UNIT 14, GRAYLANDS ESTATE



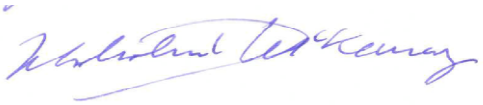
HORSHAM, WEST SUSSEX, RH12 4OD

Water Neutrality Assessment

June 2024
(Revised August 2024)

eas ltd
Environmental Assessment Services Ltd

REPORT DATA SHEET

Requirement	**Data**
Report Reference	711/GouldBaxter/Unit14GraylandsEstate/WNA
Date	June 2024
Client	Dawn Shurville
Report type	Water Neutrality Assessment
Purpose	Planning Submission
Revisions	August 2024
Prepared by	Xanthe Lyford BSc (Hons)  Signed
Approved by	Eur Ing Malcolm McKemey BSc (Hons), CEng, CEnv, MICE, MCIWEM, MIEnvSc  Signed

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DAWN SHURVILLE

UNIT 14, GRAYLANDS ESTATE, HORSHAM, WEST SUSSEX, RH12 4QD

Water Neutrality Assessment

June 2024

CONTENTS

1. BACKGROUND

2. EXISTING SITE USE

3. PROPOSED DEVELOPMENT

4. WATER NEUTRALITY ASSESSMENT

5. CONCLUSIONS

APPENDICES

APPENDIX A: **Figures**
Figure 1: Site Location
Figure 2: Existing Site Layout
Figure 3: Proposed Development (Architect's Drawing)

APPENDIX B: **Hydrology**

APPENDIX C: **Rainwater Harvesting Data**

APPENDIX D: **Low-Volume Toilets & Taps and Calculations of Usage**

APPENDIX E: **Photographs**

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DAWN SHURVILLE

UNIT 14, GRAYLANDS ESTATE, HORSHAM, WEST SUSSEX, RH12 4QD

Water Neutrality Assessment

June 2024

1. BACKGROUND

1.1 Environmental Assessment Services Ltd has been instructed to prepare a Water Neutrality Assessment for submission to Horsham District Council, on behalf of Gould Baxter Consultants LLP, in relation to the proposed redevelopment of the site at Unit 14, Graylands Estates, Horsham.

1.2 Water neutrality is defined as: *For every new development, total water use in the region after the development must be equal to or less than the total water use in the region before the new development.*

2. EXISTING SITE USE

2.1 The site comprises a single storey building, formerly used as fitness studio and office, (but lying vacant for the past 12 months) with front and rear access, plus grassed/soft landscaped area to the rear.

2.2 The area of the site is approximately 240 m^2. The Ordnance Survey (OS) map reference for the site is TQ 17744 34706. The site elevation is approximately +92 m OD. See Figure 1 for the site location and Figure 2 for the existing site layout.

2.3 There are no water meter readings from the site. It is understood that the building has been out of use for between 12 and 18 months.

2.4 The hydrology for the location is given in Appendix B.

3. PROPOSED DEVELOPMENT

3.1 It is proposed to redevelop the site for use as a Veterinary clinic. This will comprise the conversion of the existing single-storey building, (currently comprising sub-divided offices, exercise studios, kitchenette, male and female toilets and shower), into three consulting rooms, a cat and a dog ward, an operating theatre, lab, isolation room, office, staff room, freezer, reception and two disabled access toilets. The existing hardstanding to the front and side of the building and grassed area to the rear will remain as existing. See Figure 3 in Appendix A.

