South Downs National Park Authority - Stage 1 Water Cycle Study

Final Report

January 2025

Prepared for:

South Downs National Park Authority

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Document Status

Issue date	January 2025
Issued to	Katharine Stuart, South Downs National Park Authority
BIM reference	LHM-JBAU-XX-XX-RP-EN-0001
Revision	D3-C01
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Contract

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This report describes work commissioned by the South Downs National Park Authority by an instruction dated 01 September 2023. The Client's representative for the contract was Katharine Stuart of South Downs National Park. Ana Tomori, James Fitton and Libby Raines of JBA Consulting carried out this work.

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Acknowledgements

JBA Consulting would like to thank South Downs National Park Authority, the Environment Agency, Southern Water, Thames Water, and the neighbouring Local Planning Authorities (Adur, Arun, Brighton & Hove, East Hampshire, Horsham, Lewes, Mid Sussex, Wealden, Waverley, and Winchester) for their assistance with the preparation of this report.

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Abbreviations

AMP	Asset Management Plan
AMP7	Seventh Asset Management Plan period (runs 2020-2025)
AMP8	Eighth Asset Management Plan period (runs 2025-2030)
BAP	Biodiversity Action Plan
BGS	British Geological Society
BNG	Biodiversity Net Gain
BOD	Biochemical Oxygen Demand
BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Methodology
CAPEX	Capital Expenditure
CMP	Catchment Management Plan
CfSH	Code for Sustainable Homes
CEO	Combined Emergency Overflow
CSO	Combined Sewer Overflow
DCG	Design and Construction Guidance
DLUHC	Department for Levelling Up, Housing & Communities
DWF	Dry Weather Flow
DWI	Drinking Water Inspectorate
DWMP	Drainage and Wastewater Management Plan
EA	Environment Agency
EFI	Ecological Flow Indicator
EIP	Environmental Improvement Plan
EU	European Union
FCT	Favourable Condition Targets
FEH	Flood Estimation Handbook
FFT	Flow to Full Treatment
FWMA	Flood and Water Management Act
FZ	Flood Zone
GIS	Geographic Information Systems
GEP	Good Ecological Potential
GES	Good Ecological Status
HRA	Habitats Regulations Assessment
HQM	Home Quality Mark

IDBs	Internal Drainage Board
IDD	Internal Drainage District
JBA	Jeremy Benn Associates
JNCC	Joint Nature Conservation Committee
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
l/p/d	Litres per person per day
Ml/d	Mega (Million) litres per day
MHCLG	Ministry of Housing Communities and Local Government (replaced by DLUHC)
NAV	New Appointment and Variations suppliers
NE	Natural England
NH4	Ammonia
NMP	Nutrient Management Plan
NPPF	National Planning Policy Framework
NVZ	Nitrate Vulnerable Zone
OfWAT	Water Service Regulation Authority
OPEX	Operational Expenditure
OS	Ordnance Survey
P	Phosphorous
PBDE	Persistent brominated diphenyl ethers
PCC	Per Capital Consumption
PCWLMB	Pevensey and Cuckmere Water Level Management Board
PFOS	Perfluorooctanesulfonic acid
PR	Price Review
PTP	Package Treatment Plant
PW	Portsmouth Water
RAG	Red / Amber / Green assessment
RBD	River Basin District
RBMP	River Basin Management Plan
rdWRMP	Revised Draft Water Resource Management Plan
RoFSW	Risk of Flooding from Surface Water (replaced uFMfSW)
RQP	River Quality Planning tool
SA	Sustainability Appraisals
SAB	SuDS Approving Body

