Water Neutrality Statement

Erection of 3 Dwellings

at

Land at Denhams
Andrews Hill
Billingshurst
West Sussex
RH14 9JT

On Behalf of
Mr C Williamson

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1 INTRODUCTION

1.1 Horsham District is situated in an area of serious water stress, as identified by the Environment Agency Water Stressed Areas Classification.

1.2 Horsham District is supplied with water by Southern Water from its Sussex North Water Resource Zone. This supply is sourced from abstraction points in the Arun Valley, which includes locations such as Amberley Wild Brooks Site of Special Scientific Interest (SSSI), Pulborough Brooks SSSI and Arun Valley Special Protection Area/Special Area of Conservation and Ramsar site.

1.3 On 14 September 2021, Horsham District Council received a Position Statement from Natural England. Information collected by Natural England shows that water abstraction for drinking water supplies is having a negative impact on the wildlife sites in the Arun Valley. They have advised that any new development that takes place must not add to this negative impact.

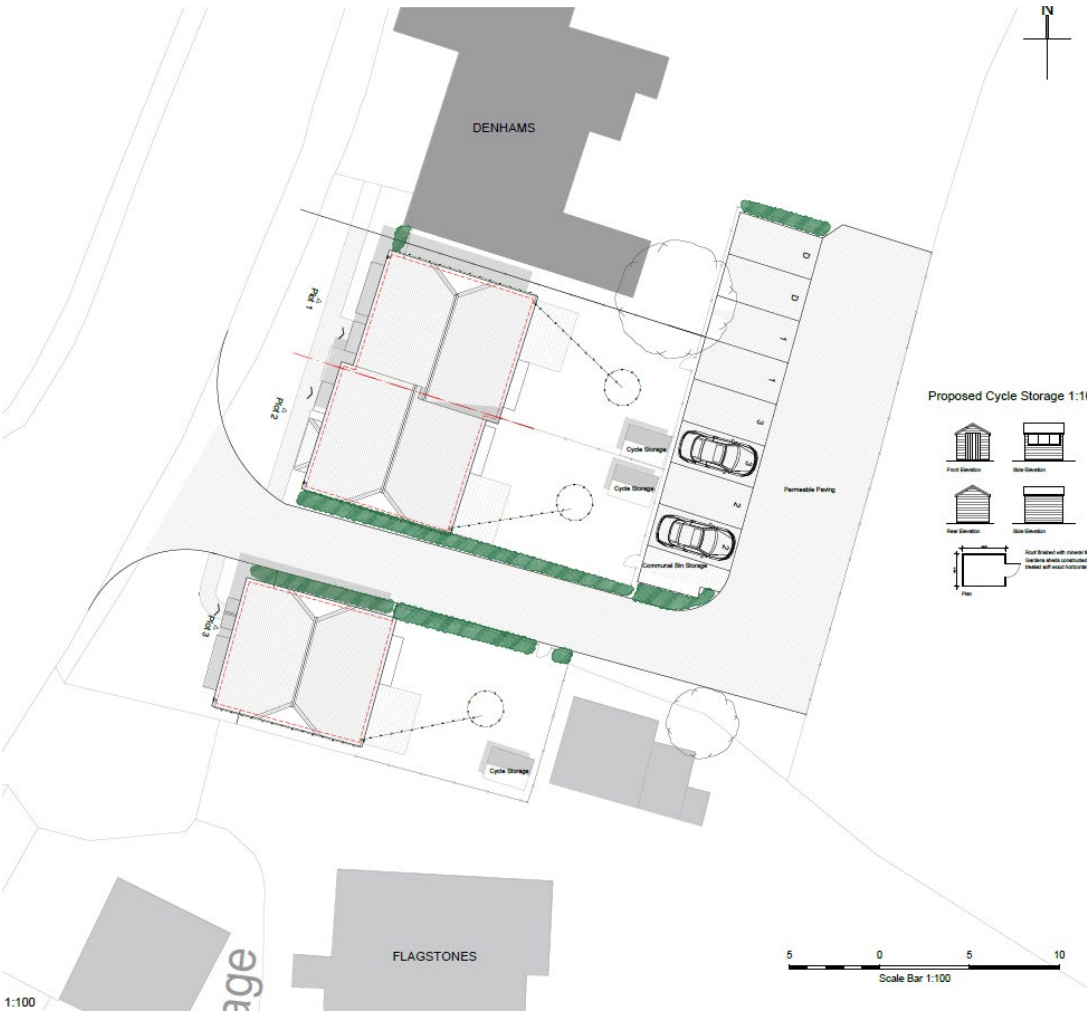
1.4 One way of preventing any further negative impact is to ensure that all new development which takes place is water neutral. Water neutrality is defined as the use of water in the supply area before the development is the same or lower after the development is in place.