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4. WATER NEUTRALITY ASSESSMENT

4.1 The existing land use is Class E (commercial, service and business). There are no meter readings or records of the prior water usage for the site as the building has been vacant for some time. At the time of the visit the electricity was not working in the building and the electric shower could not run, the water in the tap in the kitchen unit was running at a very reduced volume (presumably draining any residual water left in the roof tank) and the sinks and toilets at in the restrooms would not run/flush. In addition to this, there had been a water leak through the ceiling caused by a burst pipe, so turning the water and electricity on to calculate the flow rates was not possible without causing further damage. See Appendix E for photographs of the water damage caused by the burst pipe. As a result, an accurate flow rate and existing consumption could not be calculated from flow measurements. The previous water consumption uses are therefore calculated as accurately as possible using the make and model of the appliances at the site and flow rate data from online purchase information for the same models, alongside minimum supply flow rate information provided by Southern Water. The proposed and previous estimated daily usage has been calculated using the 'Water Efficiency Calculator for New Dwellings' tool, supported by Building Regulations Approved Document Part G. The water used in the heating system (water filled radiators) is a closed system and as such has not been included int the calculations for consumption. Photograph of the fixtures and fittings that relate to water consumption can be seen in Appendix E.

4.2 The existing site has been used mostly as an office block for a fitness company, with evening use as a fitness studio. Southern Water have stated that their water supply for the site is set at a minimum of 9 litres per minute (1 bar) See Appendix D for a transcript of the dialog with Southern Water. The existing appliances consist of a male and female toilet, two hand washing sinks, a kitchen sink and a shower. Toilet 1/female is a *lab B228 flush valve Arcadia* (available in B and Q) with a flush volume of 3 litres per flush. Toilet 2/male is a *Toilet-to go close coupled dual flush* (available in Screwfix) with a flush volume of 3 litres per flush. The shower is a *MX inspiration LXi Model 170552G* (available in PSC Bathroom Clearance Centre) with a flow rate of 8 litre per minute at 1 bar (has an estimated volume of 40 litres of water, per 5-minute shower use). The tap in the kitchen is a *Swirl Divine tap* (available in Screwfix) with a flow rate of 4 litres per minute at 1 bar (estimated as 4 litres usage per hand washing up of dishes – washing up data from the Consumer Council for Water UK and halved as office washing up is expected to be minimal due to the lack of cooking facilities). The tap in the first toilet/female is a *sequential basin lever mixer tap* (available in Toolstation) with a flow rate of 9.2 litres per minute at 1 bar (averaged as 2 litres per washing of hands – taken as 20 second hand was average as stated by NHS England). The tap in the second toilet/male is an *Etal loop mono basin mixer tap* (available in Screwfix) with a flow rate of 10.1 litres per minute at 1 bar (averaged as 2 litres per washing of hands – taken as 20 second hand was average as stated

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by NHS England). Photographs of the toilets, shower and sinks can be seen in Appendix E and examples of a low volume tap can be seen in Appendix D.

4.3 The building is to be re-purposed as a veterinary surgery with two disabled toilets, two hand washing sinks and seven other/veterinary sinks, three located in the consulting rooms, one in the prep area, one in the cat ward and one in the lab. The toilets are to be of a modern, water saving, low volume flush model with an estimated flush volume of 2 litres per flush, hand washing is estimated as 2.5 litres per wash. It should be noted that the client has informed us that the sinks in the consulting rooms are for occasional use (on average twice per day) and alcohol is to be used for hand cleansing between patients and disinfecting the consultation area. Alcohol is also to be used to scrub-down before operations. The animal drinking capacity is based on the number of cat and dog kennels (18 in total – 9 cats and 9 dogs, with a 30% occupancy on average during any one day and an average stay of 8 hours) and an average of 2 litres of water per 33kg dog per day and 0.3 litres per 5 kg cat per day (based on water consumption data from vetwest.com.au). There vets will use a washing machine for pet bedding and scrubs estimated at 50 litres per wash 6 days a week. Examples of low-volume toilets and taps and calculations using the Water Efficiency calculator can be seen in Appendix D.