SAC	Special Area of Conservation
SBP	Strategic Business Plan
SDNP	South Downs National Park
SDNPA	South Downs National Park Authority
SEA	Strategic Environmental Assessment
SEW	South East Water
SfA	Sewers for Adoption
SFRA	Strategic Flood Risk Assessment
SHELAA	Strategic Housing and Economic Land Availability Assessment
SHMA	Strategic Housing Market Assessment
SPA	Special Protection Area
SPG	Strategic Planning Groups
SPD	Supplementary Planning Document
SPZ	Source Protection Zone
SS	Suspended Solids
SSSI	Site of Special Scientific Interest
SSO	Sewerage Storm Overflow
SU	Sewerage Undertaker
SuDS	Sustainable Drainage Systems
SW	Southern Water
SWMP	Surface Water Management Plan
UKWIR	United Kingdom Water Industry Research
uPBT	Ubiquitous, persistent, bioaccumulative and toxic
UWWTD	Urban Waste Water Treatment Directive
VMR	Visual Meter Readers
WaSC	Water and Sewerage Company
WCS	Water Cycle Study
WFD	Water Framework Directive
WINEP	Water Industry National Environment Programme
WRMP	Water Resource Management Plan
WRSE	Water Resources South East
WRZ	Water Resource Zone
WTW	Water Treatment Works
WwTW	Wastewater Treatment Works
WWF	World Wildlife Fund

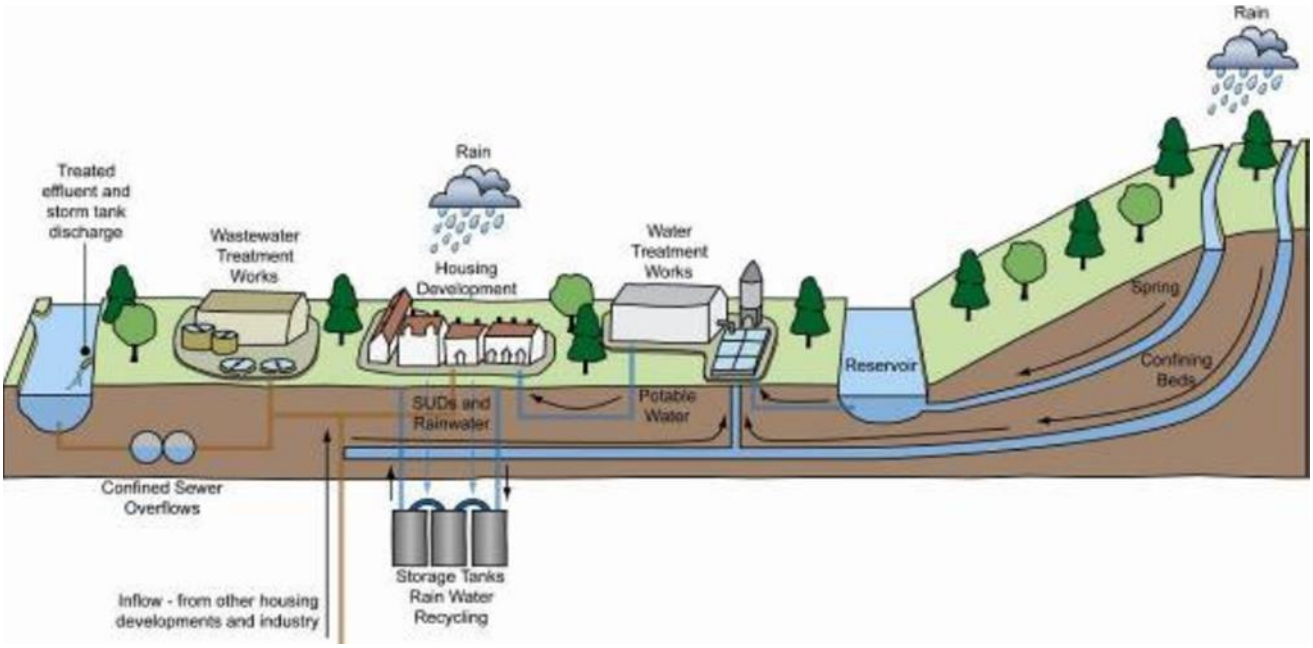
Executive Summary

JBA Consulting was commissioned by the South Downs National Park Authority (SDNPA) to undertake a Water Cycle Study (WCS) to support their draft Local Plan (Regulation 18). The Local Plan period is intended to run between 2022 and 2042. This will provide an assessment of the impact of the growth options on water infrastructure and the water environment.

