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**Proposed Drainage Details  
Moss Cottage Macclesfield Road Rushton Spencer  
Application Ref DET/2020/0006**

**1. Introduction**

- 1.1 The application site recently gained consent for the aforementioned development, planning ref DET/2020/0006.
- 1.2 Condition 13 requires the submission of foul drainage details to BS EN 6297:2007+A1:2008 Code of practice for the design and installation of drainage fields for use in wastewater treatment.
- 1.3 This report includes the porosity test results and design calculations for the drainage field.

**2. Terminology:**

**2.1 Soakaway**

A soakaway is taken to mean a system for storing and slowly releasing rainwater from roofs and hard surfacing. Traditionally these were a pit, or a trench filled with rubble. Nowadays, prefabricated concrete soakaway chambers or modular plastic soakaway crates are often used.

**2.2 Drainage Field**

A Drainage Field is taken to mean a secondary treatment system used in conjunction with a septic tank or package treatment unit.

- 2.3 The two terms are sometimes used interchangeably, but the design and function of a drainage field is quite different to a surface water soakaway.

- 2.4 A drainage field is a relatively shallow construction with a closed loop of perforated pipes buried with the aerobic soil layer. Bacteria in the soil break down any residual organic matter. See Fig. 4.

- 2.5 A soakaway disperses rainwater below the upper soil layer.

### 3. Trail Pit Details

- 3.1 Initially trail pits 1 and 2 were excavated at the locations marked in Fig. 1.
- 3.2 The initial findings indicated that the percolate rate was relatively slow in Pit 1 relative to Pit 2.
- 3.3 An intermediate pit was therefore excavated at Pit 3.

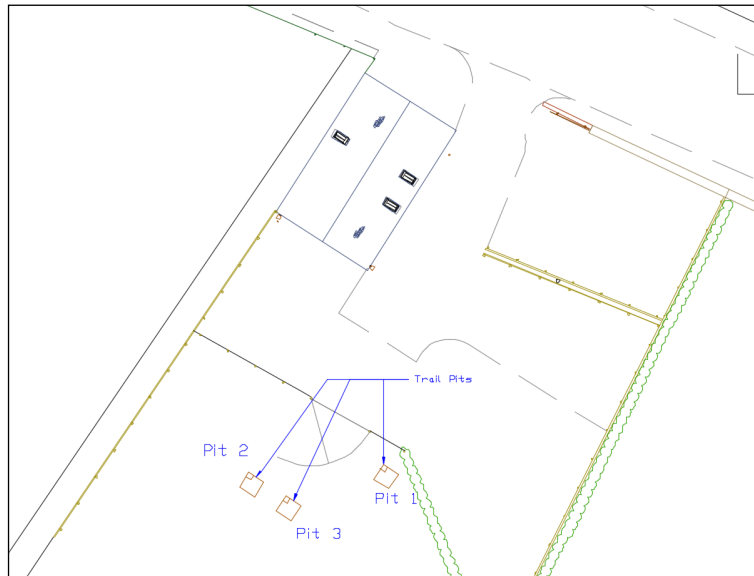


Fig. 1. Trial Pit Locations



Fig. 2. Trial Pits

- 3.4 The aerobic soil layer is approximately 600mm deep. The subsoil layer is sand.

Fig. 3. Trial Pit



- 3.5 Pit 1 comprises firm sand. Pits 2 and 3 softer sand.

Methodology

- 3.6 Each pit was excavated to a depth of 0.8 to 0.9m. A cubic hole with 0.3m sides was then excavated. A gauge was inserted, the square pit filled with water and the time to drain recorded.
- 3.7 Two recordings were made in Pits 2 and 3 with an additional measurement in the most likely candidate, Pit 1.
- 3.8 The Percolation Value  $V_p = \frac{t_{p75-25}}{d_{75-25}}$

where:  $t_{p75-25}$  = the time for the level to drop from 75 to 25% in seconds  
 $d_{75-25}$  = the depth between 75 and 25% in mm

### Results

- 3.9 The results are summarised in Table 1 below. Paragraph 1.38 of Building Regulation H1 state that average values of  $V_p$  should lie between 12 and 100. The minimum value ensures that untreated effluent cannot percolate too rapidly into groundwater. The deviating values are indicated in red.

| $V_p$   | Pit 1 | Pit 2 | Pit 2 |
|---------|-------|-------|-------|
| Test 1  | 30.3  | 6.2   | 7.3   |
| Test 2  | 67.4  | 5.8   | 8.6   |
| Test 3  | 15.9  |       |       |
| Average | 37.9  | 6.0   | 8.0   |

Table 1.

- 3.10 The average value of  $V_p$  of 37.9 for Pit 1 is mid range. A drainage field located in the harder subsoil layer encountered in the eastern part of the site would therefore perform satisfactorily. The range of individual values reflect different weather conditions and are within the required range.