1.5 The application site is located within the Sussex North Water Resource Zone. This report therefore provides evidence to show that the proposed development will be water neutral.

2 BACKGROUND

2.1 This water neutrality report supports a planning application for the erection of 3 dwellings on land adjacent to Denhams, Andrews Hill, Billinghurst.

Figure 2.1 – Proposed Site Plan



2.2 Access to the site is directly off Andrews Hill. There are no existing buildings within the application site and no historic water usage that can be evidenced.

3 CALCULATING WATER USAGE

3.1 Introduction

3.1.1 In the UK every person uses approximately 150 litres of water a day, whilst consumption in our homes has steadily increased every year by around 1% since 1930 as we enjoy better standards of cleanliness and greater use of water-using appliances.

3.1.2 Increased consumption and a growing number of households has put more pressure on water supplies and it is likely that this problem will worsen as our climate changes.

3.1.3 From April 2010 Part G of the Building Regulations requires new dwellings to limit maximum water usage to 125 litres per person per day, whilst dwellings assessed under The Code for Sustainable Homes are required to achieve a lower maximum water usage level. Water efficiency has now become an issue that must be embraced by designers, specifiers and house builders.

3.2 What is needed for a water usage calculation

3.2.1 The calculation method requires the use of water consumption figures provided from manufacturers product details. In order to calculate predicted water usage of a dwelling the following information is collected to determine the consumption of each fitting:

- Whether the dwelling has a low or high water pressure system.
- Kitchen, utility and other taps – the quantity of taps as well as the flow rates in litres per minute for each tap. Where separate hot and cold taps are provided the flow rate of each is taken to determine the average.
- Baths – the quantity of baths and the capacity to overflow in litres. The flow rates of the bath taps are not required. Jacuzzis are not included in the water efficiency calculations.
- Showers – the quantity of showers and the cold-water flow rate.

- WCs – the quantity of toilets and flush capacity in litres of both single and dual flushes (part and full flush)

- Dishwashers – the water usage in litres per place setting. If no dishwasher is present in the development then a generic figure of 1.25 litres per place setting is used. This will allow for any future installations.

- Washing machines – the water usage in the litres per kilogram of dry load. If no washing machine is present in the development, then a generic figure of 8.17 litres per kilogram of dry load is used. This will allow for any future installations.

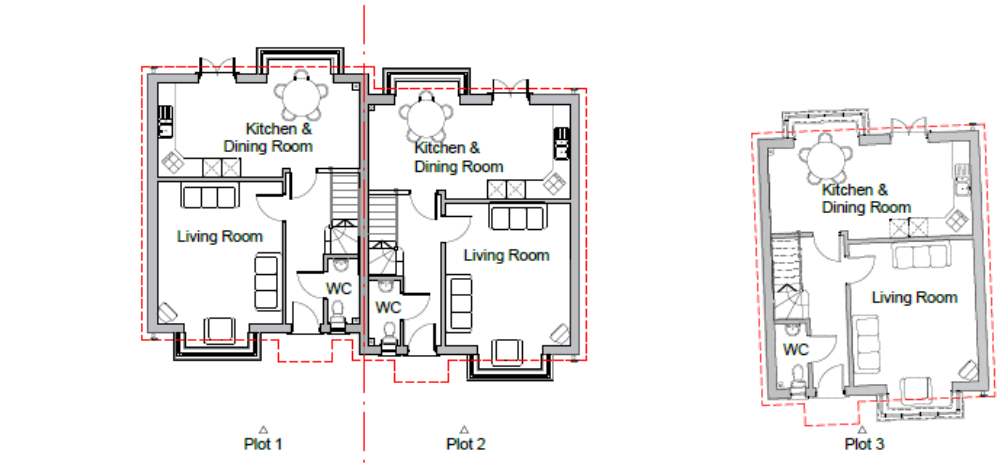
3.2.2 External taps are included in Building Regulations calculations at a fixed rate of 5 litres per person per day. External water use is not included in the target consumption rates for Code for Sustainable Homes.

