Water efficiency measures and Rainwater / greywater harvesting system details

Goffsland Farm
Shipley Road
Southwater
West Sussex

On Behalf of
Mr and Mrs Liverton

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1 BACKGROUND

1.1 Planning permission was granted via planning application reference DC/24/0932 on the 19th December 2024 and relates to the change of use of agricultural land to allow for the siting of a shepherds hut for holiday use together with associated landscaping, parking and water offsetting.

1.2 Condition 4 noted on the decision notice of DC/24/0932 states:

> ***Pre-Commencement (Slab Level) Condition***: *No development above ground floor slab level shall commence until full details of the water efficiency measures and rainwater/greywater harvesting system required by the approved water neutrality strategy (Technical Note 1: Water Neutrality Statement received 23/07/2024) have been submitted to and approved in writing by the Local Planning Authority.*
>
> *Reason: To ensure the development is water neutral to avoid an adverse impact on the Arun Valley SACSPA and Ramsar sites in accordance with Policy 31 of the Horsham District Planning Framework (2015), 179 and 180 of the National Planning Policy Framework (2021), its duties under the Conservation of Habitats and Species Regulations 2017 (as amended), and s40 of the NERC Act 2006 (Priority habitats & species).*

1.3 This report provides the details of the water efficiency measures and rainwater/greywater harvesting system to ensure the site is water neutral.

1.4 The approved water neutrality statement should be read in accordance with this submission.

2 PROPOSED WATER EFFICIENCY MEASURES

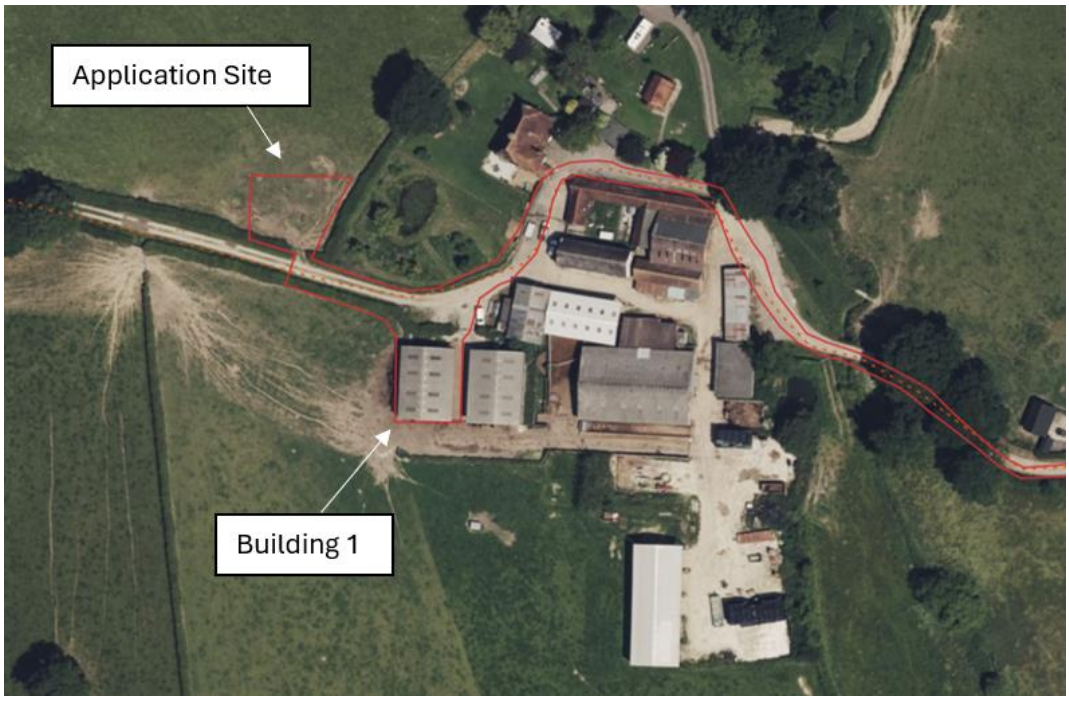
2.1 Baseline Water Usage

2.1.1 The site comprises an area of farmland which will be used to station a shepherds hut for holiday use. There are no existing buildings or water usage being evidenced on this part of the site. As such rainwater harvesting is proposed to be installed on building 1 (figure 2.1) to meet 100% of the water demand for the site.