Unmitigated future development and climate change can adversely affect the environment and water infrastructure capability. A WCS will provide the required evidence, together with a strategy to ensure that planned growth occurs within environmental constraints, with the appropriate infrastructure in place in a timely manner so that planned allocations are deliverable.

New homes require the provision of clean water, safe disposal of wastewater and protection from flooding. Strategic planning for new homes requires careful consideration to ensure there are sufficient water resources, and available capacity in the water supply and wastewater network, protecting existing customers and the environment.

In addition to increased housing demand, future climate change presents further challenges to the existing water infrastructure network, including increased intensive rainfall events and a higher frequency of drought events. Sustainable planning for water must now take this into account. The water cycle can be seen in the figure below and shows how the natural and human-caused processes and systems interact to collect, store or transport water in the environment.



Source: Environment Agency – Water Cycle Study Guidance

This study will assist the LPA to select and develop sustainable development allocations where there is minimal impact on the environment, water quality, water resources, infrastructure and flood risk. This has been achieved by identifying areas where there may

be conflict between any proposed development, the requirements of the environment and by recommending potential solutions to these conflicts.

The LPA has provided information about planned growth in their area. Potential Local Plan allocations have not been decided at the time of writing and will be assessed in a Stage 2 WCS. Available information was collated on water policy and legislation, water resources, water quality, and environmental designations within the study area. Growth already planned in the study area, and data provided by Southern Water and Thames Water was used to indicate the current capacity in wastewater treatment infrastructure.

The objective of the study is to provide evidence to guide development towards the most sustainable locations.

Water resources and supply

The South Downs National Park (SDNP) receives its water from Portsmouth Water, South East Water and Southern Water. The SDNP is within Eastbourne, Farnham, Haywards Heath, Hampshire South East, Hampshire Winchester, Portsmouth Water, Sussex Brighton, Sussex North and Sussex Worthing Water Resource Zones (WRZs). In all of the WRZs, the forecast percentage growth is higher than the expected growth during the Local Plan period. This may need to be updated in a Stage 2 WCS once the final Water Resource Management Plans (WRMPs) have been published and to take into account any changes resulting from proposed changes to the National Planning Policy Framework (NPPF).

The Water Industry National Environment Programme (WINEP) is a set of actions that the EA have requested all 20 water companies operating in England to complete in a particular Asset Management Period (AMP) as part of their environmental commitments. A number of investigations are planned or underway to ensure that abstraction of water from both groundwater and rivers, is not leading to unsustainable reductions in flow, particularly in chalk streams. Development and population growth can increase abstraction, and so SDNPA have an opportunity to contribute to these actions indirectly by pursuing policies that promote water efficiency in new development.

It is important that new development does not result in an unsustainable increase in water abstraction. This can be done in a number of ways from reducing the water demand from new houses through to achieving “water neutrality” in a region by offsetting a new developments water demand by improving efficiency in existing buildings.

Water resources in the UK are under considerable pressure. The Environment Agency have stated that "the scale of the challenge we face increases with time, and, by 2050, we are looking at a shortfall of nearly 5 billion litres of water per day between the sustainable water supplied available and the expected demand."

The National Water Resources Framework sets the objective to reduce the average per capita consumption in the UK to 110l/p/d by 2050. This is now part of the Environmental Improvement Plan and water companies WRMPs. Within Defra's Plan for Water is the commitment to review Building Regulations and a target of 100l/p/d in water stress areas is suggested.

