                 |                                |                   |           |                                |  |                                |  |   |  |
|---|--|--|--------------------------------|-------------------|-----------|--------------------------------|--|--------------------------------|--|---|--|
| lient:  | PO E   | loy Project l<br>3ox 2214<br>gar NSW 2 | -                              | ent Pty Ltd       |           |                                | N  |                                | this document are trac<br>Results provided relat | ance with ISO/IEC 170<br>ts, calibrations and/or<br>ceable to Australian/na<br>te only to the items tes<br>be reproduced except i | ational standards.<br>sted or sampled. |
| roject No<br>roject Na  |  | /19P-0143A<br>osed Subdi               |                                | e Gardens         | , Stage 2 |                                |  | RECOGNISED<br>EDITATION        | (Senior Geotech                                  | d Laboratory Nu   |  |
|   | Details  |  |                                |                   |           |                                |  |                                |  |   |  |
| mple ID:  |  | EW20W-3923                             | 3S04                           |                   |           | -                              | g Method:  | -                              |  | ng Departme   | nt                                     |
| aterial:  |  | andy CLAY                              |                                |                   |           | Date Sa                        | -  | 16/11/2020                     |  |   |  |
| ource:  |  | n-Site                                 |                                |                   |           | Date Sul                       | bmitted:   | 18/11/2020                     | )  |   |  |
| ecificatio  |  | o Specificatio<br>38 - 730 Mede        |                                | Modowia           |           |                                |  |                                |  |   |  |
| •   |  | 4203 - 0.05 ti                         | -                              | wedowie           |           |                                |  |                                |  |   |  |
| te Teste  |  | 1/11/2020                              | 0.2011                         |                   |           |                                |  |                                |  |   |  |
|   | ontent be  |  |                                | 7.7               |           | 11                             | ge Moistur   |                                |  |   |  |
| bisture C<br>bisture C<br>t. Unc. C<br>t. Unc. C                  | ontent aft<br>comp. Stre<br>comp. Stre   |  | 21<br><b>e (kPa):</b> >6       | 1.6               | Shrinkaq  | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   |  |
| oisture C<br>oisture C<br>st. Unc. C                              | ontent aft<br>comp. Stre<br>comp. Stre   | er (%):<br>ength befor                 | 21<br><b>e (kPa):</b> >6       | 1.6<br>600<br>600 | Shrinkag  | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during                          | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   |  |
| bisture C<br>bisture C<br>bit. Unc. C<br>bit. Unc. C              | ontent aft<br>comp. Stre<br>comp. Stre   | er (%):<br>ength befor                 | 21<br><b>e (kPa):</b> >6       | 1.6<br>600<br>600 | Shrinkag  | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   | · · · · · · · · · · · · · · · · · · ·  |
| bisture C<br>bisture C<br>bit. Unc. C<br>bit. Unc. C<br>hrink S   | ontent aft<br>comp. Stre<br>comp. Stre   | er (%):<br>ength befor                 | 21<br><b>e (kPa):</b> >6       | 1.6<br>600<br>600 | Shrinkag  | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   | · · · · · · · · · · · · · · · · · · ·  |
| bisture C<br>bisture C<br>bit. Unc. C<br>bit. Unc. C<br>hrink S   | ontent aft<br>comp. Stre<br>comp. Stre   | er (%):<br>ength befor                 | 21<br><b>e (kPa):</b> >6       | 1.6<br>600<br>600 | Shrinkag  | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   |  |
| bisture Co<br>bisture Co<br>bit. Unc. C<br>bit. Unc. C<br>hrink S | ontent aft<br>comp. Stre<br>comp. Stre   | er (%):<br>ength befor                 | 21<br><b>e (kPa):</b> >6       | 1.6<br>600<br>600 | Shrinkag  | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   | · · · · · · · · · · · · · · · · · · ·  |
| bisture Co<br>bisture Co<br>bit. Unc. C<br>bit. Unc. C<br>hrink S | ontent aft<br>comp. Stre<br>comp. Stre<br>comp. Stre   | er (%):<br>ength befor                 | 21<br><b>e (kPa):</b> >6       | 1.6<br>600<br>600 | Shrinkag  | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   |  |
| bisture Co<br>bisture Co<br>bit. Unc. C<br>bit. Unc. C<br>hrink S | ontent aft<br>comp. Stre<br>comp. Stre   | er (%):<br>ength befor                 | 21<br><b>e (kPa):</b> >6       | 1.6<br>600<br>600 | Shrinkag  | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   |  |
| bisture Co<br>bisture Co<br>bit. Unc. C<br>bit. Unc. C<br>hrink S | ontent aft<br>comp. Stre<br>comp. Stre<br>comp. Stre   | er (%):<br>ength befor                 | 21<br><b>e (kPa):</b> >6       | 1.6<br>600<br>600 | Shrinkag  | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   |  |
| bisture Co<br>bisture Co<br>bit. Unc. C<br>bit. Unc. C<br>hrink S | ontent aft<br>comp. Stre<br>comp. Stre<br>comp. Stre   | er (%):<br>ength befor                 | 21<br><b>e (kPa):</b> >6       | 1.6<br>600<br>600 | Shrinkag  | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   |  |
| bisture C<br>bisture C<br>bit. Unc. C<br>bit. Unc. C<br>hrink S   | ontent aft<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. comp.<br>comp. comp.<br>comp.<br>comp. comp.<br>comp.<br>comp. comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.                    | er (%):<br>ength befor                 | 21<br><b>e (kPa):</b> >6       | 1.6<br>600<br>600 | Shrinkag  | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   |  |
| bisture Co<br>bisture Co<br>bit. Unc. C<br>bit. Unc. C<br>hrink S | ontent aft<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. comp.<br>comp. comp.<br>comp.<br>comp. comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp. | er (%):<br>ength befor                 | 21<br><b>e (kPa):</b> >6       | 1.6<br>600<br>600 | Shrinkag  | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   |  |
| bisture Co<br>bisture Co<br>bit. Unc. C<br>bit. Unc. C<br>hrink S | intent aft         comp. Stree         comp. Stree         intent aft         intent aft <tr< td=""><td>er (%):<br/>ength befor<br/>ength after</td><td>21<br/>e (kPa): &gt;6<br/>(kPa): &gt;6</td><td></td><td></td><td>Est. ine<br/>Crumbli<br/>Crackin</td><td>rt material<br/>ing during<br/>g during sl<br/>Sw ell</td><td>(%):<br/>shrinkage<br/>hrinkage:</td><td>≥: Nil<br/>Minin</td><td></td><td></td></tr<>   | er (%):<br>ength befor<br>ength after  | 21<br>e (kPa): >6<br>(kPa): >6 |                   |           | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl<br>Sw ell | (%):<br>shrinkage<br>hrinkage: | ≥: Nil<br>Minin                                  |   |  |
| bisture Co<br>bisture Co<br>bit. Unc. C<br>bit. Unc. C<br>hrink S | ontent aft<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. comp.<br>comp. comp.<br>comp.<br>comp. comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp.<br>comp. | er (%):<br>ength befor                 | 21<br><b>e (kPa):</b> >6       | 1.6<br>600<br>600 | 20.0      | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl<br>Sw ell | (%):<br>shrinkage              | 3%<br>e: Nil                                     | num   | 50.0                                   |

#### Comments



| hrin   |   |                                      |                                 |            |           |                                  |   |                                |  |   |  |
|--|---|--------------------------------------|---------------------------------|------------|-----------|----------------------------------|---|--------------------------------|--|---|--|
| lient:   | PO E  | loy Project<br>Box 2214<br>gar NSW 2 | Manageme<br>2309                | nt Pty Ltd |           |                                  | N   |                                | this document are trac<br>Results provided relat | ance with ISO/IEC 170<br>s, calibrations and/or i<br>ceable to Australian/nz<br>te only to the items tes<br>e reproduced except i | ational standards.<br>sted or sampled. |
| roject No<br>roject Na                           |   | /19P-0143/<br>osed Subd              | A<br>ivision - The              | e Gardens  | , Stage 2 |                                  |   | RECOGNISED<br>EDITATION        | (Senior Geotech                                  | d Laboratory Nur  |  |
|  | Details   |                                      |                                 |            |           |                                  |   |                                |  |   |  |
| ample ID:  | : N   | EW20W-392                            | 3S05                            |            |           |                                  | g Method:   | Sampled b                      | y Engineerin                                     | ig Departme   | nt                                     |
| aterial:   | Sa  | andy CLAY                            |                                 |            |           | Date Sar                         | -   | 16/11/2020                     | )  |   |  |
| ource:   |   | n-Site                               |                                 |            |           | Date Sul                         | bmitted:  | 18/11/2020                     | )  |   |  |
| -  | cation: 68<br>cation: BI  |                                      | lowie Road, I                   | Vedowie    |           |                                  |   |                                |  |   |  |
| oisture C<br>oisture C                           | content be  |                                      |                                 | ).8<br>5.5 |           | Shrinka<br>Est. ine              | -   |                                | 5%   |   |  |
| oisture C<br>st. Unc. C<br>st. Unc. C            | Content aft<br>Comp. Stre<br>Comp. Stre   | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 |           | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s           | (%):<br>shrinkage              | 5%<br>e: Nil                                     | erate   |  |
| oisture C<br>st. Unc. C                          | Content aft<br>Comp. Stre<br>Comp. Stre   | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | Shrinkag  | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during                         | (%):<br>shrinkage              | 5%<br>e: Nil                                     | erate   |  |
| oisture C<br>st. Unc. C<br>st. Unc. C            | Content aft<br>Comp. Stre<br>Comp. Stre   | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | Shrinkag  | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s           | (%):<br>shrinkage              | 5%<br>e: Nil                                     | erate   |  |
| oisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S | Content aft<br>Comp. Stre<br>Comp. Stre   | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | Shrinkag  | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s           | (%):<br>shrinkage              | 5%<br>e: Nil                                     |   |  |
| oisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S | Content aft<br>Comp. Stre<br>Comp. Stre   | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | Shrinkag  | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s           | (%):<br>shrinkage              | 5%<br>e: Nil                                     | erate   | · · · · · · · · · · · · · · · · · · ·  |
| oisture C<br>st. Unc. C<br>st. Unc. C            | Content aft<br>Comp. Stre<br>Comp. Stre<br>Swell  | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | Shrinkag  | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s           | (%):<br>shrinkage              | 5%<br>e: Nil                                     |   | · · · · · · · · · · · · · · · · · · ·  |
| oisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S | Content aft<br>Comp. Stre<br>Comp. Stre<br>Swell  | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | Shrinkag  | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s           | (%):<br>shrinkage              | 5%<br>e: Nil                                     | erate   |  |
| oisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S | Content aft<br>Comp. Stre<br>Comp. Stre<br>Swell  | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | Shrinkag  | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s           | (%):<br>shrinkage              | 5%<br>e: Nil                                     |   | · · · · · · · · · · · · · · · · · · ·  |
| oisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S | Content aft<br>Comp. Stre<br>Comp. Stre<br>Swell  | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | Shrinkag  | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s           | (%):<br>shrinkage              | 5%<br>e: Nil                                     |   |  |
| oisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S | Content aft<br>Comp. Stre<br>Comp. Stre<br>Swell  | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | Shrinkag  | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s           | (%):<br>shrinkage              | 5%<br>e: Nil                                     |   |  |
| oisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S | Content aft<br>Comp. Stre<br>Comp. Stre<br>Swell  | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | Shrinkag  | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s           | (%):<br>shrinkage              | 5%<br>e: Nil                                     |   |  |
| oisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S | Content aft<br>Comp. Stre<br>Comp. Stre<br>Swell  | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | Shrinkag  | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s           | (%):<br>shrinkage              | 5%<br>e: Nil                                     |   |  |
| oisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S | Content aft<br>Comp. Stre<br>Comp. Stre<br>Swell<br>10.0  | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | Shrinkag  | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s           | (%):<br>shrinkage              | 5%<br>e: Nil                                     | erate   |  |
| oisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S | Content aft<br>Comp. Stre<br>Comp. Stre<br>Comp. Stre<br>Swell<br>10.0<br>-5.0<br>-5.0<br>-10.0 | er (%):<br>ngth befor<br>ngth after  | 25<br>re (kPa): >6<br>(kPa): 46 | 5.5        |           | e Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s<br>Sw ell | (%):<br>shrinkage<br>nrinkage: | 5%<br>Nil<br>Mode                                |   | 50.0                                   |
| oisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S | Content aft<br>Comp. Stre<br>Comp. Stre<br>Swell<br>10.0  | er (%):<br>ngth befor                | 25<br>re (kPa): >6              | 5.5<br>600 | 20.0      | Est. iner<br>Crumbli<br>Crackin  | rt material<br>ing during<br>g during s<br>Sw ell | (%):<br>shrinkage              | 5%<br>e: Nil                                     | erate   | 50.0                                   |

