



**Water Neutrality
Strategy**

Berkeley Homes (Southern) Ltd

Southwater Phase 5

Final

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Executive Summary

This report has been prepared in support of amendments associated to application DC/19/2464 and Phase 5 of the development known as Broadacres, Southwater.

The proposed changes solely relate to the unbuilt Phase 5 with the aim to delivery an alternative housing mix, amend the number of home (an increase of 14 compared to the resolved to be approved plans) and an improved design. The proposed amendments remain in accordance with the approved outline application parameter plans.

The revised development relates to the erection of 94 swellings with associated access, parking, and landscaping at Land West of Worthing Road (Phase 5), Southwater, as detailed in the covering letter. Due to proposed changes associated to Phase 4, the subject of a separate application, there is no increase in the number of homes overall.

The purpose of this Water Neutrality Strategy is to demonstrate that the proposed development at Southwater Phase 5 will reduce water consumption as much as possible in light of the guidance from Horsham District Council and based on the Position Statement on Water Neutrality by Natural England on 14th September 2021.

Reduced water consumption for the development is proposed through the installation of water reduction measures on site and rainwater butts as well as offsetting measures. The key measures to achieve this are listed below:

- > Water use in homes within the proposed development will be reduced by installing water-efficient fixtures and appliances. This strategy will result in a water consumption of 85 l/person/day, well below adopted Local Policy and Building regulation (Part G) requirements.
- > A water-saving culture will be encouraged among future occupants by providing information within the home user manual.
- > Further, rainwater butts will be installed for the houses to discount the water needed for external use. For the avoidance of doubt due to the difficulties in quantifying any potential benefit that the water butts may bring regarding external water use, the addition of water butts have not been factored into the calculations of forecast water demand. A 5 l/person/day allowance for external water use has thus been assigned to the offsetting calculation.
- > The residual water consumption will be offset where possible by investigating third party opportunities to do so on existing properties that lie within the Sussex North Water Resource Zone, where water neutrality must be demonstrated.
- > It is proposed a developer contribution will be paid by the developer based on a tariff payment mechanism which will be done through the Sussex North Offsetting Water Scheme (SNOWS), once available through Horsham District Council, for any water demand that cannot be feasibly offset. At the

time of writing, no third-party agreement is in place to offset the future demand. However, as outlined in Strategic Policy HA3 of the Horsham District Local Plan Regulation 19, the site should be eligible as an allocated site.

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1. INTRODUCTION

- 1.1 This document has been prepared by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development, appointed by Berkeley Homes (Southern) Ltd.
- 1.2 This document sets out the strategy to achieve a reduced water consumption for the proposed development at Southwater Phase 5, which falls under the jurisdiction of Horsham District Council.

Berkeley Sustainability Commitments

- 1.3 As part of the Berkeley Group, Berkeley Homes (Southern) Ltd will ensure that the proposed development achieves the goals and targets set out in the Group Sustainability Standards.
- 1.4 The Berkeley Group's approach to sustainability is about considering the future. It is about developing the homes and places of the future without compromising the ability of the younger generations to meet their needs.
- 1.5 Integrated water management is one of the Berkeley Group's sustainability requirements. This includes designing water-efficient homes and managing rainwater by storing it.

Site overview

- 1.6 The site is located west of Southwater in Broadacres. A location plan of Phase 5 is enclosed in Appendix A. Broadacres relates to a high quality residential development built by Berkeley Homes.
- 1.7 Outline planning permission was granted for up to 594 dwellings at Southwater in 2015 under application reference DC/14/0590. The proposals were considered to be EIA development and the application was supported by an Environmental Statement. Reserved matters approval has subsequently been granted for phases 1, 2, 3 and 4, totalling 514 units and community facilities. Phases 1, 2 and 3 have now been completed, with the final Phase 4 and 5 remaining.
- 1.8 In 2018 Berkeley gained reserved matters approval for 213 homes including 61 affordable homes in Phases 3.2 and 4 of the Southwater development (Ref: DC/18/1246).
- 1.9 The Phase 3.2 and Phase 4 reserved matters application has now been implemented in part with Phase 3.2 completed and largely occupied to relate to 56 of the 213 homes (including 6 affordable homes). No work other than an internal access road to base course have been completed within Phase 4. Berkeley have submitted a separate application to amend the design of Phase 4 under a S.73 application, although as the extant application remains implementable, with all relevant

conditions discharged, the proposed application remains unaffected by water neutrality, as confirmed by Horsham District Council.