2.2 Proposed Water Usage

2.2.1 The proposed development includes rainwater harvesting measures installed on the roof of the farm building identified as building 1 in figure 2.1 below.

Figure 2.1 – Aerial view of Goffslands Farm



2.2.2 Building 1 is used to house 40 head of cattle aged between 18 – 24 months which are stored through to fat cattle for a minimum of 7 months. Mr and Mrs Liverton take all progeny from the herd through to finishing at around 18-24 Months old. Therefore, along with rearing around 50 calves they buy in, they generally have between 175 - 200 cattle on the farm at any given time.

2.2.3 Rainwater harvesting is proposed for the cattle and full details are provided within the water neutrality statement including the proposed water usage of the holiday let. This was accepted by HDC. The total base line usage, proposed water consumption and offsetting via rainwater harvesting in litres per annum is summarised below.

Water Consumption	Litres Per Annum
Baseline Water Consumption of Application Site	0
Proposed Water Consumption of Application Site	**135,300.1**
Net Water Demand	135,300.1
Offsetting via Rainwater Harvesting	182,400
Net Water Demand post Offsetting	**-47,099.9**

2.2.4 Full details of the rainwater harvesting system to be installed are provided in chapter 3.

3 RAINWATER / GREYWATER HARVESTING SYSTEM

3.1 Rainwater Harvesting Systems

3.1.1 Rainwater harvesting is the collection of rainwater from the surface or surfaces upon which it falls. This water would otherwise have gone into the drainage system. Once collected and stored, the rainwater can be used for non-potable applications such as toilet flushing, garden watering and washing clothes using a washing machine.

3.1.2 Rainwater will be collected from the agricultural building known as 'building 1' as shown in the approved WNS and stored within a harvesting tank. The roof area of the building 1 is 216 sqm.

3.1.3 The site is located within the Arun and Pallingham rainfall catchment area. Data from the UK Centre for Ecology & Hydrology shows that on average 904.909mm of rain falls per month. Rainfall data is provided below.

	Rainfall (in mm)					
	July 2019 - June 2020	July 2020 - June 2021	July 2021 - June 2022	July 2022 - June 2023	July 2023 - June 2024	Average
July	114.147	37.533	97.554	3.16	28.671	56.213
August	46.893	26.984	88.968	37.59	40.86	48.259
September	53.995	64.433	84.821	87.88	49.451	68.116
October	99.84	28.527	60.034	95.69	83.179	73.454
November	118.658	178.691	153.733	218.17	116.909	157.2322
December	120.986	68.975	14.954	112.707	94.188	82.362
January	146.305	130.707	84.359	103.6	79.601	108.9144
February	84.842	84.842	25.693	7.132	96.191	59.74
March	151.345	57.227	57.226	131.382	56.599	90.7558
April	55.98	35.209	71.396	89.867		63.113
May	48.866	95.213	22.113	38.497		51.17225
June	4.438	97.553	61.197	19.123		45.57775
TOTAL	1046.295	905.894	822.048	944.798	645.649	904.9094

3.1.4 The rainwater calculations were summarised in the WNS and repeated here for ease. To calculate how much rainwater can be collected by a harvesting system per year the rainfall (mm) is multiplied by the roof surface area (sqm) as follows:

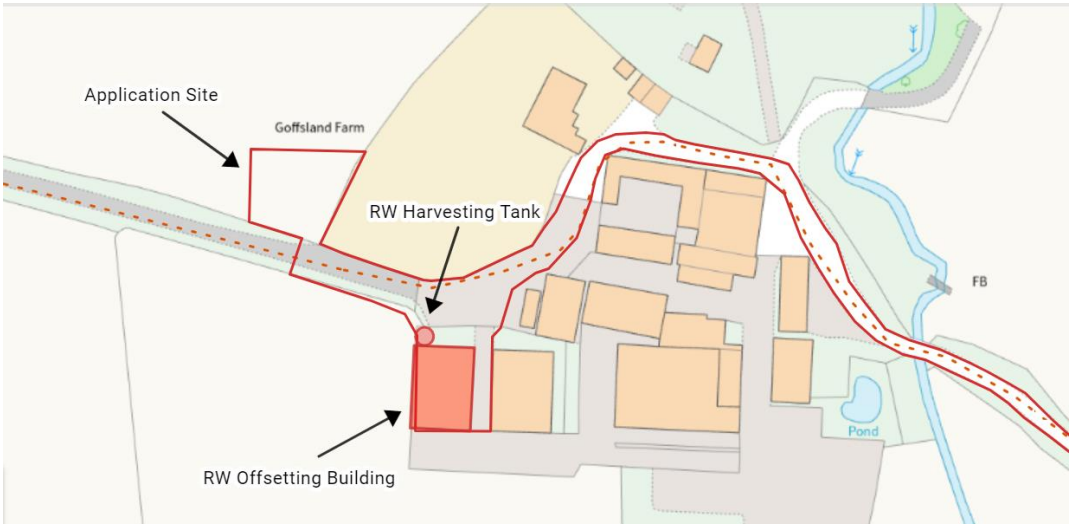
904.909mm x 216sqm = 195,460.344 litres per annum

