Water Neutrality Statement

Barn at Naldretts Farm
Naldretts Lane
Rudgwick
Horsham
RH12 3BU

On Behalf of
Mr M Randall

Prepared by
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1 INTRODUCTION

1.1 This Water Neutrality Statement is submitted in support of an application made under Regulation 77 of the Conservation of Habitats and Species Regulations 2017 (hereafter referred to as an 'HRA application').

1.2 It relates to a prior approval application for the conversion of an agricultural building to form 1no. 3-bedroom dwelling. The application reference is DC/23/1052 and was approved on 13th September 2023.

1.3 A Regulation 77 application is now required before the consented scheme can be implemented following concerns raised by Natural England, through the publication of a Position Statement in September 2021, regarding water extraction within the Sussex North Water Supply Zone. It is stated that it cannot be concluded that the existing abstraction within Sussex North Water Supply Zone is not having an impact on the protected sites within Arun Valley, therefore new developments within this area must not add to this impact. This is demonstrated by achieving water neutrality.

1.4 In response to Natural England's Position Statement, this application seeks to demonstrate that the permitted development is water neutral and can thus be implemented in accordance with the relevant regulations.

1.5 In summary, the proposed dwelling will use a total of 311.17 litres of water per day as evidenced in the water calculation attached at Appendix B of this report.

1.6 In order to achieve water neutrality, the water usage will be offset using a rainwater harvesting system installed on the applicant's stable block at Naldretts Farm.

1.7 The stable yard is served by a separate water meter and uses mains water for drinking water and the washing down of horses and associated equipment. A copy of the latest bill records the water usage of the stables as 77,000 litres over a 205 day period or 375.61 litres per day.

1.7 A rainwater harvesting system will be installed on the equestrian building (identified in Appendix C) which has a capacity to capture 185,436 litres which is more than sufficient to cater for this demand. The rainwater that will be captured and used instead of mains water will be treated with a UV light and filtration system so that the water is suitable for horses to drink.

1.8 A rainwater harvesting tank for the site has been selected to cater for a 35 day drought period.

1.9 As a result, the approved Class Q development will be water neutral. A summary of calculations are provided below:

Class Q Development

- Total proposed consumption before off-site mitigation 311.17 litres per day
- Total proposed consumption after off-site mitigation 0 litres per day

Offsetting Site

- Offsetting site – existing mains consumption 375.61 litres per day
- Offsetting site – total reduction per day from rainwater harvesting 375.61 litres per day
- Offsetting site – residual demand Zero

Net Water Demand

- Total proposed mains consumption 311.17 litres per day
- Reduction achieved through off-site mitigation 375.61 litres per day
- Residential net mains water demand Zero (-64.44 litres per day)

2 BASELINE CALCULATIONS

2.1 The application site contains one agricultural building extending to 338 sqm. The site is connected to mains water, however historical water usage cannot be proven and therefore the baseline water use on the site is assumed to be nil. This position was agreed by Horsham District Council.

2.2 There are no other extant permissions relevant to this report other than the aforementioned Class Q approval.

3 PROPOSED DEMAND

3.1 The approved Class Q development comprises the conversion of an agricultural building into a 3 bedroom dwelling.

3.2 The building will consist of 3 ensuite bedrooms, study, kitchen/diner, sitting room and a utility room. A copy of the approved floor plans is provided at Appendix A.

3.3 The master ensuite will include a WC, wash hand basin, shower and bath with the remaining ensuites containing a shower, WC and wash hand basin.

3.3 The kitchen will provide a dishwasher, washing machine and kitchen sink with an additional sink located within the utility room.

3.4 In order to calculate the proposed water usage of the dwelling the Horsham District average occupancy rate is used.

3.5 As the floor plan incorporates a separate study we have erred on the side of caution and used the district average occupancy rate of a 4 bedroom dwelling (2.86 persons) in order to calculate the proposed water usage.

3.6 This therefore assumes a daily water usage of the dwelling as 311.17 litres per day which includes 5 litres for an outside tap. The water usage is detailed in the Water Calculations provided in Appendix B.

4 bedroom dwelling – 2.86 persons.