- 1.10** Phase 5, to which this report relates, was submitted as a full standalone planning application in December 2019 (within the context of the parameters of the outline permission) and received resolution to grant at committee in September 2020 (DC/19/2464). Due to issues related to water neutrality a decision notice has not been issued and the planning application remains undetermined. This submission therefore seeks to update the existing planning application.
- 1.11** The revised the development relates to the erection of 94 dwellings with associated access, parking and landscaping at Land West of Worthing Road (Phase 5), Southwater, as detailed in the covering letter. Due to proposed changes associated to Phase 4, the subject of a separate application, there is no increase in the number of homes overall.
- 1.12** The layout of the site is illustrated in the site layout is shown in **Appendix A**.

Adopted Local Plan (2015)

- 1.13** When considering the current Local Plan, **Policy 37 Sustainable Construction** requires new development to demonstrate measures to achieve a water use of 110 l/person/day.

Natural England Position Statement

- 1.14** The Sussex North Water Resource Zone (SNWRZ) has one of the most severe pressures on its water supplies of any region in the country. Therefore, water supplies need to be future proofed to ensure no adverse effect of water abstraction on the environment as well as sufficient water resources for an increasing population. all new development is required to demonstrate that it will not exacerbate this issue further.
- 1.15** As a result, all new planning applications within the SNWRZ are required to demonstrate that they will achieve a standard of water neutrality. This relatively new requirement is in response to a position statement issued by Natural England in September 2021.
- 1.16** The definition of water neutrality in Natural England's Statement is as follows:

"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."
- 1.17** The SNWRZ covers the majority of Crawley (excluding Gatwick Airport and Maidenbower), Horsham, part of Chichester local authority area and part of the South Downs National Park.
- 1.18** A Water Neutrality Advice Note was published in February 2022 and has clarified expectations for the contents of a water neutrality strategy. The following is relevant to this Water Neutrality Statement:

- > The amount of water from new developments using public water supply will be calculated on an individual or cumulative basis to produce a predicted demand for water consumption. The proposed water neutrality strategy will be required to be produced that will ensure no net increase in water consumption through a combination of water efficiency measures and offsetting.
- > The measures implemented should prioritise mitigation as opposed to compensation, in order to avoid the impact on Habitat Sites, as opposed to addressing the impact after it has occurred.
- > The use of very efficient fittings in homes and the application of any rain/grey water harvesting technologies may not be sufficient for some developments to be water neutral. Offsetting (i.e. water reduction measures outside of the application site) will likely be required. In terms of offsetting, flow regulators are the preferred strategy, as outlined in the 'Part C: Water Neutrality Assessment' document.
- > Where offsetting is not achievable off-site, developers may have the opportunity to purchase water credits to offset the water use of the development through the planning system in order to meet local water neutrality requirements. Credits can be purchased through the Sussex North Water Offsetting Scheme (SNOWS). Given the wider uncertainties surrounding the delivery of solutions to water neutrality, the ability for the Council to meet these needs will need to be closely monitored, in part through the monitoring of the SNOWS.
- > Homeowners should be provided with the information they need to ensure correct use and maintenance of water efficient fixtures and fittings. Opportunities should be sought to incorporate education into offsetting measures in order to raise awareness of the need to conserve water.

1.19 The Water Hierarchy shown in Figure 1 summarises three steps to reduce water consumption of a site. The first is reducing water use by making the homes as water efficient as possible. Then, install water capture and reuse systems, such as rainwater harvesting or grey water recycling. Finally, any remaining demand should be offset in the existing local region. It is reasonable to expect that for large developments where there is presently no existing water consumption, such as this one, offsetting will be key to achieving a significant water reduction, and even water neutrality.