4 WATER USAGE OF THE PROPOSED DEVELOPMENT

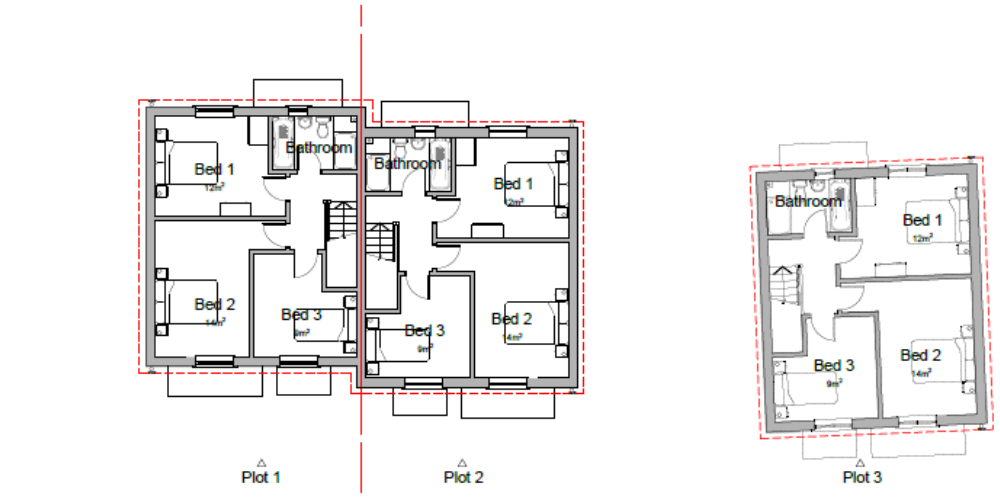
4.1 The proposed development relates to the erection of 1 no. 3 bed detached dwelling and a pair of 3 bed semi-detached dwellings.

4.2 Each dwelling will contain an open plan kitchen/dining room, living room, cloakroom, family bathroom, 3 bedrooms and have the same number of fixtures and fittings.

Figure 4.1 – Proposed Floor Plans



Proposed Ground Floor Plan 1:100



Proposed First Floor Plan 1:100

4.3 Based on 2011 census data for Horsham District, the average occupancy rate for a 3-bedroom dwelling is 2.47 occupants.

4.4 The dwellings will be subject to Horsham District Council's maximum water usage requirement of 110 litres of water per person per day. However, using more efficient water saving appliances would help to reduce this figure to 93.58 litres per person per day which includes 5 litres for an external tap. A copy of the water calculator can be found in Appendix C.

4.5 The average occupancy rate of a 3 bedroom dwelling in the Horsham District is 2.47 persons. The total water usage per dwelling would therefore be 231.14 litres of water per day or 253,101.45 litres per annum.

93.58 litres per person per day x 2.47 occupancy = 231.14 litres per day

231.14 litres per day x 3 dwellings = 693.43 litres per day

693.43 litres per day x 365 days = 253,101.45 litres.

4.6 The application site has no historic water usage that can be evidenced and therefore water offsetting will need to be identified, details of which can be found in Section 5 of this report.

