Consulting Civil Engineers

Water Neutrality Report

Mackley's Field, Small Dole, Henfield

For

Sam Mackley

Rev – **P4**

Reference **C2861**

Date **11th June 2025**

Revision	Date of Issue	Comments	Prepared By	Checked By
P-	23.10.23	Initial Issue	LT	CS
P1	31.10.23	Revised	LH	CS
P2	25.01.24	Site plan updated	LT	CS
P3	02.12.24	Revised to suit new site plan	LH	CS
P4	11.06.25	Revised to suit SNOWS	LH	CS

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1 Introduction

1.1.1 CGS Civils Ltd has been appointed by Sam Mackley to undertake a Water Neutrality Report for a proposed development at Mackley's Field, Henfield Road, Small Dole. Planning permission is sought to replace an existing structure with a small multipurpose retail/community building that will include a kitchen and toilet as well as an open plan meeting area and office. The site falls within the Sussex North Water Supply Zone, in which Natural England have written to all authorities within the zone providing a position statement for applications which may place increased pressure on this zone. This explains that recent case law has established that abstraction from the Supply Zone may be having an impact on protected sites (Arun Valley Special Area of Conservations (SAC), Special Protection Area (SPA) and Ramsar site). As a result, developments within this zone must not add to this impact, as such, the purpose of this report is to therefore provide an overview on the potential water usage changes on the site as a result of the proposed development, and to confirm that the site is water neutral.

Fig 1. Sussex North Water Supply Zone Area

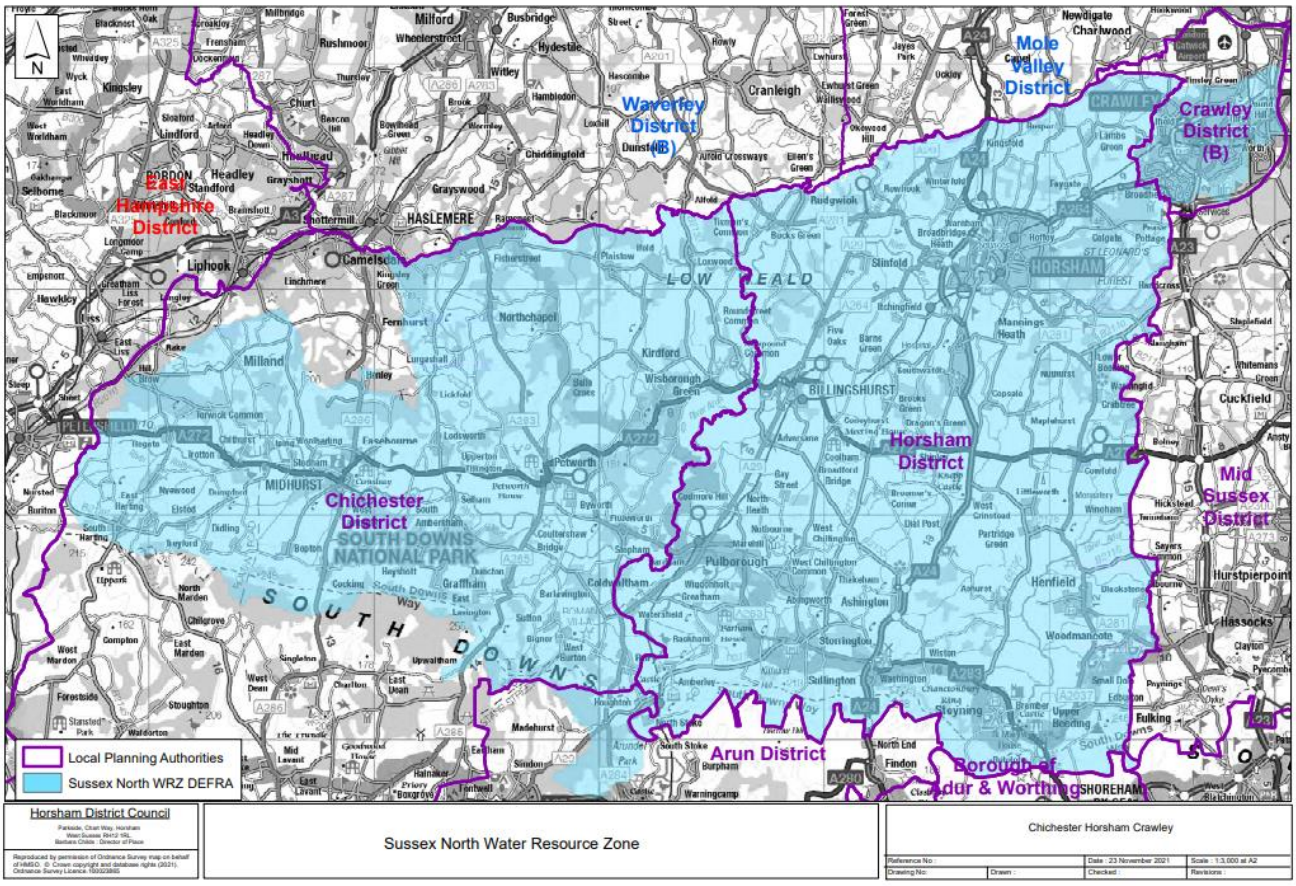
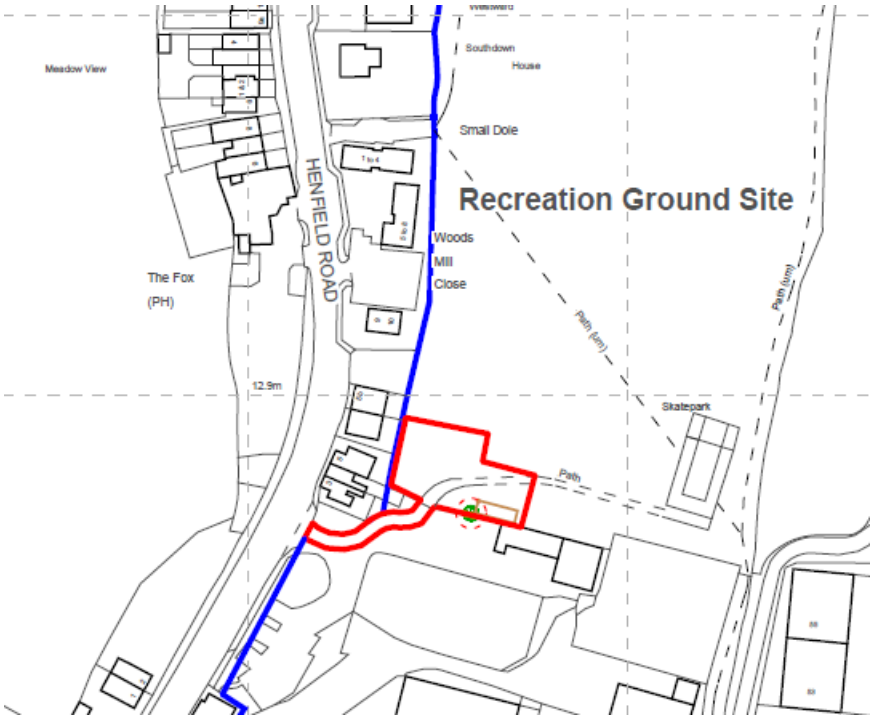


Fig 2. Site Location



1.1.2 The proposed development is located at OS Grid Reference TQ 21468 12671 and has the post code BN5 9XR.

1.1.3 Waterwise defined Water Neutrality as:

'For every new development, total water use in the region after the development must be equal to or less than the total water uses in the region before the new development.'

1.1.4 Achieving water neutrality involves using a three-step approach. First, the demand for water from the new development must be reduced as far as is practicable, followed by the re-use of water; then the remaining demand should be offset within the region. Following this three-step approach allows the volume that requires offsetting to be reduced which ultimately reduces the cost of the overall scheme. This is noted within the Waterwise neutrality definition, which defines the three steps which should be undertaken in order to achieve water neutrality in their recent review dated January 2021.

