Water Neutrality Statement

& Building Regulations Part G

MH Architects Ltd.

Proposed site at:
Fairfield Cottages,
Cowfold,
Horsham,
RH13 8BL

SRE

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1.0 Introduction

This revised Water Neutrality Statement has been written by SRE for MH Architects Ltd (the Client) to demonstrate how the new residential development at Fairfield Cottages, Cowfold, Horsham (the Proposed Development) will meet the requirements of Horsham District Council's Planning Policy, Natural England's Position Statement for Minimising Water Use[1] as well as Part G of Building Regulations 2013 (as applicable from Table 1).

The statement has been updated in response to comments for Horsham DC[2] and revised the occupancy figures in relation to the Horsham District Council FAQs[3] in relation with Water Neutrality.

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"[4].

Water neutrality is a concept whereby the total demand for potable mains water supply within a planning area after development has taken place is the same (or less) than it was before development took place. If this can be achieved, the overall balance for water demand is 'neutral', and there is considered to be no net increase in demand as a result of development. To accomplish this, it is necessary for new development to be subject to planning policy, which aims to ensure that homes and businesses are built to high standards of water efficiency through the use of water-efficient fixtures and fittings, and in some cases, rainwater harvesting and greywater recycling.

1.1 Proposed Development

The Proposed Development is a new replacement of 8 no. of residential units with onsite parking (6 no. allocated & 9 un-allocated spaces). The current 4 no. 1 bed 2 person units are being demolished as part of the planning application and future works. The site locations is shown below, with further architectural plans included in Appendix A.



Figure 1 – Proposed site details (MH Architects Ltd.)

[1] Natural England's Position Statement for Applications within the Sussex North Water Supply Zone September 2021 – Interim Approach
[2] Email from Horsham DC to MH Architects dated 04.01.2023
[3] Water neutrality and planning applications
[4] Natural England's Advice Note regarding Water Neutrality within the Sussex North Water Supply Zone: February 2022 V2

Please see the architect's drawings for further details and the site plan in Appendix A.

1.2 Policy & Regulations

The Proposed Development is required to meet both local planning policy as well as The National Standards (Part G) requirements in relation to water specification and use on site. These are summarised in Table 1 below:

Regulations, Guidance & Planning Policy	Requirement
Building Regulations Approved Document Part G - Sanitation, hot water safety and water efficiency (2015 edition with 2016 amendments)	Part G2 The minimum Part G standard equates to 125l/person/day and enhanced standard 110l/person /day (both including 5l/p/d external water use) and apply to a dwelling formed by: •New construction, •Material change of use where the building is used as a dwelling where previously it was not, or, •Material change of use where the building contains a flat, where previously it did not. "The estimated consumption of wholesome water of a new dwelling should be no more than 125 litres/person/day or 110 litres/person/day where the optional requirement applies. This includes a fixed factor of water for outdoor use of 5 litres/ person/day."[5]
Horsham District Local Plan (2021-38)[6]	Strategic Policy 38: Sustainable Design and Construction c) New residential development achieves a water efficiency of 100 litres/person/day. Development above 200 homes is expected to achieve 80 litres/person/day and incorporate site wide measures to conserve and reduce water consumption, including grey water recycling;
Water neutrality and planning applications – Horsham District Council	The Water neutrality and planning applications provides an outline of the FAQs which are directed towards anyone considering applying for development in the Horsham District, and explain Horsham District Council's proposed method of dealing with the issue. This document should be read in conjunction with the accompanying Local Plan Water Neutrality FAQs, the Natural England (NE) Position Statement (September 2021), and the Natural England FAQ's (December 2021) for development within the Sussex North Water Supply Zone.
Natural England's Position Statement for Applications within the Sussex North Water	The aim of water neutrality is to minimise the impact on existing water resources, infrastructure, and the environment. Natural England has advised that this matter should be resolved in partnership through Local Plans across the affected authorities, where

[5] Approved Document Part G 2015 edition with 2016 amendments
[6] https://horsham.moderngov.co.uk/documents/s17755/1%20Appendix%201%20Reg%2019%20HDLP%20Cabinet.pdf