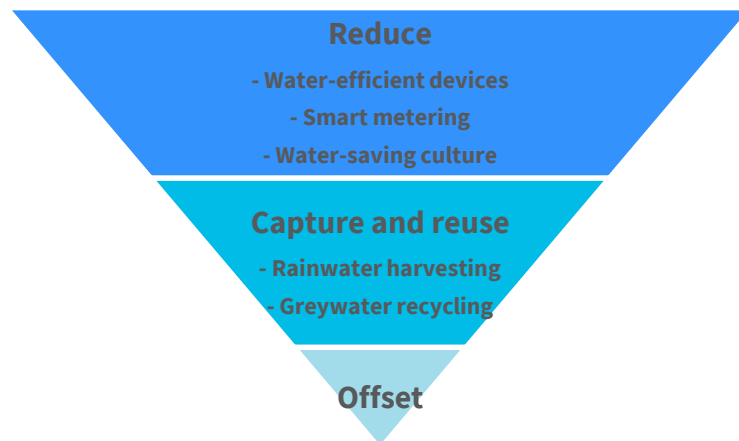


Figure 1: Water Hierarchy

2. BASELINE WATER DEMAND

- 2.1 It is critical that the strategy clearly establishes what the baseline water consumption rate is for the existing or most recent use.
- 2.2 As the site is largely a greenfield site and no known water uses are known to be present (e.g., irrigation), the baseline consumption is **zero l/person/day**. Therefore, to achieve water neutrality, the water consumption for the proposed site must be less than or equal to this.
- 2.3 Section 3 below discusses the Applicant's approach to this requirement.

3. METHODOLOGY

- 3.1** Calculating the estimated residential water use for the proposed development involves assessing compliance against the water performance targets in Part G of the Building Regulations (2010). It is not a design tool for water supply and drainage systems nor can it calculate the actual potable water consumption of a new dwelling.
- 3.2** The calculation methodology uses water consumption figures obtained from the manufacturers' product details on certain water-consuming appliances and fittings in a home, i.e., toilets, basin taps, bathtubs, showers, kitchen taps, washing machines, dishwashers, waste disposal units and water softeners.
- 3.3** This methodology provides a standardised approach as per Building Regulations Part G. While this will produce an estimate for the total water consumption of the site, the figure cannot account for individual occupant behaviour. While the final figure may differ, this methodology is still considered the most appropriate for the purpose of producing a water neutrality strategy.
- 3.4** The total water consumption is calculated as follows:

$$\text{Total consumption in l/person/day: } \{ [(A \times B) + C] \times D \}$$

Where:

A: Capacity/ flow rate of water-consuming component;

B: Use factor –varies for each water-consuming component;

C: Fixed use – varies for each water-consuming component;

D: Normalisation factor (0.91);

- 3.5** Using this figure, the proposed water demand for the development is calculated based on the expected occupancy, as follows:

$$\text{Total occupancy} \times \text{Average water consumption}$$

Note:

- > The occupancy was calculated using the 2011 Office for National Statistic Census Date for Horsham district. Occupancy rates for each house type are shown in Table 1. The occupancy figures have been provided by Horsham District Council in the 'Water Neutrality and planning applications FAQ' page on the Council website.

- > This results in a total of **260 occupants** for the proposed development. The total occupancy is shown in Table 1 below.

Table 1: Site occupancy (residential)

Type	Number of units	Expected occupancy per unit	Total occupancy
2 bed house	7	1.88	13.16
3 bed house	17	2.47	41.99
4 bed house	51	2.86	145.86
5 bed house	19	3.09	58.71
		Total	259.72

4. WATER NEUTRALITY STRATEGY

- 4.1 The September 2021 Position Statement of Natural England requires a strict water budget target to be set for new builds.
- 4.2 *The Water Neutrality Study: Part B (April 2022) and Part C (December 2022) report*, which were released as part of a deeper investigation into the water neutrality issue, indicate that 85 l/person/day is a realistic target for households.
- 4.3 With this in mind, and the feasibility of implementing water-efficient components and water capture and reuse technologies within homes and the non-residential areas, a strategy to achieve a low water consumption has been considered in line with this target and what is considered to be achievable and viable. This is significantly under the requirements of current Building Regulations (Part G).
- 4.4 The remainder of this section aims to demonstrate how this will be achieved.