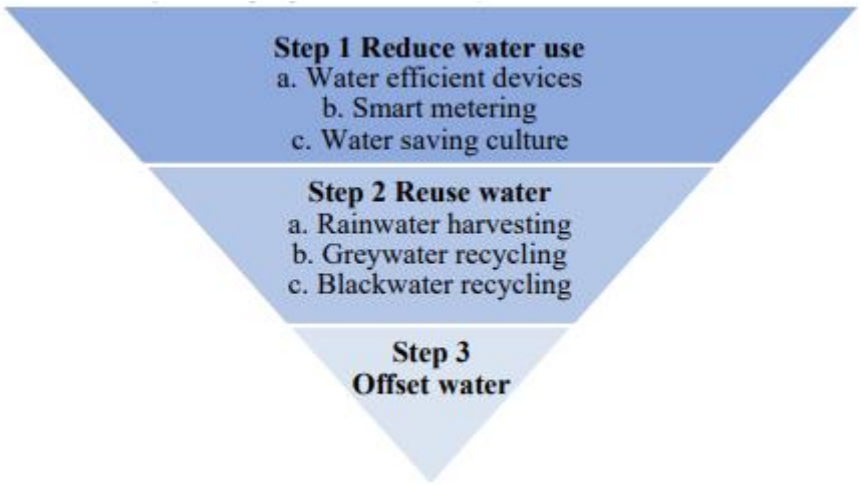
- Reduce water demand in the new development through improvement in efficiency.
- Re-use water, wherever possible.
- Offset the remaining water demand from the new development if required.

1.1.5 The report will be split into the following sections:

- A Review of Water Neutrality demand reduction
- A calculation of estimate water usage from proposed development
- Identification of measures that can be first used to reduce this demand
- Identification of measures that can be used to re-use water
- Establish solutions to offset that demand in order to achieve neutrality.

1.1.6 This report will follow the methods documented within *'A Review of Water Neutrality in the UK'* carried out by Waterwise in January 2021. The document provides details on how developments can achieve water neutrality by utilising the 3-stage approach.

Fig 2. 3-stage approach



1.1.7 Some increase in water demand within the region from planned development during the local plan period is inevitable. However, it can be minimised by making the site as water efficient as possible.

2 Executive Summary

2.1.1 The existing building was previously used as a changing room for local children's football clubs, though due to the field being too uneven for safe play it has been out of use since 2015. The water usage for the existing site is therefore **0 l/day.** The proposed scheme will consist of replacing this existing building with a small multipurpose retail/community building that will include a kitchen and toilet as well as an open plan meeting area and office.

2.1.2 As proven within this report, the use of rainwater harvesting techniques will reduce the water demand of the proposed site down to 30.77 l/day. The remaining water demand is to be offset via SNOWS.

Table 2 Water Usage Comparison

Existing Water usage	**0 l/day**
Proposed scheme water usage prior to mitigation measures	143.6 l/day
Proposed Scheme water usage post mitigation measures	30.77 l/day
Site water neutral following SNOWS?	Yes

3 Calculation of estimate water usage from the proposed development

3.1.1 Before any necessary steps to achieve water neutrality can be determined, the total water demand for the proposed development must first be calculated. The proposed scheme will consist of replacing an existing structure with a small multipurpose retail/community building that will include a kitchen and toilet as well as an open plan meeting area and office. It should be noted that the existing structure is not currently in use.

3.1.2 A survey was undertaken on site in response to the pre-application advice given by Horsham DC. The Survey was carried out during the days with the most foot traffic – Friday, Saturday and Sunday - to anticipate how many people are to use the facilities in the proposed building on average. It was recorded that on average 26 people passed by the existing structure a day. It should be assumed that not everyone is going to utilise the facilities within the proposed building and that a fair estimate of 50% will be using the facilities. Therefore, it is anticipated that the retail/community building will have up to 13 visitors using the facilities per day. There is also anticipated to be at least 2 'employees' who will be within the proposed building all day selling their cakes etc.

3.1.3 The proposed retail/community buildings will only use the kitchen taps to provide drinks to those using the facilities, and to wash up crockery. A 15L sink will be used for washing up and drinks will be served in 8 Oz cups (rounded up to 0.25l):

(15 x 0.25 l/p/d) + 15 l/p/d
= 18.75 l/day

3.1.4 In addition to this value, we also need to account for the toilets that will be used by the 15 people anticipated to use the facilities per day. In line with the guidance provided by BREEAM, the values for the toilets and basin taps are 3 l/p/d each, or a total of 90 l/day. resulting in a total water demand of **108.75 l/day** when added to the demand from the taps and sinks**.**

2 x (15 x 3 l/p/d)
= 90 l/day

3.1.5 Lastly, the upstairs office's water demand needs to be added; the occupancy of the office is **1.9** based off the BREEAM occupancy rates that is based upon the net floor area of the office. This office will make use of the downstairs toilet and kitchen facilities, resulting in an additional 12 l/p/d for the toilets, 2.03 l/p/d for the bathroom taps and 2.72 l/p/d for the kitchen sink as well as an additional 1.58 l/p/day for vessel filling fixed usage; which is a total of 18.33 l/p/d for the office space. As this is only for the use of 1.9 people, this results in a total water demand of **143.6 l/day** for the entire site.

3.1.6 The following sections within this report will cover measures that can be undertaken in order to reduce the water consumption of the proposed property and make the site water neutral.

4 Step 1 – Identifying measures that can be used to reduce this demand

4.1.1 It is proposed that water efficient fittings be installed within the proposed building as discussed in Section 3.1.3.

5 Step 2 – Identify measures that can be used to re-use water

5.1.1 Once the water demand has been reduced via the installation of water efficient products, water reuse should be considered. The term 'water reused' refers to the capture, treatment (if it is required) and the use of alternative water supplies for non-potable purposes. It includes:

- Rainwater and surface water harvesting
- Greywater recycling (typically the used water from baths, showers and hand basins)
- Wastewater recycling.

5.1.2 The installation of water reusing technology has the potential to save significant amounts of water; for example, 24% of water in the home is used for flushing the toilet and only 4% externally in the garden meaning a water reuse system could save at least a quarter of the demand if it was installed for these purposes. Depending on the quality and the system installed, it could also be possible to re-use water for a washing machine which accounts for 12% of total water usage.

Table 8 Practical Summary of Step 2

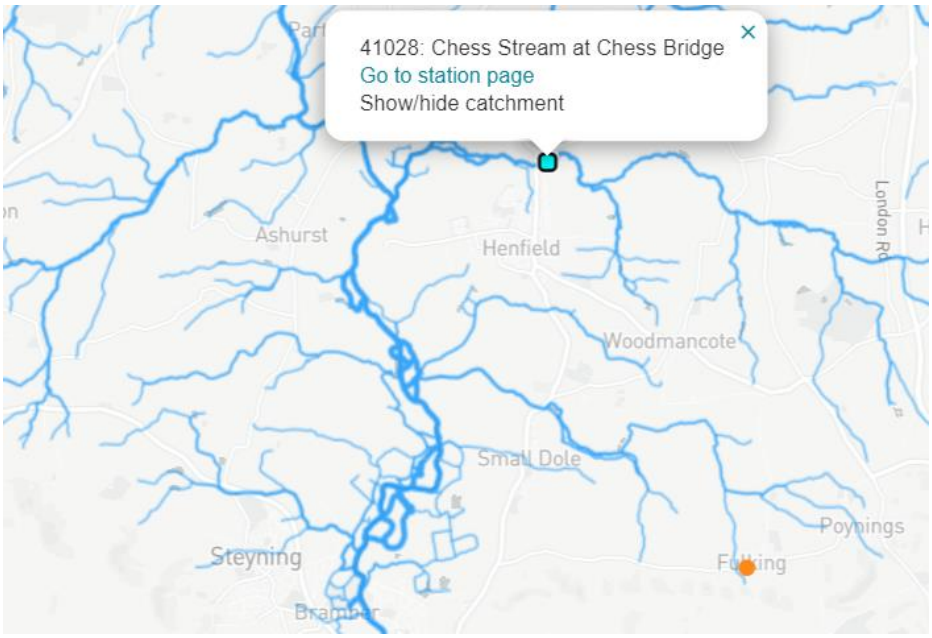
Step 2: Reuse Water			
Rainwater Harvesting	Small scale water butt	Rainwater Harvesting system for individual homes and buildings	Large scale surface water harvesting
Greywater Recycling		Small systems for individual homes	Largest scale systems for commercial and mixed-use sites

5.1.3 In this instance however, rainwater harvesting is proposed for use within the toilets only. This includes both toilets for office usage and foot traffic. The installation of water reusing technologies will further reduce the water demand on site, depending on the harvesting tank installed. The proposed roof area is sufficient to provide the required water to the property via a rainwater harvesting tank as well as has sufficient capacity for a 35-day drought period.

