

**PERCOLATION TEST REPORT**  
**UPON**  
**LAND OFF**  
**COBGATE, WHAPLODE,**  
**LINCOLNSHIRE, PE12 6UL**  
**PROJECT No: SW 20-142**  
**DOCUMENT REF: SW 20-142-REP-03**



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## CONTENTS

|                                        |    |
|----------------------------------------|----|
| 1. INTRODUCTION .....                  | 2  |
| 2. LOCATION & DESCRIPTION OF SITE..... | 3  |
| 2.1. Site Location.....                | 3  |
| 2.2. Site Description .....            | 3  |
| 2.3. Geological Description.....       | 3  |
| 3. PERCOLATION TESTS .....             | 4  |
| 4. INFILTRATION TEST RESULTS.....      | 4  |
| 5. DISCUSSIONS .....                   | 5  |
| APPENDIX A.....                        | 6  |
| APPENDIX B.....                        | 8  |
| APPENDIX C .....                       | 10 |
| APPENDIX D .....                       | 12 |
| APPENDIX E.....                        | 25 |
| APPENDIX F .....                       | 27 |

## 1. INTRODUCTION

Acting upon the instruction of Mr Adrian Brotherton of Highgrove Homes, we attended site on 04<sup>th</sup> March 2021, the purpose being to observe the underlying ground conditions and determine the percolation characteristics and infiltration rates of the soil strata.

Percolation tests were undertaken in accordance with the method described within BRE digest 365 (2007 edition)

The opinions and comments expressed within this report are based upon ground conditions encountered in the trial pits excavated at the time of our visit.

Shields Wilson have previously undertaken geotechnical ground investigation upon the site and further details on the plots history and ground conditions can be found within this report, reference SW20-142-GI-01.

This report has been prepared for the named client above and should not be relied upon by any other parties, with the exception of the client's professional advisors, for any use without the express written permission of Shields Wilson Limited.

## 2. LOCATION & DESCRIPTION OF SITE

### 2.1. Site Location

The site is situated to the south of Cobgate, Whaplode. Appropriate national grid reference TF 320 237.

A Location plan is contained with Appendix A.

### 2.2. Site Description

The site currently stands as multiple rear gardens off Cobgate.

The North of the site will be bound by existing properties off Cobgate.

The Eastern Boundary is boarded by dense hedgerow and a close boarded fence, which separates the proposed site with an existing haulage yard.

The West of the site is boarded by a well-established hedge line and trees, along with close boarded fencing, separating the proposed site from existing neighbouring gardens and residential properties.

The Southern boundary is formed with a line of established trees and shared with a neighbouring field that is used for arable farming.

At the time of our visit the weather was dry and clear, however there had been some precipitation in the days leading up to the visit.

### 2.3. Geological Description

Desktop study of the area has been undertaken using the British Geological Society Maps.

The maps indicate the site to be underlain by superficial tidal flat deposits of Sand and Silt over the Ampthill Clay (Mudstone) formation.

This information is based upon publicly available records. An extract is contained with Appendix C.

The site is underlain by slightly silty fine sand as described in our report SW20-142-GI-01.

### 3. PERCOLATION TESTS

Two No. percolation tests were undertaken in accordance with the test methodology within BRE digest 365 (2007 edition).

The ground conditions are proven to be consistent across the site by the original ground investigation report and as such two test holes one either side of the site was deemed an appropriate test sample.

SA01 was Undertaken adjacent the Eastern Boundary of the site and SA02 was undertaken to the West of the site.

In accordance with BRE 365 the test pits were refilled 3 times. This could not be achieved on the same day and as such the third test was undertaken early the morning following the first two.

Logs of the test and subsequent result calculations are contained within Appendix D, Appendix E contains a photographic record.

### 4. INFILTRATION TEST RESULTS

Results are summarised and tabulated below

| Test Pit    | Test 1               | Test 2               | Test 3               |
|-------------|----------------------|----------------------|----------------------|
| Eastern Pit | $4.6 \times 10^{-6}$ | $5.3 \times 10^{-6}$ | $6.3 \times 10^{-6}$ |
| Western Pit | $8.0 \times 10^{-6}$ | $5.3 \times 10^{-6}$ | $6.4 \times 10^{-6}$ |

The results are average for infiltration in the South Holland area and demonstrate that the underlying geology on the site is suitable for infiltration.

## 5. DISCUSSIONS

The development proposes to dispose of its run-off surface water utilising, as outlined with our drainage strategy report, reference SW21-142-REP-02.

Within the drainage strategy report there is an example surface water soakaway calculation. This calculation utilised an assumed worst case infiltration rate of  $1 \times 10^{-6}$ .

An updated calculation utilising the worst case calculated Infiltration rate is contained within Appendix F. This calculation demonstrates that a reasonably sized shallow garden soakaway will provide ample drainage in accordance with BRE 365 for the roof run-off.