#### Comments



| Shrin  |  |   |                                      |                 |           |                                |   |                                |  |   |  |
|--|--|---|--------------------------------------|-----------------|-----------|--------------------------------|---|--------------------------------|--|---|--|
| Client:  | PO I   | loy Project I<br>3ox 2214<br>gar NSW 2                | C C                                  | nt Pty Ltd      |           |                                | Ň   |                                | Accredited for complia<br>The results of the tests<br>this document are trace<br>Results provided relate<br>This report shall not be | s, calibrations and/or r<br>eable to Australian/na<br>e only to the items tes | measurements included<br>ational standards.<br>ted or sampled. |
| Project No<br>Project Na   |  | /19P-0143A<br>losed Subdi                             | -                                    | e Gardens,      | , Stage 2 |                                |   | RECOGNISED                     | Approved Signat<br>(Senior Geotechi<br>NATA Accredited<br>Date of Issue: 30  | nician)<br>d Laboratory Nur   |  |
| ample  |  |   |                                      |                 |           |                                |   |                                |  |   |  |
| ample ID:  |  | EW20W-3923  | 3S07                                 |                 |           |                                |   |                                | y Engineerin   | g Departmei   | nt   |
| aterial:   |  | andy CLAY   |                                      |                 |           | Date Sa                        | -   | 16/11/2020                     |  |   |  |
| ource:   | -  | n-Site  |                                      |                 |           | Date Su                        | bmitted:  | 18/11/2020                     | )  |   |  |
| pecificatio  |  | o Specificatio<br>38 - 730 Medo                       |                                      | Andowio         |           |                                |   |                                |  |   |  |
| •  |  | H205 - 0.30 ted                                       | -                                    | viedowie        |           |                                |   |                                |  |   |  |
| ate Teste  | -  | 4/11/2020   | 0.0011                               |                 |           |                                |   |                                |  |   |  |
| well Te  | st   |   |                                      | AS 12           | 89.7.1.1  | Shrinl                         | k Test  |                                |  | AS  | 1289.7.1   |
|  | aturation  | (%):  | -0                                   |                 | ••••••    |                                | on drying (                                       | (%):                           | 3.9  |   |  |
| well off 3d  | aturation  | ( /0).  |                                      |                 |           |                                |   |                                |  |   |  |
| loisture C   |  |   |                                      | 2.8             |           | Shrinka                        | ge Moistu   | re Content                     | <b>t (%):</b> 20.8   |   |  |
| loisture C<br>loisture C   | ontent be<br>ontent aft  | fore (%):<br>er (%):                                  | 22<br>24                             | .5              |           | Est. ine                       | rt material                                       | (%):                           | 3%   |   |  |
| loisture Co<br>loisture Co<br>st. Unc. C                         | ontent be<br>ontent aft<br>omp. Stre   | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       |           | Est. ine<br>Crumbli            | rt material<br>ing during                         | (%):<br>shrinkage              | 3%<br>3%   |   |  |
| loisture C<br>loisture C<br>st. Unc. C<br>st. Unc. C             | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre  | fore (%):<br>er (%):                                  | 22<br>24<br>e (kPa): 25              | 4.5<br>50       |           | Est. ine<br>Crumbli            | rt material                                       | (%):<br>shrinkage              | 3%   |   |  |
| loisture Co<br>loisture Co<br>st. Unc. C                         | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Christian | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   |   |  |
| loisture C<br>loisture C<br>st. Unc. C<br>st. Unc. C             | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during                         | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   |   |  |
| loisture C<br>loisture C<br>st. Unc. C<br>st. Unc. C             | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   |   |  |
| loisture C<br>loisture C<br>st. Unc. C<br>st. Unc. C             | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre<br>well  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   |   | · · · · · · · · · · · · · · · · · · ·                          |
| oisture C<br>loisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S   | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre<br>well  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   |   | ·····  |
| oisture C<br>loisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S   | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre<br>well  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   | · · · · · · · · · · · · · · · · · · ·   |  |
| oisture Co<br>oisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S  | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   |   |  |
| oisture Co<br>loisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   | · · · · · · · · · · · · · · · · · · ·   |  |
| oisture Co<br>loisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   |   |  |
| oisture Co<br>loisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre<br>wwell   | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   | ·····   |  |
| oisture C<br>loisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S   | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre<br>well  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   |   |  |
| oisture Co<br>loisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre<br>wwell   | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   | · · · · · · · · · · · · · · · · · · ·   |  |
| loisture C<br>loisture C<br>st. Unc. C<br>st. Unc. C             | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre<br>well  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   | · · · · · · · · · · · · · · · · · · ·   |  |
| oisture C<br>loisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S   | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre<br>well  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | Shrinkage | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s           | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   |   |  |
| oisture C<br>loisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S   | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre<br>well<br>10.0 - · · · ·<br>5.0 - · · ·<br>-5.0 - · · · | fore (%):<br>er (%):<br>ength before<br>ength after ( | 22<br>24<br>e (kPa): 25<br>(kPa): 18 | 4.5<br>50<br>50 |           | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s<br>Sw ell | (%):<br>shrinkage<br>hrinkage: | 3%<br>2: Nil<br>Nil  | 45.0  | 50.0   |
| oisture C<br>loisture C<br>st. Unc. C<br>st. Unc. C<br>hrink S   | ontent be<br>ontent aff<br>omp. Stre<br>omp. Stre<br>well  | fore (%):<br>er (%):<br>ength befor                   | 22<br>24<br>e (kPa): 25              | 4.5<br>50       | 20.0      | Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during s<br>Sw ell | (%):<br>shrinkage<br>hrinkage: | 3%<br>3%   | 45.0  | 50.0   |

#### Comments



Depart No. COUNEW/2022 CO.

I

| ent:  | PO B  | by Project M<br>ox 2214<br>ar NSW 23   | -                              | nt Pty Ltd    |           |  | NA   |                                      | ccredited for complian<br>ne results of the tests,<br>is document are trace<br>esults provided relate<br>nis report shall not be | , calibrations and/or i<br>eable to Australian/na<br>only to the items tes | measurements inclu<br>ational standards.<br>sted or sampled. |
|---|---|--|--------------------------------|---------------|-----------|--|--|--------------------------------------|--|--|--|
| oject No<br>oject Na                                      | me: NEW   | I9P-0143A<br>sed Subdiv                | rision - The                   | e Gardens,    | Stage 2   |  |  | ECOGNISED (S                         | pproved Signato<br>Senior Geotechn<br>ATA Accredited<br>ate of Issue: 30   | ician)<br>Laboratory Nur   |  |
| nple ID:<br>erial:<br>urce:<br>cificatio<br>ject Loc      | CL<br>On<br>on: No<br>cation: 688   | -Site<br>Specificatior<br>8 - 730 Medo | n<br>wie Road, N               | Лedowie       |           | Samplin<br>Date Sar<br>Date Sul            | -  | Sampled by<br>6/11/2020<br>8/11/2020 | Engineering  | g Departme   | nt   |
| e Teste   | <b>cation:</b> BH<br><b>d:</b> 24/  | 206 - 0.60 to<br>11/2020               | 0.85m                          |               | 89.7.1.1  |  |  |                                      |  |  | 1289.7.  |
| ell Te  | e <b>st</b><br>aturation (§   | %):                                    | -0.                            | .7            |           | Shrink o                                   | on drying (%   | o):                                  | 3.3  |  |  |
| ell on Sa<br>sture C<br>sture C<br>Unc. C<br>Unc. C       | aturation (Sontent before<br>ontent afte<br>comp. Stren<br>comp. Stren  | ore (%):<br>r (%):<br>igth before      | 30<br>32<br><b>e (kPa):</b> 29 | .0<br>.8<br>0 |           | Shrinka<br>Est. inei<br>Crumbli            | on drying (%<br>ge Moisture<br>rt material (<br>ng during s<br>g during sh | Content<br>%):<br>hrinkage           | <b>(%):</b> 29.9<br><1%  | rate   |  |
| ell on Sa<br>sture C<br>sture C<br>Unc. C                 | aturation (Sontent before<br>ontent afte<br>comp. Stren<br>comp. Stren  | ore (%):<br>r (%):<br>igth before      | 30<br>32<br><b>e (kPa):</b> 29 | .0<br>.8<br>0 | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moisture<br>rt material (<br>ng during s                                | Content<br>%):<br>hrinkage           | (%): 29.9<br><1%<br>: Nil  | rate   |  |
| ell on Sa<br>sture C<br>Unc. C<br>Unc. C<br><b>Unc. C</b> | aturation (Sontent before<br>ontent afte<br>comp. Stren<br>comp. Stren  | ore (%):<br>r (%):<br>igth before      | 30<br>32<br><b>e (kPa):</b> 29 | .0<br>.8<br>0 | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moisture<br>rt material (<br>ng during s<br>g during sh                 | Content<br>%):<br>hrinkage           | (%): 29.9<br><1%<br>: Nil  | rate   | · · · · · · · · · · · · · · · · · · ·                        |
| ell on Sa<br>sture C<br>Unc. C<br>Unc. C<br><b>Unc. C</b> | aturation (9<br>ontent befo<br>ontent afte<br>comp. Stree<br>comp. Stree  | ore (%):<br>r (%):<br>igth before      | 30<br>32<br><b>e (kPa):</b> 29 | .0<br>.8<br>0 | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moisture<br>rt material (<br>ng during s<br>g during sh                 | Content<br>%):<br>hrinkage           | (%): 29.9<br><1%<br>: Nil  | rate   |  |
| ell on Sa<br>sture C<br>sture C<br>Unc. C<br>Unc. C       | aturation (9<br>ontent before<br>ontent after<br>comp. Street<br>comp. Street<br>comp | ore (%):<br>r (%):<br>igth before      | 30<br>32<br><b>e (kPa):</b> 29 | .0<br>.8<br>0 | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moisture<br>rt material (<br>ng during s<br>g during sh                 | Content<br>%):<br>hrinkage           | (%): 29.9<br><1%<br>: Nil  | rate   |  |