The Future Homes Hub, who are supporting Defra to produce a roadmap to greater water efficiency propose a stages reduction in PCC, with a target of 100l/p/d in water stressed areas in place from 2025, and a reduced target of 90l/p/d in place by 2030 (depending on market conditions and customer acceptance).

This study recommends that as a minimum the proposed new Building Regulations target of 100l/p/d outlined in Defra's Plan for Water be adopted across the study area. This should be achieved using a fittings-based approach.

This should be supported by the requirement for non-household development to achieve three credits in the assessment category WAT01 of the BREEAM UK New Construction Standard.

The Local Plan should allow for a future reduction in the Building Regulations target to 90l/p/d in 2030.

Within the water neutrality zone, a lower target of 85l/p/d should apply, in line with the Water Neutrality Strategy.

Wastewater network

Development in areas where there is limited wastewater network capacity will increase pressure on the network, increasing the risk of a detrimental impact on customers, and increasing the likelihood of storm overflow operation. Early engagement with developers, Thames Water and Southern Water is required, and further modelling of the network may be required in the Stage 2 WCS and at the planning application stage. Furthermore, in the Thames Water and Southern Water networks, there are areas where the current network is a combined sewer system, and further separation of foul and surface water may be required, as well as suitably designed SuDS.

Early engagement between developers, the SDNPA, Thames Water and Southern Water is recommended to allow time for the strategic infrastructure required to serve these developments to be planned.

Wastewater treatment

A headroom assessment was carried out comparing the current flow from each Wastewater Treatment Works (WwTW), making allowance for growth already planned, with the permit limit. This provides an estimate of the spare capacity in wastewater treatment infrastructure in SDNP.

13 of the 45 WwTWs expected to serve growth in the study area are likely to be close to or exceeding their permit during the Local Plan period. An increase in the permit limit, and / or upgrades to treatment capacity may be required at these WwTWs in order to accommodate further growth.

Consideration should be given to using capacity in existing permits as this provides a lower carbon cost than upgrading capacity at existing WwTW or building new treatment works.

There are a number of poorly performing storm tank overflows at WwTWs in SDNP. Growth within these catchments could result in an increase in the operations of these overflows

contributing to a worsening of water quality in the area. Action should be taken by the water companies to address these overflows prior to an increase in wastewater demand being generated by new development.

New development proposed within the Thames Water and Southern Water's WwTW odour buffer zones are recommended to undergo an odour assessment, to be paid for by the developer as part of the planning process. Preferred sites will be assessed at Stage 2 to determine their proximity to WwTWs.

Water quality

The EA "reasons for not achieving good" (RNAG) dataset indicates that the water industry (groundwater abstractions, sewerage discharge, barriers and impoundment) and agriculture and rural land management (poor livestock and nutrient management) are the main reasons for watercourses not achieving good status in this area. Growth during the local plan period will also increase the discharge of treated wastewater from WwTWs in South Downs National Park. There is a potential for this to cause a deterioration in water quality in the receiving watercourses and this must be carefully considered. A significant deterioration in water quality is not acceptable under the Water Framework Directive, and large-scale investment in treating effluent to higher standards may therefore be required. Detailed modelling will be undertaken in the Stage 2 WCS.

Nutrient management

Development located within the designated nutrient neutrality catchment areas, or outside of them but which would drain foul and or surface water into them, will need to demonstrate nutrient neutrality. Some developers with access to substantial additional adjacent or nearby land may be able to develop their own nutrient offsetting schemes. Where this is not possible, they will need to purchase nutrient credits from schemes developed by LPAs, Natural England or third parties. It is anticipated that the availability of offsetting schemes may limit the volume or timing of development within these areas.

Water quality modelling in the stage 2 WCS should consider the limitations on growth in these catchments, considering the Technically Achievable Limits (TAL) for treatment of phosphates and nitrates in urban wastewater.