Supply Zone (September 2021 – Interim Approach)	policy and assessment can be agreed and secured to ensure water use is offset for all new developments within Sussex North. Minimising water use of new builds: • Complete a water budget (based on occupancy) • All new builds to demonstrate that they can achieve strict water targets (e.g., 85L/pp/day*) [excluding external water use of 5l/p/d] This can be achieved by measures such as: - Grey water recycling (advantage of being reliable in hot dry weather - Rainwater harvesting - Water efficient fixings (such as shower aerators) to demonstrably reduce demand-this would need to be suitably certain In addition water offsetting is required • One way to achieve this is retrofitting of council owned properties/commercial buildings-located within Sussex North. Examples include: - Grey water recycling - Rainwater harvesting of commercial settings - Installation of water reduction fittings in Council-owned buildings. **This this is the reasonably achievable figure with the above measures based on the early data from the strategic solution and may be subject to change as the strategic solution evolves.*
Southern Water WRMP (2019)[7]	Central area strategy Our detailed plans include the following schemes that potentially need to be developed depending on the future sustainability reductions: • Media and engagement water efficiency campaign as part of the first phase of our Target 100 vision • Increased leakage reduction activity • Rehabilitation and enhancement of three existing sources in Sussex North • Catchment management and infrastructure solutions to reduce nitrates and pesticides and increase resilience at a number of sources as part of our Catchment First initiative • Extend the universal metering programme, and enhance meter reading frequency. Develop trials of customer offerings or propositions to encourage more efficient use of water.

Table 1 - Summary of Regulations, Guidance & Planning Policy Requirement

[7] Water Resource Management Plan 2019: Technical Overview

1.2.1 Natural England - water neutrality

Natural England have defined the North Sussex Water Resource Zone (WRZ) as seen in Figure 2 – Sussex North Water Resource Zone:

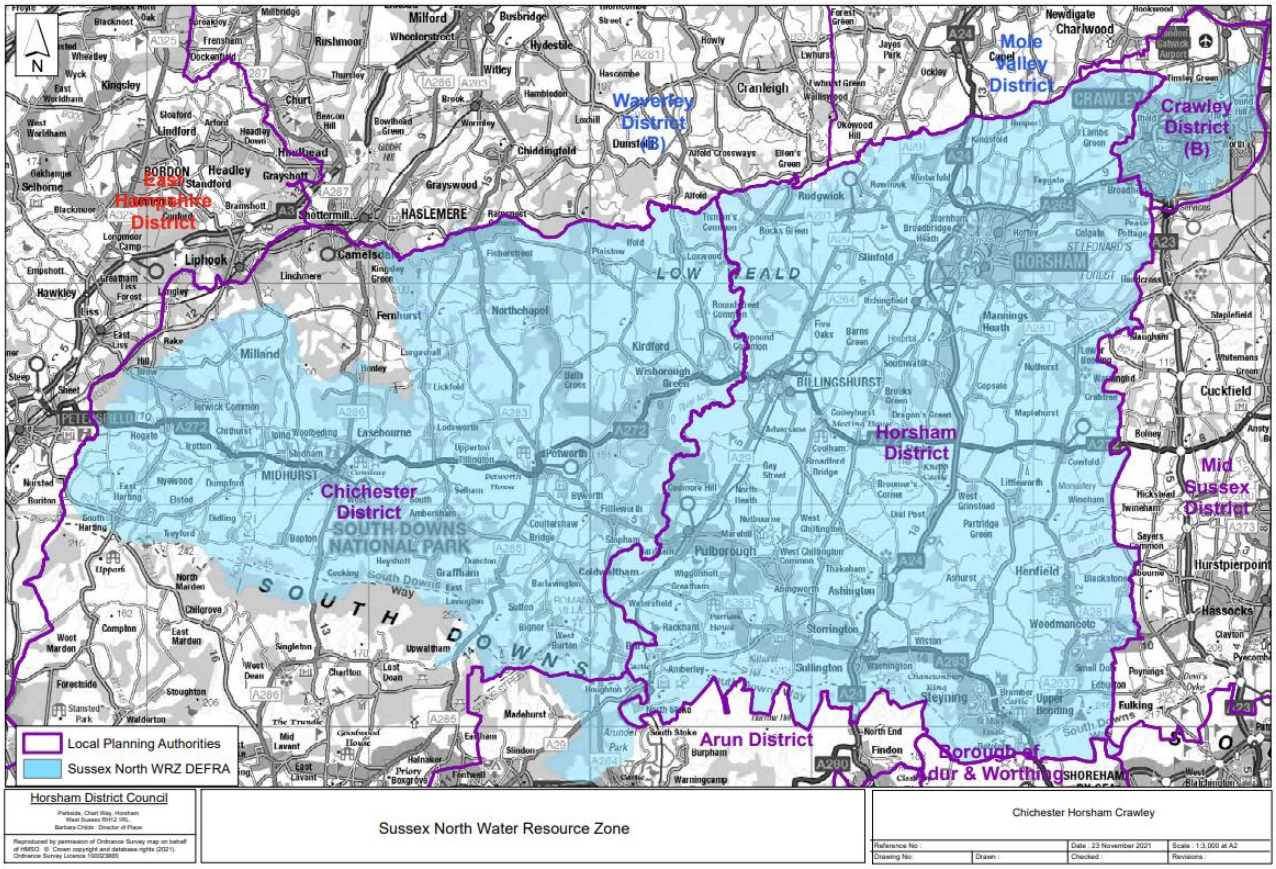


Figure 2 – Sussex North Water Resource Zone
(https://www.horsham.gov.uk/__data/assets/pdf_file/0018/106551/Sussex_North_WRZ_DEFRAred.pdf)

The proposed site is located in Horsham District Council's jurisdiction within the West Sussex WRZ, which is within the Central sub-regional Southern Water supply area as mentioned in Appendix B.