2.86 occupancy rate x 108.8 litres per person per day = 311.17 litres per day

4 OFFSITE MITIGATION

4.1 Due to there being no baseline water usage on the site offsetting measures are required to achieve water neutrality.

4.2 It is proposed to offset the water demand of the proposed dwelling by installing a rainwater harvesting system on the applicant's stable building which is used to house the applicant's horses. The location of the stable building is identified at Appendix C.

4.3 The stable yard consists of two stable blocks which provides 10 stables and a tack room, it is served by its own water meter and provides the drinking water for the horses as well as the associated cleaning of the yard and equipment.

4.4 A copy of the most recent Southern Water bill dated 23rd April 2024 can be found in Appendix D and confirms the water usage of the stable yard over a 205 day period as being 77,000 litres or 375.61 litres per day.

77,000 litres / 205 day period = 375.61 litres per day

375.61 litres per day x 365 days = 137,097.65 litres per annum

4.5 In order to determine an appropriate rainwater harvesting system for the building it is necessary to firstly determine how much rainfall the area experiences.

4.6 The site is located within the Arun at Pallingham rainfall catchment area. Data from the UK Centre for Ecology & Hydrology shows that on average 909 mm 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	84.555	67.4014
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	730.204	909.1978

UK Water Resources Portal (ceh.ac.uk)

4.7 The stable building has a roof area of 204 sqm. This is multiplied by the average monthly rainfall and multiplied by 365 to determine the amount of rainwater that can be captured in a year.

204 sqm x 909 mm = 185,436 litres per annum

4.8 This is more than required to offset the 113,577.05 litres per annum used by the Class Q scheme.

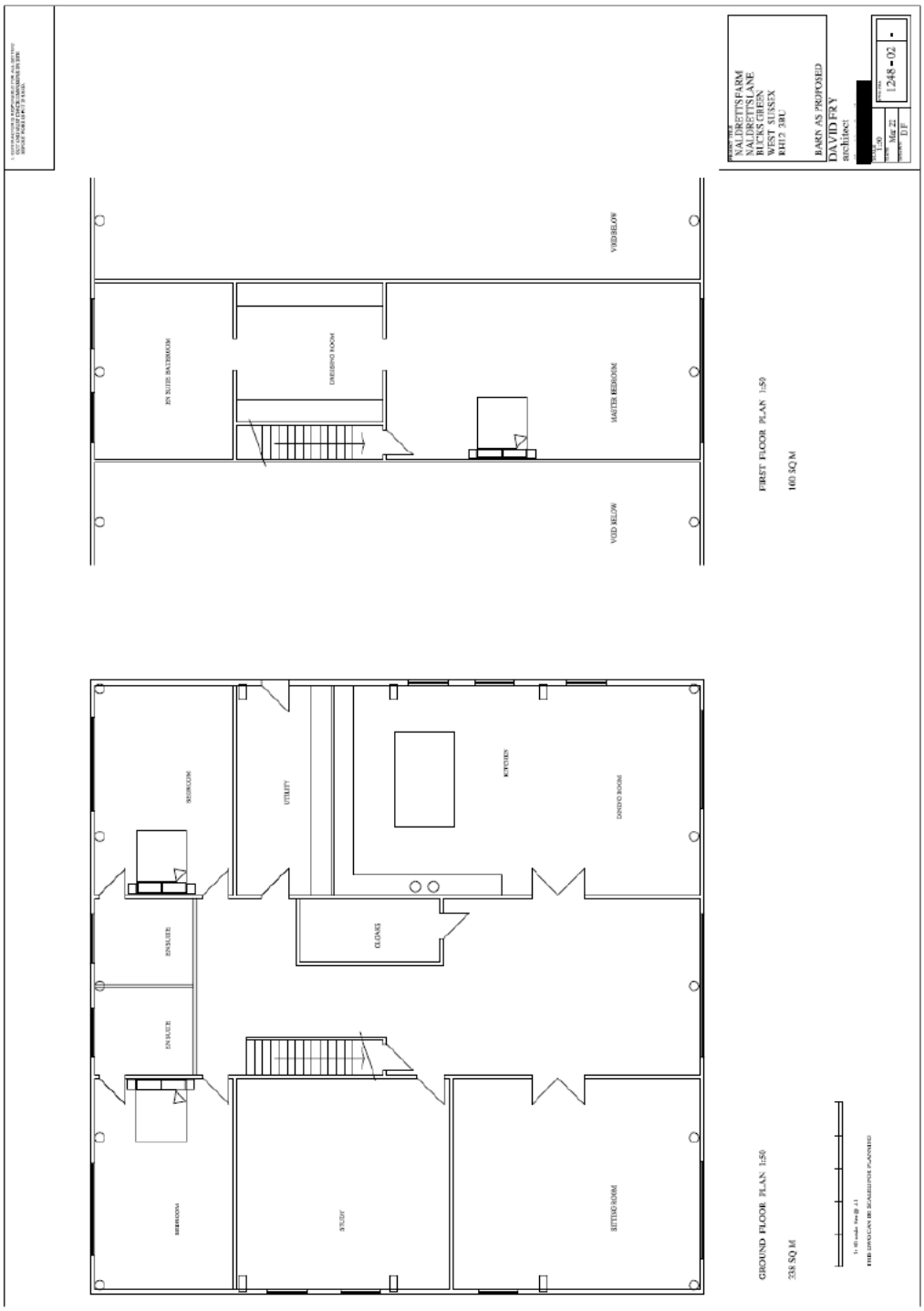
4.9 The rainwater will be used for drinking water, cleaning and washing down. Rainwater harvesting tanks will be fitted with ultra violet light filters to ensure that the water is safe for horses to drink.