5.1.4 By installing the water efficient devices listed above as well as the rainwater harvesting technologies listed above, the total demand will be reduced to **30.77 l/day.**

5.1.5 A calculation is to be made to ensure that the rainwater harvested is greater than the rainwater demand within the dwelling. The following is a calculation for 5% of the annual rainwater yield and has been calculated using Rainfall data from the National River Flow Archive which provides annual rainfall data as recorded by the Met office and follows the intermediate approach as detailed within BS 8515:2009.

5.1.6 Using the rainfall catchment data provided by the National River Flow Archives, the closest station point to the site with rainfall catchment data is 41028 – Chess Stream at Chess Bridge:



Note that while the closest station point to the site is 41031 – Fulking Stream at Fulking, no rainfall catchment data is available for this station point.

5.1.7 The latest data available for this station is SAAR 1961-1990, which shows that the depth of rainfall in the area is 849mm.

$$Y_R = A \times e \times h \times n \times 0.05$$

Where:

Y_R = the annual rainwater yield (l)
A = The collecting area (m^2)
e = yield coefficient (%)
h = depth of rainfall (mm)
n = hydraulic filter efficiency

$$\underline{\mathbf{3129.4}} = 97 \times 0.8 \times 849 \times 0.95 \times 0.05$$

5.1.8 In order to ensure there is sufficient roof area, another calculation from BS 8515:2009 must be carried out in order to calculate the annual demand within the property. The following is a calculation for 5% of the annual non-potable water demand.

$$D_N = P_d \times n \times 365 \times 0.05$$

Where:

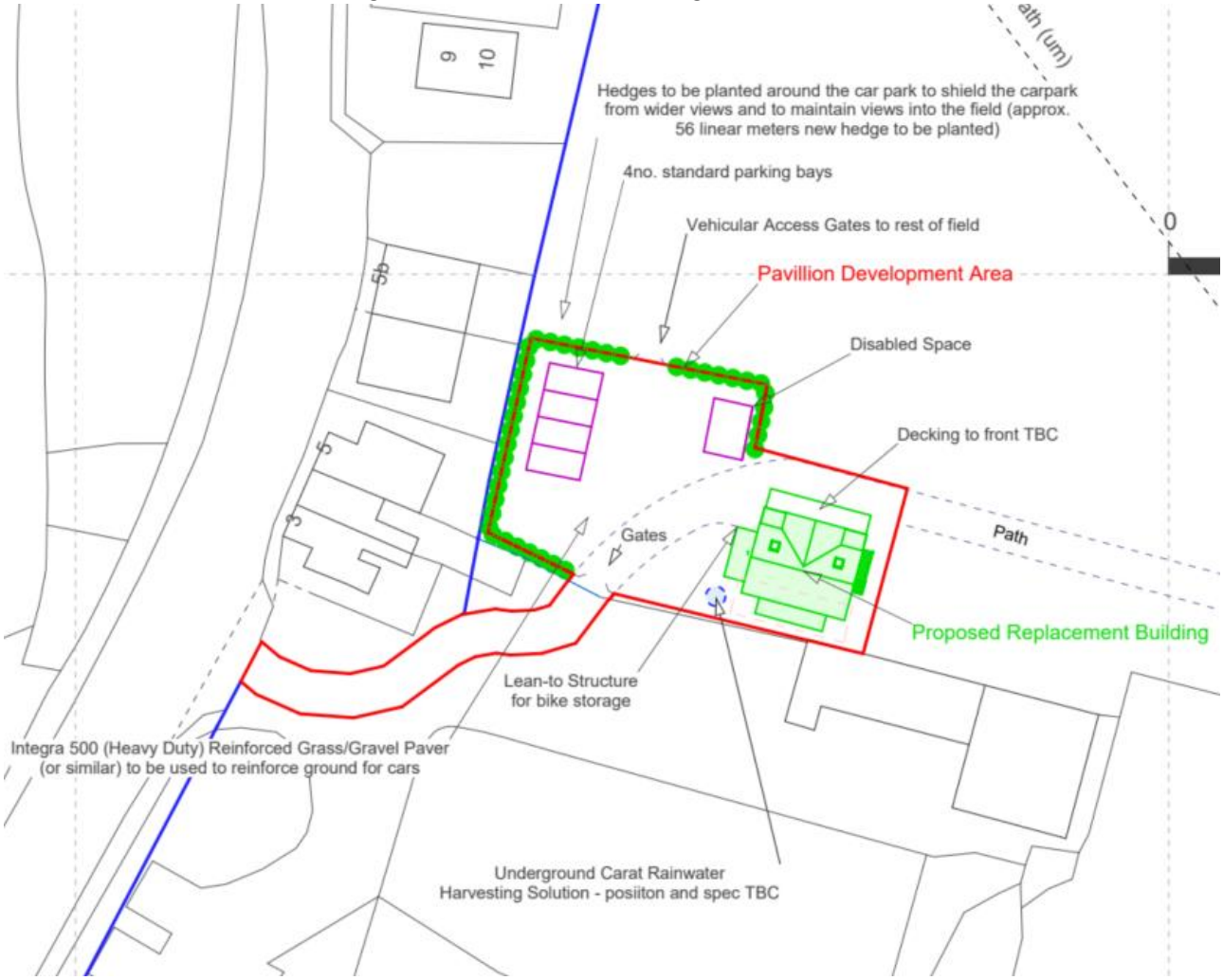
D_N = the annual non-potable water demand (l)
P_d = The daily requirement per person (l)
n = number of persons
Note that in this case the total site's toilet water demand of 112.8l/day (22.8 l/day for office and 90 l/day for foot traffic) Is used instead of values P_d and n.

$$1642.5 = 112.8 \times 365 \times 0.05$$

5.1.9 To ensure there is sufficient area to allow a 35-day drought storage, an extra 35 days is to be included:

$$\underline{\mathbf{1,800}} = 90 \times 400 \times 0.05$$

Fig. 4 Potential Rainwater Harvesting tank locations



5.1.10 In order to provide a cumulative consumption comparison between the existing and the proposed water usage, the occupancy rates would be for 'as existing' and 'as proposed':

- An existing water demand of 0l/day.
- Proposed water demand from BREEAM of 143.6 l/day for the overall site.
- This can be reduced down to 30.77 l/day with the implementation of rainwater harvesting techniques.