Environmental opportunities and constraints

The potential impact of development on a number of protected sites such as SAC and SSSIs within, or downstream of the study area should be carefully considered in future plan making. There are also a large number of Priority Habitats within SDNP.

Water quality modelling should be undertaken in a Stage 2 WCS to identify potential deterioration in water quality in waterbodies adjacent to protected sites.

The growth forecast for SDNPA is higher than the percentage growth predicted within most of the WRZs serving SDNP. It is therefore recommended that the difference between the rdWRMP24 and the growth plans is investigated in a Stage 2 WCS to ensure that the WRMP24 has accounted for a sufficient level of growth and that delivery of the SDNPA growth plan does not lead to an unsustainable increase in abstraction

Development sites within the study area could be sources of diffuse pollution from surface runoff. SuDS are required on all development sites. Their design should consider both water quantity and water quality and site level investigations should be undertaken to define the most appropriate SuDS types for each specific development. Opportunities exist for these SuDS schemes to offer multiple benefits of flood risk reduction, amenity value and biodiversity.

SDNPA should be consulted at an early stage of development to ensure that SuDS are implemented and designed in response to site characteristics and policy factors.

In the wider area, opportunities exist to implement natural flood management techniques to achieve multiple benefits of flood risk, water quality and habitat creation.

1 Introduction

1.1 Terms of reference

JBA Consulting was commissioned by the South Downs National Park Authority (SDNPA) to undertake a Water Cycle Study (WCS) to support their draft Local Plan (Regulation 18). The Local Plan period is intended to run between 2022 and 2042. This will provide an assessment of the impact of the growth options on water infrastructure and the water environment.

The purpose of the WCS is to form part of a comprehensive and robust evidence base to inform the preparation of the new Local Plan, which will set out where and how development will take place during the plan period, which is expected to be at least 15 years in length and will be used to inform decisions on the location of future development.

Unmitigated future development and climate change can adversely affect the environment and water infrastructure capability. A WCS will provide the required evidence, together with a strategy to ensure that planned growth occurs within environmental constraints, with the appropriate infrastructure in place in a timely manner so that planned allocations are deliverable.

1.2 Structure of report

The requirements and objectives of the WCS are set out in the section below. Planned growth in and around the South Downs National Park (SDNP) is characterised in Section 2 of the report, before relevant environmental and water industry policy and legislation is presented in Section 3 to provide context for the following assessment. The report is then divided into sections assessing the impact of growth on each topic in the water cycle study.

1.3 The Water Cycle

Planning Practice Guidance on Water Supply, Wastewater and Water Quality describes a water cycle study as:

> "a voluntary study that helps organisations work together to plan for sustainable growth. It uses water and planning evidence and the expertise of partners to understand environmental and infrastructure capacity. It can identify joined up and cost-effective solutions, that are resilient to climate change for the lifetime of the development.
>
> The study provides evidence for Local Plans and sustainability appraisals and is ideally done at an early stage of plan-making. Local authorities (or groups of local authorities) usually lead water cycle studies, as a chief aim is to provide evidence for sound Local Plans, but other partners often include the Environment Agency and water companies."

The Environment Agency's guidance on WCS recommends a phased approach:

- Stage 1: Scoping study, identifies if the water infrastructure capacity could constrain growth and if there are any gaps in the evidence you need to make this assessment. The scoping study will identify:
    - The area and amount of proposed development;
    - the existing evidence;
    - main partners to work with; and
    - evidence gaps and constraints on growth.
- Stage 2: Detailed study, to provide the evidence to inform an integrated water management strategy. It will identify the water and flood management infrastructure that will mitigate the risks from too little or too much water. It will also identify what you need to do to protect and enhance the water environment.

As a WCS is not a mandatory document, Local Planning Authorities are advised to prioritise the stages of the WCS to integrate with their Local Plan programme. Figure 1.1 below displays the main elements that compromise the Water Cycle.