4.10 To cater for a 35 day drought period, which would require 13,146.35 litres of water, one 20,000 litre rainwater harvesting tanks will be used to capture this water and would be positioned by the side of the building. Details of an option for the rainwater harvesting tanks can be found in Appendix E.

4.11 Mains water to supply the horses will be disconnected once the tanks have been filled with captured rainwater. This will be undertaken prior to the occupation of the proposed dwelling to ensure the scheme is water neutral. This can be secured by a planning condition.

Appendix A

Approved plans



Appendix B

Water Calculator

Installation Type	Unit of Measure	Capacity/Flow rate (1)	Use Factor (2)	Fixed use (litres/person/day) (3)	Litres/person/day = [(1)x(2)] + (3) (4)
WC (single flush)	Flush Volume (litres)		4.42	0.00	0
WC (dual flush)	Full flush Volume (litres)	3.68	1.46	0.00	5.37
	Part flush Volume (litres)	0	2.96	0.00	0.00
WC (multiple fittings)	Average effective flushing Volume (litres)		4.42	0.00	0
Taps (excluding kitchen/utility room taps)	Flow rate (litres/min)	3.50	1.58	1.58	7.11
Bath (where shower also present)	Capacity to overflow(litres)	100.00	0.11	0.00	11.00
Shower (where bath also present)	Flow Rate(litres / minute)	13.00	4.37	0.00	56.81
Bath Only	Capacity to overflow(litres)		0.50	0.00	0
Shower Only	Flow Rate (litres/minute)		5.60	0.00	0
Kitchen/Utility room sink taps	Flow rate (litres/minute)	4.00	0.44	10.36	12.12
Washing Machine	(Litres/kg dry load)	8.17	2.1	0.00	17.157
Dishwasher	(Litres/place setting)	1.25	3.6	0.00	4.5
Waste disposal unit	(Litres/use)	☐ Present	3.08	0.00	0
Water Softener	(Litres/person/day)		1.00	0.00	0
	(5)	Total Calculated use (litres/person/day) =SUM(column 4)			114.07
	(6)	Contribution from greywater (litres/person/day)			0
	(7)	Contribution from rainwater (litres/person/day)			0
	(8)	Normalisation factor			0.91
	(9)	Total internal water consumption = [(5)-(6)-(7)]x(8) (litres/person/day)			103.80
	(10)	External water use			5.0
	(11)	Total water consumption (Building Regulation 17.K) =(9)+(10)(litres/person/day)			108.8