#### Comments



| Client:   | PO  | loy Project l<br>3ox 2214<br>gar NSW 2                        | -                              | ent Pty Ltd             |           |   | N  | $\wedge$                       |   | eable to Australian/na<br>e only to the items tes | measurements include<br>ational standards.<br>sted or sampled. |
|---|---|---|--------------------------------|-------------------------|-----------|---|--|--------------------------------|---|---|--|
| Project No<br>Project Na  |   | V19P-0143A<br>oosed Subdi                                     |                                | e Gardens               | , Stage 2 |   |  | RECOGNISED<br>EDITATION        | Approved Signat<br>(Senior Geotechi<br>NATA Accredited<br>Date of Issue: 30 | nician)<br>d Laboratory Nur                       |  |
| ample I   |   |   | 0.000                          |                         |           | Complin                                   | a Mathadu  | O da al ha                     | <b>F</b> a sin s sin  | - Denseter  |  |
| ample ID:<br>aterial:   |   | EW20W-3923<br>LAY   | 3809                           |                         |           | Date Sa                                   | g Method:  |                                |   | g Departme  | nt   |
| ource:  |   | n-Site  |                                |                         |           | Date Sal                                  | •  | 16/11/2020<br>18/11/2020       |   |   |  |
| -   | ation: 6<br>ation: B  | o Specificatio<br>88 - 730 Med<br>H207 - 0.20 te<br>4/11/2020 | owie Road, I                   | Medowie                 |           |   |  |                                |   |   |  |
| well on Sa<br>oisture Co<br>oisture Co  | ituration<br>ontent be<br>ontent af   | fore (%):<br>er (%):  | 18<br>24                       | 1.8<br>3.9<br>4.1<br>50 |           | Shrinka<br>Est. ine                       | on drying (<br>ge Moistur<br>rt material<br>ing during | e Conten<br>(%):               | <1%   |   |  |
| well on Sa<br>oisture Co<br>oisture Co<br>st. Unc. C<br>st. Unc. C            | ituration<br>ontent be<br>ontent aff<br>omp. Stro<br>omp. Stro  | fore (%):   | 18<br>24<br><b>e (kPa):</b> 35 | 3.9<br>4.1              |           | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during sl | e Content<br>(%):<br>shrinkage | <b>t (%):</b> 15.8<br><1%   |   |  |
| well on Sa<br>oisture Co<br>oisture Co<br>st. Unc. C<br>st. Unc. C            | ituration<br>ontent be<br>ontent aff<br>omp. Stro<br>omp. Stro  | fore (%):<br>er (%):<br>ength befor                           | 18<br>24<br><b>e (kPa):</b> 35 | 3.9<br>4.1<br>50        | Shrinkago | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during                | e Content<br>(%):<br>shrinkage | t (%): 15.8<br><1%<br>: Nil   |   |  |
| well on Sa<br>oisture Co<br>oisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | aturation<br>ontent be<br>ontent aff<br>omp. Stro<br>omp. Stro<br>well  | fore (%):<br>er (%):<br>ength befor                           | 18<br>24<br><b>e (kPa):</b> 35 | 3.9<br>4.1<br>50        | Shrinkago | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during sl | e Content<br>(%):<br>shrinkage | t (%): 15.8<br><1%<br>: Nil   |   |  |
| well on Sa<br>oisture Co<br>oisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | aturation<br>ontent be<br>ontent aff<br>omp. Stro<br>omp. Stro<br>well  | fore (%):<br>er (%):<br>ength befor                           | 18<br>24<br><b>e (kPa):</b> 35 | 3.9<br>4.1<br>50        | Shrinkago | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during sl | e Content<br>(%):<br>shrinkage | t (%): 15.8<br><1%<br>: Nil   |   | · · · · · · · · · · · · · · · · · · ·                          |
| well on Sa<br>oisture Co<br>oisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | aturation<br>ontent be<br>ontent aff<br>omp. Stro<br>omp. Stro<br>well  | fore (%):<br>er (%):<br>ength befor                           | 18<br>24<br><b>e (kPa):</b> 35 | 3.9<br>4.1<br>50        | Shrinkago | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during sl | e Content<br>(%):<br>shrinkage | t (%): 15.8<br><1%<br>: Nil   |   | · · · · · · · · · · · · · · · · · · ·                          |
| well on Sa<br>oisture Co<br>oisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | turation<br>ontent be<br>ontent aff<br>omp. Stro<br>omp. Stro<br>well   | fore (%):<br>er (%):<br>ength befor                           | 18<br>24<br><b>e (kPa):</b> 35 | 3.9<br>4.1<br>50        | Shrinkago | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during sl | e Content<br>(%):<br>shrinkage | t (%): 15.8<br><1%<br>: Nil   |   | · · · · · · · · · · · · · · · · · · ·                          |
| well on Sa<br>oisture Co<br>oisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | aturation<br>ontent be<br>ontent aff<br>omp. Stro<br>omp. Stro<br>well  | fore (%):<br>er (%):<br>ength befor                           | 18<br>24<br><b>e (kPa):</b> 35 | 3.9<br>4.1<br>50        | Shrinkago | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during sl | e Content<br>(%):<br>shrinkage | t (%): 15.8<br><1%<br>: Nil   |   | · · · · · · · · · · · · · · · · · · ·                          |
| well on Sa<br>oisture Co<br>oisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | turation<br>ontent be<br>ontent aff<br>omp. Stro<br>omp. Stro<br>well   | fore (%):<br>er (%):<br>ength befor                           | 18<br>24<br><b>e (kPa):</b> 35 | 3.9<br>4.1<br>50        | Shrinkage | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during sl | e Content<br>(%):<br>shrinkage | t (%): 15.8<br><1%<br>: Nil   |   | · · · · · · · · · · · · · · · · · · ·                          |
| well on Sa<br>oisture Co<br>oisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | turation<br>ontent be<br>ontent aff<br>omp. Stro<br>omp. Stro<br>well   | fore (%):<br>er (%):<br>ength befor                           | 18<br>24<br><b>e (kPa):</b> 35 | 3.9<br>4.1<br>50        | Shrinkago | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during sl | e Content<br>(%):<br>shrinkage | t (%): 15.8<br><1%<br>: Nil   |   |  |
| well on Sa<br>oisture Co<br>oisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | turation<br>ontent be<br>ontent aff<br>omp. Stro<br>omp. Stro<br>well   | fore (%):<br>er (%):<br>ength befor                           | 18<br>24<br><b>e (kPa):</b> 35 | 3.9<br>4.1<br>50        | Shrinkago | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during sl | e Content<br>(%):<br>shrinkage | t (%): 15.8<br><1%<br>: Nil   |   |  |
| well on Sa<br>oisture Co<br>oisture Co<br>st. Unc. C<br>st. Unc. C<br>hrink S | 10.0 Content be<br>ontent afformer structure<br>omp. Structure<br>well<br>10.0 Content of the<br>5.0 Content of the<br>0.0 Content of the<br>content of the<br>structure<br>structure<br>content of the<br>structure<br>structure<br>content of the<br>structure<br>structure<br>content of the<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>structure<br>struct | fore (%):<br>er (%):<br>ength befor                           | 18<br>24<br><b>e (kPa):</b> 35 | 3.9<br>4.1<br>50        | Shrinkago | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during sl | e Content<br>(%):<br>shrinkage | t (%): 15.8<br><1%<br>: Nil   |   |  |
| st. Unc. C<br>hrink S<br><sup>MSI</sup> (%) IIa/                              | turation<br>ontent be<br>ontent aff<br>omp. Stro<br>omp. Stro<br>well   | fore (%):<br>er (%):<br>ength befor                           | 18<br>24<br><b>e (kPa):</b> 35 | 3.9<br>4.1<br>50        | Shrinkage | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during sl | e Content<br>(%):<br>shrinkage | t (%): 15.8<br><1%<br>: Nil   | 45.0  | 50.0   |

