



DRAINAGE REPORT

IN RELATION TO

PROPOSED ERECTION OF AN AGRICULTURAL BUILDING, ON LAND AT
BERTHENGRON FARM, SONTLEY, WREXHAM

ON BEHALF OF

GN MORRIS



RTPI
regulation of space - making of place



DRAINAGE REPORT

APPLICANT'S DETAILS

GN Morris
Berthengron Farm
Sontley
Wrexham
LL13 0UY

PROJECT

Proposed Agricultural Building.

ISSUED BY

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APPROVED BY



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1 INTRODUCTION

- 1.1 This supporting statement accompanies an application for the erection of an agricultural building on land at Berthengron Farm, Sontley, Wrexham on behalf of our client GN Morris..

2 CURRENT DRAINAGE DETAILS

- 2.1 The proposed site of the agricultural building is clear with no none drainage. The area around the building will be permeable hardcore.

3 FLOOD RISK



NRW Flood Map – Flooding from Seas & Rivers

- 3.1.1 The site is located within flood zone 1 (no designation) as identified by Natural Resource Wales, as land identified with the lowest probability of flooding from sea and rivers / watercourses.



NRW Flood Map – Flooding from Surface Water Flooding

- 3.1.2 The site is outside of any area identified as being affected or vulnerable to surface water run off flooding. Area to the north of the highway outside of the development site shows some areas affected.

4 PROPOSED DRAINAGE DESIGN

4.1 Surface Water Design

- 4.1.1 It is proposed to direct the surface water from the roof of the dwelling and drained areas of the driveways to a new soakaway located close to the buildings.
- 4.1.2 The soakaway was designed following a percolation test undertaken in accordance with BRE Digest 365.

5 IMPACT OF THE PROPOSED DEVELOPMENT ON DRAINAGE

- 5.1 The proposed drainage for the site is to be a self-contained system, therefore there is no perceived risk of flooding on or around the site.

6 CONCLUSIONS

- 6.1. The proposed development's soakaways have been designed following a percolation test that was carried out following the procedures laid out by the BRE Digest 365 and in the event of an 'exceedance event' the excess water can be contained within the site's ownership.
- 6.2. Therefore there is not perceived risk of flooding from the proposed development or proposed drainage design.

APPENDIX A – DRAINAGE PLAN



APPENDIX B – PERCOLATION TEST

This percolation test was carried out following the procedures laid out by the BRE Digest 365

When cleaned and trimmed the trial hole was approximately, **1.1m** wide, **2.6m** deep and **2m** long.

Water was added to a depth of **1.50m** and depths of water were recorded.

This was repeated 3 times and an average time calculated.

Following interpolation of the results time was established for the water to fall between 75 % and 25% depth of the pit. Percolation rates were only slightly slower across the three tests, with only the depth of water towards the end of the test increasing.

The following Percolation Rate calculations have been completed on a spread sheet and are summarised here for the report.

$$\text{Soil infiltration rate} \quad f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = trial pit between 75% and 25% effective depth

a_{p50} = 50% effective depth and including the base area

t_{p75-25} = the time for the water level to fall from 75% to 25% effective depth.

$$V_{p75-25} = 1.65$$

$$A_{s50} = 2 \times (50\% \times 1.1) + 2 \times (2.6 \times 50\%) + (1.1 \times 2.6) = 6.85\text{m}^2$$

The time taken for water to drain from 75% to 25% full : $t_{p75-25} =$

	Time (m)	Date	Weather Conditions
Test 1	125	30/01/2017	Dry
Test 2	135	31/01/2017	Dry
Test 3	140	01/02/2017	Dry
Average =	133.333		

$$\text{Soil infiltration rate} = \frac{1.65}{6.85 \times (133 \times 60)} = \frac{1.65}{54786.3} = 3.01 \times 10^{-5} \text{ m/sec}$$

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APPENDIX C – SOAKAWAY DESIGN

Total additional impermeable area **1760m²** roof area.

Rainfall Ratio 0.39

Infiltration Rate As previously calculated above = **3.01×10^{-5} m/sec**

The following soakaway calculations have been completed on a spread sheet and are summarised here for the report.

Soakaway Dimensions **6 m** long x **1.5 m** effective depth

Storm Duration D – min	1 in 10 year
Required soakaway width W - m	
10	8.14
15	9.86
30	12.35
60	14.91
120	16.81
240	17.54
360	17.18
600	15.36

Therefore the soakaway to take the surface water off **1760m²** at to be **6m** long x **2.6m** deep x **17.54m** wide with an effective storage depth of **1.5m**.

The soakaways will be filled with a granular material having 30% free volume. The granular material will be separated from the surrounding soil by a geotextile liner to prevent the migration of fines into the soakaway. The top surface of the granular material will also be covered with geotextile to prevent the ingress of backfill material during and after surface reinstatement.

There is sufficient area with the site boundary/ site ownership, to successfully contain the 1 in 100 year storm including the allowance for climate change.

In the event of an 'exceedance event' the excess water will be retained in the area surrounding the soakaway, as the location of the soakaway is a slight hollow in the topography of the site.

Half Empty Time

$$T_{s50} = \frac{S \times 0.5}{A_{s50} \times f} = \frac{(2 \times 17.54) \times 0.5}{9 + 1.1 \times 17.54 \times 3.01 \times 10^{-5}}$$

$$= \frac{23.67}{0.00010630}$$

= 6.18 Hours