Installation Type	Make/Model (mandatory)	Litres/Person/Day
Taps	WCs Taps 3.5 Litres Per Minute	7.11
Baths (shower(s) present)	100 Capacity	11.00
Showers (bath(s) present)	13 litres per minute capacity, ensuite and master	56.81
Kitchen Taps	4 litres per minute capacity, kitchen and utility	12.12
Washing Machines		17.157
Dishwasher		4.5

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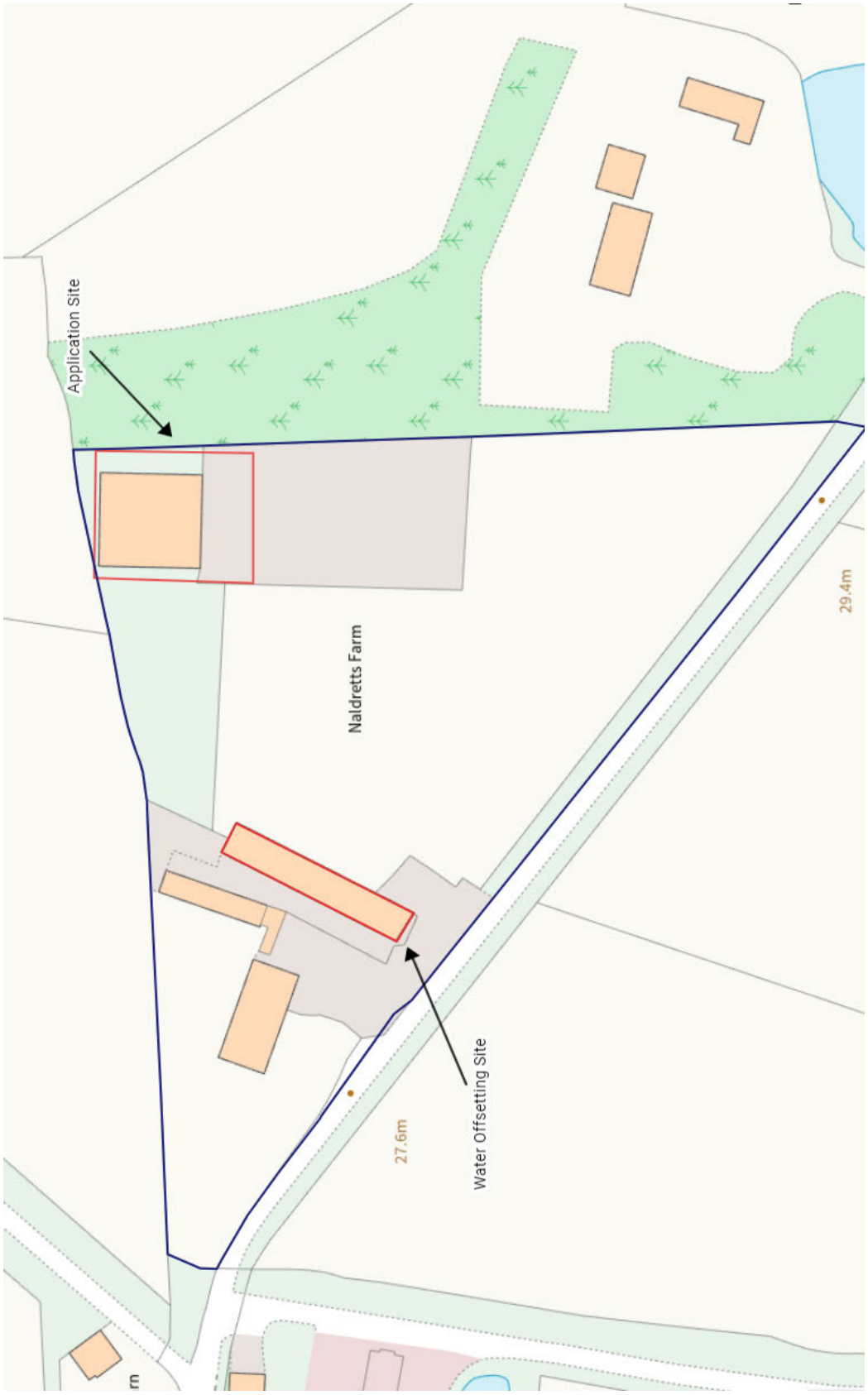
Terms and Conditions
System Requirements