#### Comments



|  | k Sw   |                                       |                                 |            | -         |   |  |                                |   |   |   |
|--|--|---------------------------------------|---------------------------------|------------|-----------|---|--|--------------------------------|---|---|---|
| nt:  | McC<br>PO E  |                                       | Manageme                        | -          |           |   | N  | $\boldsymbol{\wedge}$          | The results of the test<br>this document are trac<br>Results provided relat | ance with ISO/IEC 17(<br>ts, calibrations and/or<br>ceable to Australian/na<br>te only to the items tes<br>be reproduced except i | measurements inclu<br>ational standards.<br>ted or sampled. |
| ject No<br>ject Na                                       |  | /19P-0143/<br>osed Subd               | A<br>ivision - The              | e Gardens  | , Stage 2 |   |  | RECOGNISED<br>EDITATION        | (Senior Geotech   | d Laboratory Nu   |   |
|  | Details  |                                       |                                 |            |           |   |  |                                |   |   |   |
| ple ID:  |  | EW20W-392                             | 3S10                            |            |           |   | g Method:  |                                |   | ng Departme   | nt  |
| erial:   | -  | LAY                                   |                                 |            |           | Date Sa                                   | •  | 16/11/2020                     |   |   |   |
| rce:   |  | n-Site                                |                                 |            |           | Date Sul                                  | bmitted:   | 18/11/2020                     | )   |   |   |
| cificati   |  | o Specificatio                        |                                 | Ma davida  |           |   |  |                                |   |   |   |
|  |  | 88 - 730 Mec<br>H208 - 1.10           | lowie Road, l<br>to 1 30m       | Viedowie   |           |   |  |                                |   |   |   |
| Teste  |  | 1/11/2020                             | 0 1.3011                        |            |           |   |  |                                |   |   |   |
|  |  |                                       |                                 | A C 40     | 00 7 4 4  | Charles                                   |  |                                |   |   | 4000 7  |
| ell Te   | aturation  | (0/_).                                | -0                              |            | 89.7.1.1  |   |  | 2/ )•                          | 2.4   | Að  | 1289.7.   |
| n on S   | aturation  | (%):                                  | -0                              | ./         |           | II Shrink d                               | on drying ('                                       | 70):                           | 3.4   |   |   |
|  | ontant ha  | for (0/)                              | 20                              | 0          |           |   | ao Moiotur   | a Cantan                       | + /0/ \   |   |   |
| ture C   | Content be   |                                       |                                 | ).9<br>L 7 |           | Shrinka                                   | ge Moistur<br>rt matorial                          |                                |   |   |   |
| sture C<br>sture C                                       | content aft  | er (%):                               | 31                              | 1.7        |           | Shrinka<br>Est. ine                       | rt material  | (%):                           | <1%   |   |   |
| sture C<br>sture C<br>Unc. C                             | Content aft<br>Comp. Stre                          | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  |           | Shrinka<br>Est. ine<br>Crumbli            | rt material<br>ing during                          | (%):<br>shrinkage              | <1%<br>e: Nil   | erate   |   |
| ature C<br>ature C<br>Unc. C<br>Unc. C                   | Content aft<br>Comp. Stre<br>Comp. Stre            | er (%):                               | 31<br>re (kPa): 42              | 1.7<br>20  |           | Shrinka<br>Est. ine<br>Crumbli            | rt material  | (%):<br>shrinkage              | <1%<br>e: Nil   | erate   |   |
| sture C<br>sture C<br>Unc. C                             | Content aft<br>Comp. Stre<br>Comp. Stre            | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkaq  | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   | erate   |   |
| ature C<br>ature C<br>Unc. C<br>Unc. C                   | Content aft<br>Comp. Stre<br>Comp. Stre            | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkage | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during                          | (%):<br>shrinkage              | <1%<br>e: Nil   | erate   |   |
| ature C<br>ature C<br>Unc. C<br>Unc. C                   | Content aft<br>Comp. Stre<br>Comp. Stre            | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkag  | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   | erate   |   |
| ature C<br>ature C<br>Unc. C<br>Unc. C                   | Content aft<br>Comp. Stre<br>Comp. Stre            | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkagı | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   | erate   |   |
| ature C<br>ature C<br>Unc. C<br>Unc. C                   | Content aft<br>Comp. Stre<br>Comp. Stre            | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkag  | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   |   |   |
| ature C<br>ature C<br>Unc. C<br>Unc. C                   | Content aft<br>Comp. Stre<br>Comp. Stre            | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkag  | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   |   |   |
| ature C<br>ature C<br>Unc. C<br>Unc. C                   | Content aft<br>Comp. Stre<br>Comp. Stre            | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkagı | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   |   | · · · · · · · · · · · · · · · · · · ·                       |
| ture C<br>unc. C<br>Unc. C<br>Unc. C<br>ink S            | Content aft<br>Comp. Stre<br>Comp. Stre            | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkag  | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   |   |   |
| ture C<br>unc. C<br>Unc. C<br>Unc. C<br>ink S            | Content aft<br>Comp. Stre<br>Comp. Stre            | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkag  | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   |   |   |
| ture C<br>unc. C<br>Unc. C<br>Unc. C<br>ink S            | Soment aft<br>Comp. Stre<br>Comp. Stre<br>Swell    | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkagı | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   |   |   |
| ture C<br>Unc. C<br>Unc. C<br>Unc. C<br>S<br>NS3 (%) IIe | Soment aft<br>Comp. Stre<br>Comp. Stre<br>Swell    | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkage | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   |   |   |
| ture C<br>Unc. C<br>Unc. C<br>Unc. C<br>S<br>NS3 (%) IIe | Soment aft<br>Comp. Stre<br>Comp. Stre<br>Swell    | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkag  | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   |   |   |
| ture C<br>Unc. C<br>Unc. C<br>Unc. C<br>S<br>NS3 (%) IIe | Swell  | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkag  | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   |   |   |
| ature C<br>ature C<br>Unc. C<br>Unc. C                   | Swell  | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkagı | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   | erate   |   |
| ture C<br>Unc. C<br>Unc. C<br>Unc. C<br>S<br>NS3 (%) IIe | Swell  | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | Shrinkagı | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl           | (%):<br>shrinkage              | <1%<br>e: Nil   |   |   |
| ture C<br>Unc. C<br>Unc. C<br>Unc. C<br>S<br>NS3 (%) IIe | Content aft<br>Comp. Stree<br>Comp. Stree<br>Swell | er (%):<br>ength befor<br>ength after | 31<br>re (kPa): 42<br>(kPa): 50 |            |           | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl<br>Sw ell | (%):<br>shrinkage<br>nrinkage: | <1%<br>P: Nil<br>Mode   |   | 50.0  |
| ture C<br>Unc. C<br>Unc. C<br>Unc. C<br>S<br>NS3 (%) IIe | Content aft<br>Comp. Stre<br>Comp. Stre<br>Swell   | er (%):<br>ength befo                 | 31<br>re (kPa): 42              | 1.7<br>20  | 20.0      | Shrinka<br>Est. ine<br>Crumbli<br>Crackin | rt material<br>ing during<br>g during sl<br>Sw ell | (%):<br>shrinkage              | <1%<br>e: Nil   | erate   | 50.0  |

## Comments



| hrink   |  |                                    |                                 |                  |           |  |   |                                |  |   |   |
|---|--|------------------------------------|---------------------------------|------------------|-----------|--|---|--------------------------------|--|---|---|
| lient:  | PO B   | oy Project<br>ox 2214<br>Jar NSW 2 | Manageme<br>2309                | ent Pty Ltd      |           |  | N   |                                | Accredited for complia<br>The results of the tests<br>his document are trac<br>Results provided relats<br>This report shall not be | s, calibrations and/or<br>ceable to Australian/n<br>te only to the items test | measurements includ<br>ational standards.<br>sted or sampled. |
| roject No.<br>roject Nar  |  | 19P-0143A<br>osed Subdi            | A<br>ivision - The              | e Gardens        | , Stage 2 |  |   | RECOGNISED (                   | Approved Signat<br>Senior Geotech<br>NATA Accredited<br>Date of Issue: 30  | nician)<br>d Laboratory Nu  |   |
| ample [   | Details  |                                    |                                 |                  |           |  |   |                                |  |   |   |
| mple ID:  |  | W20W-392                           | 3S11                            |                  |           | Samplin                                    | g Method:   | Sampled by                     | y Engineerin   | ig Departme   | nt  |
| aterial:  | Sa   | ndy CLAY                           |                                 |                  |           | Date Sar                                   | npled:  | 16/11/2020                     |  |   |   |
| urce:   | Or   | n-Site                             |                                 |                  |           | Date Sul                                   | omitted:  | 18/11/2020                     |  |   |   |
| ecificatio  | n: No  | Specificatio                       | on                              |                  |           |  |   |                                |  |   |   |
| -   |  |                                    | owie Road, I                    | Medowie          |           |  |   |                                |  |   |   |
| -   |  | 1209 - 0.15 t                      | o 0.50m                         |                  |           |  |   |                                |  |   |   |
| te Tested   | : 24   | /11/2020                           |                                 |                  |           |  |   |                                |  |   |   |
| vell on Sa<br>bisture Co<br>bisture Co<br>t. Unc. Co  | turation (<br>ontent bef<br>ontent afte<br>omp. Stre                                   | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 |                  |           | Shrinka<br>Est. inei<br>Crumbli            | on drying ( <sup>6</sup><br>ge Moistur<br>rt material<br>ng during s<br>g during sł | e Content<br>(%):<br>shrinkage | <1%  | r   |   |
|   | turation (<br>ontent bef<br>ontent afte<br>omp. Stre<br>omp. Stre                      | ore (%):<br>er (%):                | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 |           | Shrinka<br>Est. inei<br>Crumbli            | ge Moistur<br>rt material   | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r   |   |
| vell on Sa<br>bisture Co<br>bisture Co<br>t. Unc. Co<br>t. Unc. Co  | turation (<br>ontent bef<br>ontent afte<br>omp. Stre<br>omp. Stre                      | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s  | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r   |   |
| vell on Sa<br>visture Co<br>visture Co<br>t. Unc. Co<br>t. Unc. Co  | turation (<br>ontent bef<br>ontent afte<br>omp. Stre<br>omp. Stre                      | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r<br>   |   |
| ell on Sa<br>isture Co<br>isture Co<br>t. Unc. Co<br>t. Unc. Co   | turation (<br>ontent bef<br>ontent afte<br>omp. Stre<br>omp. Stre<br>well              | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r<br>   |   |
| ell on Sa<br>isture Co<br>isture Co<br>t. Unc. Co<br>t. Unc. Co<br><b>trink S</b>   | turation (<br>ontent bef<br>ontent afte<br>omp. Stre<br>omp. Stre<br>well              | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r<br>   | · · · · · · · · · · · · · · · · · · ·                         |
| ell on Sa<br>isture Co<br>isture Co<br>t. Unc. Co<br>t. Unc. Co<br><b>arink S</b>   | turation (<br>ontent bef<br>ontent afte<br>omp. Stre<br>omp. Stre<br>well              | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r   | · · · · · · · · · · · · · · · · · · ·                         |
| ell on Sa<br>isture Co<br>isture Co<br>t. Unc. Co<br>t. Unc. Co   | turation (<br>ontent bef<br>ontent afte<br>omp. Stre<br>omp. Stre<br>well              | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r   |   |
| ell on Sa<br>isture Co<br>isture Co<br>t. Unc. Co<br>t. Unc. Co<br><b>t. Unc. Co</b><br>MSI (%)   | turation (<br>ontent bef<br>ontent after<br>omp. Stre<br>omp. Stre<br>well             | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r   |   |
| ell on Sa<br>isture Co<br>isture Co<br>t. Unc. Co<br>t. Unc. Co<br><b>t. Unc. Co</b><br><b>mink S</b>   | turation (<br>ontent bef<br>ontent afte<br>omp. Stre<br>omp. Stre<br>well              | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r<br>   | · · · · · · · · · · · · · · · · · · ·                         |
| ell on Sa<br>isture Co<br>isture Co<br>t. Unc. Co<br>t. Unc. Co<br>t. Unc. Co<br>mrink S  | turation (<br>ontent bef<br>ontent after<br>omp. Stre<br>omp. Stre<br>well             | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r<br>   | · · · · · · · · · · · · · · · · · · ·                         |
| ell on Sa<br>isture Co<br>isture Co<br>t. Unc. Co<br>t. Unc. Co<br>t. Unc. Co<br>mrink S  | turation (<br>ontent bef<br>ontent after<br>omp. Stre<br>omp. Stre<br>well             | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r   | · · · · · · · · · · · · · · · · · · ·                         |
| ell on Sa<br>isture Co<br>isture Co<br>t. Unc. Co<br>t. Unc. Co<br>t. Unc. Co<br>mrink S  | turation (<br>ontent bef<br>ontent after<br>omp. Stre<br>omp. Stre<br>well             | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r<br>   | · · · · · · · · · · · · · · · · · · ·                         |
| ell on Sa<br>isture Co<br>isture Co<br>t. Unc. Co<br>t. Unc. Co<br><b>t. Unc. Co</b><br>MSI (%)   | turation (<br>ontent bef<br>ontent after<br>omp. Stre<br>omp. Stre<br>well             | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r   | · · · · · · · · · · · · · · · · · · ·                         |
| ell on Sa<br>isture Co<br>isture Co<br>t. Unc. Co<br>t. Unc. Co<br>t. Unc. Co<br>t. Unc. Co<br>mrink So   | turation (<br>ontent bef<br>ontent after<br>omp. Stre<br>omp. Stre<br>well             | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r   | · · · · · · · · · · · · · · · · · · ·                         |
| ell on Sa<br>isture Co<br>isture Co<br>t. Unc. Co | turation (<br>pontent bef<br>pontent after<br>pomp. Stre<br>pomp. Stre<br>well<br>10.0 | ore (%):<br>er (%):<br>ngth befor  | 19<br>25<br><b>re (kPa):</b> 30 | 9.3<br>5.1<br>00 | Shrinkag  | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ng during s<br>g during sl                             | e Content<br>(%):<br>shrinkage | : <b>(%):</b> 17.2<br><1%<br><b>::</b> Nil   | r<br>   | 50.0  |