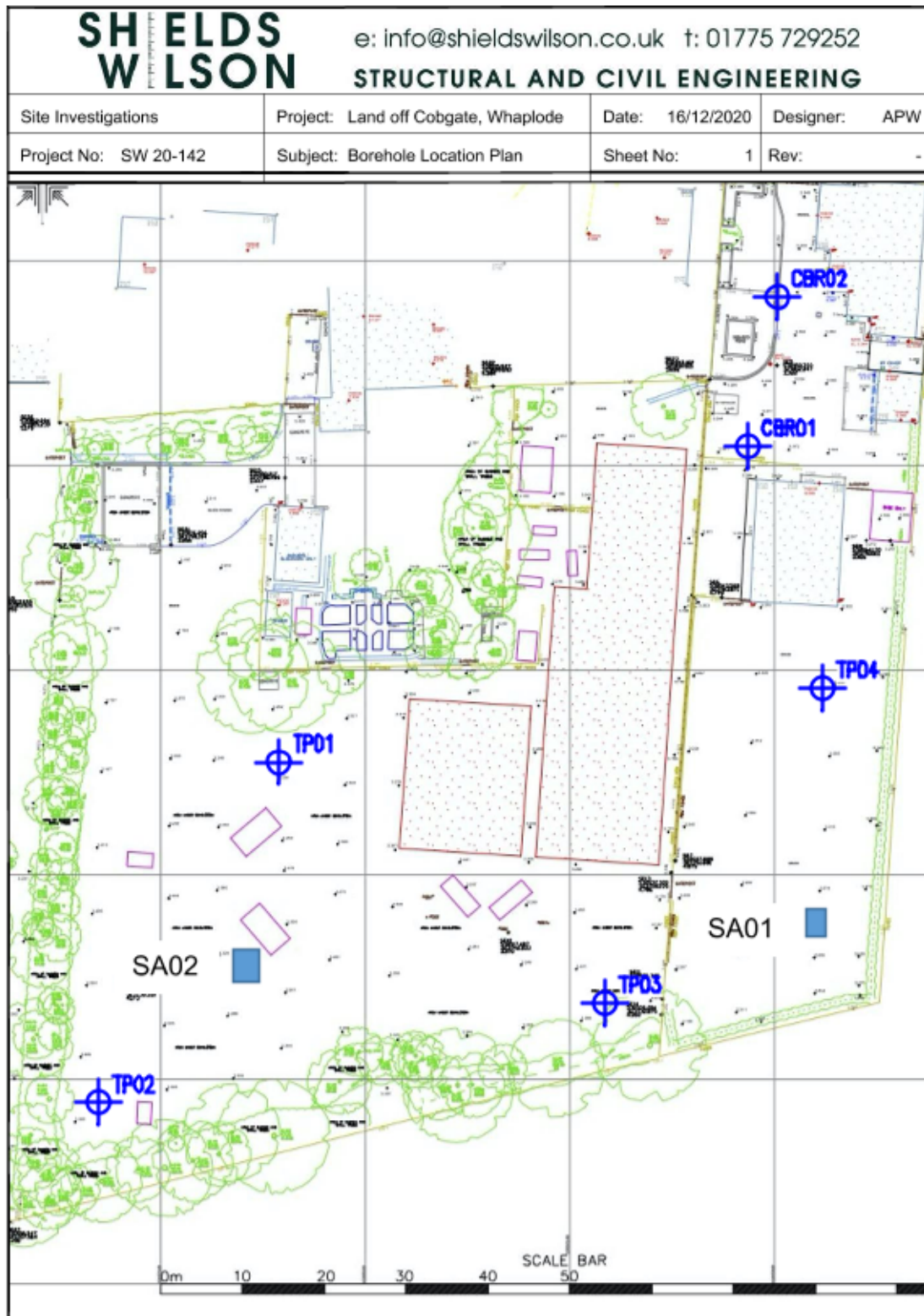
The value determined by calculation is over 4 times better than this assumed value, as such the testing has validated the proposals within the drainage strategy.

For and on behalf of **SHIELDS WILSON LIMITED**

**A.P.Wilson CEng MIStructE**

**11<sup>th</sup> March 2021.**

## APPENDIX A



Copyright Shields Wilson Limited.