The Proposed Development will seek to deliver the requirements via on-site water efficiency of <85l/p/day requirement and then wider off-site water use offset to achieve water neutrality.[89]

1.2.2 Natural England – Nitrate Neutral Area

It should be noted that the Proposed Development does not sit within one of Natural England's 'Nitrate Neutral' areas impacting the Solent and therefore this issue is not applicable to the application. (Refer Appendix C for the detailed map).

[8] Water Neutrality Study Final Report_Part_B
[9] Natural England's Position Statement for Applications within the Sussex North Water Supply Zone

Methodology

2.0 Methodology

The following methodology has been adopted to address the water calculations, water offset calculations and the occupancy levels.

2.1 Water Neutrality Hierarchy

Water neutrality is achieved by the following 3 Step process: reducing water use, reusing and recycling water onsite, and then offsetting any remaining water demand in the existing local community, as demonstrated in Figure 3.

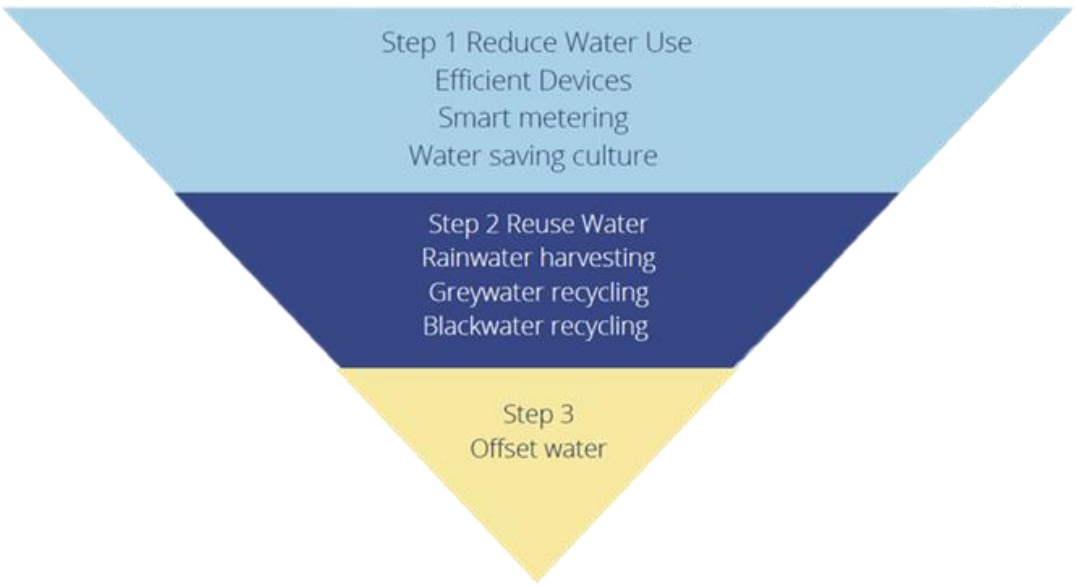


Figure 3 – Water Neutrality Hierarchy

2.2 Water Calculations

In order to accurately calculate the predicted water use within the Proposed Development and any water offset calculations from on-site and/or off-site existing dwellings/buildings the Part G Domestic Water Calculator or the Code for Sustainable Homes(CSH) Water Calculator Tool and/or the BREEAM Wat 01 tool are used.

The calculators will all provide total 'L/person/day', and in the case of the BREEAM Wat 01 Tool can also provide 'm^3/person/year'.

2.2.1 Part G Domestic Water Calculator

The Part G Domestic Water Calculator is only applicable for Steps 1 & 3 of the Water Neutrality Hierarchy where the total consumption of each fitting in litres per person per day can be calculated for the dwelling/building.

2.2.2 CSH Water Calculator

The CSH Water Calculator is used in the case of implementing Reuse of Water (Step 2) in the Water Neutrality calculations. Additionally, the use of multiple fittings of the same type that have various flow rates or capacities, the CSH Water Calculator is used to determine the average flow rate or capacity, and eventually the consumption of such fittings (in litres per person per day) by deducting the water savings from the Step 2 results.