Residential Consumption

- 4.5 It is proposed to install water-efficient white goods and fittings (such as shower and tap flow regulators) within the dwellings. An indicative strategy has been put together which could include the following measures for the proposed development:

- > 4/2.6 L dual flush cisterns for the toilets. This reduces the water consumption from the more common 6/3 L dual flush cisterns that are normally used;
- > Basin and kitchen taps with flow regulators fitted to limit the flow rate to 3 l/min;
- > Showers to achieve on average 7 l/min through flow regulators;
- > Lower-capacity bathtubs will be installed (approx. 130 L);
- > Water-efficient washing machines and dishwashers with consumptions of no more than 7 l/kg and 0.58 l/place setting, respectively.

4.6 Table 2 below presents an indicative specification for capacities and flow rates in order to achieve 85 l/p/d.

Table 2: Indicative water consumption- residential use

Installation type	Unit of measure	Capacity/flow rate	Litres/person/day
WC	Full flush volume	4	5.84
	Part flush volume	2.6	7.70
Taps	Flow rate (litres/minute)	3	6.32
Bath	Capacity to overflow	130	14.30
Shower	Flow rate (litres/minute)	7	30.59
Kitchen sink taps	Flow rate (litres/minute)	3	11.68
Washing machine	Litres/kg	7	14.70
Dishwasher	Litres/place setting	0.58	2.09
Calculated use			93.2
Normalisation factor			0.91
Total consumption			84.8

- 4.7** **Appendix B** presents the abovementioned strategy – using a water efficiency calculator – that shows that measures such as these will result in a water consumption of 85 l/person/day.
- 4.8** An additional 5 l/person/day has then been added to reflect external water use, in line with the Part G water calculator methodology. This results in a total residual site water consumption of **23,375 litres/day**.
- 4.9** This figure has been rounded up to ensure that the total consumption of the site has been fully covered for the purposes of offsetting.

Table 3: Total residential water consumption

House Type	Total occupancy	Daily internal consumption (litres/person/day)	Daily total consumption (litres/person/day)	Total (litres/day)	Total (roundup)
2 bed unit	13.16	85	90	1,184.4	1,184
3 bed unit	41.99	85	90	3,779.1	3,779
4 bed unit	145.86	85	90	13,127.4	13,127
5 bed unit	58.71	85	90	5,283.9	5,284
Total	259.72	-			23,375

- 4.10** Based on the above calculations, the total water consumption with water efficient fittings is expected to be **23,375 litres/day**.

Developing a water-saving culture

- 4.11** Along with installing water-efficient fixtures and white goods within homes and non-residential areas, it is essential for occupants to adopt good water-saving behaviours so that these are used effectively. A culture of water saving and understanding the value water resources will be critical to ensure these water-efficient fixtures and appliances installed in the home are accepted and remain in place.
- 4.12** Therefore, home user manuals and building user guides will be provided for the future occupants of the residential and non-residential spaces, respectively, explaining the value of the systems installed as well as guidance on how to adopt water-saving behaviour.

Offsetting measures

- 4.13** The total water consumption for Phase 5 is **23,375 litres/person/day**. As there is no existing water consumption on site, it will be required to offset the entirety of the remaining water consumption for the proposed development.
- 4.14** When the remaining water requirement for the proposed development cannot be satisfied using the water reduction and reuse measures on the site, it must be offset. This can be done by enabling and supporting schemes that save water in the local region. In line with the latest Natural England recommendations (see *Arun Valley and Water Neutrality - Frequently asked questions (FAQs) – Developers (March 2022)* for more detail), this includes offsetting on:
- > Private occupied property with Southern Water supply in Sussex North;
 - > Council-owned property with Southern Water supply in Sussex North;
 - > Registered Provider property with Southern Water supply in Sussex North;
 - > Commercial property with Southern Water supply in Sussex.
- 4.15** The schemes used for offsetting also need to be within the same water resource zone as the new development.
- 4.16** To offset the expected water use of a development, water-efficient white goods and fittings (such as shower and tap flow regulators) could be installed within such existing properties, either via a third-party agreement or via the Council's SNOWS scheme.
- 4.17** Where feasible, water capture and reuse technologies such as rainwater harvesting and greywater recycling could be considered to further offset water demand. However, it must be acknowledged that the technical and cost implications of these measures may limit the practicality of their installation, especially given that these may require significant space and modifications on the sites/buildings of third-party owners.
- 4.18** At the time of writing, no third-party offsetting scheme has been secured. In the absence of such a scheme, the site will be eligible for SNOWS. Therefore, a developer contribution will be made to offset the remaining water use. Further discussions with the Council will be required in order to fully develop the offsetting strategy.