## APPENDIX B

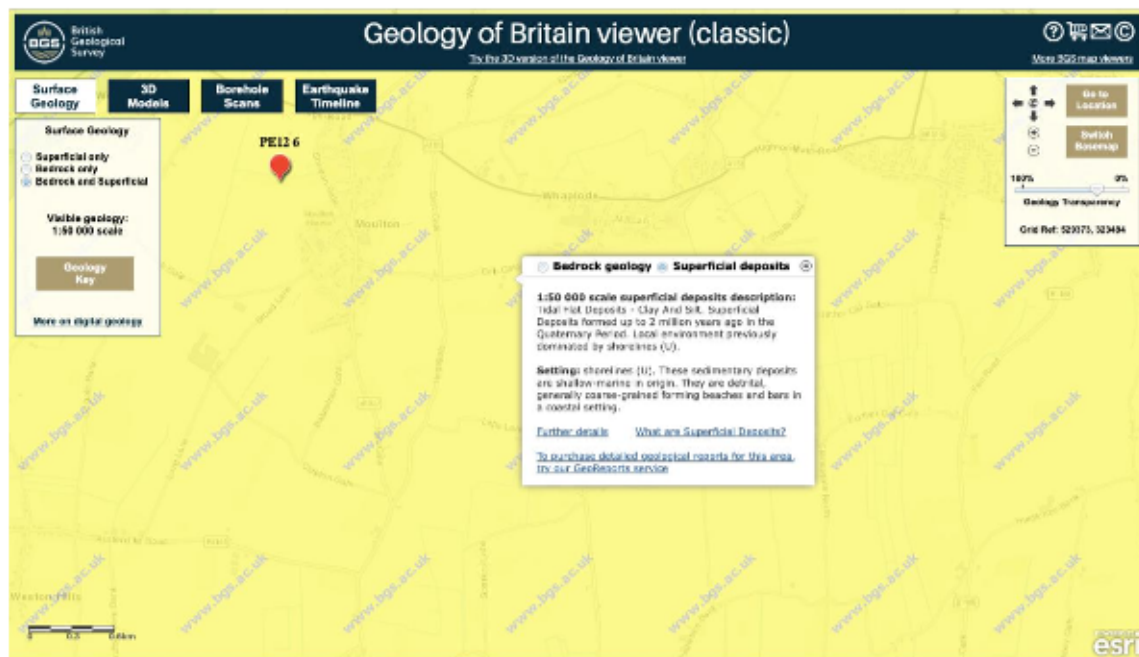


Extract of OS County Series 1968-1970

## APPENDIX C



Extract British Geological Society Maps – Bedrock Geology

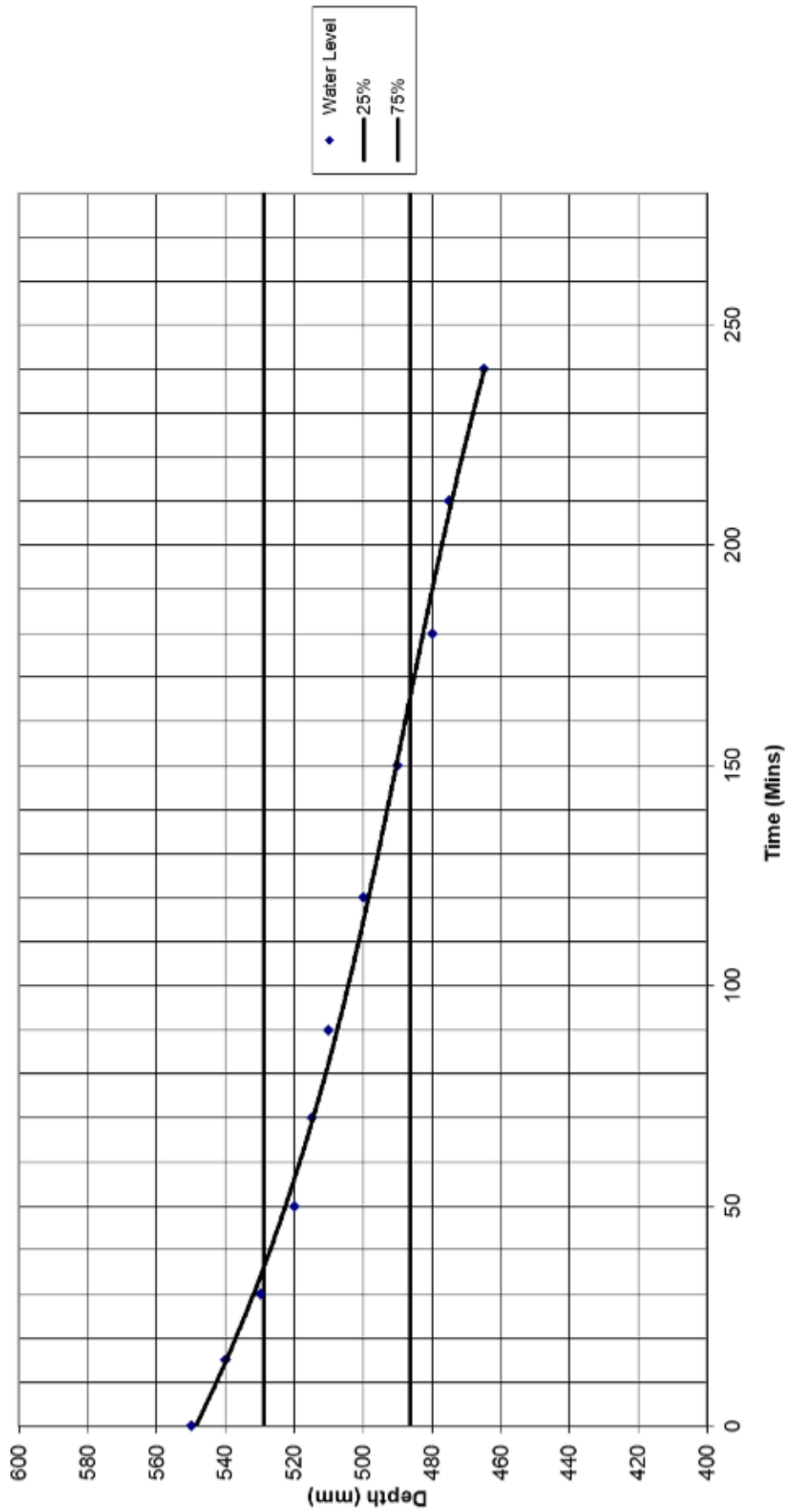


Extract British Geological Society Maps – Superficial Deposits

## APPENDIX D

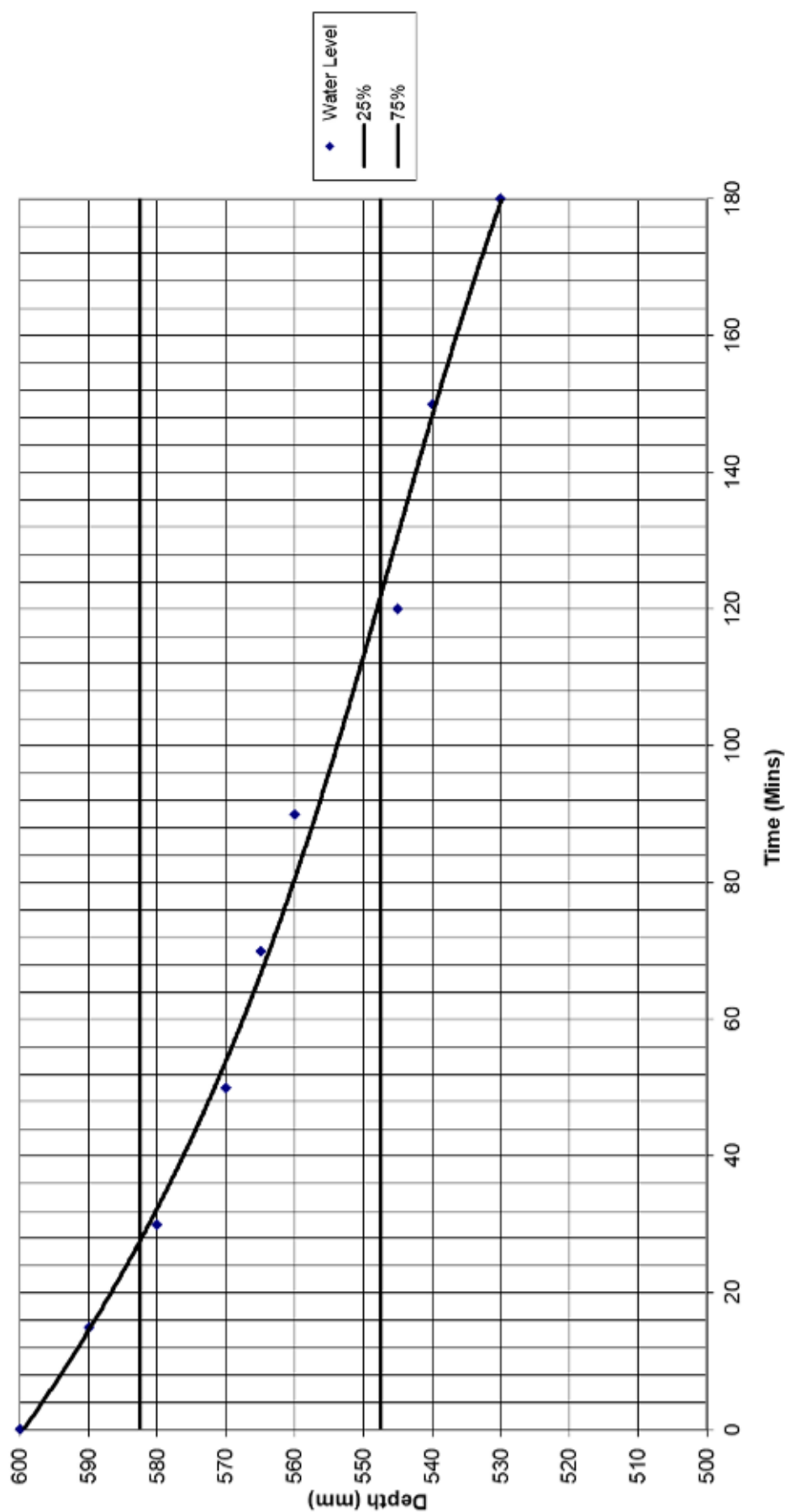
|                                                         |                |                |  |
|---------------------------------------------------------|----------------|----------------|--|
| SA01                                                    |                |                |  |
| TIME (Mins)                                             | DEPTH mm (d)   |                |  |
| 0                                                       | 550            |                |  |
| 15                                                      | 540            |                |  |
| 30                                                      | 530            |                |  |
| 50                                                      | 520            |                |  |
| 70                                                      | 515            |                |  |
| 90                                                      | 510            |                |  |
| 120                                                     | 500            |                |  |
| 150                                                     | 490            |                |  |
| 180                                                     | 480            |                |  |
| 210                                                     | 475            |                |  |
| 240                                                     | 465            |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
| <b><u>Trial Dimensions</u></b>                          |                |                |  |
| A =                                                     | 1.4            | m              |  |
| B =                                                     | 0.6            | m              |  |
| C =                                                     | 1.1            | m              |  |
| C.S.Area of<br>SA01 =                                   | 0.84           | m <sup>2</sup> |  |
| Total Volume =                                          | 0.071          | m <sup>3</sup> |  |
| 75% Volume =                                            | 0.054          | m <sup>3</sup> |  |
| 25% Volume =                                            | 0.018          | m <sup>3</sup> |  |
| Time Taken From 75% Volume to 25% Volume                |                |                |  |
| 128                                                     | Mins           |                |  |
| Effective Depth From 75% Volume to 25% Volume           |                |                |  |
| 0.0425                                                  | m              |                |  |
| 50% Effective Internal Surface Area Including Base area |                |                |  |
| 1.01                                                    | m <sup>2</sup> |                |  |