### Drainage Field Calculation

- 3.11 For Package Treatment Units,  $A = P \times V_p \times 0.2$

where:  $A$  = the area of the drainage field  
 $P$  = Population,  $P$  for a house with three bedrooms = 5  
 $V_p$  = Percolation Value

$$A = 5 \times 37.9 \times 0.2 = 37.9\text{m}^2$$

Say  $40\text{m}^2$

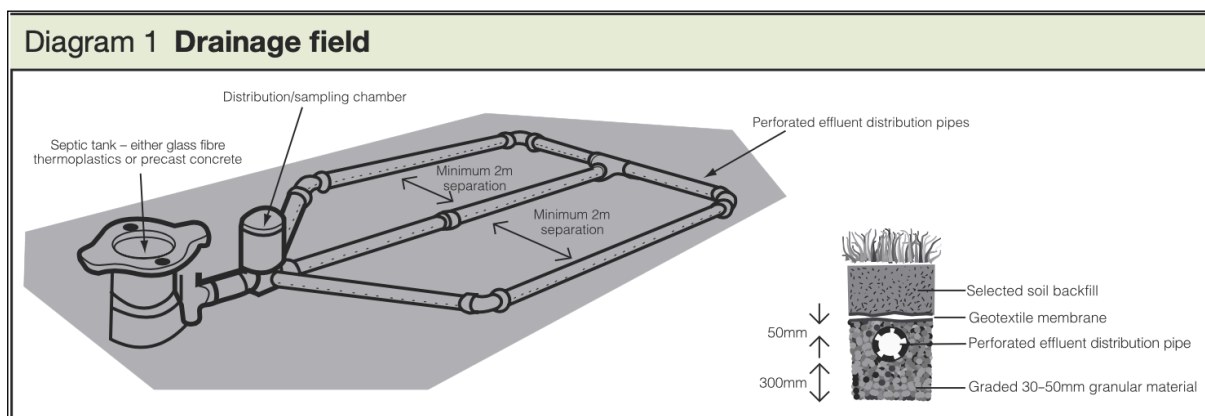


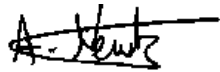
Fig. 4. Drainage Field

3.12 If each pipe is laid in a 600mm wide trench, this would equate to 67m of perforated pipe.

An arrangement with three parallel pipes in trenches 2m apart would cover an area 4.6m x 19m. See Fig. 4.

3.13 Please refer to the accompanying drainage plan for details.

3.14 Please refer to the accompanying test results, attached at Appendix 1

A handwritten signature in black ink, appearing to read 'A W Newby', with a horizontal line drawn through it.

A W Newby, B.Sc (Eng). DMS.  
PME Planning Services  
Wednesday, 9 June 2021

Infiltration Rate Calculations

| Site:                          | Moss Cottage, Macclesfield Road, Rushton Spencer, SK11 0QU |            |            |                    |            |            |                    |            |            |           |     |
|--------------------------------|------------------------------------------------------------|------------|------------|--------------------|------------|------------|--------------------|------------|------------|-----------|-----|
| Client:                        | Mr & Mrs A Hollies                                         |            |            |                    |            |            |                    |            |            |           |     |
|                                | Pit 1 Measurements                                         |            |            | Pit 2 Measurements |            |            | Pit 3 Measurements |            |            |           |     |
|                                | Test1                                                      | Test2      | Test3      | Average            | Test1      | Test2      | Average            | Test1      | Test2      | Average   |     |
| Date                           | 02/04/2021                                                 | 04/04/2021 | 30/05/2021 |                    | 30/03/2021 | 30/03/2021 |                    | 30/05/2021 | 30/05/2021 |           |     |
| Trial pit dimensions X,Y,X (m) | 0.300                                                      | 0.300      | 0.300      |                    | 0.300      | 0.300      |                    | 0.300      | 0.300      |           |     |
| Trial Pit Volume (m³)          | 0.027                                                      | 0.027      | 0.027      |                    | 0.027      | 0.027      |                    | 0.027      | 0.027      |           |     |
| Effective Volume 75-25%        | 0.014                                                      | 0.014      | 0.014      |                    | 0.014      | 0.014      |                    | 0.014      | 0.014      |           |     |
| Surface Area at 50% depth      | 0.270                                                      | 0.270      | 0.270      |                    | 0.270      | 0.270      |                    | 0.270      | 0.270      |           |     |
| Drainage Time (sec) 100%       | 10105                                                      | 17785      | 4740       |                    | 1945       | 1792       |                    | 1985       | 2229       |           |     |
| Drainage Time (sec) 75%        | 7319                                                       | 13949      | 3565       |                    | 1439       | 1332       |                    | 1537       | 1759       |           |     |
| Drainage Time (sec) 50%        | 4532                                                       | 10112      | 2389       |                    | 932        | 872        |                    | 1088       | 1289       |           |     |
| Drainage Time (sec) 25%        | 2787                                                       | 3837       | 1176       |                    | 507        | 460        |                    | 449        | 470        |           |     |
| Drainage Time 75-25% (sec)     | 4532                                                       | 10112      | 2389       |                    | 932        | 872        |                    | 1088       | 1289       |           |     |
| Depth 75-25% (mm)              | 150                                                        | 150        | 150        |                    | 150        | 150        |                    | 150        | 150        |           |     |
| Infiltration rate (m/sec)      | 1.103E-05                                                  | 4.945E-06  | 2.093E-05  | 1.230E-05          | 5.365E-05  | 5.734E-05  | 5.549E-05          | 4.596E-05  | 3.879E-05  | 4.237E-05 |     |
| Percolation Value (secs/mm)    | 30.2                                                       | 67.4       | 15.9       | 37.9               | 6.2        | 5.8        | 6.0                | 7.3        | 8.6        | 7.9       |     |
|                                |                                                            |            |            |                    |            |            |                    |            |            |           |     |
| Maximum Percolation Value      |                                                            |            |            | 100                |            |            | 100                |            |            |           | 100 |
| Minimum Percolation Value      |                                                            |            |            | 12                 |            |            | 12                 |            |            |           | 12  |
| Pass/Fail                      | ✓                                                          | ✓          | ✓          | ✓                  | ✗          | ✗          | ✗                  | ✗          | ✗          | ✗         | ✗   |

Appendix 1. Test Results