4.4 The existing usage numbers are based on two uses of the toilet and hand washes, per person, per working day, assuming a five-day week for the office and a six-day week for the vets. The estate agent has informed us that there were approximately 24 office workers on site. The client has informed us that the sinks in the consulting rooms will be used a possible two times per day, (two consulting rooms are to be used Mondays, Tuesdays, Thursdays and Fridays and one room is to be used for half a day on Wednesday and Saturday). The previous shower use is based on the average exercise class size of 15 (taken as an average exercise class size), two classes per day only (according to the estate agent, the fitness studio was only in evening use) assuming a six-day week. It is assumed that the drinking water for the occupants for both the previous and proposed uses of the building is from large-scale, free-standing dispensers for use both by the office staff, fitness studio users and the veterinary practice staff. Existing free standing water dispensers can be seen in the photographs in Appendix D.

4.5 The existing and proposed uses of water at the site have been calculated using the ‘Water Efficiency Calculator for New Dwellings’ tool. This calculator has been developed in accordance with the Government's National Calculation Methodology for assessing water efficiency in new dwellings in support of: The Code for Sustainable Homes, April 2009 and subsequent versions of Building Regulations Approved Document Part G. The results of the calculations can be seen in Appendix D and are summarised in Table 4.1 below.

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TABLE 4.1
WATER USAGE

Water use	**Existing Site (5 office days + 6 studio evenings)**			**Proposed Development (6 days)**		
	Number of units + uses	Litres per day	Litres per week	Number of units + uses	Litres per day	Litres per week
WC (3 litres per flush – old model / 2 litres per flush new model)	**2 (3 litres flush model)** (24 staff 2 x p/d)	144	864	**2 (2 litre flush model)** (6 staff 2 x p/d + 20 customers)	64	384
Hand washing sinks (2 litres per wash)	**2** (24 staff 2 x p/d)	96	576	**2** (6 staff 2 x p/d + 20 customers)	80	480
Shower (5 mins at 40 litres per shower)	**1** (15 users - 2 x classes p/d - 6 days)	1200	7200	**0**	n/a	n/a
Other sinks (kitchen – 4 litres per wash /lab /consulting room 2.5 litres per hand wash)	**1** (4 x kitchen washing up p/d)	16	80	**7** (4 x consulting/lab prep handwash p/d per vet/nurse (4) 4 x washing up p/d)	56	336
Animal drinking water (0.3 litres per cat + 2 litres per dog)	**0**	n/a	n/a	**18** (average occupancy 3 cats - 0.3 l & 3 dogs - 2 l p/d)	6.9	41.4
Washing Machine (50 litres per wash)	**0**	n/a	n/a	**6** (50 litres per wash 6 days a week)	50	300

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Total:	**-**	**1456**	**8720**	**-**	**256.9**	**1541.4**

(The figures above are taken as a maximum predicted usage).

4.6 The results show that the predicted water usage is 1199.1 litres less per day or 7178.6 litres less per week than the existing usage, making the proposed development better than water neutral.

Options for reducing water consumption:

- Rainwater harvesting. This would comprise collecting rainwater from the roof for lavatory flushing. There is a potential available volume of 14.4 m^3 (assuming 75% availability). This would be sufficient to service the flushing of both toilets, provided that appropriate storage facilities and construction methods are employed. The main limitation on rainwater harvesting at the site would be the volume of storage available. Rainwater harvested for toilet flushing should be treated to prevent bacterial growth in pipes and cisterns. Treatment by UV is probably the most practicable. Rainwater harvesting details are given in Appendix C.

- Reduced water flow facilities. This would comprise reduced flush lavatories and other devices to reduce water use. Examples of reduced flow taps and sinks are seen in Appendix D.

- Water metering. The proposed development should have a metered water supply, ideally a smart water meter with a display indicating water use.

4.7 Offsetting water use in new developments.

Options for offsetting water use by contribution to water conservation elsewhere are not yet developed, although approaches to Southern Water regarding contributions to their water conservation programmes can be made.

5. CONCLUSIONS

5.1 The estimated water usage of the proposed development (according to the information provided to us by the client, with regards to the uses of water and cleaning practices to be adhered to within the proposed veterinary practice), compared to the estimated water use of the previous activity at the site (according to the information provided to us by the estate agent with regards to the usage at the site during occupation and the online flow rates of the appliances seen on site at the time of our visit), indicates water neutrality will be achieved.