## Comments



| ent:   | PO E   | loy Project l<br>3ox 2214<br>gar NSW 2                        | -                       | ent Pty Ltd      |              |                                 |  | $\wedge$         | Accredited for complia<br>The results of the tests<br>his document are trac<br>Results provided relate<br>This report shall not be | eable to Australian/na<br>only to the items test | measurements inclu<br>ational standards.<br>sted or sampled. |
|--|--|---|-------------------------|------------------|--------------|---------------------------------|--|------------------|--|--|--|
| oject No<br>oject Na   |  | /19P-0143A<br>osed Subdi                                      |                         | e Gardens        | , Stage 2    |                                 | WORLD  | RECOGNISED       | Approved Signat<br>(Senior Geotechr<br>NATA Accredited<br>Date of Issue: 30  | nician)<br>I Laboratory Nui                      |  |
| mple  <br>nple  D:   | Details  | EW20W-3923  | 3S13                    |                  |              | Samplin                         | g Method:                                    | Sampled by       | v Engineerin   | g Departme                                       | nt   |
| erial:   |  | andy CLAY   |                         |                  |              | Date Sai                        |  | 16/11/2020       | -  | 5 1  |  |
| irce:  | 0  | n-Site  |                         |                  |              | Date Sul                        | bmitted:                                     | 18/11/2020       |  |  |  |
| •  | cation: 68   | o Specificatio<br>38 - 730 Med<br>H211 - 0.60 to<br>I/11/2020 | owie Road, I            | Medowie          |              |                                 |  |                  |  |  |  |
| ell Te   | st   |   |                         | AS 12            | 89.7.1.1     | Shrink                          | < Test                                       |                  |  | AS   | 1289.7   |
|  |  | (%)·  | -0                      |                  |              |                                 | on drying (%                                 | -                | 3.0  |  |  |
| ell on Sa  |  |   |                         |                  |              |                                 |  |                  |  |  |  |
| ell on Sa<br>isture C  | ontent be  | fore (%):   | 30                      | ).7              |              | 11                              | ge Moistur                                   |                  |  |  |  |
| ell on Sa<br>isture C<br>isture C  | ontent be<br>ontent aft  | fore (%):<br>er (%):  | 30<br>32                | 2.6              |              | Est. ine                        | rt material (                                | %):              | <1%  |  |  |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C                              | ontent be<br>ontent aft<br>comp. Stre  | fore (%):   | 30<br>32<br>e (kPa): 56 | 2.6              |              | Est. ine<br>Crumbli             | -  | %):<br>shrinkage | <1%  | rate   |  |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C                  | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre  | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60        |              | Est. ine<br>Crumbli             | rt material (<br>ing during s                | %):<br>shrinkage | <1%  | rate   |  |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C                              | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre  | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60        | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s                | %):<br>shrinkage | <1%  | rate   |  |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C                  | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre  | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   |  |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C                  | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre  | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   |  |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C<br><b>rink S</b> | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre  | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   | · · · · · · · · · · · · · · · · · · ·                        |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C<br><b>rink S</b> | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre  | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   |  |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C<br><b>rink S</b> | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre  | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   | · · · · · · · · · · · · · · · · · · ·                        |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C<br><b>rink S</b> | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre  | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   | · · · · · · · · · · · · · · · · · · ·                        |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C<br><b>rink S</b> | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre  | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag<br> | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   | · · · · · · · · · · · · · · · · · · ·                        |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C<br><b>rink S</b> | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. Stre  | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   |  |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C<br><b>rink S</b> | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre<br>c | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   |  |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C<br><b>rink S</b> | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. Stre<br>comp. Stre  | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   |  |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C                  | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre<br>c | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   |  |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C<br><b>rink S</b> | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre<br>c | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   |  |
| ell on Sa<br>isture C<br>isture C<br>. Unc. C<br>. Unc. C<br><b>rink S</b> | ontent be<br>ontent aft<br>comp. Stre<br>comp. Stre<br>c | fore (%):<br>er (%):<br>ngth befor                            | 30<br>32<br>e (kPa): 56 | 2.6<br>60<br>600 | Shrinkag     | Est. iner<br>Crumbli<br>Crackin | rt material (<br>ing during s<br>g during sh | %):<br>shrinkage | <1%  | rate   | 50.0   |