The natural water cycle describes the continuous transfers of water around the planet, from atmosphere to surface and back via evaporation, transpiration and precipitation, and the various flows and storage processes that occur. The artificial water cycle looks at the availability of water resources for human consumption, its treatment and supply to homes and business, its use and consequently the generation of wastewater. It then looks at how wastewater is taken away, treated, and finally what happens when it is returned to the environment.

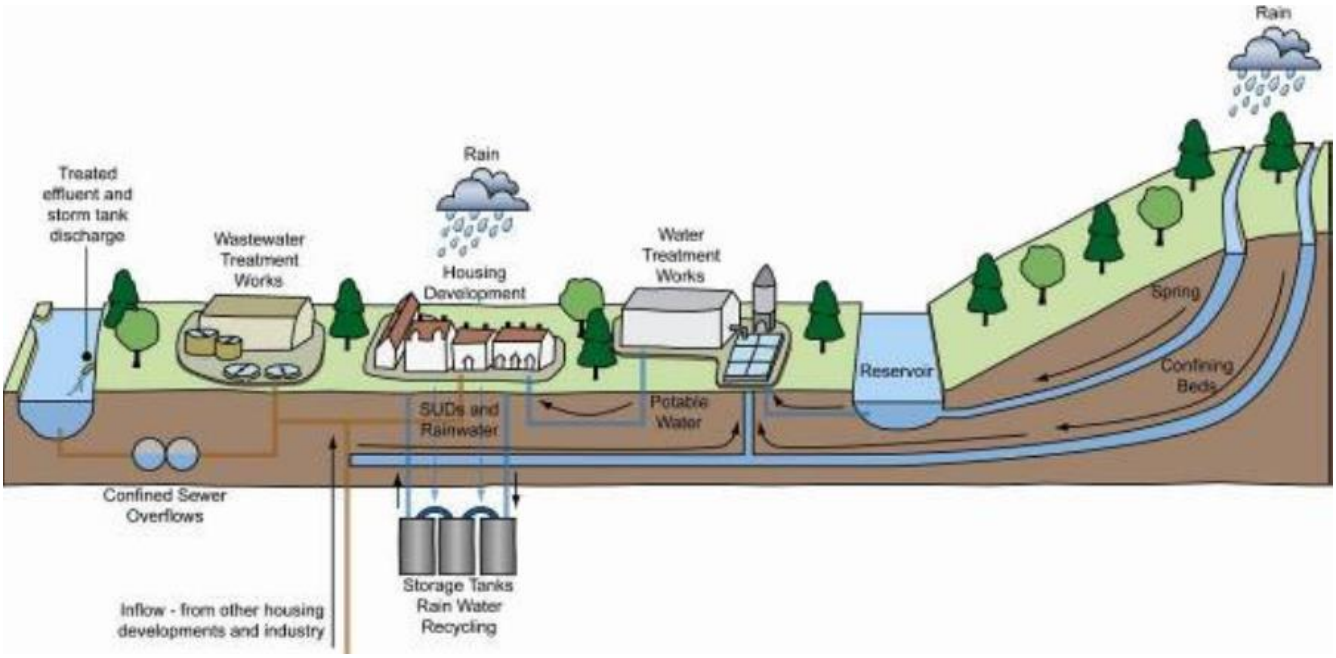


Figure 1.1: The Water Cycle

1.4 Impacts of Development on the Water Cycle

New homes require the provision of clean water, safe disposal of wastewater and limitation of flood risk. It is possible that allocating large numbers of new homes at some locations may result in the capacity of the existing available infrastructure being exceeded. This situation could potentially lead to service failures to water and wastewater customers, have adverse impacts on the environment or cause the high cost of upgrading water and wastewater assets being passed on to bill payers. Climate change presents further challenges such as increased intensity and frequency of rainfall and a higher frequency of drought events that can be expected to put greater pressure on the existing infrastructure. Development, when planned correctly, can also offer opportunities to reduce flood risk to existing properties and increase community resilience, contribute to nature recovery, and allow a collaborative approach to infrastructure.