5.2 There are opportunities to reduce mains water consumption in the proposed redevelopment by incorporating water use reduction measures. The proposed

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development will use low-volume flushing toilets and low volume taps, this will reduce the amount of water used in toilet use. See Appendix D for examples of low-volume flushing toilets and taps. Another possible method of saving water would be using harvested rainwater from the roof for toilet flushing. The modelled figures for this are shown in Appendix B and C.

5.3 The water supply to the proposed redevelopment should be metered, ideally using a smart meter so that water consumption should be visible to the user, and thus encourage more careful water use.

☆ ☆ ☆ ☆ ☆ ☆ ☆

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APPENDIX A

Figures

Figure 1: Site Location
Figure 2: Existing Site Layout
Figure 3: Proposed Development (Architect's Drawing)

Figure 1: Site Location

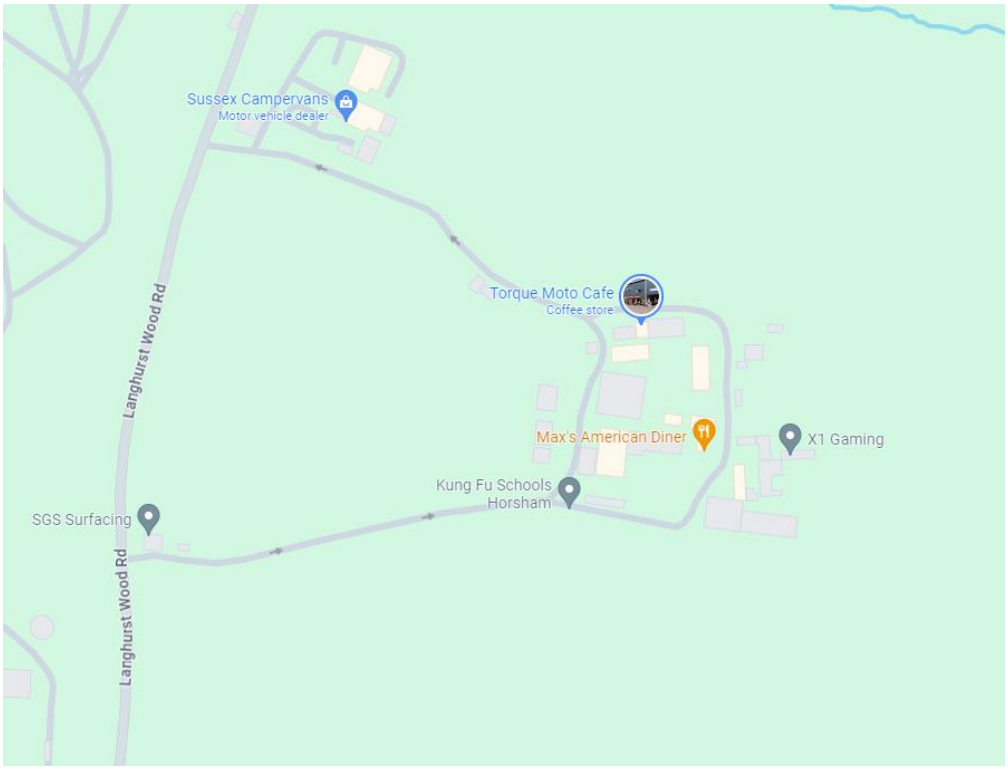
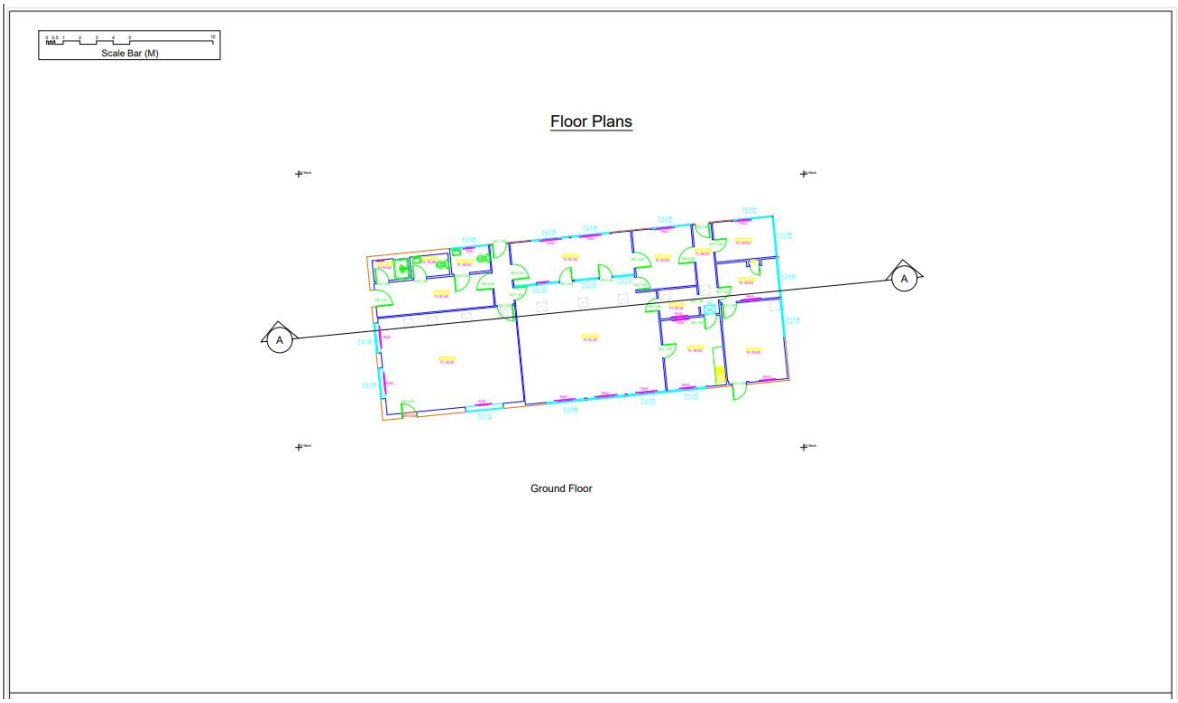