| Soil Infiltration rate, f                               |                |                |  |
| 4.602E-06                                               | m/s            |                |  |

Plot showing water level against time for Trench 1, test 1



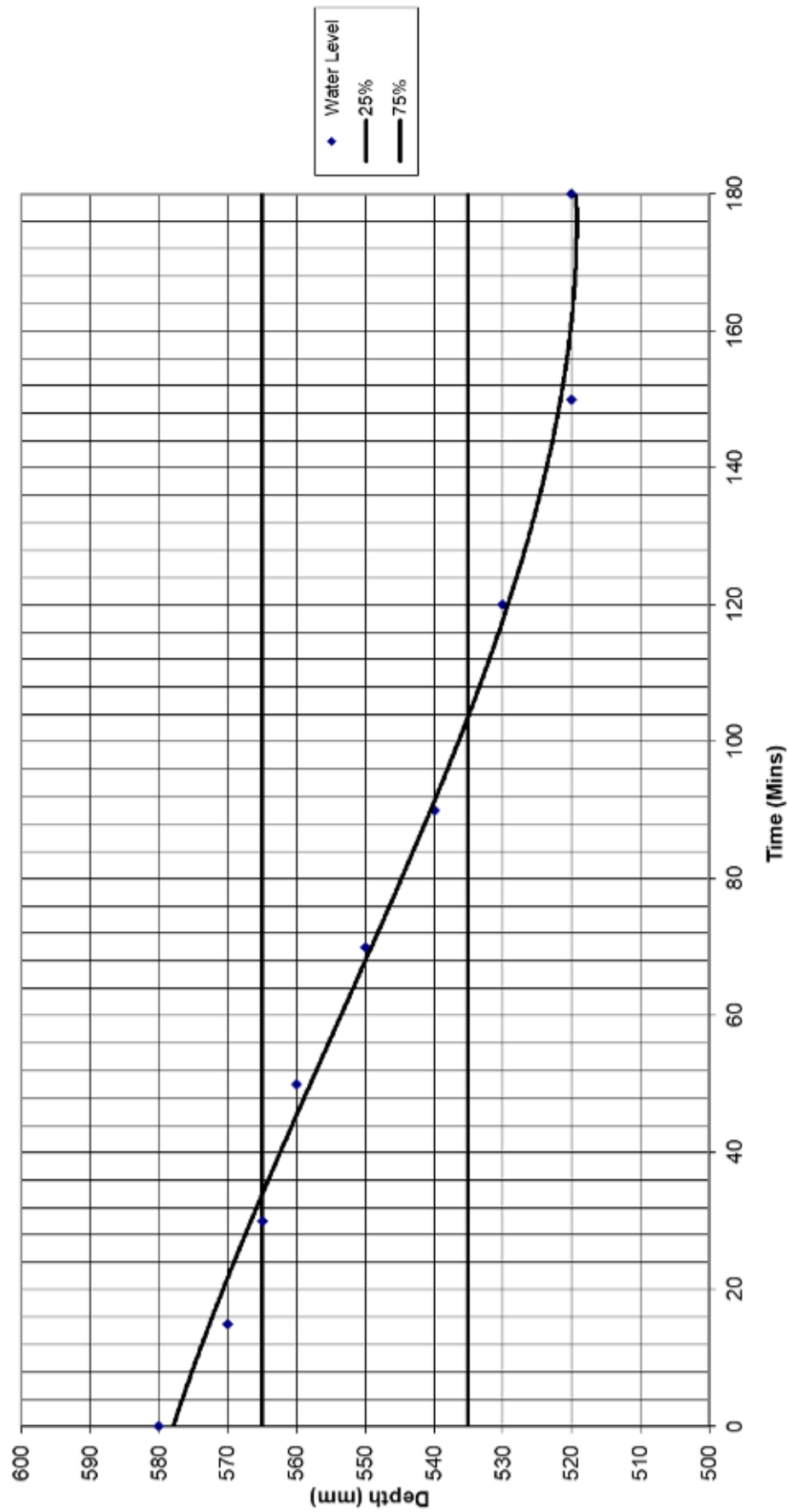
|                                                         |                |                |  |
|---------------------------------------------------------|----------------|----------------|--|
| SA01                                                    |                |                |  |
| TIME (Mins)                                             | DEPTH mm (d)   |                |  |
| 0                                                       | 600            |                |  |
| 15                                                      | 590            |                |  |
| 30                                                      | 580            |                |  |
| 50                                                      | 570            |                |  |
| 70                                                      | 565            |                |  |
| 90                                                      | 560            |                |  |
| 120                                                     | 545            |                |  |
| 150                                                     | 540            |                |  |
| 180                                                     | 530            |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
| <b><u>Trial Dimensions</u></b>                          |                |                |  |
| A =                                                     | 1.4            | m              |  |
| B =                                                     | 0.6            | m              |  |
| C =                                                     | 1.1            | m              |  |
| C.S.Area of<br>SA01 =                                   | 0.84           | m <sup>2</sup> |  |
| Total Volume =                                          | 0.059          | m <sup>3</sup> |  |
| 75% Volume =                                            | 0.044          | m <sup>3</sup> |  |
| 25%Volume =                                             | 0.015          | m <sup>3</sup> |  |
| Time Taken From 75% Volume to 25% Volume                |                |                |  |
| 95                                                      | Mins           |                |  |
| Effective Depth From 75% Volume to 25% Volume           |                |                |  |
| 0.035                                                   | m              |                |  |
| 50% Effective Internal Surface Area Including Base area |                |                |  |
| 0.98                                                    | m <sup>2</sup> |                |  |
| Soil Infiltration rate, f                               |                |                |  |
| 5.26E-06                                                | m/s            |                |  |