5 PROPOSED WATER OFFSETTING MEASURES

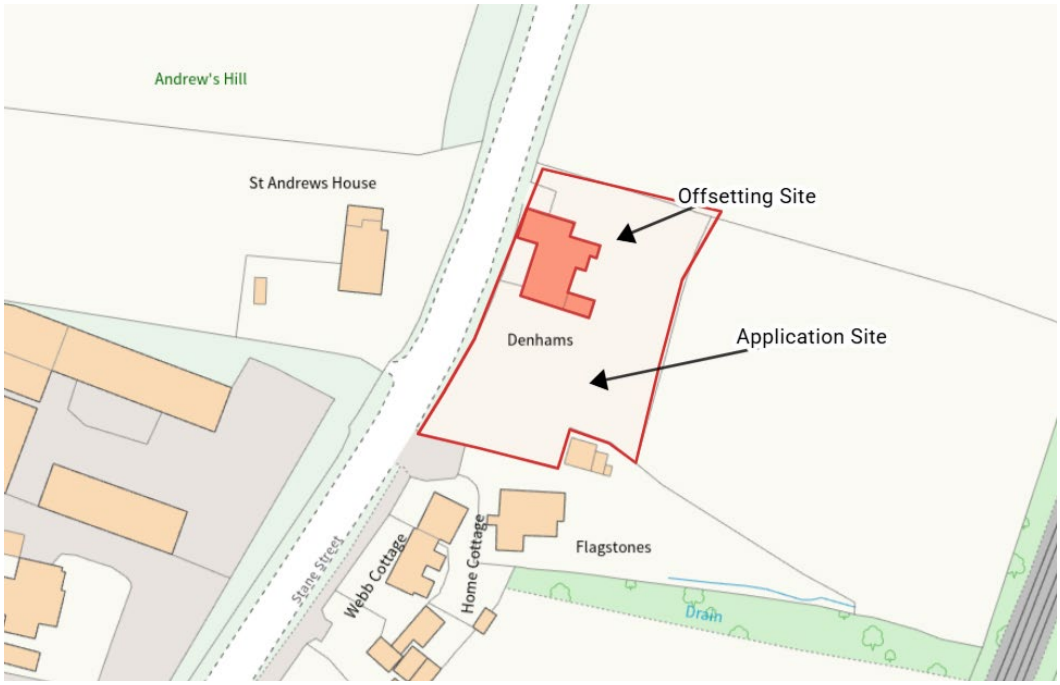
5.1 Introduction

5.2 The applicant owns the residential property Denhams which is located to the north of the application site.

5.3 Denhams is a 5-bedroom detached property and is occupied by 5 residents.

5.4 In order to offset the mains water usage of 253,101.45 litres per annum it is proposed to use flow restrictors on the existing dwelling 'Denhams' as well as rainwater harvesting systems.

Figure 5.1 – Offsetting Site Plan



5.5 Flow testing on the existing water fixtures and fittings was undertaken by a qualified plumber to confirm the existing flow rates and what these can be reduced by though the installation of flow restrictors. Examples of which can be found in Appendix E.

Figure 5.2 – Flow Rates of Denhams

Fitting Type	Existing Flow Rate Litres per Minute	Proposed Flow Rate Litres per Minute
Cloakroom	5	5
Bathroom	5	5
Cloakroom Basin Tap (H)	10.8	5
Cloakroom Basin Tap (C)	9.6	5
Bath Tap (H)	8.4	5
Bathroom Basin Tap (H)	7.7	5
Bathroom Basin Tap ©	7.7	5
Kitchen Tap (H)	7	5

5.6 Water calculations were undertaken to confirm the existing and proposed water usage of the above fittings on a per person basis, details of which can be found in Appendix D.

5.7 The existing flow rates of the above fittings equates to 205.98 litres per person per day which based on the actual occupancy of the 5 bedroom dwelling, equates to 1029.90 litres per day.

205.98 litres per person per day x 5 occupants = 1029.90 litres per day

5.8 The proposed flow rates of the above fittings once flow regulators have been installed to the taps equates to 152.06 litres per person per day or based on the actual occupancy of the dwelling equates to 760.30 litres per day.

152.06 litres per person x 5 occupants = 760.30 litres per day

5.9 This therefore provides a mains water saving of 269.60 litres per day or 98,404 litres per annum and which would be available towards offsetting.

1029.90 litres per day (existing) – 760.30 litres per day (proposed) = 269.60 litres per day saving.

269.60 litres per day x 365 = 98,404 litres per annum saving

5.10 As noted above in item 5.4, 253,101.45 litres per annum is required to be offset in order to deem the proposal water neutral. This therefore requires a further 154, 697.45 litres per annum or 423.83 litres per day to be offset.

5.2 Rainwater Harvesting Systems

5.2.1 It is proposed to use rainwater harvesting to serve the WCs, washing machines and outside taps on each proposed dwelling as well as the existing dwelling Denhams to provide further offsetting.

Rainwater Harvesting on Proposed Dwellings

5.2.2 The roof plan area of each proposed dwelling measures 98 sqm.

5.2.3 The application site is located within the Arun at Pallingham Catchment area and details of the average rainfall within this area for the last 5 years has been recorded as 911.46 mm per annum.