Figure 2: Existing Plans



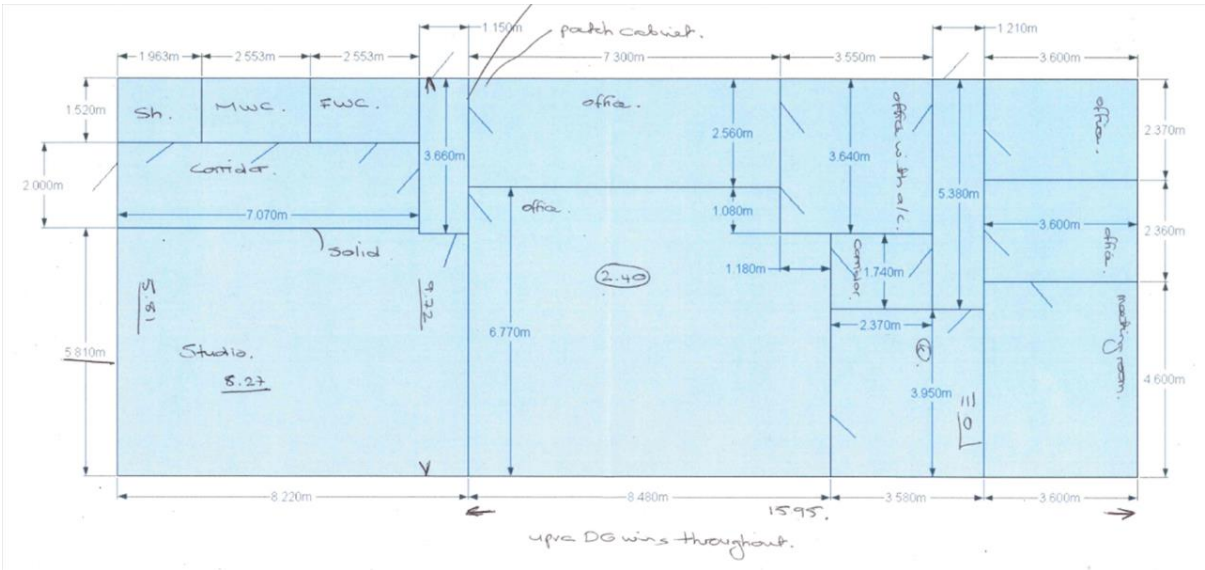
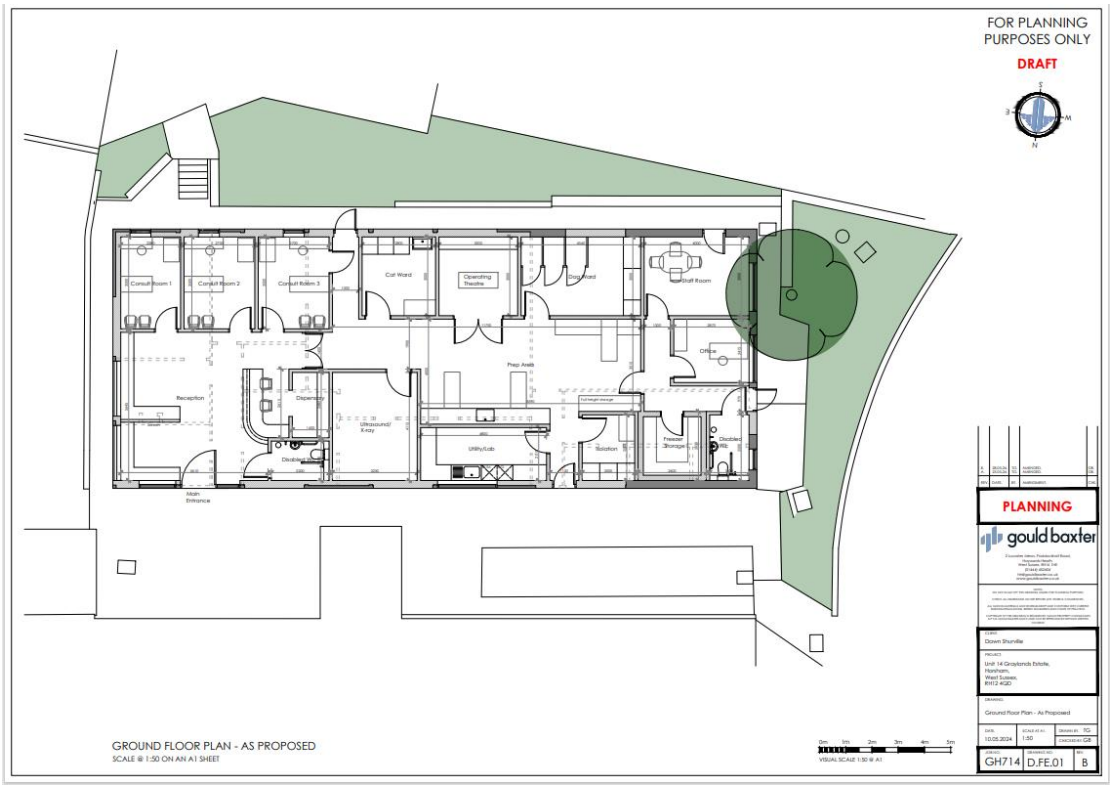


Figure 3: Proposed Development



APPENDIX B

Hydrology

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Job No.	711
Sheet no.	1
Date	18/06/24

MasterDrain
HY 11.0

Project	Graylands Estate	By	XL
Title	Hydrological data for Horsham	Checked	
		Reviewed	

Data:-

FSR values

Location	= Horsham	Grid reference	= TQ1328
M5-60 (mm)	= 20.0	SAAR (mm/yr)	= 800
r	= 0.36	Soil	= 0.45
Long reference	= 513128	Area	= England and Wales
Hydrological area	= 7	Hydrological zone	= 1

Soil classification for WRAP type 4
Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

FEH values

No FEH data available in this file.