Appendix C

Location of Offsetting Site



Appendix D

Water Bill



Appendix E

Rainwater Harvesting Tank

ECO20000POT

Product description: WRAS approved cylindrical storage tank, suitable for the storage of drinking water

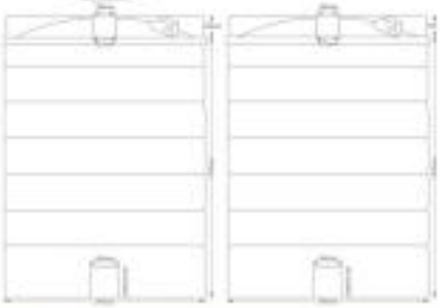












Product Information					
Height	Diameter	Lid	Weight	Outlet	Certificate no:
3800mm	2700mm	24" screwdown	360kg	Supplied loose	2003727

Sizes approximate, owing to shrinkage

Specification subject to change; please call to confirm details

Product Notes:

- Tanks must be installed in accordance with The Water Supply (Water Fittings) Regulations 1999 in order to be properly used for storage of drinking water. This will include the addition of fittings which are not supplied with the tank unless ordered separately.
- Tank must be sited on a level, fully supportive base leaving a gap of at least 100mm from walls or other tanks
- Additional fittings can be added as and where required without compromising tank's structural integrity
- Tank moulded blank. Male outlet supplied loose.

Product Details:

- WRAS approval certificate number: 2003727
- Approximate wall thickness: 5-7mm
- 24" screw down non-vented lid for easy access
- 2" brass threaded male outlet supplied as standard
- Accepts 6" flanged outlets

Optional Extras:

- Plastic tank connector (up to 4")
- Brass tank connector (up to 3")
- Isolation valve
- By-law kit
- Ball cock and float valve

Benefits:

- Suitable for internal and external use
- Frost proof; will not crack in cold
- Plastic meets the requirements of BS 6920-1:2000
- Plastic will not contaminate water
- Value for money, high capacity storage
- Ideal for agricultural or commercial water storage
- Robust, heavy duty product; industrial strength
- Opaque plastic reduces algae growth in sunlight
- Rotationally moulded for strength and durability
- 10 year warranty against manufacturing defects

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Melbourn,
Royston,
SG8 6NA

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RAINHARVESTING SYSTEMS DATA SHEET

Saphir UV DISINFECTION UNITS

- Suitable for a range of domestic and commercial applications.
- Available in various sizes to suit required flow rates.
- Effective microbiological protection.
- Uses no chemicals & produces no by-products.
- Economical, safe & reliable
- Lamp operation indicator.
- Does not affect taste or odour.
- Long life lamps require only annual replacement.
- Simple to install & maintain.
- *Saphir+* version now available with additional telemetry.



Why use UV treatment?

The quality of untreated rainwater is such that it cannot be classified as potable or 'wholesome' and therefore is not fit for drinking. Even though it is widely used for drinking, bathing etc. in various parts of the world, it is not deemed acceptable practice for the UK.

Untreated rainwater is not considered safe for personal use due to the contamination risk, particularly from bird droppings. To be sure that any 'unwholesome' water is fit to drink it should therefore be treated, and the simplest and most reliable way of doing this on a small scale is to use Ultra-Violet (UV) sterilisation. The water to be treated must first be free of even microscopic particles, so it is usually necessary to fit sediment pre-filters prior to the water entering the UV unit.

How does it work?

UV disinfection works by destroying the DNA of potentially damaging micro-organisms, thus rendering them harmless. This process is instant, effective and reliable. No chemicals are involved and the process does not affect the taste of the water in any way. UV radiation is part of natural sunlight, and a UV lamp emits a particular wavelength at high concentration to destroy bacteria, viruses and cysts.



Saphir UV unit

UV treatment is safe, reliable and simple to maintain. It is generally deemed to be ecologically preferable to chlorination and reverse osmosis (RO). However, please note that UV treatment alone will not remove discolouration or bad taste.

