Drainage Report

Project Name: Queensbridge Farm Glamping Site
Project Address: Queensbridge Farm, Overton-on-Dee, Wrexham, LL13 0LE

Description:

This report outlines the proposed on-site foul water drainage design, including the roof run-off drainage system.
A recent percolation test was undertaken on-site (by a third party, not Premier Tech). The test results indicate non-compliance with the minimum infiltration rate requirements, confirming that a conventional drainage field, as defined in Building Regulations Document Part H, is not feasible. This limitation is attributable to the high clay content and low permeability of the subsoil.
Consequently, the proposed design will incorporate a drainage mound system in accordance with the requirements set out in Building Regulations Part H (BR_PDF_AD_H_2015.pdf), ensuring compliance with statutory drainage performance criteria.

Flows and Loads:

In the United Kingdom, the sizing of packaged sewage treatment plants must be undertaken in accordance with the British Water *Code of Practice: Flows and Loads – 4*.
The proposed development at Queensbridge Farm Glamping Site comprises the installation of seven (7) glamping pods, each with varying maximum occupancy capacities, together with a small welfare unit intended to accommodate a part-time staff member. The design loading and capacity assessment shall therefore be calculated in accordance with the occupancy profiles detailed below.

Welfare Unit	1 Part Time Staff
Unit 1	6 Persons
Unit 2	4 Persons
Unit 3	4 Persons
Unit 4	4 Persons
Unit 5	6 Persons
Unit 6	4 Persons
Unit 7	4 Persons

This gives the following flows and loads using British Water Code of Practice Flows and Loads 4.

F021 A&D WWTP Load FL4 1510B Rev 2

Sewage Treatment Plant Sizing Spreadsheet

Loadings data from British Water Code of Practice - Flows and Loads 4
Sizing Criteria, Treatment Capacity for Sewage Treatment Systems

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Loadings - Design Data

Application	No. of People or Meals or Uses	Flow per Person [l/day]	Total Flow [l/day]	Organic Load per person [$gBOD_5$/day]	Total Organic Load [$gBOD_5$/day]	Ammonia Load per person [gNH_4-N/day]	Total Ammonia Load [gNH_4-N/day]
Industrial							
Welfare Unit	1	45	45	25	25	3	3
Amenity Sites							
Caravan sites - Static not serviced	32	100	3200	44	1408	8	256

Loadings - Summary — PE @ 150/60/8

Total Daily Flow	3245 l/day	21.64
Total Daily Organic Load	1433 $gBOD_5$/day	23.89
Total Daily Ammonia Load	259 gNH_4-N/day	32.38
Organic Concentration	442 mg/l BOD_5	
Ammonia Concentration	80 mg/l NH_4-N	
Peak Flow	0.1 l/s	

Required Discharge Consent

BOD:	20 mg/l
SS:	30 mg/l
Ammonia:	20 mg/l
Alkalinity$_{(mg)}$: ($CaCO_3$ Equivalent)	425 mg/l

Sewage Treatment Design:

The total population equivalent (PE) for the proposed development is calculated at 32 PE, based on ammonia concentration loadings, with an associated total daily hydraulic loading of 3,245 L/day.

Under the Environment Agency's General Binding Rules, discharges to ground via drainage fields, drainage mounds, or any other infiltration system must not exceed 2,000 L/day, and the design must comply with the requirements of BS 6297:2007 (Code of practice for the design and installation of drainage fields for use in wastewater treatment).

As the projected site-wide daily hydraulic loading exceeds this regulatory threshold, the foul drainage system will be divided into two independent treatment and disposal schemes, each with a dedicated drainage mound.

Scheme 1

Wastewater from the welfare unit and three (3) glamping pods will be conveyed to a Premier Tech Water & Environment primary (septic) tank, designed to retain and settle solids. The resulting septic effluent will then be pumped to an Ecoflo® Treatment Plant Filter for tertiary treatment. Treated effluent will be discharged to ground via a distribution bed constructed in accordance with Building Regulations Part H requirements for drainage mound installations.

Scheme 2

The remaining four (4) glamping pods will be served by a separate, identical treatment train, located at a different point on the site to ensure full compliance with the discharge flow limits.

Treatment Technology

The Premier Tech Water & Environment Ecoflo® Treatment Plant Filter is a Packaged Sewage Treatment Plant holding PIA certification demonstrating compliance with EN 12566-3 performance testing standards. The Ecoflo® unit operates without electrical power, delivering the following technical and operational benefits:

- No noise generation due to the absence of mechanical aeration.
- 25-year structural warranty on the tank body.
- 10-year warranty on the coconut filter media.
- Low-maintenance access via dedicated manway openings.
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In contrast to traditional drainage mounds—which are not classed as packaged treatment plants and therefore subject to no PIA performance testing—the Ecoflo® system provides independently verified treatment performance, enhanced environmental protection, and reduced operational impact.

<u>Roof Run Off Design:</u>

Roof Run-off Assessment

The seven (7) proposed glamping pods and associated welfare unit will collectively present an estimated combined roof surface area of 168 m², with each individual structure having a roof footprint of 21 m².

Using long-term climate data published by the UK Met Office, the maximum rainfall for the Wrexham area is 83 mm/day. This equates to a rainfall depth of 0.0083 m/day per square metre of roof area. Applying a rainwater yield factor of 0.75 (to account for collection inefficiencies, splash loss, and first flush diversion), the projected roof run-off per unit is calculated as follows:

Daily run-off per unit = 0.0083 x 21m2 x 0.75
= 0.13m3 per day = 130 litres per day

This results in approximately 130 litres/day of run-off from each glamping pod or welfare unit.

Total Site Run-off Volume

130 litres per day per unit x 8 units = 1,040 litres per day = 1.1m3 per day

Proposed Rainwater Disposal System

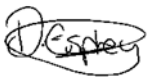
To manage this run-off effectively and in accordance with Building Regulations Part H requirements for surface water drainage, Premier Tech Water & Environment proposes the installation of a 3m³ rainwater soakaway system, distributed proportionally between the units. This is slightly oversized to ensure sufficient splitting of the units.
The soakaway will be constructed using modular, high void-ratio soakaway crates to maximise storage capacity within a compact footprint, combined with a network of traditional French drains to promote infiltration across a wider dispersal area. The system will be designed in accordance with the principles set out in BRE Digest 365: Soakaway Design, ensuring that infiltration rates, ground conditions, and groundwater protection criteria are met.

This approach will:

- Mitigate surface water discharge to off-site networks.
- Promote sustainable drainage (SuDS) principles through on-site infiltration.
- Provide resilience against extreme rainfall events through adequate attenuation capacity.

All other technical documentation can be provided on request.

Yours sincerely,



Daniel Espley
National Installation Manager