## Comments



| hrin  |  |   |                                      |                        |           |  |   |   |  |   |  |
|---|--|---|--------------------------------------|------------------------|-----------|--|---|---|--|---|--|
| lient:  | PO E   | oy Project N<br>Sox 2214<br>Jar NSW 2               | -                                    | ent Pty Ltd            |           |  | N   |   | The results of the test<br>his document are trac<br>Results provided related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>related<br>r | ance with ISO/IEC 170<br>ts, calibrations and/or<br>ceable to Australian/na<br>te only to the items tes<br>be reproduced except i | measurements include<br>ational standards.<br>sted or sampled. |
| roject No.<br>roject Na   |  | 19P-0143A<br>osed Subdiv                            |                                      | e Gardens              | , Stage 2 |  |   | EDITATION                                     | (Senior Geotech  | d Laboratory Nu   |  |
| ample I   | Details  |   |                                      |                        |           |  |   |   |  |   |  |
| ample ID:   | NE   | EW20W-3923  | 8S14                                 |                        |           |  |   | Sampled by                                    | y Engineerin   | ng Departme   | nt   |
| aterial:  | CL   | .AY   |                                      |                        |           | Date Sar                                   | mpled:  | 16/11/2020                                    |  |   |  |
| ource:  | Or   | n-Site  |                                      |                        |           | Date Sul                                   | bmitted:  | 18/11/2020                                    |  |   |  |
| pecificatio   |  | Specification                                       |                                      |                        |           |  |   |   |  |   |  |
| •   |  | 8 - 730 Medo  |                                      | Medowie                |           |  |   |   |  |   |  |
| ample Loc<br>ate Testec   |  | +212 - 0.90 -<br>/11/2020                           | 1.10m                                |                        |           |  |   |   |  |   |  |
| oisture Co  | ontent bei<br>ontent afte  | ore (%):<br>er (%):                                 | 30<br>25                             | .3<br>).8<br>5.8       |           | Shrinka<br>Est. ine                        | on drying (<br>ge Moistur<br>rt material                        | e Content<br>(%):                             | <1%  |   |  |
| oisture Co<br>oisture Co<br>at. Unc. Co<br>at. Unc. Co              | ontent bef<br>ontent aft<br>omp. Stre<br>omp. Stre                 | ore (%):  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       |           | Shrinka<br>Est. iner<br>Crumbli            | ge Moistur  | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%  | r   |  |
| oisture Co<br>oisture Co<br>st. Unc. Co                             | ontent bef<br>ontent aft<br>omp. Stre<br>omp. Stre                 | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during                         | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  | r   |  |
| oisture Co<br>oisture Co<br>st. Unc. Co<br>st. Unc. Co              | ontent bef<br>ontent aft<br>omp. Stre<br>omp. Stre                 | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during s           | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  | r   |  |
| bisture Co<br>bisture Co<br>st. Unc. Co<br>t. Unc. Co<br>hrink S    | ontent bei<br>ontent afte<br>omp. Stre<br>omp. Stre<br>well        | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during s           | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  | r<br>   | · · · · · · · · · · · · · · · · · · ·                          |
| bisture Co<br>bisture Co<br>st. Unc. Co<br>t. Unc. Co<br>hrink S    | ontent bei<br>ontent aft<br>omp. Stre<br>omp. Stre<br>well         | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during s           | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  | r   |  |
| bisture Co<br>bisture Co<br>st. Unc. Co<br>t. Unc. Co<br>hrink S    | ontent bei<br>ontent afte<br>omp. Stre<br>omp. Stre<br>well        | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during s           | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  | r   |  |
| bisture Co<br>bisture Co<br>bit. Unc. Co<br>bit. Unc. Co<br>hrink S | ontent bei<br>ontent aft<br>omp. Stre<br>omp. Stre<br>well         | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during s           | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  | r   | · · · · · · · · · · · · · · · · · · ·                          |
| bisture Co<br>bisture Co<br>bit. Unc. Co<br>bit. Unc. Co<br>hrink S | ontent bei<br>ontent aft<br>omp. Stre<br>omp. Stre<br>well         | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during s           | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  | r   | · · · · · · · · · · · · · · · · · · ·                          |
| bisture Co<br>bisture Co<br>bit. Unc. Co<br>bit. Unc. Co<br>hrink S | ontent bei<br>ontent aft<br>omp. Stre<br>omp. Stre<br>well         | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during s           | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  | r<br>   | · · · · · · · · · · · · · · · · · · ·                          |
| bisture Co<br>bisture Co<br>bit. Unc. Co<br>bit. Unc. Co<br>hrink S | ontent bei<br>ontent aft<br>omp. Stre<br>omp. Stre<br>well         | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during s           | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  | r   |  |
| bisture Co<br>bisture Co<br>bit. Unc. Co<br>bit. Unc. Co<br>hrink S | ontent bei<br>ontent aft<br>omp. Stre<br>omp. Stre<br>well         | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during s           | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  | r<br>   |  |
| bisture Co<br>bisture Co<br>bit. Unc. Co<br>bit. Unc. Co<br>hrink S | ontent bei<br>ontent aft<br>omp. Stre<br>omp. Stre<br>well         | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during s           | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  |   | · · · · · · · · · · · · · · · · · · ·                          |
| Shrink (%) Esh - Swell (%) Esw                                      | ontent bei<br>ontent afte<br>omp. Stre<br>omp. Stre<br>well        | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | Shrinkage | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during s           | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  | r   |  |
| Shrink (%) Esh - Swell (%) Esw                                      | ontent bei<br>ontent aft<br>omp. Stre<br>omp. Stre<br>well<br>10.0 | Fore (%):<br>er (%):<br>ngth before<br>ngth after ( | 30<br>25<br>e (kPa): 28<br>(kPa): 25 | 0.8<br>5.8<br>30<br>50 |           | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during<br>g during s<br>Sw ell | re Content<br>(%):<br>shrinkage:<br>hrinkage: | t <b>(%):</b> 31.5<br><1%<br>P: Nil<br>Major   |   |  |
| Shrink (%) Esh - Swell (%) Esw                                      | ontent bei<br>ontent afte<br>omp. Stre<br>omp. Stre<br>well        | ore (%):<br>er (%):<br>ngth before                  | 30<br>25<br><b>e (kPa):</b> 28       | ).8<br>5.8<br>30       | 20.0      | Shrinka<br>Est. iner<br>Crumbli<br>Crackin | ge Moistur<br>rt material<br>ing during s<br>Sw ell             | e Content<br>(%):<br>shrinkage                | t <b>(%):</b> 31.5<br><1%<br>e: Nil  | r   | 50.0   |

## Comments



- 02 4968 4468
- T:
- F: E: W:
- 1:
   02 4968 4468

   F:
   02 4960 9775

   E:
   admin@qualtest.com.au

   W:
   www.qualtest.com.au

   ABN:
   98 153 268 896

#### Report No: MAT:NEW20W-3923--S01 Issue No: 1 **Material Test Report** Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provider letale only to the items tested or sampled. This report shall not be reproduced except in full. McCloy Project Management Pty Ltd PO Box 2214 Client: Dangar NSW 2309 ΝΑΤΑ Cull B NEW19P-0143A Project No.: Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - The Gardens, Stage 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 30/11/2020

## **Sample Details**

| -                 |                                   |
|-------------------|-----------------------------------|
| Sample ID:        | NEW20W-3923S01                    |
| Sampling Method:  | Sampled by Engineering Department |
| Date Sampled:     | 16/11/2020                        |
| Source:           | On-Site                           |
| Material:         | Sandy CLAY                        |
| Specification:    | No Specification                  |
| Project Location: | 688 - 730 Medowie Road, Medowie   |
| Sample Location:  | BH201 - 0.20 to 0.35m             |
|                   |                                   |

## Test Results

| Test Results         |               |            |        |
|----------------------|---------------|------------|--------|
| Description          | Method        | Result     | Limits |
| Sample History       | AS 1289.1.1   | Oven-dried |        |
| Preparation          | AS 1289.1.1   | Dry Sieved |        |
| Linear Shrinkage (%) | AS 1289.3.4.1 | 13.0       |        |
| Mould Length (mm)    |               | 250        |        |
| Crumbling            |               | No         |        |
| Curling              |               | No         |        |
| Cracking             |               | No         |        |
| Liquid Limit (%)     | AS 1289.3.1.1 | 43         |        |
| Method               |               | Four Point |        |
| Plastic Limit (%)    | AS 1289.3.2.1 | 17         |        |
| Plasticity Index (%) | AS 1289.3.3.1 | 26         |        |
| Date Tested          |               | 25/11/2020 |        |

## Comments



- 02 4968 4468
- T:
- 1:
   02 4968 4468

   F:
   02 4960 9775

   E:
   admin@qualtest.com.au

   W:
   www.qualtest.com.au

   ABN:
   98 153 268 896
   F: E: W:

#### Report No: MAT:NEW20W-3923--S15 Issue No: 1 **Material Test Report** Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provider letale only to the items tested or sampled. This report shall not be reproduced except in full. McCloy Project Management Pty Ltd PO Box 2214 Client: Dangar NSW 2309 ΝΑΤΑ Cull B NEW19P-0143A Project No.: Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - The Gardens, Stage 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 30/11/2020

## Sample Details

| Sample ID:        | NEW20W-3923S15                    |
|-------------------|-----------------------------------|
| Sampling Method:  | Sampled by Engineering Department |
| Date Sampled:     | 16/11/2020                        |
| Source:           | On-Site                           |
| Material:         | CLAY                              |
| Specification:    | No Specification                  |
| Project Location: | 688 - 730 Medowie Road, Medowie   |
| Sample Location:  | BH201 - 0.9 to 1.0m               |

## Test Results

| rest Results         |               |            |        |
|----------------------|---------------|------------|--------|
| Description          | Method        | Result     | Limits |
| Sample History       | AS 1289.1.1   | Oven-dried |        |
| Preparation          | AS 1289.1.1   | Dry Sieved |        |
| Linear Shrinkage (%) | AS 1289.3.4.1 | 15.0       |        |
| Mould Length (mm)    |               | 250        |        |
| Crumbling            |               | No         |        |
| Curling              |               | No         |        |
| Cracking             |               | Yes        |        |
| Liquid Limit (%)     | AS 1289.3.1.1 | 37         |        |
| Method               |               | Four Point |        |
| Plastic Limit (%)    | AS 1289.3.2.1 | 14         |        |
| Plasticity Index (%) | AS 1289.3.3.1 | 23         |        |
| Date Tested          |               | 25/11/2020 |        |

## Comments



- 02 4968 4468
- T:
- 1: 02 4968 4468 F: 02 4960 9775 E: admin@qualtest.com.au W: www.qualtest.com.au ABN: 98 153 268 896

#### Report No: MAT:NEW20W-3923--S02 Issue No: 1 **Material Test Report** Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provider letale only to the items tested or sampled. This report shall not be reproduced except in full. McCloy Project Management Pty Ltd PO Box 2214 Client: Dangar NSW 2309 ΝΑΤΑ B Call NEW19P-0143A Project No.: Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - The Gardens, Stage 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 30/11/2020

## **Sample Details**

| -                 |                                   |
|-------------------|-----------------------------------|
| Sample ID:        | NEW20W-3923S02                    |
| Sampling Method:  | Sampled by Engineering Department |
| Date Sampled:     | 16/11/2020                        |
| Source:           | On-Site                           |
| Material:         | CLAY                              |
| Specification:    | No Specification                  |
| Project Location: | 688 - 730 Medowie Road, Medowie   |
| Sample Location:  | BH201 - 1.00 to 1.20m             |

## Test Results

| Test Results         |               |            |        |
|----------------------|---------------|------------|--------|
| Description          | Method        | Result     | Limits |
| Sample History       | AS 1289.1.1   | Oven-dried |        |
| Preparation          | AS 1289.1.1   | Dry Sieved |        |
| Linear Shrinkage (%) | AS 1289.3.4.1 | 15.0       |        |
| Mould Length (mm)    |               | 250        |        |
| Crumbling            |               | No         |        |
| Curling              |               | No         |        |
| Cracking             |               | Yes        |        |
| Liquid Limit (%)     | AS 1289.3.1.1 | 58         |        |
| Method               |               | Four Point |        |
| Plastic Limit (%)    | AS 1289.3.2.1 | 21         |        |
| Plasticity Index (%) | AS 1289.3.3.1 | 37         |        |
| Date Tested          |               | 26/11/2020 |        |

## Comments

N/A



- 02 4968 4468
- T:
- 1: 02 4968 4468 F: 02 4960 9775 E: admin@qualtest.com.au W: www.qualtest.com.au ABN: 98 153 268 896

#### Report No: MAT:NEW20W-3923--S06 Issue No: 1 **Material Test Report** Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provider letale only to the items tested or sampled. This report shall not be reproduced except in full. McCloy Project Management Pty Ltd PO Box 2214 Client: Dangar NSW 2309 ΝΑΤΑ B Call NEW19P-0143A Project No.: Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - The Gardens, Stage 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 30/11/2020

## **Sample Details**

| -                 |                                   |
|-------------------|-----------------------------------|
| Sample ID:        | NEW20W-3923S06                    |
| Sampling Method:  | Sampled by Engineering Department |
| Date Sampled:     | 16/11/2020                        |
| Source:           | On-Site                           |
| Material:         | Sandy CLAY                        |
| Specification:    | No Specification                  |
| Project Location: | 688 - 730 Medowie Road, Medowie   |
| Sample Location:  | BH204 - 0.50 to 0.80m             |
|                   |                                   |