Several models available to suit most applications

Model	flow rate @ 40mJ/cm²	flow rate @ 25mJ/cm²	Inlet / outlet size	Power consumption	Length mm
Saphir 1	13.5 l/min.	20 l/min.	¾" bsp	15w	405
Saphir 2	22.5 l/min.	36.5 l/min	¾" bsp	25w	554
Saphir 3	40 l/min.	63 l/min	¾" bsp	40w	554
Saphir 4	46.5 l/min.	73 l/min	1" bsp	36w	962
Saphir 7	89 l/min.	140 l/min	1" bsp	36w	962
Saphir 10	120 l/min.	193 l/min	1 ½" bsp	75w	962

** mJ/cm² = millijoules per cm² at end of lamp life*

Saphir UV

Standard units have:
- Stainless steel chamber
- High-output low-pressure UV lamp
- Lamp on indicator
- IP55 rated controls
- Control module can be chamber or wall mounted
- Chamber can be mounted vertically or horizontally
- Up to 10 bar pressure
- UK manufactured
-

Saphir+

The + version of the Saphir unit has several additional features:
- Micro processor control
- Lamp status indicator to show when the lamp needs changing
- Alarm & processer reset button
- volt-free contacts for remote alarm output.

Data Sheet UV/17/01

SEDIMENT PRE-FILTERS FOR USE WITH UV UNITS

- For use with pressurised water supplies.
- Sediment removal down to 5 microns.
- Available in a range of sizes to suit different flow rates.
- Replaceable polypropylene cartridges or bags.
- Simple cartridge changing.
- Nitrate and Carbon filters also available.

When using *Saphir* UV units to disinfect rainwater we recommend that additional filtration is added prior to the water passing through the UV chamber. It is important that the water to be treated is as clean as possbile, otherwise small particles can create a 'shadow' which the UV light cannot penetrate. We recommend that water is cleaned down to 5 microns prior to UV treatment.

The filters require pressure in order to work effectively so are suitable only for pumped supplies. The cartridges require regular replacement, frequency of which will vary according to the nature of the water they are treating.

Water is normally pumped through 25-micron and 5-micron wound sediment filters to ensure that sufficient material is removed. These are available in a range of sizes to suit different flow rates. For larger UV units where a higher flow rate is required, a single 5-micron 'bag' filter is sufficient.

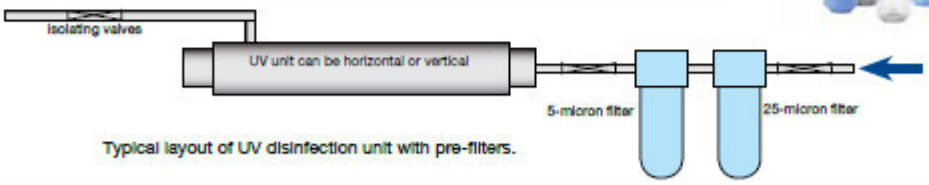






Filters are selected to match the flow rate of the UV unit

UV Unit	25-micron pre-filter	5-micron pre-filter	Connection size
Saphir 1	10" standard wound cartridge	10" standard wound cartridge	¾" bsp
Saphir 2	20" standard wound cartridge	20" standard wound cartridge	¾" bsp
Saphir 3	10" 'Big Blue' wound cartridge	10" 'Big Blue' wound cartridge	¾" bsp
Saphir 4	10" 'Big Blue' wound cartridge	10" 'Big Blue' wound cartridge	1" bsp
Saphir 7	N/A	10" 'Big Blue' bag filter	1" bsp
Saphir 10	N/A	10" 'Big Blue' bag filter	1½" bsp



Typical layout of UV disinfection unit with pre-filters.

Distributor:

Rainharvesting Systems Ltd.

The Green Shop
Calf Way, Bisley,
Stroud, Gloucestershire GL6 7BX
Tel: 0845 223 5430
Fax: 01452 772008
E-mail: sales@rainharvesting.co.uk
Website: www.rainharvesting.co.uk

NB continuous development may necessitate change in these details without notice E&OE. *Data Sheet UV/17/01*