1.5 Objectives

This Stage 1 scoping report is written to support the SDNPA Local Plan Review. The overall objective of the WCS is to understand the environmental and physical constraints of development and identify opportunities for more sustainable planning and improvements that may be required to achieve the required level of development.

This WCS will consider the following issues:

- Water resources, demand, and supply.
- Wastewater infrastructure and treatment.
- Water quality and environmental impact.

1.6 Study Area

Stretching between Winchester and Eastbourne, the South Downs National Park (SDNP) is approximately 1,600km^2 and incorporates the counties of Hampshire, West and East Sussex. The area encompasses Petersfield, Midhurst, Lewes, Petworth, Liss, and a small part of Arundel amongst many other smaller towns and villages. The area has a number of major road and rail networks, with connections to Crawley and Guildford to the north, Brighton and Hove to the south, as well as Portsmouth and Southampton to the south-west.

The SDNP has a population of 113,300 (based on 2021 Census data).

Several Environment Agency (EA) designated main rivers flow within the SDNP. This includes the following watercourses: River Adur, River Arun, River Cuckmere, River Ems, River Itchen, River Lavant, River Ouse, River Meon and River Rother and its tributaries.

Water supply services to the SDNP are provided by Portsmouth Water, Southern Water and South East Water. Thames Water supplies water to a very small proportion (<0.5km^2) of the SDNP near Northchapel. SDNP wastewater undertakers are Southern Water and Thames Water.

1.7 Authorities responsible for Water Resource and Wastewater Management in SDNPA

Within the SDNP, there are a number of authorities and regulators responsible or involved in supplying, managing, and overseeing water supply, wastewater and the environment. Table 1-1 below explains the responsibilities of various bodies within the district.

Table 1-1: Responsibilities of authorities within the South Downs National Park

Authority Name	Key Responsibilities of Authority
Environment Agency	The EA are the environmental regulator in the UK with responsibilities for water quality, flood risk and administering licences for water abstraction. They are a statutory consultee for many development plan documents and for some planning applications. They advise on environmental issues across the water cycle and where possible, work collaboratively with water companies to identify infrastructure capacity constraints.
Natural England	Natural England are the Government's advisors on the natural environment, which they have a responsibility to protect and enhance. In a WCS they may provide information on the conservation objectives, and guidance on, the protection of designated sites.
Portsmouth Water	Portsmouth Water is the water supplier for the south-west of the SDNP, with their service area including the Meon Valley and Eartham. Portsmouth Water has a statutory duty under the Water Industry Act to maintain an efficient and economical system of water supply within its area and supply households with a reliable and sufficient supply of water.
South East Water	South East Water is the water supplier for the north (including Petersfield) and south-east of the SDNP (including Fulking and Birling Gap). As the water supplier for this part of the SDNP, South East Water have the same responsibilities as Portsmouth Water to maintain an efficient and economical system of water supply.
Southern Water	Southern Water is the water supplier for the centre and east of the SDNP, including Midhurst, Petworth and Lewes. They also supply water to the north-western tip of the SDNP, surrounding Chilcomb. As the water supplier for this part of the SDNP, Southern Water have the same responsibilities as Portsmouth Water and South East Water to maintain an efficient and economical system of water supply. Southern Water is also the sewerage undertaker for the majority of the SDNP (including Petersfield, Petworth and Lewes). Sewerage undertakers have a duty under the Water Industry Act to provide, improve and extend a system of public sewers (for both domestic and trade flows) so as to cleanse and maintain those sewers (and any lateral drain) to ensure that the area that they serve is effectually drained. There is also a duty to make provision for the emptying of