## Test Results

| rest Results         |               |            |        |
|----------------------|---------------|------------|--------|
| Description          | Method        | Result     | Limits |
| Sample History       | AS 1289.1.1   | Oven-dried |        |
| Preparation          | AS 1289.1.1   | Dry Sieved |        |
| Linear Shrinkage (%) | AS 1289.3.4.1 | 12.5       |        |
| Mould Length (mm)    |               | 250        |        |
| Crumbling            |               | No         |        |
| Curling              |               | No         |        |
| Cracking             |               | No         |        |
| Liquid Limit (%)     | AS 1289.3.1.1 | 49         |        |
| Method               |               | Four Point |        |
| Plastic Limit (%)    | AS 1289.3.2.1 | 14         |        |
| Plasticity Index (%) | AS 1289.3.3.1 | 35         |        |
| Date Tested          |               | 25/11/2020 |        |

## Comments



- 02 4968 4468
- T: 02 4960 9775
- F: E: W: E: admin@qualtest.com.au W: www.qualtest.com.au ABN: 98 153 268 896

#### Report No: MAT:NEW20W-3923--S12 Issue No: 1 **Material Test Report** Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provider letale only to the items tested or sampled. This report shall not be reproduced except in full. McCloy Project Management Pty Ltd PO Box 2214 Client: Dangar NSW 2309 ΝΑΤΑ Cull B NEW19P-0143A Project No.: Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - The Gardens, Stage 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 30/11/2020

## **Sample Details**

| -                 |                                   |  |
|-------------------|-----------------------------------|--|
| Sample ID:        | NEW20W-3923S12                    |  |
| Sampling Method:  | Sampled by Engineering Department |  |
| Date Sampled:     | 16/11/2020                        |  |
| Source:           | On-Site                           |  |
| Material:         | CLAY                              |  |
| Specification:    | No Specification                  |  |
| Project Location: | 688 - 730 Medowie Road, Medowie   |  |
| Sample Location:  | BH210 - 0.70 to 0.90m             |  |

## Test Results

| Test Nesults         |               |            |        |
|----------------------|---------------|------------|--------|
| Description          | Method        | Result     | Limits |
| Sample History       | AS 1289.1.1   | Oven-dried |        |
| Preparation          | AS 1289.1.1   | Dry Sieved |        |
| Linear Shrinkage (%) | AS 1289.3.4.1 | 12.5       |        |
| Mould Length (mm)    |               | 250        |        |
| Crumbling            |               | No         |        |
| Curling              |               | No         |        |
| Cracking             |               | Yes        |        |
| Liquid Limit (%)     | AS 1289.3.1.1 | 56         |        |
| Method               |               | Four Point |        |
| Plastic Limit (%)    | AS 1289.3.2.1 | 28         |        |
| Plasticity Index (%) | AS 1289.3.3.1 | 28         |        |
| Date Tested          |               | 26/11/2020 |        |

## Comments

## **APPENDIX C:**

## **CSIRO** Sheet BTF 18

Foundation Maintenance and Footing Performance: A Homeowner's Guide

# Foundation Maintenance and Footing Performance: A Homeowner's Guide



BTF 18 replaces Information Sheet 10/91

Buildings can and often do move. This movement can be up, down, lateral or rotational. The fundamental cause of movement in buildings can usually be related to one or more problems in the foundation soil. It is important for the homeowner to identify the soil type in order to ascertain the measures that should be put in place in order to ensure that problems in the foundation soil can be prevented, thus protecting against building movement.

This Building Technology File is designed to identify causes of soil-related building movement, and to suggest methods of prevention of resultant cracking in buildings.

### Soil Types

The types of soils usually present under the topsoil in land zoned for residential buildings can be split into two approximate groups – granular and clay. Quite often, foundation soil is a mixture of both types. The general problems associated with soils having granular content are usually caused by erosion. Clay soils are subject to saturation and swell/shrink problems.

Classifications for a given area can generally be obtained by application to the local authority, but these are sometimes unreliable and if there is doubt, a geotechnical report should be commissioned. As most buildings suffering movement problems are founded on clay soils, there is an emphasis on classification of soils according to the amount of swell and shrinkage they experience with variations of water content. The table below is Table 2.1 from AS 2870, the Residential Slab and Footing Code.

## **Causes of Movement**

#### Settlement due to construction

There are two types of settlement that occur as a result of construction:

- Immediate settlement occurs when a building is first placed on its foundation soil, as a result of compaction of the soil under the weight of the structure. The cohesive quality of clay soil mitigates against this, but granular (particularly sandy) soil is susceptible.
- Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compressive or shear stresses. This will usually take place during the first few months after construction, but has been known to take many years in exceptional cases.

These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction. Building Technology File 19 (BTF 19) deals with these problems.

#### Erosion

All soils are prone to erosion, but sandy soil is particularly susceptible to being washed away. Even clay with a sand component of say 10% or more can suffer from erosion.

#### Saturation

This is particularly a problem in clay soils. Saturation creates a boglike suspension of the soil that causes it to lose virtually all of its bearing capacity. To a lesser degree, sand is affected by saturation because saturated sand may undergo a reduction in volume – particularly imported sand fill for bedding and blinding layers. However, this usually occurs as immediate settlement and should normally be the province of the builder.

#### Seasonal swelling and shrinkage of soil

All clays react to the presence of water by slowly absorbing it, making the soil increase in volume (see table below). The degree of increase varies considerably between different clays, as does the degree of decrease during the subsequent drying out caused by fair weather periods. Because of the low absorption and expulsion rate, this phenomenon will not usually be noticeable unless there are prolonged rainy or dry periods, usually of weeks or months, depending on the land and soil characteristics.

The swelling of soil creates an upward force on the footings of the building, and shrinkage creates subsidence that takes away the support needed by the footing to retain equilibrium.

#### Shear failure

This phenomenon occurs when the foundation soil does not have sufficient strength to support the weight of the footing. There are two major post-construction causes:

- Significant load increase.
- Reduction of lateral support of the soil under the footing due to erosion or excavation.
- In clay soil, shear failure can be caused by saturation of the soil adjacent to or under the footing.

| GENERAL DEFINITIONS OF SITE CLASSES |   |  |  |
|-------------------------------------|---|--|--|
| Class                               | Foundation  |  |  |
| А                                   | Most sand and rock sites with little or no ground movement from moisture changes  |  |  |
| S                                   | Slightly reactive clay sites with only slight ground movement from moisture changes   |  |  |
| М                                   | Moderately reactive clay or silt sites, which can experience moderate ground movement from moisture changes   |  |  |
| Н                                   | Highly reactive clay sites, which can experience high ground movement from moisture changes   |  |  |
| Е                                   | Extremely reactive sites, which can experience extreme ground movement from moisture changes  |  |  |
| A to P                              | Filled sites  |  |  |
| Р                                   | Sites which include soft soils, such as soft clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soils subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise |  |  |

#### Tree root growth

Trees and shrubs that are allowed to grow in the vicinity of footings can cause foundation soil movement in two ways:

- · Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.
- Roots in the vicinity of footings will absorb much of the moisture in the foundation soil, causing shrinkage or subsidence.

#### **Unevenness of Movement**

The types of ground movement described above usually occur unevenly throughout the building's foundation soil. Settlement due to construction tends to be uneven because of:

- Differing compaction of foundation soil prior to construction.
- · Differing moisture content of foundation soil prior to construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where subfloor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure

Seasonal swelling and shrinkage of clay soil affects the perimeter of the building first, then gradually spreads to the interior. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Swelling gradually reaches the interior soil as absorption continues. Shrinkage usually begins where the sun's heat is greatest.

## Effects of Uneven Soil Movement on Structures

#### **Erosion and saturation**

Erosion removes the support from under footings, tending to create subsidence of the part of the structure under which it occurs. Brickwork walls will resist the stress created by this removal of support by bridging the gap or cantilevering until the bricks or the mortar bedding fail. Older masonry has little resistance. Evidence of failure varies according to circumstances and symptoms may include:

- Step cracking in the mortar beds in the body of the wall or above/below openings such as doors or windows.
- Vertical cracking in the bricks (usually but not necessarily in line with the vertical beds or perpends).

Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

#### Seasonal swelling/shrinkage in clay

Swelling foundation soil due to rainy periods first lifts the most exposed extremities of the footing system, then the remainder of the perimeter footings while gradually permeating inside the building footprint to lift internal footings. This swelling first tends to create a dish effect, because the external footings are pushed higher than the internal ones.

The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally there may be visible dishing of the hip or ridge lines.

As the moisture absorption process completes its journey to the innermost areas of the building, the internal footings will rise. If the spread of moisture is roughly even, it may be that the symptoms will temporarily disappear, but it is more likely that swelling will be uneven, creating a difference rather than a disappearance in symptoms. In buildings with timber flooring supported by bearers and joists, the isolated piers will rise more easily than the strip footings or piers under walls, creating noticeable doming of flooring.



As the weather pattern changes and the soil begins to dry out, the external footings will be first affected, beginning with the locations where the sun's effect is strongest. This has the effect of lowering the external footings. The doming is accentuated and cracking reduces or disappears where it occurred because of dishing, but other cracks open up. The roof lines may become convex.

Doming and dishing are also affected by weather in other ways. In areas where warm, wet summers and cooler dry winters prevail, water migration tends to be toward the interior and doming will be accentuated, whereas where summers are dry and winters are cold and wet, migration tends to be toward the exterior and the underlying propensity is toward dishing.

#### Movement caused by tree roots

In general, growing roots will exert an upward pressure on footings, whereas soil subject to drying because of tree or shrub roots will tend to remove support from under footings by inducing shrinkage.

#### Complications caused by the structure itself

Most forces that the soil causes to be exerted on structures are vertical - i.e. either up or down. However, because these forces are seldom spread evenly around the footings, and because the building resists uneven movement because of its rigidity, forces are exerted from one part of the building to another. The net result of all these forces is usually rotational. This resultant force often complicates the diagnosis because the visible symptoms do not simply reflect the original cause. A common symptom is binding of doors on the vertical member of the frame.

#### Effects on full masonry structures

Brickwork will resist cracking where it can. It will attempt to span areas that lose support because of subsided foundations or raised points. It is therefore usual to see cracking at weak points, such as openings for windows or doors.

In the event of construction settlement, cracking will usually remain unchanged after the process of settlement has ceased.

With local shear or erosion, cracking will usually continue to develop until the original cause has been remedied, or until the subsidence has completely neutralised the affected portion of footing and the structure has stabilised on other footings that remain effective.