Plot showing water level against time for Trench 1, test 2



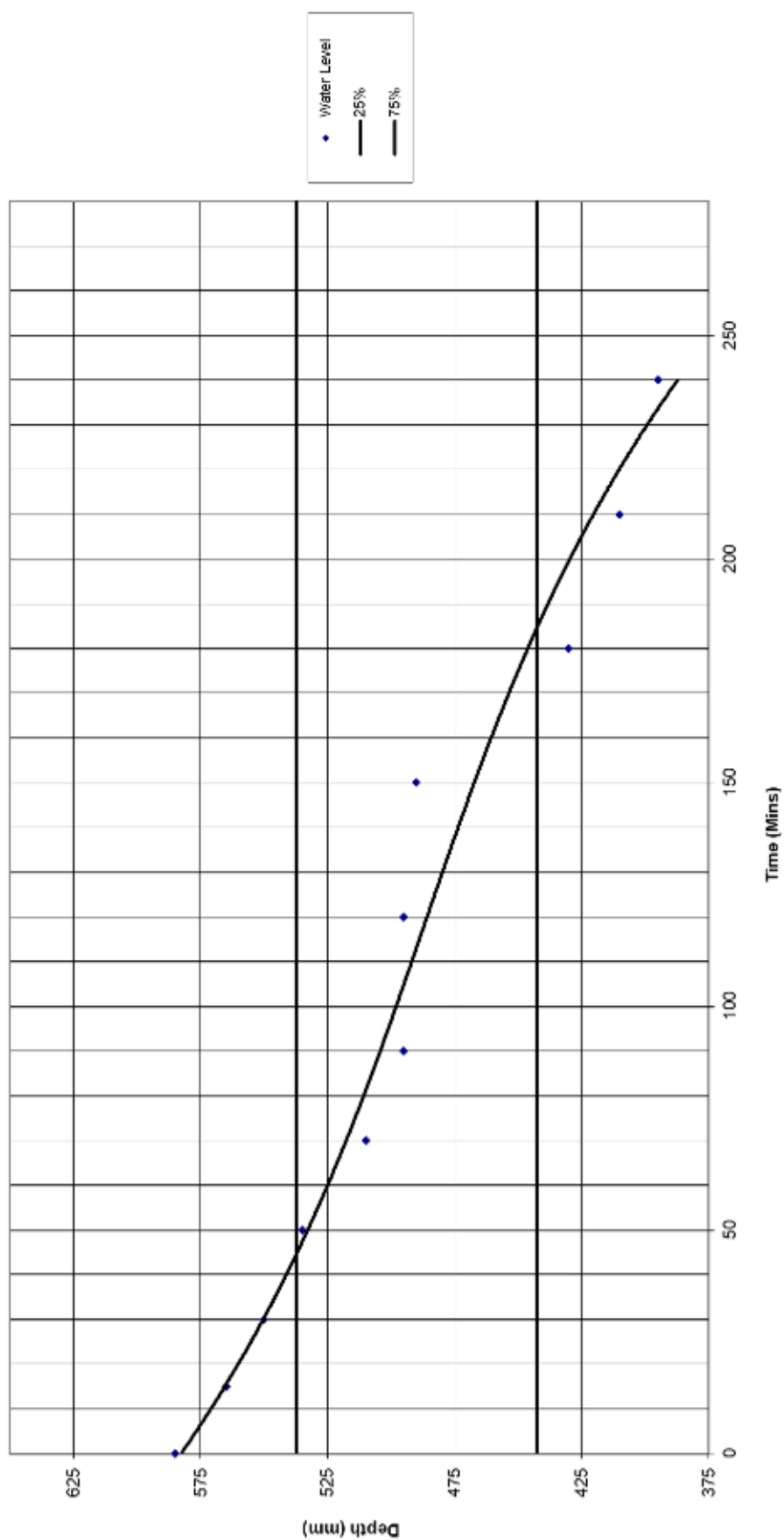
|                                                         |                |                |  |
|---------------------------------------------------------|----------------|----------------|--|
| SA01                                                    |                |                |  |
| TIME (Mins)                                             | DEPTH mm (d)   |                |  |
| 0                                                       | 580            |                |  |
| 15                                                      | 570            |                |  |
| 30                                                      | 565            |                |  |
| 50                                                      | 560            |                |  |
| 70                                                      | 550            |                |  |
| 90                                                      | 540            |                |  |
| 120                                                     | 530            |                |  |
| 150                                                     | 520            |                |  |
| 180                                                     | 520            |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
| <b><u>Trial Dimensions</u></b>                          |                |                |  |
| A =                                                     | 1.4            | m              |  |
| B =                                                     | 0.6            | m              |  |
| C =                                                     | 1.1            | m              |  |
| C.S.Area of<br>SA01 =                                   | 0.84           | m <sup>2</sup> |  |
| Total Volume =                                          | 0.050          | m <sup>3</sup> |  |
| 75% Volume =                                            | 0.038          | m <sup>3</sup> |  |
| 25% Volume =                                            | 0.013          | m <sup>3</sup> |  |
| Time Taken From 75% Volume to 25% Volume                |                |                |  |
| 70                                                      | Mins           |                |  |
| Effective Depth From 75% Volume to 25% Volume           |                |                |  |
| 0.03                                                    | m              |                |  |
| 50% Effective Internal Surface Area Including Base area |                |                |  |
| 0.96                                                    | m <sup>2</sup> |                |  |
| Soil Infiltration rate, f                               |                |                |  |
| 6.250E-06                                               | m/s            |                |  |