2.2.3 BREEAM Wat 01 Tool

The BREEAM Wat 01 tool is utilised for any non-domestic building within the Proposed Development or non-domestic existing building(s) as part of on-site and/or off-site water offset (Steps 2 & 3).

The standard BREEAM method determines water efficiency (measured in L/person/day and m^3/person/year) for a building based on the building's actual component specification and default usage patterns for the building type and its activity areas. This modelled output is compared with the same output for a baseline component specification and the percentage improvement used to determine the number of BREEAM credits achieved.

The minimum water efficient parameters for each component to achieve the particular BREEAM credits can be seen in Appendix D.

2.2.4 Existing Dwelling Water Usage

If an existing dwelling/building is being replaced as part of a development this existing water use can be utilised as part of any offset. In this instance the 'Per Capita Consumption' (PCC) figure is used as a measure of water use by one person in one day and measured in litres per person per day (l/p/d).

Within the Southern Water's annual report 2021, three water usage figures are provided:

- Average PCC - 135 l/p/d.
- For a home without a water meter - 160 l/p/d
- For a home with a water meter - 131 l/p/d[10].

As part of the screening assessment to support the Horsham Local Plan, it has been established that the existing dwellings in the Southern Water's Sussex North WRZ have an average metered water consumption of 135 l/p/d.

Unless supporting water meter data is available and acceptable to the Local Authority, this figure is therefore used for all existing domestic properties and provides the baseline when determining any water offset savings from installing water saving fittings.

2.3 Occupancy

When calculating water use and water offset, each building's 'occupancy' must be taken into consideration as part of the overall calculations so an accurate 'Total litres per day' water use figure can be produced.

There are two approaches to determining the occupancy rates:

2.3.1 Occupancy – Part G

Water use and water offset calculations are based on Building Regulations Approved Document Part G guidance for an occupancy rate of 2 people for the main bedroom and 1 person for each additional bedroom thereafter[11]. This approach is also used when sizing rain water harvesting tanks.

2.3.2 Occupancy – Horsham District Council

Water use and water offset calculations are based on extrapolated 2011 census data for Horsham District's average occupancy data which is listed in their FAQs[12] as follows:

- One-bedroom dwellings: 1.32 occupants
- Two-bedroom dwellings: 1.88 occupants

[10] Water Neutrality Study: Part A – Individual Local Authority Areas (Final Report), July 2021
[11] Approved Document Part G 2015 edition with 2016 amendments,
[12] https://www.horsham.gov.uk/planning/water-neutrality-in-horsham-district/water-neutrality-and-planning-applications

- Three-bedroom dwellings: 2.47 occupants
- Four-bedroom dwellings: 2.86 occupants
- Five-bedroom dwellings: 3.09 occupants

The water calculations within this Water Neutrality Statement will calculate the water consumption of each dwelling based on the Horsham DC occupancy approach.

Assessment

3.0 Assessment

The following assessment has been undertaken in order to calculate the water offset requirements for the Proposed Development.

3.1 Step 1 – Reduce water use

The first step of water neutrality is reducing water usage compared to Part G and planning policy. This includes water efficient devices, smart metering and promoting water saving culture.

3.1.1 Water efficient devices

Water efficient devices will be installed to the toilet, kitchen sink taps, showers and other household appliances to reduce water use.

Water appliances would be specified as products that are certified with a high rating from the European Water Label to ensure water efficiency. It's also important to regularly check toilets and taps for leaks, as these can waste between 200-400 litres/day[13].

Further details of the proposed fitting and flow rates are provided in Section 4.0 (Water Fittings Specification)

3.1.2 Smart meters

The Proposed Development will use Smart Meters which will allow the consumer to monitor how much water they are using and how this affects their water bill. This can help consumers to reduce water usage, identify leaks and meet water saving targets recommended by water companies, with the incentive of reduced bills.

3.1.3 Water saving culture

The site can implement good water saving culture and behaviours to reduce water use and ensure that other measures put in place are effective. Education and self-awareness are therefore important components of achieving water neutrality. The contractor and local water authority can help encourage water saving behaviour by providing a water saving information pack for the residents upon completion of the Proposed Development. This would include information about the new installed technologies and how the overall water consumption can be reduced to encourage water saving behaviour.

3.1.4 Proposed water savings at the Proposed Development

As part of the water reduction measures at the Proposed Development, the proposed water saving fittings in the Appendix E should be used to get the reduced water usage. In this assessment Horsham Local Plan requirement for estimated consumption of wholesome water of a new dwelling is used as the baseline. Accordingly, the significant improvement (%) and the reduced water usage is calculated (l/p/d) for the Proposed Development.