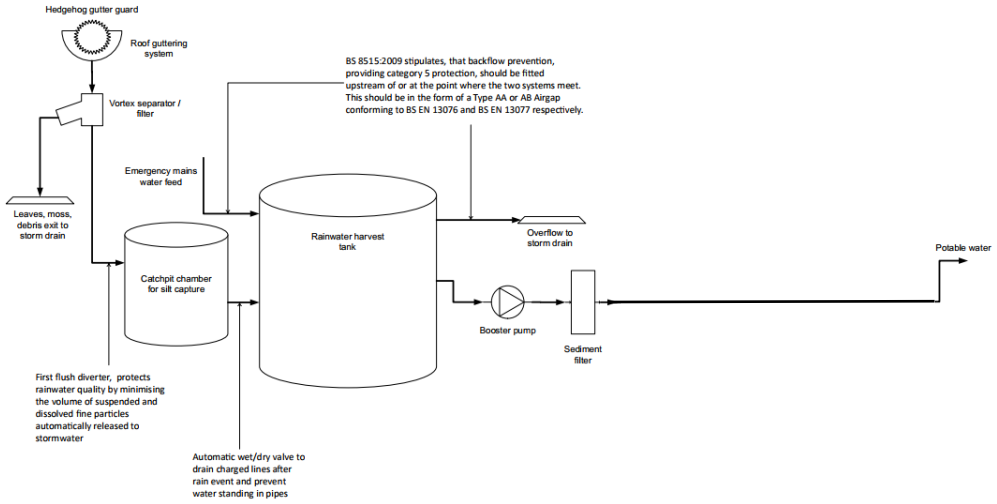
5.1.11 The client is willing to install a 5,000 l rainwater harvesting tank. The harvesting tank is to be fitted with the following equipment for use within the toilets.

- PREFILT103/4 10" prefilter housing

5.1.12 The likely contaminants associated with rainwater harvesting systems and how to treat them are:

- Dust – Sediment Filter

Fig. 3 Schematic view of treatment system



5.2 Rainwater Harvesting Tank Maintenance Specification

5.2.1 Rainwater Harvesting Tank

In order to maintain the functioning of the rainwater harvesting tanks, the following maintenance requirements should be adhered to:

Operation and maintenance requirements for rainwater harvesting tanks		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Ensure that all inlets and outlets are clear of debris and blockage	Weekly
	Remove debris inlets and outlets	Weekly
	Inspect first flush diverter to ensure it is working correctly and not clogged	Weekly – Clean if necessary
	Clean Filter screens	Monthly – Replace if damaged
	Inspect the tank for sediment build-up and any signs of algae	Monthly
	Inspect roof and gutters and clear of all debris	Every 3 months
	Inspect pump for any signs of wear or damage and test to ensure it is functioning correctly	Every 3 months
	Check bottom of the tank for sediment build-up and clear if necessary	Every 6 months
	Ensure all downpipes are clear and functioning correctly and clear if necessary	Every 6 months
	Test water	Every 6 months
	Thorough tank cleaning – drain tank, scrub interior and rinse	Annually or as required
	Service the pump and filtration system and replace any worn parts	Annually
	Inspect overflow to ensure it is working correctly and clear any obstructions	Annually
Monitoring	Monitor Water levels	Annually
	Inspect for pests e.g mosquitoes and take measures to prevent	As required

5.2.2 During a drought period that surpasses the 35-day protection period, mains water can be fed into a rainwater harvesting tank by utilising an automatic top-up system that will ensure there is a consistent water supply. Here is how it typically works:

- **Float Valves or sensor systems:** The rainwater tank is equipped with a float valve or an electronic sensor system that monitors the water levels. When the water level falls below a certain threshold, it triggers the system to allow mains water to top up the tank.
- **Control Unit**: The system will include a control unit that manages the operation of the float valve or sensors. This unit ensures that the mains water only flows into the tank when necessary, preventing overfilling and unnecessary use of mains water.
- **Mains Water connection**: A pipe connects the mains water supply to the harvesting tank. This pipe is typically fitted with a backflow prevention device to prevent any contamination of the mains water supply.
- **Topping up process:** When the water level in the tank is low, the control unit opens a valve to allow mains water to flow into the tank. Once the desired water level is reached, the valve closes.
- The system is designed with an overflow mechanism to handle excess water if the tank becomes too full, ensuring that any surplus water is safely directed away from the tank.

6 Offsetting Water Demand

6.1.1 The remaining **30.77 l/day** is to be offset via SNOWS.

6.1.2 Additional information can be supplied upon request.

7 Conclusion

7.1.1 The overall water demand can be reduced by utilising methods listed in the sections above to re-use water for the proposed development. This results in the site being water neutral.

7.1.2 To summarise:

- The proposed development will use on average **143.6 l/day** prior to any mitigation techniques.
- Re-using the water through rainwater harvesting tanks can reduce the water demand down to **30.77 l/day.**
- The remaining water demand is to be offset via SNOWS.
- The overall water demand will match the existing site's thereby making the site water neutral.

8 Appendices

8.1 Appendix A:

Example Rainwater Harvesting Tank Brochure:

Carat Rainwater Harvesting solutions



RAINWATER HARVESTING

WASTEWATER SYSTEMS

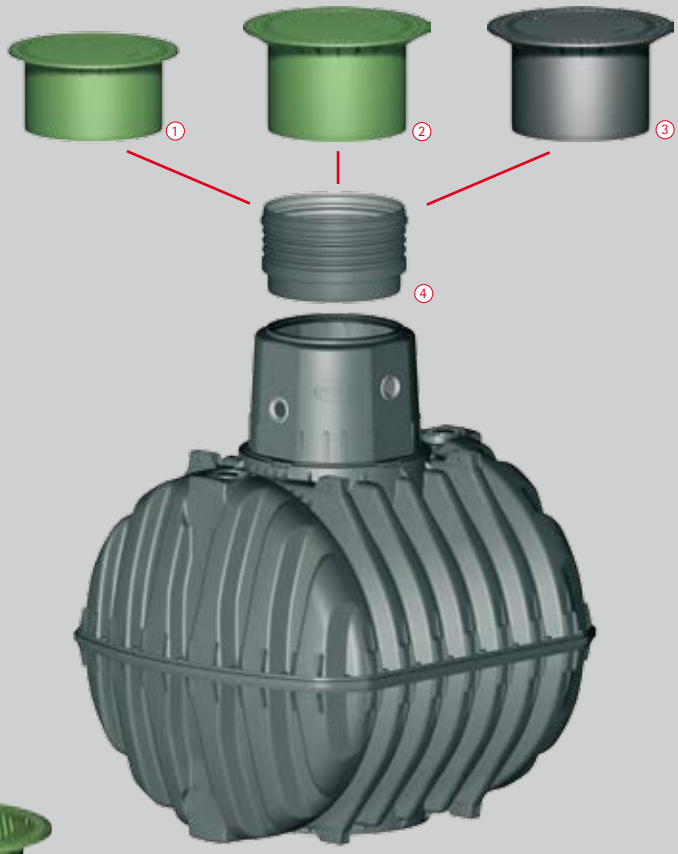
RAINWATER RETENTION

DRINKING WATER RESERVOIRS

Edition 2007
Salesfolder C 27-2 Carat EN

Benefits of the Carat System

Flexible, stackable, user-friendly and better for the environment



① **Mini telescopic dome shaft with PE lid**
Designed for non-vehicle loading and ideal for garden use, the shaft can be adjusted from 750 - 950 mm and tilted up to 5% to sit flush with the ground level. Includes a PE lid with child safety lock. This item is supplied in green.

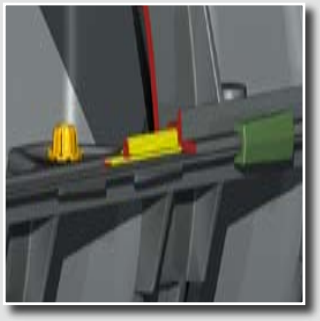
② **Maxi telescopic dome shaft with PE lid**
Designed for non-vehicle loading and ideal for the Complete Package (Eco-Plus), the shaft can be adjusted from 750 - 1,050 mm and tilted up to 5% to sit flush with the ground level. Includes PE lid with child safety lock. This item is supplied in green.

③ **Vehicle loading telescopic dome shaft with cast iron lid**
Designed for vehicle loading applications, the tank can be adjusted from 750 -1,050 mm and tilted up to 5% to sit flush with the ground level. Includes child-safe cast iron cover. This item is supplied in dark grey.

④ **Extension**
For use with the telescopic dome shaft to increase the height of the lid from 1,000 - 1,500 mm. Always refer to installation instructions when usig this item.