Plot showing water level against time for Trench 1, test 3



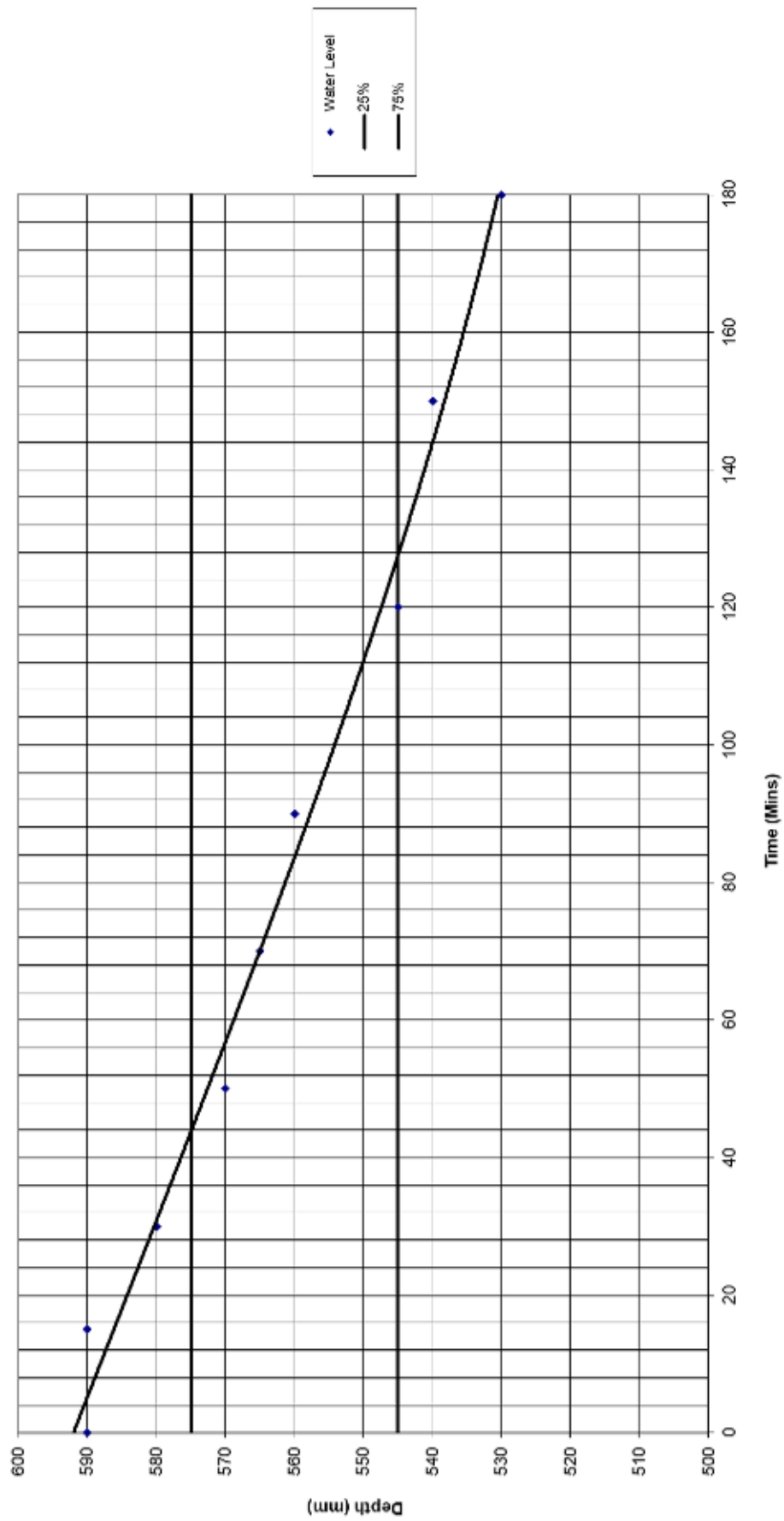
|                                                         |                |                |  |
|---------------------------------------------------------|----------------|----------------|--|
| SA02                                                    | Test 1         |                |  |
| TIME (Mins)                                             | DEPTH mm (d)   |                |  |
| 0                                                       | 585            |                |  |
| 15                                                      | 565            |                |  |
| 30                                                      | 550            |                |  |
| 50                                                      | 535            |                |  |
| 70                                                      | 510            |                |  |
| 90                                                      | 495            |                |  |
| 120                                                     | 495            |                |  |
| 150                                                     | 490            |                |  |
| 180                                                     | 430            |                |  |
| 210                                                     | 410            |                |  |
| 240                                                     | 395            |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
| <b><u>Trial Dimensions</u></b>                          |                |                |  |
| A =                                                     | 1.8            | m              |  |
| B =                                                     | 0.6            | m              |  |
| C =                                                     | 1.1            | m              |  |
| C.S.Area of<br>SA01 =                                   | 1.08           | m <sup>2</sup> |  |
| Total Volume =                                          | 0.205          | m <sup>3</sup> |  |
| 75% Volume =                                            | 0.154          | m <sup>3</sup> |  |
| 25% Volume =                                            | 0.051          | m <sup>3</sup> |  |
| Time Taken From 75% Volume to 25% Volume                |                |                |  |
| 140                                                     | Mins           |                |  |
| Effective Depth From 75% Volume to 25% Volume           |                |                |  |
| 0.095                                                   | m              |                |  |
| 50% Effective Internal Surface Area Including Base area |                |                |  |
| 1.536                                                   | m <sup>2</sup> |                |  |
| Soil Infiltration rate, f                               |                |                |  |
| 7.952E-06                                               | m/s            |                |  |