5. CONCLUSION

- 5.1** The issue of water use reduction has been considered for the proposed development at Southwater Phase 5 by Berkeley Homes (Southern) Ltd in Horsham District Council. This will be achieved via the installation of water reduction measures on site and rainwater butts as well as offsetting measures.
- 5.2** A summary of the measures proposed to achieve water neutrality is provided below:
- > Water use in homes within the proposed development will be reduced by installing water-efficient fixtures and appliances. This strategy will result in a water consumption of 85 l/person/day, well below adopted Local Policy and Building regulation (Part G) requirements.
 - > A water-saving culture will be encouraged among future occupants by providing information within the home user manual.
 - > Further, rainwater butts will be installed for the houses to discount the water needed for external use. For the avoidance of doubt due to the difficulties in quantifying any potential benefit that the water butts may bring regarding external water use, the addition of water butts have not been factored into the calculations of forecast water demand. A 5 l/person/day allowance for external water use has thus been assigned to the offsetting calculation.
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REFERENCES

- > Environment Agency (2002) *Optimum Use of Water for Industry and Agriculture Dependent on Direct Abstraction*, p. 25
- > Jeremy Benn Associates; JBA (2022) *Water Neutrality Study: Part B – In combination*
- > Jeremy Benn Associate; JBA (2022) *Water Neutrality Study: Part C – Mitigation Strategy*
- > Natural England (March 2022) *Arun Valley and Water Neutrality - Frequently asked questions (FAQs) - Developers*

APPENDICES

Appendix A

Site Layout

Appendix B

Residential Water efficiency calculator

Appendix A

Site Layout

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PROW

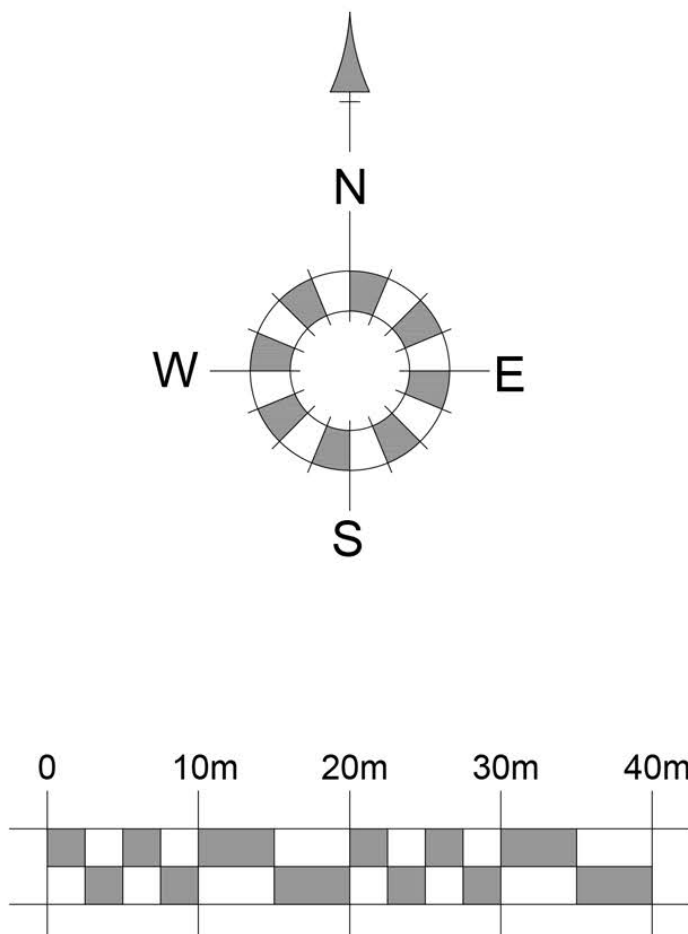
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Woodland House