Rainfall data for Arun at Pallingham Catchment Area

	Rainfall (in mm)						
	July 2019 - June 2020	July 2020 - June 2021	July 2021 - June 2022	July 2022 - June 2023	July 2023 - June 2024	July 2024 - June 2025	Average
July	114.147	37.533	97.554	3.16	28.671	67.848	58.15216667
August	46.893	26.984	88.968	37.59	40.86	36.279	46.26233333
September	53.995	64.433	84.821	87.88	49.451	156.293	82.81216667
October	99.84	28.527	60.034	95.69	83.179	90.822	76.34866667
November	118.658	178.691	153.733	218.17	116.909	86.143	145.384
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	60.544		53.0466
June	4.438	97.553	61.197	19.123	19.104		40.283
TOTAL	1046.295	905.894	822.048	944.798	809.852		911.4625333

5.2.4 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:

911.46mm x 98 sqm = 89,323.08 litres per annum per dwelling

5.2.5 30, 508.45 litres per annum per dwelling is required to be captured to serve the washing machine, WCs and outside tap each year so this is readily possible or 83.58 litres per day.

11.68 (WCs) + 17.16 (Washing Machine) + 5 (o/s tap) = 33.84 litres per person

33.84 litres per person x 2.47 occupants = 83.58 litres per day

83.58 litres per day x 365 = 30,508.45 litres per annum

5.2.6 1 x 1200 litre tanks per dwelling will be required to provide adequate storage to cover a 35 day drought period details of which can be found in Appendx F.

Rainwater Harvesting on Existing Dwelling Denmans

5.2.7 The roof plan area of Denmans measures 345 sqm.

5.2.8 As per the proposed dwellings Denmans is located within the Arun at Pallingham Catchment area, using the average rainfall data of 911.46 mm per annum equates to 314, 453.70 litres of rainwater being able to be collected per annum.

911.46mm x 345 sqm = 314,453.70 litres per annum

5.2.9 121,107 litres per annum is required to be captured to serve the washing machine, WCs and outside tap each year so this is readily possible.

44.2 (WCs) + 17.16 (Washing Machine) + 5 (o/s tap) = 66.36 litres per person

66.36 litres per person x 5 occupants = 331.80 litres per day

331.80 litres per day x 365 = 121,107 litres per annum

5.2.10 1 x 3500 litre tank will be required to provide adequate storage to cover a 35 day drought period details of which can be found in Appendix F.

5.2.11 The combined mains water saving by using rainwater harvesting at the 3 new dwellings and the existing dwelling Denmans totals 212,632.35 litres per annum.

(30,508.45 x 3) + 121,107 = 212,632.35 litres per annum

5.2.11 By installing flow restrictors to the existing taps at Denmans as well as undertaking rainwater harvesting on both the existing and proposed properties to serve the WCs, washing machines and outside taps will provide both water neutrality and a further water saving of 57,934.90 litres per annum.

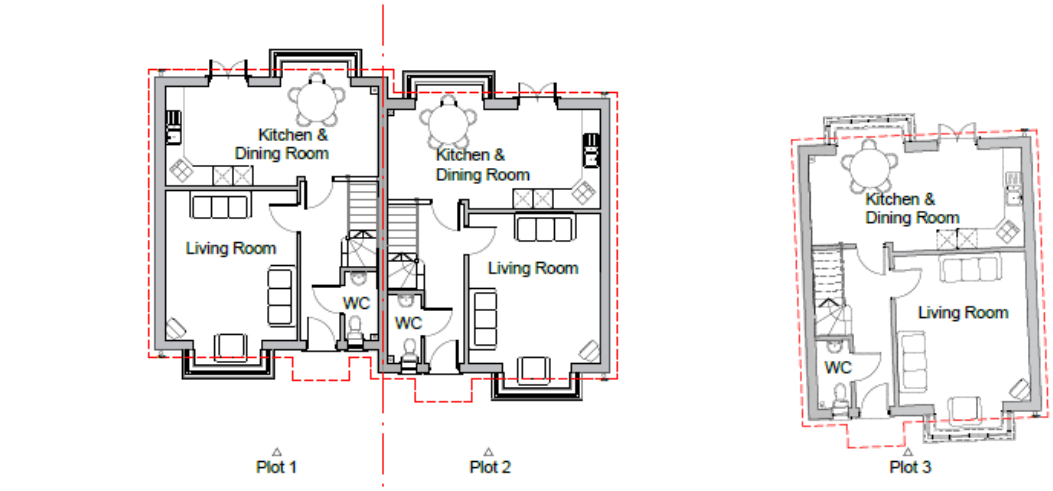
Detail	Litres Per Annum
Proposed Mains Water Usage of New Dwellings	253,101.45
Mains Water Saving by Flow Restrictors Installed at Denmans	98,404.00
Mains Water Saving by Rainwater Harvesting Installed on New Dwellings	91,525.35
Mains Water Saving by Rainwater Harvesting Installed at Denmans	121,107.00
Total Mains Water Saving Post Offsetting	**57,934.90**