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Job No.	711
Sheet no.	2
Date	18/06/24

Project	Graylands Estate	By	Checked	Reviewed
Title	Hydrological data for Horsham	XL		

<- Soil

M5-60 ->

<- SAAR

r x 100 ->

Map extracts reproduced by permission of H R Wallingford.

APPENDIX C

Rainwater Harvesting Data

Rainwater Harvesting Details

1. Sizing the system

The required storage is recommended as 5% of the annual water demand. In this case, the demand being lavatory flushing (estimated at 50 litres/day):

5% of the annual lavatory flushing demand will be 913 litres. Commercially available rainwater harvesting tanks include the size 1000 litres.

A mains water supply will also be connected to top-up the tank in case of extreme low rainfall periods.

Single downpipe connection to a standard water butt to collect water for garden irrigation. This water may also be used for car washing and other non-potable uses.

2. Model specification

Type: Shallow Dig Domestic Rainwater Harvesting System using 1000 litre storage tank

Direct Rainwater Harvesting System with roof water drained to underground tank adjacent to the point of used within the building.

Features: A submersible pump mounted inside the tank maintains pressure and delivers filtered rainwater on demand to where it is required (in this case for lavatory flushing).

A mains water top up unit, tops up the tank if it runs low on rainwater. Sensor detection allows mains water to enter the tank if the level becomes very low.

The filter comprises a two-stage commercial rainwater harvesting filter mounted in a chamber upstream of the storage tank. The filter size is based on the roof. The filter unit is designed to be self-cleaning. Alternatively, an internal basket filter can be fitted in the tank inlet.

Availability: Systems to the specification given above are commercially available from several companies.

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APPENDIX D

Low-Volume Toilets & Taps and Calculations of Usage

Low Flush Toilets Comparison Summary:

	Eco Flush		Eco Vac Extend
Dual Flush	Yes		No
Urine Flush Volume	0.3 Litre		N/a
Solids Flush	2.5 Litre		0.6 Litre
Electric Connection	None		230 Volt
Water Flow	Gravity		Gravity or Up 2m
Septic tank pressure requirement	None		None
Pipework Diameter	110mm		50mm
Max Distance from WC to Tank	30m		Max 45m





Low Volume Taps

1. Flow Rate: 3.5 lpm
2. Spout Height: 94mm
3. 5 Year Warranty
4. German Quality



Water Calculation - Electric Shower (per shower)

Water Calculator | WC | Taps (Other) | Taps (Kitchen/Utility) | Baths | Dishwashers | Washing Machines | Showers | H2O softeners | Greywater | Rainwater

Click here for instructions on entering data on showers

Shower fitting Type	Flow rate (litres/min) (a)	Quantity (No.) (b)	Total per Fitting Type =(a)x(b) (c)
Are there any Baths Present?	☐		
1	8	5	40.00
2			
3			
4			
5			
6			
Total (Sum of all Quantities) (d)		5	
Total (Sum of all totals per fitting type) (e)			40.00
Average flow rate (litres/min) = [(e)/(d)]			8.00
Maximum flow rate (litres/min) (f)			8.00
Weighted Average flow rate (litres/min) = [(f)x0.7]			5.60
Calculate			

Water Calculator – Existing WC (per day)

Water Calculator | WC | Taps (Other) | Taps (Kitchen/Utility) | Baths | Dishwashers | Washing Machines | Showers | H2O softeners | Greywater | Rainwater

Click here for instructions on entering data on WCs

WC Type	Effective Flushing volume* (litres) (a)	Quantity (No.) (b)	Total per Fitting Type = (a)x(b) (c)
Multiple Fittings?	☐		
Dual Flush?	☐		
1	3	48	144.00
Total (Sum of all Quantities) (d)		48	
Total (Sum of all totals per fitting type) (e)			144.00
Average effective flushing volume (litres)=(e)/(d)			3.00
Calculate			