Logistical advantages of the Carat

The Carat tank consists of two half shells which can be stacked on top of each other, allowing multiple tanks to be stacked on a single pallet for shipping. For example, it is possible to stack five 6,500 ltr Carat tanks, or nine 2,700 ltr Carat tanks on a single pallet. This allows a standard 40 ft. shipping container to house a total tank volume of up to 130,000 ltrs! The tanks unique stacking feature directly reduces transport costs and environmental impact from vehicle emissions, whilst allowing shipments to any destination in the world.

Easy and safe assembly

- The patented quick connection (illustrated in green), allows the Carat tank to be assembled without screws in only few minutes. Disassembly is possible at any time.
- The first-class EPDM material used in the profile sealings (illustrated in yellow), has been laboratory tested to last more than 25 years.
- The centering bolt (illustrated in orange) assures the accurate and easy assembly of the two half shells preventing any leaks

The Carat

The first Rainwater underground tank of its kind!

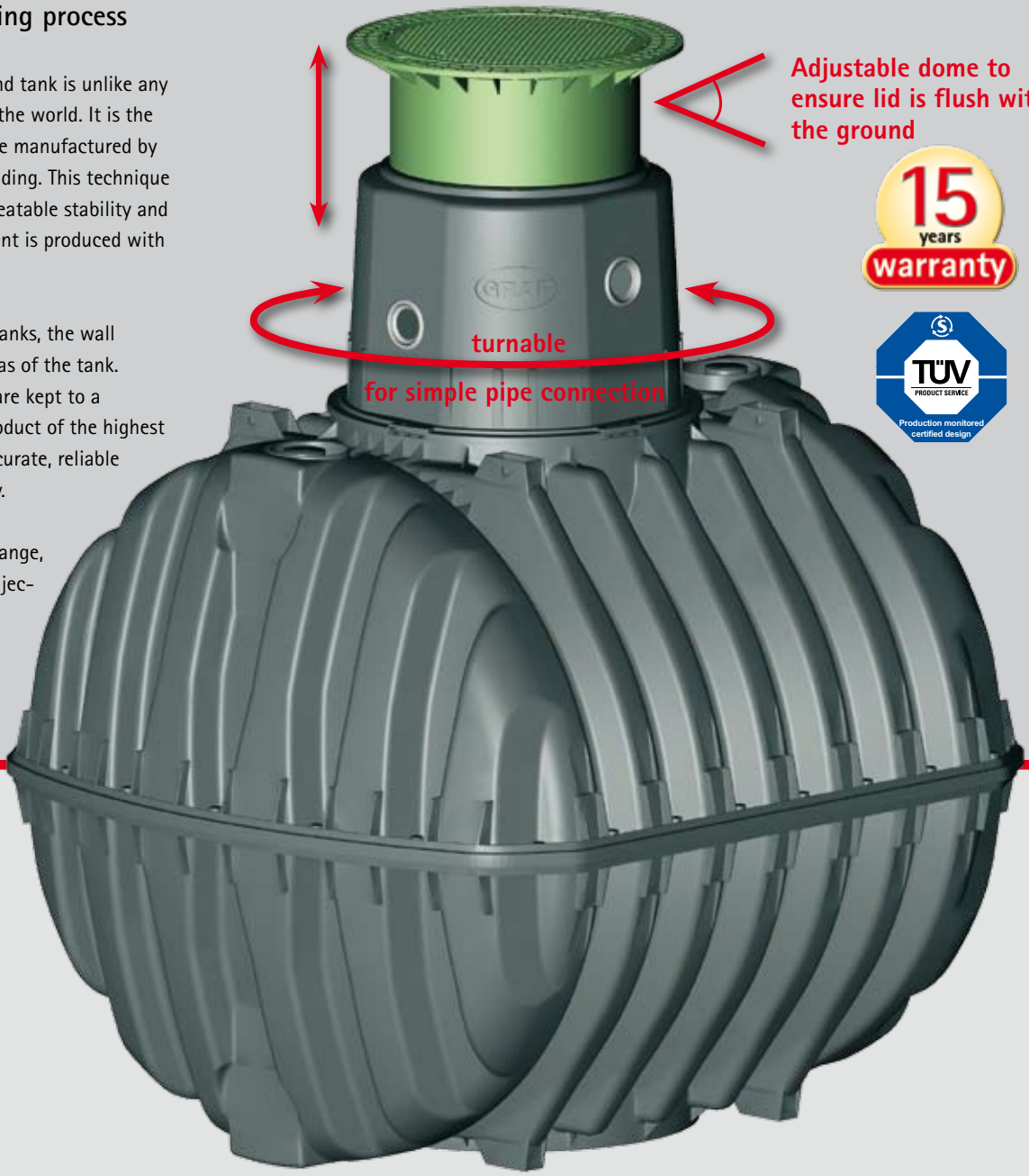
NEW

Unique manufacturing process

The GRAF Carat underground tank is unlike any other underground tank in the world. It is the largest tank of its kind to be manufactured by injection compression moulding. This technique provides the tank with unbeatable stability and ensures that each component is produced with the highest of accuracy.

Unlike other underground tanks, the wall thickness is equal in all areas of the tank. The production tolerances are kept to a minimum, resulting in a product of the highest quality, which is strong, accurate, reliable and extremely user-friendly.

To manufacture the Carat range, one of the worlds largest injection moulding systems had to be developed.



15 years warranty

TÜV PRODUCT SERVICE Production monitored certified design

The Carat underground tank is made from Duralen®, a high quality material that is extremely rigid and impact resistant, therefore ideally suited for producing underground tanks. With very low warping characteristics and high stiffness, this material provides high stability and a unique life expectancy. Duralen® can also be easily recycled which reduces waste and environmental impact.

Duralen®

The modular Carat system

Choose your tank size

NEW

Carat, vehicle bearing underground tank

Size 2,700 – 13,000 litres
(700 – 3,400 US-Gallons).
Designed to be used in conjunction with the vehicle loading telescope dome shaft. The access dome is designed in accordance to DIN testing.

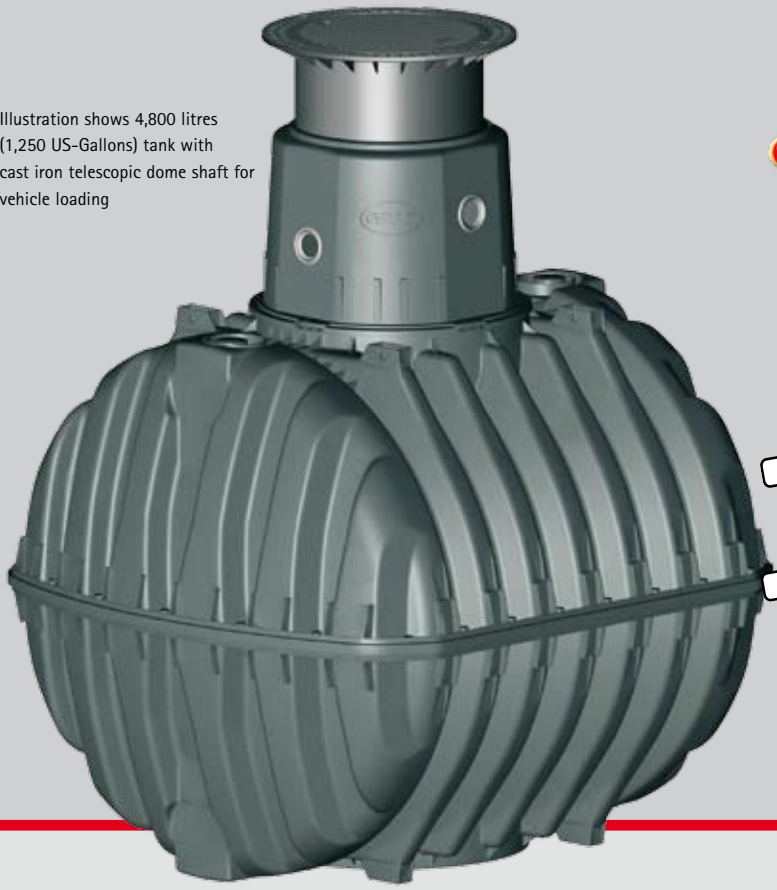


Illustration shows 4,800 litres (1,250 US-Gallons) tank with cast iron telescopic dome shaft for vehicle loading