Pond

SHAW'S LANE

Holy Inno Church
Southwater House
The Vicarage



- D 28/06/24 Layout updated with new mix for planning.
C 13/07/20 Position of Plots 3 & 7 slightly re-adjusted & access road between these plots revised to allow more tree planting. Additional footpaths added in front of Plots 25 & 68 linking to the PROW.
B 05/06/20 Parking/house types adjusted on Plots 8, 15-16, 34-35, 43-44, 53-55 & 71.
A 14/05/20 House type on Plot 62 revised.

DEVELOPER
PHASE 5
SOUTHWATER
WEST SUSSEX

DRAWING TITLE
SITE LAYOUT

Berkeley
Designed for life

Berkeley Homes (Southern) Limited
Berkeley House, Bay Tree Avenue
Leatherhead
Surrey, KT22 7UE
Tel: (01372) 370400

REF	DATE	REVISION
1	14/05/20	House type on Plot 62 revised.
2	05/06/20	Parking/house types adjusted on Plots 8, 15-16, 34-35, 43-44, 53-55 & 71.
3	13/07/20	Position of Plots 3 & 7 slightly re-adjusted & access road between these plots revised to allow more tree planting. Additional footpaths added in front of Plots 25 & 68 linking to the PROW.
4	28/06/24	Layout updated with new mix for planning.

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Appendix B

Residential Water efficiency calculator

Water Efficiency Calculator Southwater Phase 5						
	Internal Water Consumption					
Installation Type	Unit of Measure	Capacity / Flow Rate	Use Factor	Fixed Use	Litres/person/day	Notes
WC	Full Flush Volume (Litres)	4	1.46	0	5.84	Low flush WCs will be installed to reduce the volume of water consumed during flushing. All WCs will have dual flush cisterns which will provide both part (3L) and full (6L) flushes.
	Part Flush Volume (Litres)	2.6	2.96	0	7.70	
Basin Tap	Flow Rate (Litres/minute)	3	1.58	1.58	6.32	All taps (excluding kitchen taps) will be reduced to 4 litres/minute using flow restrictors. Where multiple taps are to be provided the average flow rate will be used.
Bath	Capacity (Litres to overflow)	130	0.11	0	14.30	All baths will have reduced capacities of 150 litres (excluding displacement). The bath taps are not included in this calculation as they are already incorporated into the use factor for the baths.
Shower	Flow Rate (Litres/minute)	7	4.37	0	30.59	Shower flow rates will be reduced to a maximum of 9 litres/minute using flow restrictors fixed to the shower heads. These contain precision-made holes or filters to restrict water flow and reduce the outlet flow and pressure.
Kitchen Tap	Flow Rate (Litres/minute)	3	0.44	10.36	11.68	Kitchen taps will be reduced to 4 litres/minute using flow restrictors which will be fitted within the console of the tap or in the pipework.
Washing Machine	Water Consumption (Litres/kg)	7	2.1	0	14.70	Water efficient washing machines or washer-dryers will be specified. The make and model numbers of the appliances are unknown at this stage therefore a default figure of 8.17 litres/kg has been assumed.
Dishwasher	Water Consumption (Litres/place setting)	0.58	3.6	0	2.09	All dishwashers will be water efficient. The make and models numbers are unknown therefore a default figure of 1.25 litres/place setting has been assumed at this stage.
Net Internal Water Consumption (Litres/person/day)					93.2	
Normalisation Factor					0.91	
Total Internal Water Consumption (Litres/person/day)					84.8	The total <i>internal</i> water consumption target of ≤105 litres/person/day will be achieved in accordance with Regulation 36 para (2)b optional requirement Approved Document G.
Allowance for External Water Consumption (Litres/person/day)					0	
Total Water Consumption (Litres/person/day)					84.8	The <i>total</i> water consumption target of ≤110 litres/person/day will be achieved in accordance with Regulation 36 para (2)b optional requirement of Approved Document G.