Appendix A

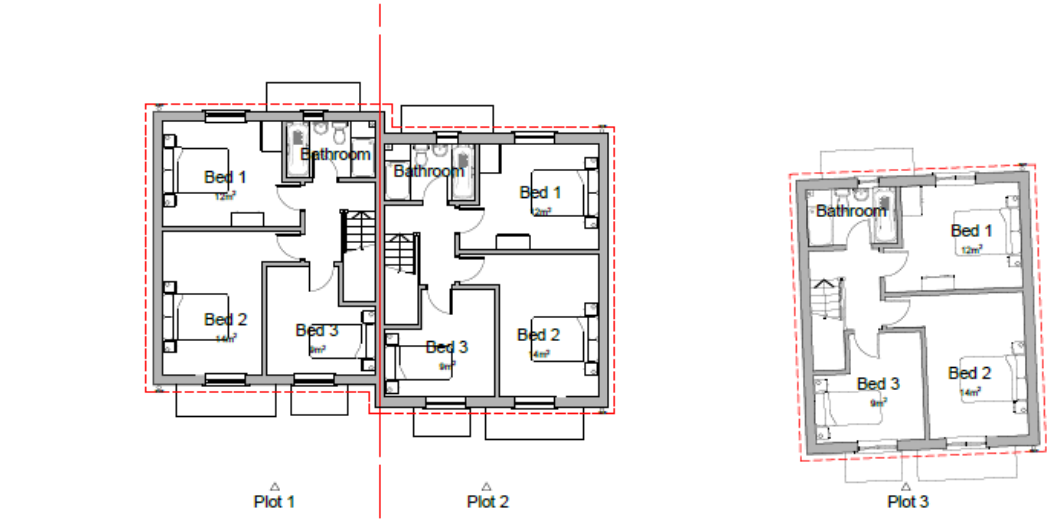
Proposed Site Location Plan and Offsetting Plan

Appendix B

Proposed Floor Plan



Proposed Ground Floor Plan 1:100



Proposed First Floor Plan 1:100

Appendix C

Proposed Water Calculator Per Dwelling

Unified Water Label

Denmans New Dwellings

Congratulations

You are within your target maximum consumption of potable water (**125** litres / person / day).

Total water consumption from your calculation 93.58 litres per person per day

This calculator is intended to inform design choices by demonstrating the likely impact of specification changes on total water consumption. Results can only be used to demonstrate compliance with the Code for Sustainable Homes when the calculations have been verified by a suitably qualified Code for Sustainable Homes assessor.

Calculation summary:

Installation type	Unit of measure	Capacity / flow rate	Use factor	Fixed use	Litres / person / day
WCs (dual flush) Full Flush	Average effective flushing volume (litres)	8	1.46	0	11.68
Taps (excl. kitchen/utility room)	Flow rate (litres/minute)	8	1.58	1.58	14.22
Bath	Capacity to overflow (litres)	100	0.11	0	11
Shower	Flow rate (litres / minute)	6	4.37	0	26.22
Kitchen/utility room sink taps	Flow rate (litres / minute)	5	0.44	10.36	12.56
Washing machine	Litres / kg dry load	8.17	2.1	0	17.16
Dishwasher	Litres / place setting	1.25	3.6	0	4.5
Waste disposal unit	Litres / use		3.08	0	
Water softener	Litres / person / day		1.00	0	

Totals

Total Calculated use (litres/person/day)	97.34
Contribution from greywater (litres/person/day)	
Contribution from rainwater (litres/person/day)	
Normalisation factor	0.91
Total internal water consumption (litres/person/day)	88.58
External water use	5.00
Total water consumption (Building Regulations Part G)	93.58

Appendix D

Denmans Existing Flow Rate Water Calculator

Unified Water Label

Denhams Existing Flow Rates

You are not within your target maximum consumption of potable water (125 litres / person / day).

Total water consumption from your calculation 205.98 litres per person per day

This calculator is intended to inform design choices by demonstrating the likely impact of specification changes on total water consumption. Results can only be used to demonstrate compliance with the Code for Sustainable Homes when the calculations have been verified by a suitably qualified Code for Sustainable Homes assessor.