In the case of swell/shrink effects, the brickwork will in some cases return to its original position after completion of a cycle, however it is more likely that the rotational effect will not be exactly reversed, and it is also usual that brickwork will settle in its new position and will resist the forces trying to return it to its original position. This means that in a case where swelling takes place after construction and cracking occurs, the cracking is likely to at least partly remain after the shrink segment of the cycle is complete. Thus, each time the cycle is repeated, the likelihood is that the cracking will become wider until the sections of brickwork become virtually independent.

With repeated cycles, once the cracking is established, if there is no other complication, it is normal for the incidence of cracking to stabilise, as the building has the articulation it needs to cope with the problem. This is by no means always the case, however, and monitoring of cracks in walls and floors should always be treated seriously.

Upheaval caused by growth of tree roots under footings is not a simple vertical shear stress. There is a tendency for the root to also exert lateral forces that attempt to separate sections of brickwork after initial cracking has occurred.

#### Trees can cause shrinkage and damage

The normal structural arrangement is that the inner leaf of brickwork in the external walls and at least some of the internal walls (depending on the roof type) comprise the load-bearing structure on which any upper floors, ceilings and the roof are supported. In these cases, it is internally visible cracking that should be the main focus of attention, however there are a few examples of dwellings whose external leaf of masonry plays some supporting role, so this should be checked if there is any doubt. In any case, externally visible cracking is important as a guide to stresses on the structure generally, and it should also be remembered that the external walls must be capable of supporting themselves.

## Effects on framed structures

Timber or steel framed buildings are less likely to exhibit cracking due to swell/shrink than masonry buildings because of their flexibility. Also, the doming/dishing effects tend to be lower because of the lighter weight of walls. The main risks to framed buildings are encountered because of the isolated pier footings used under walls. Where erosion or saturation cause a footing to fall away, this can double the span which a wall must bridge. This additional stress can create cracking in wall linings, particularly where there is a weak point in the structure caused by a door or window opening. It is, however, unlikely that framed structures will be so stressed as to suffer serious damage without first exhibiting some or all of the above symptoms for a considerable period. The same warning period should apply in the case of upheaval. It should be noted, however, that where framed buildings are supported by strip footings there is only one leaf of brickwork and therefore the externally visible walls are the supporting structure for the building. In this case, the subfloor masonry walls can be expected to behave as full brickwork walls.

#### Effects on brick veneer structures

Because the load-bearing structure of a brick veneer building is the frame that makes up the interior leaf of the external walls plus perhaps the internal walls, depending on the type of roof, the building can be expected to behave as a framed structure, except that the external masonry will behave in a similar way to the external leaf of a full masonry structure.

## Water Service and Drainage

Where a water service pipe, a sewer or stormwater drainage pipe is in the vicinity of a building, a water leak can cause erosion, swelling or saturation of susceptible soil. Even a minuscule leak can be enough to saturate a clay foundation. A leaking tap near a building can have the same effect. In addition, trenches containing pipes can become watercourses even though backfilled, particularly where broken rubble is used as fill. Water that runs along these trenches can be responsible for serious erosion, interstrata seepage into subfloor areas and saturation.

Pipe leakage and trench water flows also encourage tree and shrub roots to the source of water, complicating and exacerbating the problem.

Poor roof plumbing can result in large volumes of rainwater being concentrated in a small area of soil:

 Incorrect falls in roof guttering may result in overflows, as may gutters blocked with leaves etc.

- Corroded guttering or downpipes can spill water to ground.
- Downpipes not positively connected to a proper stormwater collection system will direct a concentration of water to soil that is directly adjacent to footings, sometimes causing large-scale problems such as erosion, saturation and migration of water under the building.

### Seriousness of Cracking

In general, most cracking found in masonry walls is a cosmetic nuisance only and can be kept in repair or even ignored. The table below is a reproduction of Table C1 of AS 2870.

AS 2870 also publishes figures relating to cracking in concrete floors, however because wall cracking will usually reach the critical point significantly earlier than cracking in slabs, this table is not reproduced here.

#### Prevention/Cure

#### Plumbing

Where building movement is caused by water service, roof plumbing, sewer or stormwater failure, the remedy is to repair the problem. It is prudent, however, to consider also rerouting pipes away from the building where possible, and relocating taps to positions where any leakage will not direct water to the building vicinity. Even where gully traps are present, there is sometimes sufficient spill to create erosion or saturation, particularly in modern installations using smaller diameter PVC fixtures. Indeed, some gully traps are not situated directly under the taps that are installed to charge them, with the result that water from the tap may enter the backfilled trench that houses the sewer piping. If the trench has been poorly backfilled, the water will either pond or flow along the bottom of the trench. As these trenches usually run alongside the footings and can be at a similar depth, it is not hard to see how any water that is thus directed into a trench can easily affect the foundation's ability to support footings or even gain entry to the subfloor area.

#### Ground drainage

In all soils there is the capacity for water to travel on the surface and below it. Surface water flows can be established by inspection during and after heavy or prolonged rain. If necessary, a grated drain system connected to the stormwater collection system is usually an easy solution.

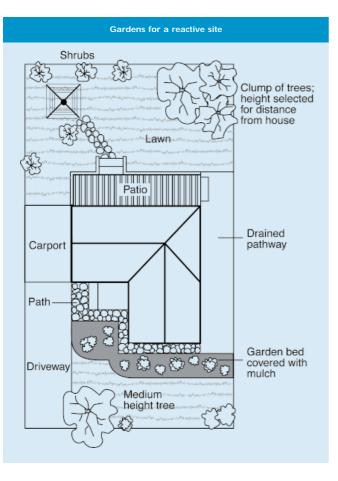
It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

## Protection of the building perimeter

It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

For this reason, particularly where problems exist or are likely to occur, it is recommended that an apron of paving be installed around as much of the building perimeter as necessary. This paving

| CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS  |  |                    |  |  |  |
|---|--|--------------------|--|--|--|
| Description of typical damage and required repair   | Approximate crack width<br>limit (see Note 3)                | Damage<br>category |  |  |  |
| Hairline cracks   | <0.1 mm  | 0                  |  |  |  |
| Fine cracks which do not need repair  | <1 mm  | 1                  |  |  |  |
| Cracks noticeable but easily filled. Doors and windows stick slightly   | <5 mm  | 2                  |  |  |  |
| Cracks can be repaired and possibly a small amount of wall will need<br>to be replaced. Doors and windows stick. Service pipes can fracture.<br>Weathertightness often impaired   | 5–15 mm (or a number of cracks<br>3 mm or more in one group) | 3                  |  |  |  |
| Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted | 15–25 mm but also depend<br>on number of cracks              | 4                  |  |  |  |



should extend outwards a minimum of 900 mm (more in highly reactive soil) and should have a minimum fall away from the building of 1:60. The finished paving should be no less than 100 mm below brick vent bases.

It is prudent to relocate drainage pipes away from this paving, if possible, to avoid complications from future leakage. If this is not practical, earthenware pipes should be replaced by PVC and backfilling should be of the same soil type as the surrounding soil and compacted to the same density.

Except in areas where freezing of water is an issue, it is wise to remove taps in the building area and relocate them well away from the building – preferably not uphill from it (see BTF 19).

It may be desirable to install a grated drain at the outside edge of the paving on the uphill side of the building. If subsoil drainage is needed this can be installed under the surface drain.

#### Condensation

In buildings with a subfloor void such as where bearers and joists support flooring, insufficient ventilation creates ideal conditions for condensation, particularly where there is little clearance between the floor and the ground. Condensation adds to the moisture already present in the subfloor and significantly slows the process of drying out. Installation of an adequate subfloor ventilation system, either natural or mechanical, is desirable.

*Warning:* Although this Building Technology File deals with cracking in buildings, it should be said that subfloor moisture can result in the development of other problems, notably:

- Water that is transmitted into masonry, metal or timber building elements causes damage and/or decay to those elements.
- High subfloor humidity and moisture content create an ideal environment for various pests, including termites and spiders.
- Where high moisture levels are transmitted to the flooring and walls, an increase in the dust mite count can ensue within the living areas. Dust mites, as well as dampness in general, can be a health hazard to inhabitants, particularly those who are abnormally susceptible to respiratory ailments.

#### The garden

The ideal vegetation layout is to have lawn or plants that require only light watering immediately adjacent to the drainage or paving edge, then more demanding plants, shrubs and trees spread out in that order.

Overwatering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

#### **Existing trees**

Where a tree is causing a problem of soil drying or there is the existence or threat of upheaval of footings, if the offending roots are subsidiary and their removal will not significantly damage the tree, they should be severed and a concrete or metal barrier placed vertically in the soil to prevent future root growth in the direction of the building. If it is not possible to remove the relevant roots without damage to the tree, an application to remove the tree should be made to the local authority. A prudent plan is to transplant likely offenders before they become a problem.

#### Information on trees, plants and shrubs

State departments overseeing agriculture can give information regarding root patterns, volume of water needed and safe distance from buildings of most species. Botanic gardens are also sources of information. For information on plant roots and drains, see Building Technology File 17.

#### Excavation

Excavation around footings must be properly engineered. Soil supporting footings can only be safely excavated at an angle that allows the soil under the footing to remain stable. This angle is called the angle of repose (or friction) and varies significantly between soil types and conditions. Removal of soil within the angle of repose will cause subsidence.

#### Remediation

Where erosion has occurred that has washed away soil adjacent to footings, soil of the same classification should be introduced and compacted to the same density. Where footings have been undermined, augmentation or other specialist work may be required. Remediation of footings and foundations is generally the realm of a specialist consultant.

Where isolated footings rise and fall because of swell/shrink effect, the homeowner may be tempted to alleviate floor bounce by filling the gap that has appeared between the bearer and the pier with blocking. The danger here is that when the next swell segment of the cycle occurs, the extra blocking will push the floor up into an accentuated dome and may also cause local shear failure in the soil. If it is necessary to use blocking, it should be by a pair of fine wedges and monitoring should be carried out fortnightly.

This BTF was prepared by John Lewer FAIB, MIAMA, Partner, Construction Diagnosis.

The information in this and other issues in the series was derived from various sources and was believed to be correct when published.

The information is advisory. It is provided in good faith and not claimed to be an exhaustive treatment of the relevant subject.

Further professional advice needs to be obtained before taking any action based on the information provided.

Distributed by

CSIRO PUBLISHING PO Box 1139, Collingwood 3066, Australia Freecall 1800 645 051 Tel (03) 9662 7666 Fax (03) 9662 7555 www.publish.csiro.au Email: publishing.sales@csiro.au

© CSIRO 2003. Unauthorised copying of this Building Technology file is prohibited