Water Calculator – Existing Sink (per day)

Water Calculator | WC | Taps (Other) | Taps (Kitchen/Utility) | Baths | Dishwashers | Washing Machines | Showers | H2O softeners | Greywater | Rainwater

Click here for instructions on entering data on taps (other)

Tap Fitting Type	Flow rate (litres/min) (a)	Quantity (No.) (b)	Total per Fitting Type =(a)x(b) (c)
1	2	48	96.00
2			
3			
4			
5			
6			
Total (Sum of all Quantities) (d)		48	
Total (Sum of all totals per fitting type) (e)			96.00
Average flow rate (litres/min) = [(e)/(d)]			2.00
Maximum flow rate (litres/min) (f)			2.00
Weighted Average flow rate (litres/min) = [(f)x0.7]			1.40
Calculate			

Water Calculator – Existing Kitchen Sink (per day)

Water Calculator | WC | Taps (Other) | Taps (Kitchen/Utility) | Baths | Dishwashers | Washing Machines | Showers | H2O softeners | Greywater | Rainwater

Click here for instructions on entering data on taps (kitchen)

Tap Fitting Type	Flow rate (litres/min) (a)	Quantity (No.) (b)	Total per Fitting Type =(a)x(b) (c)
1	4	2	8.00
2			
3			
4			
5			
6			
Total (Sum of all Quantities) (d)		2	
Total (Sum of all totals per fitting type) (e)			8.00
Average flow rate (litres/min) = [(e)/(d)]			4.00
Maximum flow rate (litres/min) (f)			4.00
Weighted Average flow rate (litres/min) = [(f)x0.7]			2.80
Calculate			

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Southern Water transcript for water supply flow rate enquiry.

Info: Hi, I'm Southern Water's Digital Assistant. To keep your data safe, please don't provide me with any personal details unless I ask for them. **How can I help you today?**
9:43, Aug 29
You: Please could you tell me the minimum water pressure normally supplied
9:43, Aug 29
Digital Assistant: Water pressure is the force of water that gets pushed through pipework and results in how strong the flow is that comes through your tap.
9:43, Aug 29
Digital Assistant: Let me know if there's anything else I can help you with. If not you can now end the chat by clicking on the three dots. If you have some time, please complete the survey.
9:43, Aug 29
You: Please could I speak to an advisor
9:43, Aug 29
Digital Assistant: I think one of our agents may be able to help you better. Would you like me to see if one is available to help you?
9:44, Aug 29
You: yes please
9:44, Aug 29
Digital Assistant: Thanks, let me connect you to one of our team.
9:44, Aug 29
Digital Assistant: I'll transfer you through to the queue now.
Info: You are now chatting with Usama.
9:44, Aug 29
Usama: Good morning, Usama here. Let me go through the above conversation.
9:44, Aug 29
Usama: As I understand you want to enquire about water pressure, correct?
9:45, Aug 29
You: yes, what is the normal average supply pressure please?
9:45, Aug 29
You: and minimum you aim for
9:45, Aug 29
Usama: May I please have your postcode?
9:46, Aug 29
You: RH12 4QD
9:46, Aug 29
Usama: Thank you.
9:46, Aug 29
Usama: I would like to inform you that the minimum flow rate is 9 litres per minute, which is 1 bar

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APPENDIX E

Photographs

Front elevation



Rear elevation



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Office spaces







Studio



Shower



Electric shower fitting



Toilets



Female toilet (1) & sink







Male Toilet (2) & sink







Kitchen



Kitchen Sink showing tap fitting



Radiators (closed system not included in water usage calculations)



Boiler room



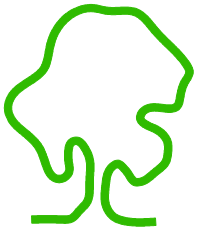
Burst pipe causing water damage to ceiling



Burst pipe causing water damage to floor



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