Calculation summary:

Installation type	Unit of measure	Capacity / flow rate	Use factor	Fixed use	Litres / person / day
WCs (single flush)	Flush volume (litres)	10	4.42	0	44.2
Taps (excl. kitchen/utility room)	Flow rate (litres/minute)	55	1.58	1.58	88.48
Bath	Capacity to overflow (litres)	100	0.5	0	50
Kitchen/utility room sink taps	Flow rate (litres / minute)	14	0.44	10.36	16.52
Washing machine	Litres / kg dry load	8.17	2.1	0	17.16
Dishwasher	Litres / place setting	1.25	3.6	0	4.5
Waste disposal unit	Litres / use		3.08	0	
Water softener	Litres / person / day		1.00	0	

Totals

Total Calculated use (litres/person/day)	220.86
Contribution from greywater (litres/person/day)	
Contribution from rainwater (litres/person/day)	
Normalisation factor	0.91
Total internal water consumption (litres/person/day)	200.98
External water use	5.00
Total water consumption (Building Regulations Part G)	205.98

Appendix E

Denmans Proposed Post Flow Restrictors Water Calculator

Unified Water Label

Denmans Flow Restrictors

You are not within your target maximum consumption of potable water (125 litres / person / day).

Total water consumption from your calculation 152.06 litres per person per day

This calculator is intended to inform design choices by demonstrating the likely impact of specification changes on total water consumption. Results can only be used to demonstrate compliance with the Code for Sustainable Homes when the calculations have been verified by a suitably qualified Code for Sustainable Homes assessor.

Calculation summary:

Installation type	Unit of measure	Capacity / flow rate	Use factor	Fixed use	Litres / person / day
WCs (single flush)	Flush volume (litres)	10	4.42	0	44.2
Taps (excl. kitchen/utility room)	Flow rate (litres/minute)	20	1.58	1.58	33.18
Bath	Capacity to overflow (litres)	100	0.5	0	50
Kitchen/utility room sink taps	Flow rate (litres / minute)	5	0.44	10.36	12.56
Washing machine	Litres / kg dry load	8.17	2.1	0	17.16
Dishwasher	Litres / place setting	1.25	3.6	0	4.5
Waste disposal unit	Litres / use		3.08	0	
Water softener	Litres / person / day		1.00	0	

Totals

Total Calculated use (litres/person/day)	161.60
Contribution from greywater (litres/person/day)	
Contribution from rainwater (litres/person/day)	
Normalisation factor	0.91
Total internal water consumption (litres/person/day)	147.06
External water use	5.00
Total water consumption (Building Regulations Part G)	152.06

Appendix E

Example of Flow Restrictors

ECO Range

Accessories
Flow Regulators

Features:

- Limiters can be fitted within tap or shower inlet tails
- All flow limiters accurate by +/-10%
- Limiters suitable to work on a minimum pressure of 0.2bar

Product Certifications:

WRAS APPROVED PRODUCT

WRAS Certificate No: 2007800
WRAS Expiry Date: 31/07/2025

For more products, visit our website:
http://www.bristan.com

Specification

Product Code	Limited To (lpm)	Minimum Dynamic Pressure (bar)	Connection Inlet	Fitted To	What's In the Box?
ECO TAP1	1	0.2	Ø15mm	Tap Tail; Shower Inlet	1x 1lpm Pink Flow Limiter
ECO TAP2	2	0.2	Ø15mm	Tap Tail; Shower Inlet	1x 2lpm Olive Flow Limiter
ECO TAP3	3	0.2	Ø15mm	Tap Tail; Shower Inlet	1x 3lpm Brown Flow Limiter
ECO TAP4	4	0.2	Ø15mm	Tap Tail; Shower Inlet	1x 4lpm Grey Flow Limiter
ECO TAP5	5	0.2	Ø15mm	Tap Tail; Shower Inlet	1x 5lpm Yellow Flow Limiter
ECO TAP6	6	0.2	Ø15mm	Tap Tail; Shower Inlet	1x 6lpm Black Flow Limiter
ECO TAP7	7	0.2	Ø15mm	Tap Tail; Shower Inlet	1x 7lpm Green Flow Limiter