Based on the above specification on the following baseline in litres per day (l/d) has been calculated for both the house types as litres/person/day (l/p/d).

[13] www.ewaterwsie.org.uk/save-water/

	Horsham DC	Type 1	Type 2	Total
		2 bed	1 bed	
Reduce Water Use l/p/d	100	89.34	89.34	
Improvement %		10.66%	10.66%	
Occupancy/unit		1.88	1.32	
Total No. of Units		4	4	8
Total l/d		671.84	471.72	1,143.66

Table 2 - Water Efficiency - Reduce for Proposed Development

3.2 Step 2 - Reuse water

Once internal water use is reduced to an ambitious level, water reuse should be considered for the site. Water reuse systems provide an alternative water supply for non-potable uses (e.g. flushing toilets, outdoor use, irrigation and laundry facilities). There are different options available including rainwater (and surface water) harvesting, greywater recycling and black water recycling.

Due to the low internal water use already being achieved it is not proposed to install on site reuse water systems for the Proposed Development at this time.

3.3 Step 3 - Offset Water

The final step to achieving water neutrality (as required) is offsetting any residual demand by making savings in the existing local community. Importantly, these savings must be made within the same water resource zone as managed by the local water authority.

Options for offsetting schemes are as follows:

- Water efficiency audits and retrofits for existing homes
- Offsetting by fixing leaks over and above planned work by water companies
- Retrofitting properties to improve water efficiency.
- Retrofitting water reuse schemes.
- Installing smart meters can also help encourage water saving behaviours and provide information on how much water is being used.
- Leak detection system

3.3.1 On-site Offset

By removing the water usage within the existing buildings on-site, the overall water usage could be reduced further.

The water consumption of the existing 4 no. 1 bed dwellings on the site that are being demolished are based on assumptions made about the water fittings prior to demolition and align with the figure stipulated by Horsham DC, Table 3 shows the difference in the total water use based on the Horsham DC occupancy approach.

Existing Dwelling	l/p/d	No. of 1 bed units	Occupancy/unit	Total l/d
Baseline Water consumption	135.00	4	1.32	712.8

Table 3 - Water Efficiency - Existing Development (Southern Water & Part G Approach)

As a result, the baseline water consumption for the 4 no. 1 bed houses is 712.8 l/d. By following the offset approach, on-site offset of 712.8 l/d is considered for Water Neutrality of the Proposed Development.

3.3.2 Off-site Offset

Therefore, in order for the Proposed Development to be water neutral, further off-site water offset needs to be undertaken and contractually agreed by the end Client and the Local Authority. As already stated in Section 3.3 this offset could be delivered via a number of measures including through upgrades to existing housing stock managed by the client in the North Sussex WRZ.

The off-site offset of water consumption for the Proposed Development, shall be done via implementing the water saving fittings to the existing dwelling/building stock managed by the Client.

As a result, some of the water savings from the development at the Cobblers, Slinford (existing housing stock) is considered for the water neutrality calculations by embedding water saving measures.

4.0 Water Fittings Specification

Where known, the flow rates and capacities have been selected in order to achieve the requirements for reducing water use and specifying water efficient devices in line with natural England's water neutrality requirements.

Where fittings and appliances have not yet been specified, the flow rates and capacities listed in the Water Efficiency Calculation are the maximum allowable flow rates and capacities and should be used to inform the specification and purchasing of the fittings.

4.1 Building Specification

The Water Efficiency Calculation has been undertaken on the basis of the specifications mentioned in the Appendix E for delivering in excess of the baseline water use prior to onsite reuse and offsetting.

The manufactures and fitting types provide a performance specification in support of the calculations to achieve the desired flow rates.

The main contractor/sub-contractor shall select similar/equivalent performing products in order to achieve the water reduction targets for the Proposed Development (Appendix E).

5.0 Summary

Water neutrality has the potential to deliver large scale water and associated carbon saving across the Proposed Development

In order to reduce and offset the water use across the Proposed Development SRE propose:

- Reduce water use
  - Provide Water efficient devices, in line with the recommendations in Appendix E
  - Install Smart meters, to help the owners monitor ongoing water consumption
  - Provide water saving information pack to influence owner's behaviour.
- Offsetting Water
  - Water offset in Client property portfolio to address the remaining water use on site.