3.1.5 To account for a coefficient yield rate of 1% for rainwater that could be lost during collection would bring this figure down to **193,505.741 litres per year.**

3.1.6 As noted in the WNS and summarised above in chapter 2, 135,300.1 litres of rainwater is required to be captured per annum to offset the mains water usage of the proposed holiday let.

3.1.7 A 25,000 litre tank will be installed to the rear of the building to capture enough rainwater to be used to offset the full mains water usage of the cattle that are housed in building 1 which is above what is required to offset the proposed holiday let as well as adequate storage to cover a 35 day drought period. This will be in the location as shown on the site location plan within figure 3.1, below.

Figure 3.1 – Approved Site Plan



3.2 Rainwater Harvest Tank

3.2.1 The approved WNS indicated in appendix C an Enduromaxx 25,000 litre vertical potable tank to be installed adjacent to building 1. Further details of the enduromaxx tank are outlined below:

- Supplied as standard with a 2" Outlet 177920 (other options available)
- Lid: 620 mm
- Dimensions (mm): 2700 dia x 4650 h
- Colours: Available in black, boat blue or dark green colour
- 100% rust proof
- UK manufactured

3.2.2 Enduramaxx's 25,000 Litre Rainwater Tank is constructed from the MDPE polyethene which is UV stabilised. This rain harvesting tank is a one-piece, seamless, rotationally moulded tank that guarantees strength, impacts resistance and durability and many years of use.

3.2.3 This round rainwater tank is designed to provide rainwater/grey water storage for a rainwater harvesting system allowing rainwater to be harvested, conserved and recycled at your convenience. These rainwater tanks can be used in many domestic and commercial applications where mains water is not available. Appropriate uses for the tank are listed on

https://enduramaxx.co.uk/enduramaxx/250000-litre-vertical-rainwater-harvesting-tank/

and include the following:

- Toilet flushing in industrial, commercial, hospital or school environments
- Equine and agricultural establishments
- Irrigation and/or wash-down facilities
- Rainwater, being non-chlorinated, is better for plants and gardens
- Agricultural tank and farm sprayer tank
- Crop sprayer tank

3.3 Filtration Measures for Rainwater

3.3.1 Rainwater filters are important to make the water used in any rainwater harvesting system and are used to filter debris from the rainwater as it flows from the collection roof before it enters the storage tank. Calmed inlets are used as part of the filter system as the water runs down to the bottom of the tank and fills the tank through the calmed inlet at the bottom of the tank.

3.3.2 Rainwater harvesting tank filters can be fitted to new or existing rainwater storage tanks.

3.3.3 This oxygenates the water in the tanks and helps prevents it from stagnating. When the tank is full the overflow siphon diverts the excess water to a drain or soakaway.

3.3.4 Rainwater filters prevent leaves moss and other debris from entering the rainwater storage tank and reduce build-up of sediment. The kit to be installed would filter in two stages – large debris is removed initially through the cascades before the water passes through a finer second stage mesh.

3.3.5 Each filter has two inlets, 2 x 4". The filter kits also has an overflow to remove the debris into a drain or soak away as well as and an outlet in the bottom of the filter for water to enter the storage tank.

3.3.6 The filtered water enters the tank via a calmed inlet, filling from the bottom and thereby oxygenating the water and preventing it from stagnating.