Plot showing water level against time for Trench 2, test 1



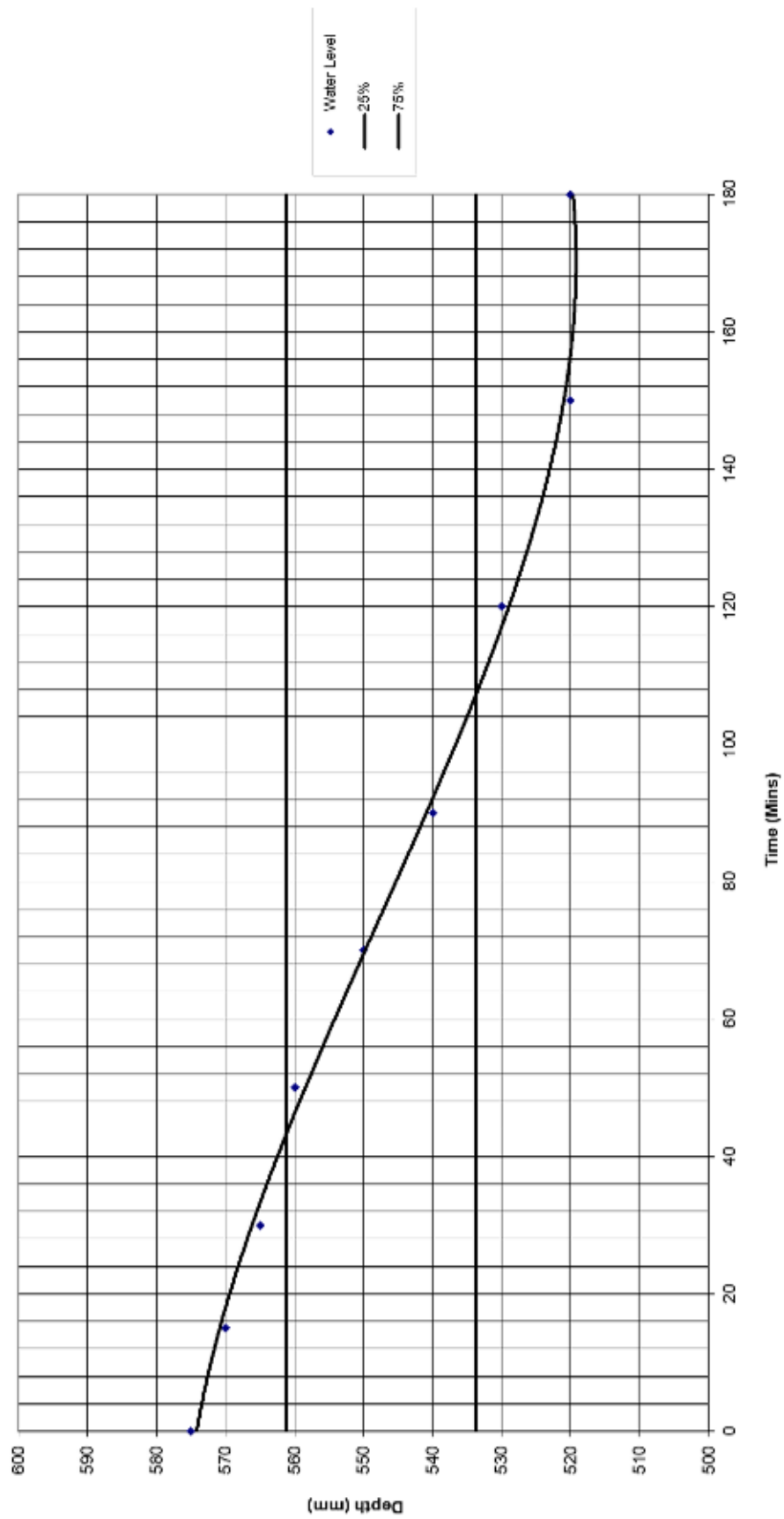
|                                                         |                |                |  |
|---------------------------------------------------------|----------------|----------------|--|
| SA02                                                    | Test 2         |                |  |
| TIME (Mins)                                             | DEPTH mm (d)   |                |  |
| 0                                                       | 590            |                |  |
| 15                                                      | 590            |                |  |
| 30                                                      | 580            |                |  |
| 50                                                      | 570            |                |  |
| 70                                                      | 565            |                |  |
| 90                                                      | 560            |                |  |
| 120                                                     | 545            |                |  |
| 150                                                     | 540            |                |  |
| 180                                                     | 530            |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
| <b><u>Trial Dimensions</u></b>                          |                |                |  |
| A =                                                     | 1.8            | m              |  |
| B =                                                     | 0.6            | m              |  |
| C =                                                     | 1.1            | m              |  |
| C.S.Area of<br>SA01 =                                   | 1.08           | m <sup>2</sup> |  |
| Total Volume =                                          | 0.065          | m <sup>3</sup> |  |
| 75% Volume =                                            | 0.049          | m <sup>3</sup> |  |
| 25%Volume =                                             | 0.016          | m <sup>3</sup> |  |
| Time Taken From 75% Volume to 25% Volume                |                |                |  |
| 84                                                      | Mins           |                |  |
| Effective Depth From 75% Volume to 25% Volume           |                |                |  |
| 0.03                                                    | m              |                |  |
| 50% Effective Internal Surface Area Including Base area |                |                |  |
| 1.224                                                   | m <sup>2</sup> |                |  |
| Soil Infiltration rate, f                               |                |                |  |
| 5.25E-06                                                | m/s            |                |  |