Therefore, considering the water reduction measures the Proposed Development water use can be significantly reduced by measures undertaken on-site (Section 3.1.4) and off-site (Section 3.3.2) in excess of Horsham DC planning policy and in line with Natural England's Position Statement & Water Neutrality Study Final Report Part B.

	l/p/d	Total l/d	Balance Remaining Total l/d
Proposed Dwelling Reuse Water	89.34	1,143.66	1,143.66
Offset- on-site (removal)	-135	-712.8	430.86
Offset- off-site (reduction)	-110	-430.86	0

Table 4 - Total Water Offset required to achieve water neutrality for the Proposed Development

The Proposed Development (4 no. 2 bed and 4 no. 1 bed Residential units) at the site will have a daily water consumption of 1,143.66 l/d. Accordingly, the resultant water consumption must be offset, by implementing the water saving fittings to the existing house stock managed by the client.

The demolition of the existing development (4 no. 1 bed units) at the site will result in water savings of 712.8 l/d, while the proposed development (4 no. 1 bed units & 4 no. 2 bed units) will have a daily demand of 1,143.66 l/d. Accordingly, the difference in the consumption for the existing and Proposed Development must be offset for water neutrality (430.86 l/d).

As the design plan indicates to demolish the existing 4-bed bungalow, it will result in the on-site offset of the existing water consumption coupled with the offsite offset from the existing housing stock at the Cobblers, Slinford.. As a result, the water use by the Proposed Development is equal to the total water-use by the existing development, thus achieving water neutrality.

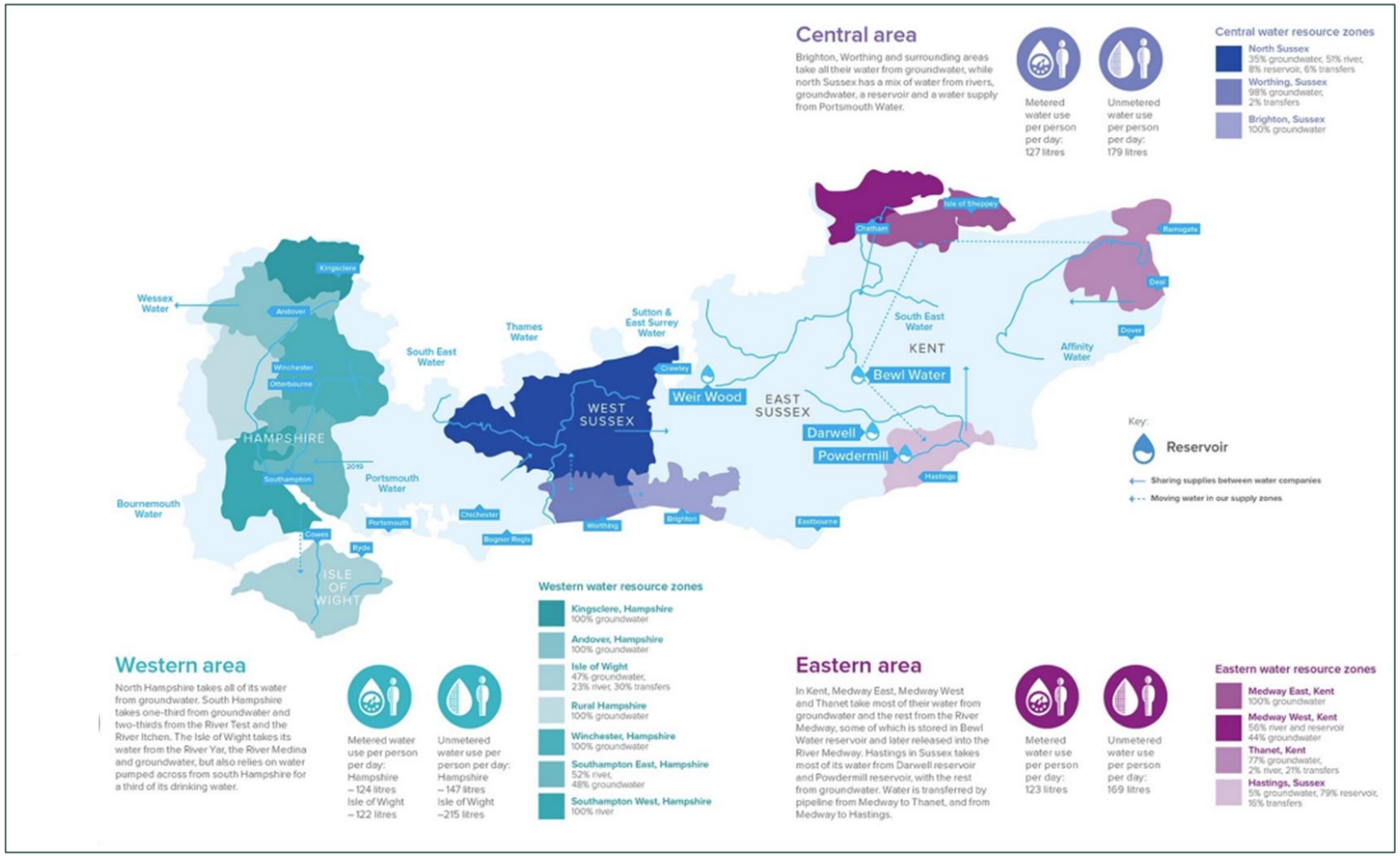
Therefore, considering all the approaches to reduce the final water consumption, the Proposed Development addresses the Horsham DC Planning Policy requirements for reducing water use to <100 l/p/d and the target of <85l/p/d (excluding external water use) requirements set out by Natural England and has then identified the required additional off-site water offset needed to satisfy the Natural England requirement to be technically 'Water Neutral'.