15 years warranty

EINSTIEGSDOM nach DIN EINSTIEGSDOM

TÜV

European 0870877 Patent

US 5878907 Patent

Volume

Litres	US-Gallons
2,700	700
3,750	1,000
4,800	1,250
6,500	1,700
7,500*	2000*
9,600*	2,500*
13,000*	3,400*

* Set consisting of two Carat underground tanks

Technical data

Dimensions/weight	2,700 L 700 US-Gallons	3,750 L 1000 US-Gallons	4,800 L 1,250 US-Gallons	6,500 L 1,700 US-Gallons	7,500 L* 1,850 US-Gallons	9,600 L* 2,500 US-Gallons	13,000 L* 3,400 US-Gallons
Length	2,080 mm (81.9 inches)	2,280 mm (89.8 inches)	2,280 mm (89.8 inches)	2,390 mm (94.1 inches)	Set consisting of two Carat underground tanks		
Width	1,565 mm (61.6 inches)	1,755 mm (69.1 inches)	1,985 mm (78.1 inches)	2,190 mm (86.2 inches)			
Heigth (including tank dome)	2,010 mm (79.1 inches)	2,200 mm (86.6 inches)	2,430 mm (95.7 inches)	2,710 mm (106.7 inches)			
Height of tank dome	610 mm (24.0 inches)						
Internal Ø tank dome	800 mm (31,5 inches)						
Weight	120 kg (265 lbs.)	150 kg (331 lbs.)	185 kg (408 lbs.)	220 kg (485 lbs.)			
Load							
Max. axle load	Car-bearing				see 3,750 L tank	see 4,800 L tank*	see 6,500 L tank*
Earth covering	800 - 1,200 mm (31.5 - 47.2 inches)						
Groundwater							
Groundwater stable	up to the middle of the tank				see 3,750 L tank	see 4,800 L tank	see 6,500 L tank
Required earth covering	800 mm (31.5 inches)						



For dimensions see 3,750 L tank*



For dimensions see 4,800 L tank*



For dimensions see 6,500 L tank*

Garden Comfort package

The simple garden solution with submersible pump system



Carat Garden Comfort underground tank package

- Simple to install and use
- Use a simple hose connection socket and pressure sensitive pump for automatic water activation, purposely designed for the Gardena® system
- Low visual impact
- Reduces electricity consumption by using a pressure drop activation system, so that electricity is only used when required

Scope of supply

① Carat underground tank
② Mini telescopic dome shaft for pedestrian loading with an adjustable PE lid
③ Filter package 2, consisting of:
- Internal Universal Filter 3
- Inflow stilling system for controlling the water inflow
- Overflow siphon and rodent guard
- Spannfix pipe connection sleeve

④ Garden Comfort pump package, consists of:
- Integra-Duo® 1100 Submersible pump, with protection against dry running and automatic Start / Stop function
- Floating water extraction unit
- Water hose connection box
- 10 m of pressure hose

Volume

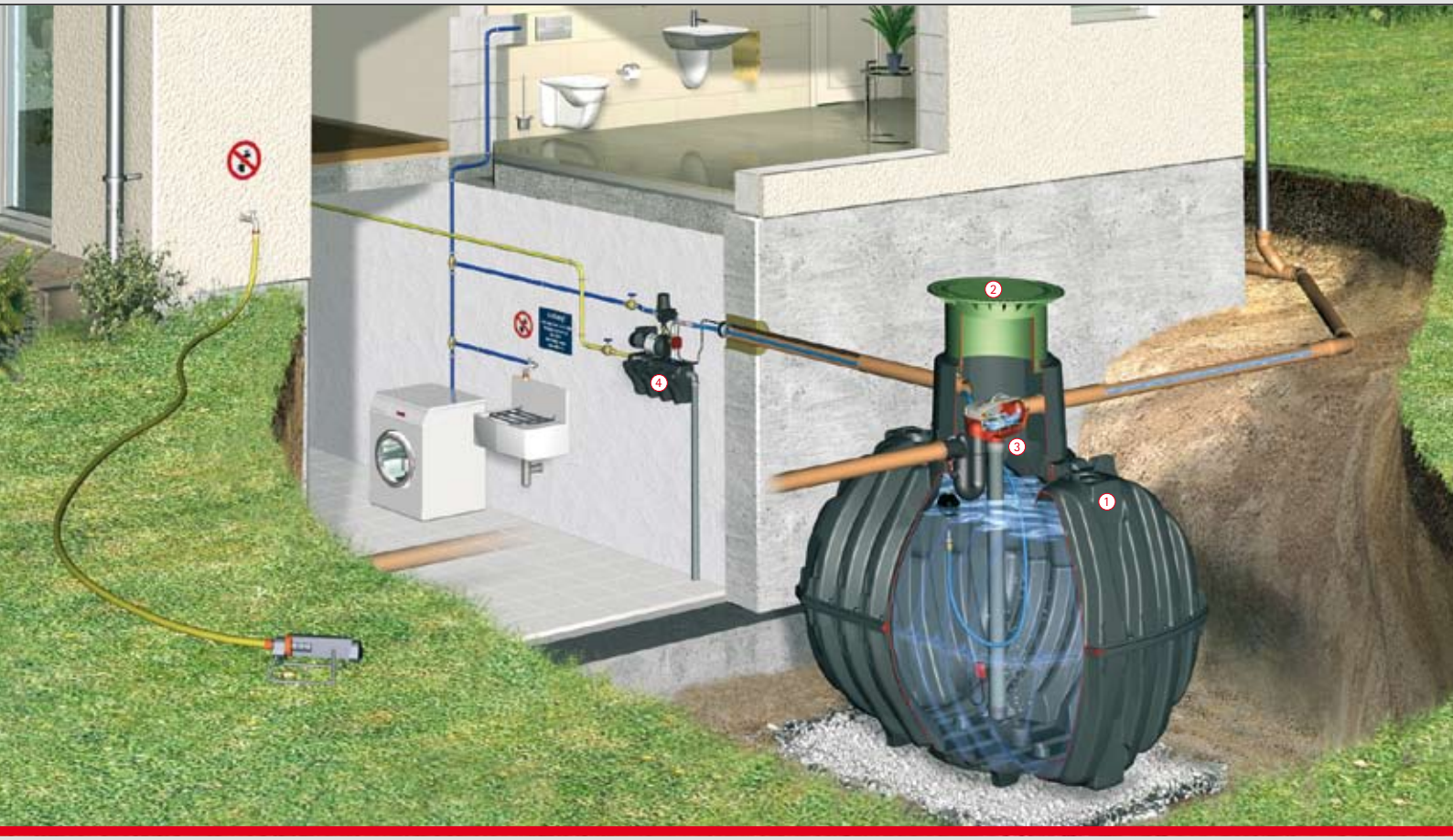
Litres	US-Gallons
2,700	700
3,750	1,000
4,800	1,250
6,500	1,700
7,500*	2,000*
9,600*	2,500*
13,000*	3,400*

* Set consisting of two Carat underground tanks

Vehicle loading version available on request

Eco-Plus package

The ideal solution for use in the home and garden



Carat underground tank package Eco Plus

- Economic package solution
- Patented filter technology and in-house pump system with automatic switch-over to mains water supply
- Easy to assemble due to modular components
- Float switch controlled
- Only one cover viewable on the surface

Scope of supply

① Carat underground tank
② Maxi telescopic dome shaft for pedestrian loading with an adjustable PE lid
③ Filter package 3, consisting of:
- Internal Optimax-Pro (self-cleaning) filter
- Inflow stilling system for controlling the water inflow
- Overflow siphon and rodent guard
- Spannfix pipe connection sleeve

④ Eco-Plus pump package consists of:
- Water supply control unit
- Floating water extraction unit
- DN 100 wall duct
- Labelling set
- Suction pipe