Plot showing water level against time for Trench 2, test 2



|                                                         |                |                |  |
|---------------------------------------------------------|----------------|----------------|--|
| SA02                                                    | Test 3         |                |  |
| TIME (Mins)                                             | DEPTH mm (d)   |                |  |
| 0                                                       | 575            |                |  |
| 15                                                      | 570            |                |  |
| 30                                                      | 565            |                |  |
| 50                                                      | 560            |                |  |
| 70                                                      | 550            |                |  |
| 90                                                      | 540            |                |  |
| 120                                                     | 530            |                |  |
| 150                                                     | 520            |                |  |
| 180                                                     | 520            |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
|                                                         |                |                |  |
| <b><u>Trial Dimensions</u></b>                          |                |                |  |
| A =                                                     | 1.4            | m              |  |
| B =                                                     | 0.6            | m              |  |
| C =                                                     | 1.1            | m              |  |
| C.S.Area of<br>SA01 =                                   | 0.84           | m <sup>2</sup> |  |
| Total Volume =                                          | 0.046          | m <sup>3</sup> |  |
| 75% Volume =                                            | 0.035          | m <sup>3</sup> |  |
| 25%Volume =                                             | 0.012          | m <sup>3</sup> |  |
| Time Taken From 75% Volume to 25% Volume                |                |                |  |
| 63                                                      | Mins           |                |  |
| Effective Depth From 75% Volume to 25% Volume           |                |                |  |
| 0.0275                                                  | m              |                |  |
| 50% Effective Internal Surface Area Including Base area |                |                |  |
| 0.95                                                    | m <sup>2</sup> |                |  |
| Soil Infiltration rate, f                               |                |                |  |
| 6.433E-06                                               | m/s            |                |  |

Plot showing water level against time for Trench 2, test 3



## APPENDIX E



## APPENDIX F

|                                                |                          |                                                      |                                                             |               |                      |
|------------------------------------------------|--------------------------|------------------------------------------------------|-------------------------------------------------------------|---------------|----------------------|
| <u>Job Details</u>                             |                          | SW20-142 - Residential development, Cobgate Whaplode |                                                             |               |                      |
| <u>Title</u>                                   |                          | Individual Plot                                      |                                                             |               |                      |
| <u>Calculated Infiltration Rate (m/s)</u>      |                          | 0.0000046                                            |                                                             |               |                      |
| <u>Design Rainfall - R</u>                     |                          | <u>Soakaway Dimensions</u>                           |                                                             |               |                      |
| M5-60                                          | Z1                       | <u>Polystorm crates</u>                              |                                                             | <u>Number</u> | <u>Total Lengths</u> |
| 0.02                                           | 1                        | <u>Width</u>                                         | 0.5                                                         | 6             | 3                    |
| M10-D                                          | Z2                       | <u>Length</u>                                        | 1                                                           | 3             | 3                    |
| 0.02                                           | 1.24                     | <u>Depth</u>                                         | 0.4                                                         | 1             | 0.4                  |
| <u>Half Effective</u>                          |                          | 0.2                                                  |                                                             |               |                      |
| R =                                            | 0.0248                   | m                                                    | <u>Internal Surface Area Not Including Base (50% depth)</u> |               |                      |
| <u>Inflow To Soakaway</u>                      |                          | 11.4 m <sup>2</sup>                                  |                                                             |               |                      |
| <u>Area (m<sup>2</sup>)</u>                    | x                        | <u>R</u>                                             | <u>Storage Volume</u>                                       |               |                      |
| 110                                            |                          | 0.0248                                               | 3.6 m <sup>3</sup>                                          |               |                      |
| <u>Inflow =</u>                                |                          | 2.728 m <sup>3</sup>                                 |                                                             |               |                      |
| <u>Outflow From Soakaway</u>                   |                          |                                                      |                                                             |               |                      |
| <u>Internal SA (50%)</u>                       | <u>Infiltration Rate</u> | <u>Storm Duration (s)</u>                            |                                                             |               |                      |
| 11.4                                           | 0.0000046                | 60                                                   | 60                                                          | 3600          |                      |
| <u>Outflow =</u>                               |                          | 0.188784 m <sup>3</sup>                              |                                                             |               |                      |
| <u>Storage Required</u>                        |                          | <u>Soakaway Has Been Designed For A</u>              |                                                             |               |                      |
| <u>Inflow -</u>                                | <u>Outflow</u>           | 10 Year Storm Of 60 Minute Duration                  |                                                             |               |                      |
| 2.728                                          | 0.188784                 | 2.539216                                             |                                                             |               |                      |
| <u>Storage Volume With 30% Free (Required)</u> |                          |                                                      |                                                             |               |                      |
| 3.3009808                                      |                          |                                                      |                                                             |               |                      |
| <u>Actual Storage Volume</u>                   |                          | <u>NB. Actual Storage Volume Needs To Be</u>         |                                                             |               |                      |
| 3.6                                            |                          | Greater Than Storage Volume + 30%                    |                                                             |               |                      |