Appendices

Appendix A Site Plan (MH Architects)

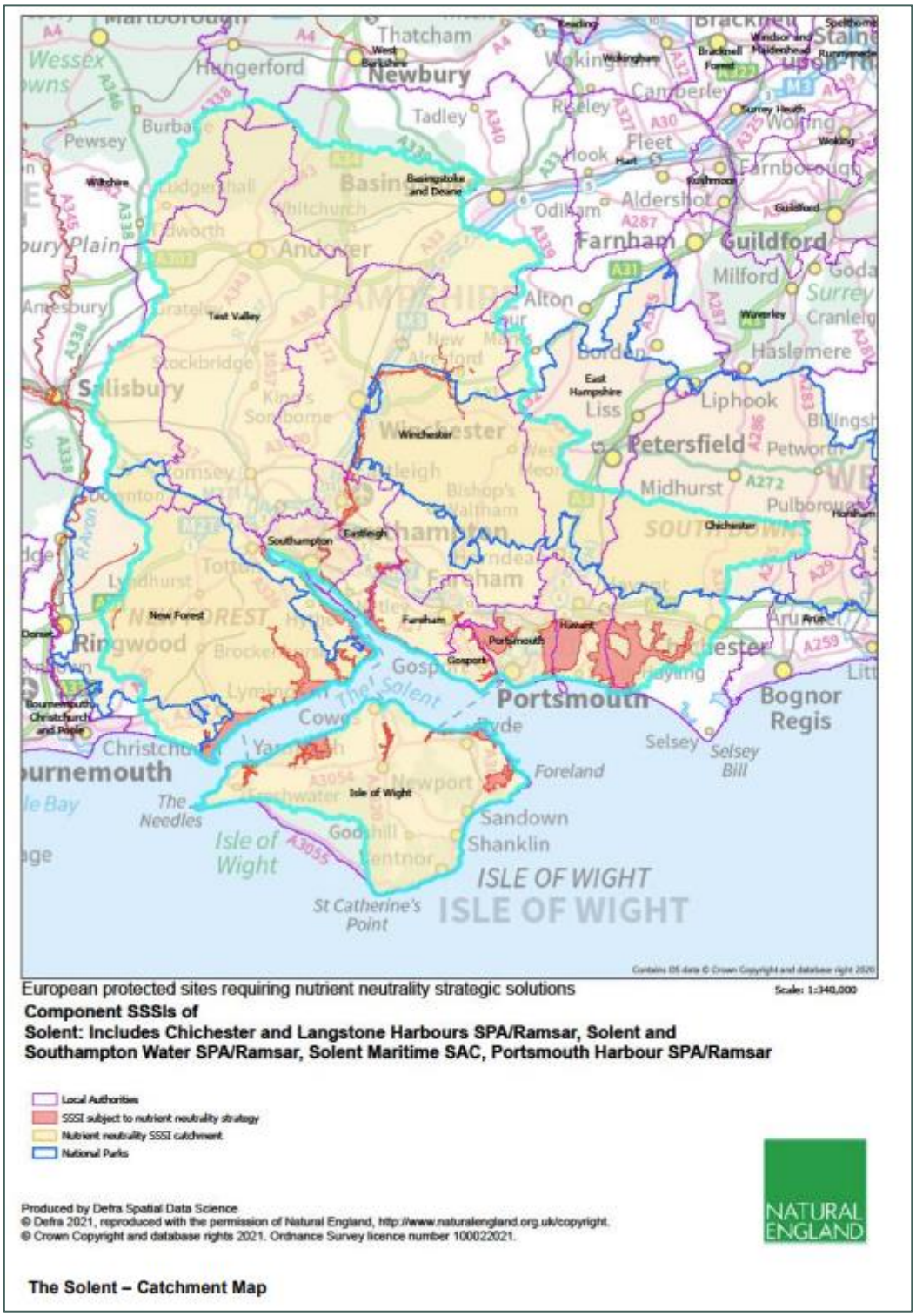


Appendix B Southern Water supply area and water resource zone[14]