Volume

Litres	US-Gallons
3,750	1,000
4,800	1,250
6,500	1,700
7,500*	2,000*
9,600*	2,500*
13,000*	3,400*

*Set consisting of two Carat underground tanks

Vehicle loading version available on request

Internal filter technology

NEW

Efficient cleaning system with high water yield

Optimax Pro, self-cleaning Filter

Advantages

- Provides over 95% water yield
- Utilises patented, high quality filter technology
- Low-maintenance (self-cleaning)
- TÜV-tested to German standards
- Space-saving filter technology inside the tank
- Filter housing can be easily removed without the need for tools
- Transparent lid for filter visibility
- **Can manage roof areas up to 350 m²**
- Standard 100 mm connections
- Self cleaning Opticlean system available as an optional extra
- Low offset height of 165 mm between inlet and outlet

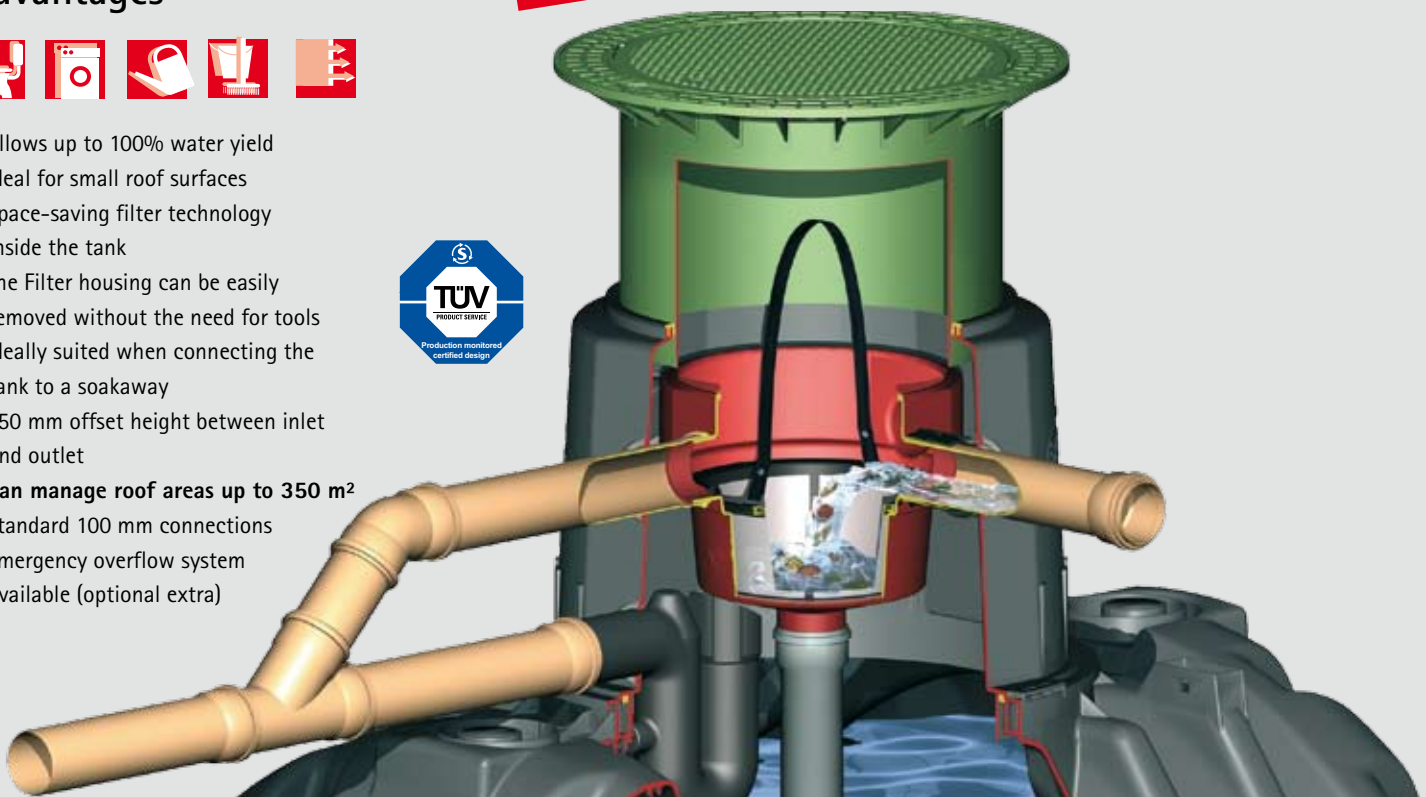


Universal Filter 3

up to 100% water yield

Advantages

- Allows up to 100% water yield
- Ideal for small roof surfaces
- Space-saving filter technology inside the tank
- The Filter housing can be easily removed without the need for tools
- Ideally suited when connecting the tank to a soakaway
- 250 mm offset height between inlet and outlet
- **Can manage roof areas up to 350 m²**
- Standard 100 mm connections
- Emergency overflow system available (optional extra)



GRAF – Setting the standards in quality



Production site at Teningen (Germany) near Freiburg



Production site at Dachstein (France)

High Quality Manufacturing

GRAF has invested more than € 20 million in a new production site specially set up for the new CARAT range. The new facility has an approximate surface area of 155,000 m² - that equals 31 football pitches - one of the most modern production facilities for plastic products in the world

For over 40 years, Otto Graf GmbH has been offering high-class plastic products to its customers. In 1974 GRAF developed its first pioneering range of rainwater harvesting products. Now GRAF is recognised as Germany's number one rainwater harvesting brand and proudly presents the new premium Carat range of the tanks. A range which is manufactured in one of the most modern and efficent plastic manufacturing facilities in the world!

RAINWATER HARVESTING



STORMWATER MANAGEMENT



AGRICULTURAL CONTAINERS



SEWAGE TREATMENT PLANTS



Warranty clause:
The warranty mentioned in this brochure only refers to the tank in question and not to the accessories. Within the warranty period we grant free replacement of the material. Further benefits are excluded. Pre-condition for warranty benefits are proper handling, assembly and installation according to the mounting guidelines.

N.B. Protect tanks from frost when installed above-ground! In case of groundwater installation, please contact us for further information previous to the purchase!

For all indications of measurements in this brochure we reserve a tolerance of +/- 3%. The useful volume of the tanks may be up to 10% lower than the tank capacity, according to the connecting option.

Technical modifications and further development of the different products are subject to change. Errors excepted.

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Over 40 years of quality and innovation

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8.2 Appendix B:

BREAAM Calculations for proposed building:

BREEAM-NOR 3.0 Wat 01 Water consumption: Average flow rate calculator

Building details

Building name	Mackley's Field
BRE assessment reference no.	

WCs

	WC type	Specification effective flush volume (litres)	Quantity (no.)		Total per fitting type
1	Toilet	3.00	1		3.00
2					0.00
3					0.00
4					0.00
5					0.00
	Total		1		3.00

Average effective flushing volume (litres)	3.00

Enter this average component consumption figure in to the rel

Urinals

Urinals - automatically operated flushing cisterns

	Urinal flushing system type	Specification cistern capacity (litres)	Flushing frequency (flushes/hr)	Quantity (no.)		Total per fitting type
1					0	0.00
2					0	0.00
3					0	0.00
4					0	0.00
5					0	0.00
					0.00	0.00

Average cistern capacity (litres)	
No. of cisterns	0
Average flushing frequency (flushes/hour)	

Urinals - Manual or automatically operated pressure flushing valves

	Urinal flushing system type	Specification flush volume (litres)	Quantity (no.)		Total per fitting type
1					0.00
2					0.00
3					0.00

4					0.00
5					0.00
		Total	0		0.00

Average flush volume (litres)

Taps (excluding kitchen sink taps)

	Tap type	Specification flow rate (litres/minute)	Quantity (no.)		Total per fitting type
1	Basin Tap	3.00	1		3.00
2					0.00
3					0.00
4					0.00
5					0.00
		Total	1		3.00

Average flow rate (litres/min) 3.00 *Enter this average component consumption figure in to the rel*