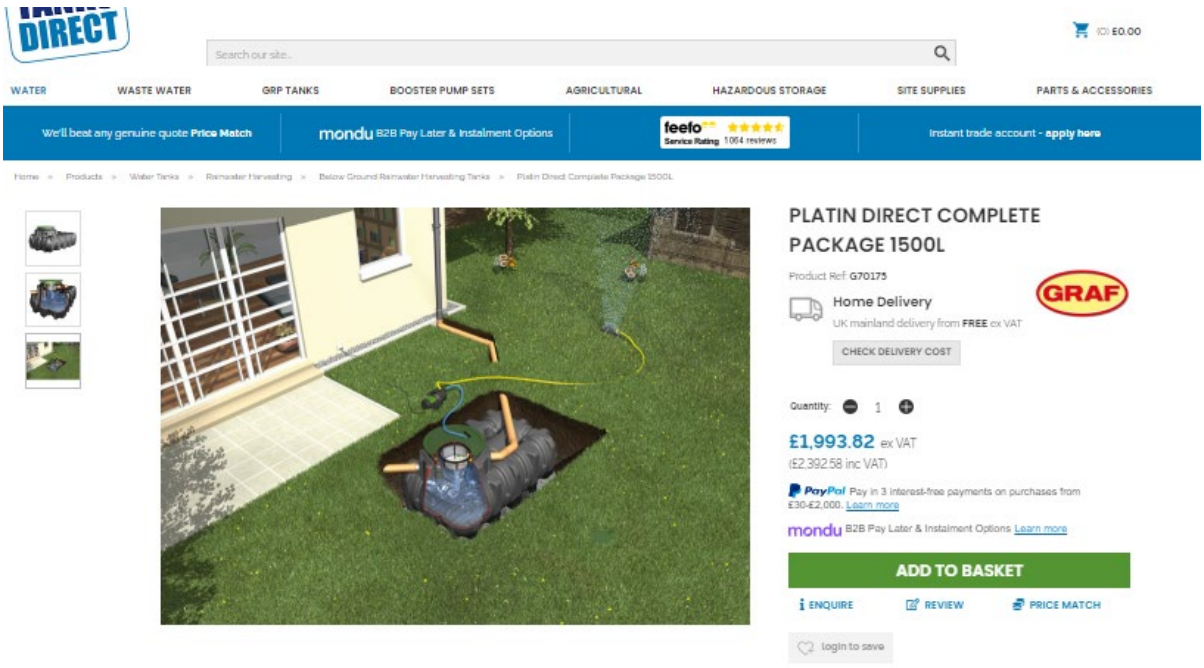
TECHNICAL DATA SHEET

TOP QUALITY 5 YEARS GUARANTEED

BRISTAN D6

Appendix F

Example of Rainwater Harvesting Tank for New Dwellings



Description | Delivery | Returns Information

Product Description

1,500 LITRE GRAF PLATIN DIRECT RAINWATER HARVESTING SYSTEM

The GRAF Platin tanks are shallow-dig plastic rain water storage tanks designed for ultra-low installation. The GRAF Direct Package includes a complete system for storing and using rainwater for on-demand supply to WCs, washing machines and external taps, potentially saving up to 50% of your mains water usage.

Customer Notice: *The processed water may be used to water the garden, flush toilets, wash clothes and as conventional cleaning water. It is* **Not** *suitable for consumption or personal hygiene.*

- Simple & quick to install.
- On Demand Rainwater Supply - submersible pump supplies harvested to toilets, washing machine & external tap.
- Guaranteed Water Supply - tank topped up with mains supply when water level in the tank is low.
- Mains-on-Tap - quiet and conveniently sized unit that can fit in a cupboard for low visual impact.
- Innovative Float Sensor - ensures underground tank is kept supplied with mains water, but only the amount needed to supply demand, whilst leaving as much volume as possible to collect rainwater when available.

Specifications:

Capacity: 1,500 litres
Length: 2100mm
Width: 1250mm
Height: 1015mm
Inner Ø dome shaft: 650mm
Tank Weight: 120kg
Dome Shaft Weight: 9kg (pedestrian loading)/35kg (vehicle loading)
Warranty: 15 Years

Please Note: *All dimensions are approximate (the manufacturer reserve a tolerance of +/- 3%) and the useful volume of the tanks may be up to 10% lower than the tank capacity, according to the connecting option. All images shown are used for illustration purposes only and may differ from the actual product supplied.*

Example of Rainwater Harvesting Tank for Denmans