[14] Water Resource Management Plan 2019 (https://www.southernwater.co.uk/media/1332/dwrmp19-technical-overview.pdf)

Appendix C The Solent Catchment Map[15]



[15] The Solent Catchment Map (http://publications.naturalengland.org.uk/file/6565585214504960)

Appendix D BREEAM Wat 01 - Water efficient consumption levels

Component	Performance Levels						
	Baseline	1 Credit	2 Credits	3 Credits	4 Credits	5 Credits	Unit
WC	6	5	4.50	4	3.75	3	Effective flush volume (litres)
Wash Hand Basin Taps	12	9	7.50	4.50	3.75	3	litres/min
Showers	14	10	8	6	4	3.50	litres/min
Baths	200	180	160	140	120	100	litres
Urinals (2 or More)	7.50	6	3	1.5	0.75	0	litres/bowl/hour
Urinals (1 only)	10	8	4	2	1	0	litres/bowl/hour
Greywater/ rainwater system	0%	0%	0%	25%	50%	75%	% of WC/urinal flushing demand met using recycled non-potable water
Kitchen Tap/Kitchenette	12	10	7.50	5	5	5	litres/min
Kitchen taps: Restaurant	10.30	9	8.30	7.30	6.30	6	litres/min
Domestic Dishwasher	17	13	13	12	11	10	litres/cycle
Domestic Washing Machine	90	60	50	40	35	30	litres/use
Waste Disposal Unit	17	17	0	0	0	0	litres/min
Commercial Dishwasher	8	7	6	5	4	3	litres/rack
Commercial/ Industrial Washing Machine	14	12	10	7.50	5	4.50	litres/kg

The above figures are taken from BREEAM New Construction 2018 methodology.

Appendix E Water fittings specification – Proposed Development

Fitting	Measure	Capacity / flow rate	Manufacturer's Details (make & model)
Kitchenette Tap	Flow rate (litres/ minute)	3	CP961 Inline Flow Regulator
Shower	Flow rate (litres/ minute)	6	EcoVand Style Air 6 l/min shower head
WC (dual flush)	Flush volume (litres)	4	Lecico l/l Lever Cistern Fittings CPKSALL
	Part flush volume (litres)	2.6	Lecico l/l Lever Cistern Fittings CPKSALL
Bath	Capacity to overflow (litres)	135	Twyford Celtic
Washing machine	Litres/kg dry load	8.17	Default
Wash hand basin taps	Flow rate (litres/ minute)	2	CP961 Inline Flow Regulator
Dishwasher	Litres/place setting	1.25	Default
Waste disposal unit	Litres/use	n/a	-
Water softener	Litres/person/day	n/a	-

Table 5 - Water fittings - Proposed Development

Appendix F - Detailed Water Calculations (Proposed Development)

Building Regulations 2013 Part G	Planning Stage Specification				
		Capacity / flow rate	Use factor	Fixed use (litres/ person/ day)	Litres/ person/ day
WC (single flush)	Flush volume (litres)	0.00	4.42	0.00	0.00
WC (dual flush)	Flush volume (litres)	4.00	1.46	0.00	5.84
	Part flush volume (litres)	2.60	2.96	0.00	7.70
WCs (multiple fittings)	Average flush volume (litres)	0.00	4.42	0.00	0.00
Taps (excluding kitchen / utility)	Flow rate (litres/minute)	2.00	1.58	1.58	4.74
Bath (where shower also present)	Capacity to overflow (litres)	135.00	0.11	0.00	14.85
Shower (where bath also present)	Flow rate (litres/minute)	6.00	4.37	0.00	26.22
Bath only	Capacity to overflow (litres)	0.00	0.50	0.00	0.00
Shower only	Flow rate (litres/minute)	0.00	5.60	0.00	0.00
Kitchen/utility room sink taps	Flow rate (litres/minute)	3.00	0.44	10.36	11.68
Washing machine	Litres/kg dry load	8.17	2.10	0.00	17.16
Dishwasher	Litres/place setting	1.25	3.60	0.00	4.50
Waste disposal unit	Litres/use	0.00	85.25	0.00	0.00
Water softener	Litres/person/day	0.00	1.00	0.00	0.00
				Total calculated use	92.68
				Contribution from greywater (litres/person/day)	0.00
				Contribution from rainwater (litres/person/day)	0.00
				Normalisation factor	0.91
				Total water consumption	84.34
				External water use	5.00
				Total water consumption	89.34



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