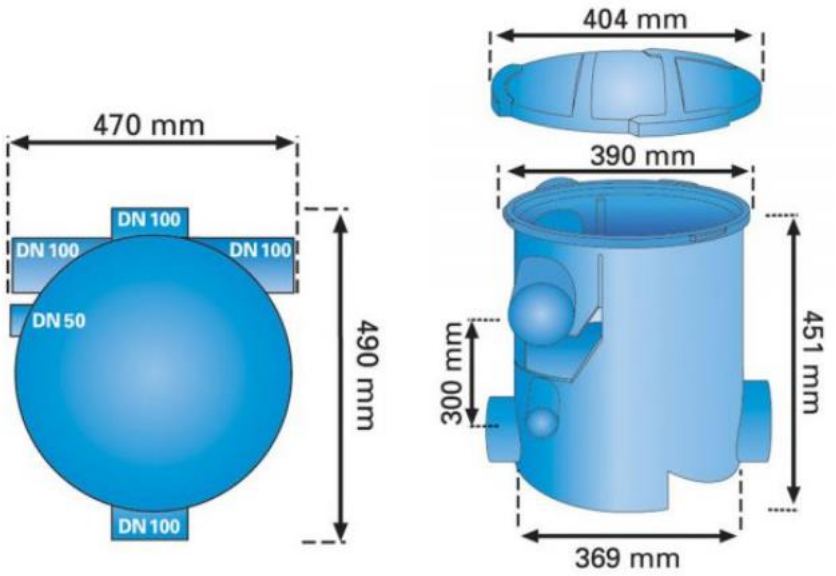
3.3.7 The overflow siphon, incorporating a skimming inlet, diverts any overfill or excess water to a drain or soakaway. By skimming the surface water further debris, pollen, oils and other floating contaminants are removed.

3.3.8 The appropriate filter to be installed is shown below in figure 3.2. Indicative dimensions of the filter are provided below in figure 3.3.

Figure 3.2 – Example of appropriate rainwater filter (www.enduromaxx.co.uk)



Figure 3.3 – Dimensions of appropriate rainwater filter



3.3.9 The filter is designed for roof sizes up to a maximum of 450m2 and comprises a two stage rainwater filter unit, siphon overflow and calmed inlet.

3.3.10 On entering the filter, water flows across the first cascade to remove largest debris particles. Pre-filtered water then flows over the secondary sieve filter (mesh size 0,65 mm) where the mesh structure diverts any remaining debris.

3.3.11 The clean filtered water is then delivered into the tank via a calmed inlet. This allows the water to enter the tank with minimal turbulence and without disturbing any sediment at the bottom of the tank. Rainwater entering the tank via a calmed inlet also supplies oxygen to the water, thereby preventing anaerobic decomposition. Finally, the overflow siphon, which incorporates a skimming inlet, skims the upper surface water and removes any further debris, oils or other floating contaminants thereby increasing the quality of the stored water.

3.3.12 Leaf guards on gutters and a water filter will be provided prior to the water reaching the storage tank to ensure no debris will enter the tank. Gutters will be cleaned on a monthly basis to ensure all debris is removed and that the rainwater capture is at its maximum potential.

3.3.13 BS EN 16941-1:2018 for onsite non potable water does not require frequent testing to be undertaken but states that observations for water quality should be made during maintenance visits and testing should be carried out where the system is not operating satisfactory.

3.3.14 Maintenance visits and filter changes will be entered into the service book and details of all site visits and findings will also be recorded. A copy of the logbook can be provided to the council within 14 day notice.

3.5 System Failure

3.5.1 In the unlikely event of the system failing this will be immediately reported to the installer of the rainwater harvesting system so that the issue can be resolved.

3.5.2 The service provide will allow for attendance to address re-activation of the system which would likely mean the system being out of supply for 7 days.

3.5.3 During this time the applicants would seek a supply of water to cover this period from an organisation outside of the Arun Valley catchment area. This approach

was accepted by the inspector of an appeal decision at Pear Tree Farm, Henfield reference APP/Z3825/C/23/3318225 whereby the inspector concluded that *"in the unlikely event that this is a disruption to the spring supply. I am convinced that connecting to the mains supply would be an effective solution, given how long it would take for such a supply to be installed and connected. A more likely scenario would be that the occupiers of the pitches would seek a supply of bottled water or water sourced from outside the Arun Valley sites' catchment area."*

3.5.4 The above maintenance plan for the site will be in-situ for the lifetime of the development and we trust it is acceptable to the council in order to discharge Condition 4.