Proportionate flow rate (litres/min) 2.10

Kitchen sink taps

	Tap type	Specification flow rate (litres/minute)	Quantity (no.)		Total per fitting type
1	Kitchen Tap	6.00	1		6.00
2					0.00
3					0.00
4					0.00
5					0.00
		Total	1		6.00

Average flow rate (litres/min) 6.00 *Enter this average component consumption figure in to the rel*

Proportionate flow rate (litres/min) 4.20

Showers

	Shower type	Specification flow rate (litres/minute)	Quantity (no.)		Total per fitting type
1					0.00
2					0.00
3					0.00
4					0.00

8.3 Appendix C:

BREAAM Calculations for proposed office:

BREEAM 2018 Wat 01 Water consumption: Water efficiency calculator for new non domestic office buildings

BREEAM® UK delivered by bre

Building type	Description of building type	Default occupancy	Default annual days/operation	Default daily hours of operation
Office	Offices and workshop business (including those with a basic (category 1) laboratory area)	1.887	253	10

Main building activity areas	Description of activity area	Activity area present in building?	Net Floor Area (m^2)
Office - Office areas	Cellular or open plan office space, including staff kitchen where present/adjacent and reception areas. Exlcude meeting rooms, visitor waiting or circulation areas.	Yes	17
Office - Small workshop / laboratory space	Small scale workshop or category 1 laboratory area	No	
Office - Staff canteen dining area	Seated dining areas that accompany a permanently staffed kitchen preparing food for consumption on the premises (excludes small un-staffed kitchen's used by office staff to re-heat food, make tea etc.)	No	
Office - Fitness suite/gym (with changing facility and showers)	A fitness suite or gym that is part of the office building/development and used by the building's employees only. The gym will have its own changing facility with showers.	No	

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Water consumption - building microcomponent

WC component - all activity areas	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
WC - male (no urinals installed)	Effective flush volume (Litres)	3.00	4.00	1.00	6.00
WC - female	Effective flush volume (Litres)	3.00	4.00	1.00	6.00

Note: W
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Urinal component - all activity areas	units	Specification	No. of cisterns	Flushing frequency (flushes/hour)	Consumption (L/person/day)

	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)

	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)

	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)

Taps components (personal hygiene) - all activity areas					
Wash hand basin taps	Flow rate (litres/min)	3.00	4.00	0.25	2.03
Shower use	Flow rate (litres/min)		0.030	5.60	0.00
Fixed use - vessel filling	Litres/person/day	-	-	-	1.58
Tap components (cleaning) - staff kitchenette					
Kitchen taps - kitchenette	Flow rate (litres/min)	6.00	1.00	0.67	2.72
Dishwasher	Litres/cycle		0.04	1.00	0.00
Tap components (cleaning and food preparation) - staff canteen food preparation area					

	Microcomponent consumption (L/person/day)
Total	18.33

Note: Tl
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Minimum requirements according to EU taxonomy for sustainable finance

Do all the installed wash hand basin taps and kitchen taps have a maximum water flow of 6 litres/min?	Please select
Do all the installed showers have a maximum water flow of 8 litres/min?	Please select
Do all WCs, including suites, bowls and flushing cisterns, have a full flush volume of a maximum of 6 litres and a maximum average flush volume of 3,5 litres?	Please select
Do all urinals use a maximum of 2 litres/bowl/hour and flushing urinals have a maximum full flush volume of 1 litre?	Please select
Is all the EU taxonomy requirements for sanitary equipment met?	No

Non potable water yield - greywater system

Has, or will, the greywater system be specified and installed in compliance with BS8525-1:2010 Greywater Systems - Part 1 Code of Practice	Please select

Greywater source (building components)		Greywater collected	Proportion of components collected from (%)	Greywater yield (L/person/day)
Greywater source (other components)	**Typical greywater yield (litres)**	**Frequency of yield (days)**	**Greywater yield (litres/day)**	**Greywater yield (L/person/day)**

	Greywater yield (L/person/day)
Total	0.00

Non potable water yield - rainwater system

Has, or will, the rainwater system be specified and installed in compliance with BS EN 16941-1:2018 Rainwater Harvesting Systems - Code of practice	Yes

How has the storage capacity for the proposed system been calculated?	BS EN 16941-1 'detailed approach'

Rainwater yield if basic approach:

Collection area (m2)	Rainfall (average mm/yr)	Hydraulic filter efficiency (%)	Yield co-efficient (%)	Annual rainwater yield (Litres)	Rainwater yield (L/person/day)

Rainwater yield if detailed:

Daily rainfall collection (litres)	Rainwater yield (L/person/day)
180	95.39

Non Potable Water Demand - Building Components

	Greywater and/or rainwater yield (L/person/day)
Total	95.39

Component	Greywater and/or rainwater utilised for component	Proportion of components using greywater and/or rainwater yield (%)	Maximum permissible demand (L/person/day)
WC flushing	Yes	100%	12.00

	Demand met by yield (L/person/day)
Total	12.00

Other permissible components

Are there other permissible components present which demand greywater and/or rainwater yield?	No

Maximum permissible demand (L/day)
157

Proportion of maximum permissible demand utilised by other permissible components (%)	

	Demand met by yield (L/person/day)
Total	0.00

	Greywater and/or rainwater demand met by yield (L/person/day)
Total	12.00

Water consumption calculation results

	Litres/person/day	m^3/person/yr
Water consumption - modelled baseline performance benchmark (excludes fixed uses)	**35.31**	**8.93**
Microcomponent water consumption - modelled performance (excludes fixed uses)	**16.75**	**4.24**
Modelled water demand met via greywater and rainwater sources	**12.00**	**3.04**
If greywater/rainwater systems specified has the minimum % efficiency improvement for component specifications been met	**Yes**	
Net modelled water consumption (excludes fixed uses)	**4.75**	**1.20**
Percentage improvement	**86.53%**	
Total Wat 01 BREEAM credits achieved, before checking minimum requirements according to EU taxonomy for sustainable finance.	**5 credits**	
Total Wat 01 BREEAM credits achieved	**1 credit**	
Total Wat 01 BREEAM Exemplary credits achieved	**1 innovation credit achieved**	
Key performance indicator - use of freshwater resource (includes fixed uses)	**6.33**	**1.60**

8.4 Appendix D:

Rainwater Harvesting tank size calculator – please note, the demand of 112.8 l/day as been added to outdoor usage to accurately calculate the size required:

COLLECTABLE ROOF AREA (M²)

Main Building	Width:		Length:	Rain Collection Area:	0	m²
Extension one	Width:		Length:	Rain Collection Area:	0	m²
Extension Two	Width:		Length:	Rain Collection Area:	0	m²
Extension Three	Width:		Length:	Rain Collection Area:	0	m²
Or the total roof area, if you already know it:			97	Total area of collectable roof space:	97	m²
Select Your Region		England SE & Central		Average rainfall per year in your region:	64	L
Collectable rainwater per annum in litres - discounted by 20% to account for water loss					**49664**	**L**

USE OF RAINWATER IN THE BUILDING

	people:	bedrooms:	
Number of people or bedrooms in the building -	1	0	
Number of clothes washing cycles per day (*50 litres each*)	0.00 Cycles	0.00	L
Number of toilet flushes per day (*4.42 flushes per person, average 5 litres each*)	0.00 Flushes	0.00	L
Outdoor use in litres, per person per day (*recommended 5 litres per person per day*)	12.8	112.80	L
Amount of water you require every day		112.8	L
Amount of water you require every year	**DEMAND**	**41172**	**L**

FINAL FIGURES

How many days drought protection do you need? Typically 21 (18 minimum)	35	
Capacity of water storage in litres required for drought protection	3948.00	L
The lesser of YIELD (blue) or DEMAND (green) per annum	41172	L
Therefore, volume of rainwater storage required	**3948**	**L**

CONCLUSION

Is there sufficient roof water available:		YES
Recommended tank size from our shallow dig range:	F-Line Range:	5000 LITRE F-LINE TANK