Authority Name	Key Responsibilities of Authority
	those sewers, normally through sewage treatment works or where appropriate through discharges direct to watercourses.
Thames Water	As a water supplier, Thames Water have the same responsibilities as Portsmouth Water, Southern Water and South East Water to maintain an efficient and economical system of water supply. As Thames Water only supplies water to a very small proportion (<0.5km^2) of the SDNP near Northchapel, Thames Water has not been considered as a 'primary' water supplier for the SDNP and has been excluded from the subsequent water resources assessments undertaken as part of this WCS. Thames Water is also the sewerage undertaker for the north-west of the SDNP surrounding Lower Farringdon. As the sewerage undertaker for this part of the SDNP, Thames Water have the same responsibilities as Southern Water to provide, improve and extend a system of public sewers (for both domestic and trade flows) and to make provision for the emptying of those sewers.
Retail suppliers to non-household customers	Businesses and other non-household customers are supplied via non-household water and wastewater service retailers. The "wholesale supplier" remains the local supplier of water and/or wastewater services in that area. Retail suppliers were introduced with the intention of providing competition in the monopolistic water market.
Lead Local Flood Authority	Lead Local Flood Authorities (LLFA) are county councils and unitary authorities. They lead in managing local flood risks (i.e. risks of flooding from surface water, groundwater and ordinary (smaller) watercourses). This includes ensuring co-operation between the Risk Management Authorities in their area.

1.8 Record of Engagement

1.8.1 Overview

Preparation of a WCS requires significant engagement with stakeholders, within the Local Planning Authority (LPA) area, with water and wastewater utilities, with the Environment Agency, and where there may be cross-boundary issues, with neighbouring local authorities. This section forms a record of engagement for the WCS Stage 1. Further engagement will take place, if necessary, as the Local Plan progresses.

1.8.2 Engagement

The preparation of this WCS Stage 1 was supported by the following engagement:

Table 1-2 Parties engaged as part of the inception meeting.

Engaged Parties	Details
South Downs National Park Authority (LPA)	Scope of works and data collection requirements.

Table 1-3 Engagement with neighbouring Local Planning Authorities to the South Downs National Park area.

Engaged Parties	Details
All 14 neighbouring Local Planning Authorities	Request and receipt of site allocation and commitment data

Table 1-4 Collaboration with Water Companies and other Risk Management Authorities.

Risk Management Authorities	Engaged Parties	Details
Local Planning Authority	South Downs National Park Authority	Scope of works and data collection requirements.
Environment Agency	Environment Agency	Scope of works and data collection requirements.
Lead Local Flood Authorities (LLFAs)	Hampshire County Council East Sussex County Council West Sussex County Council	Data collection requirements.
Internal Drainage Basins (IDBs)	Pevensey and Cuckmere Water Level Management Board (PCWLMB) River Arun Internal Drainage District (IDD)	Data collection requirements.
Water Companies	Portsmouth Water South East Water Southern Water	Data collection requirements.

2 Future Growth in the South Downs National Park

2.1 Growth in South Downs National Park

The SDNPA's new Local Plan is currently expected to be adopted in 2027. The plan period is between 2024 to 2042. The plan will direct future growth and associated infrastructure across the area and will include new housing and employment requirements for the SDNP. Potential allocations for the SDNP were provided by SDNPA, to inform a growth scenario within the Stage 1 WCS. Several assumptions have been made about when development might occur, where this was not specified. The following section summarises the planned development in SDNP to 2042, including new allocations in the Local Plan Review which allows a forecast to be created that can used to predict the volume of water and wastewater required in the future and the resulting pressure on water infrastructure.

The forecast consists of:

- Potential residential and employment allocations for SDNPA's Local Plan Review.
- Existing allocations from the adopted Local Plan and Made Neighbourhood Development Plans.
- Committed development sites with full or outline planning permission, currently in the planning system as of August 2024.
- Recent completions - sites completed from 2022 to 2024 that may not yet appear in flow data provided by the water companies.
- Neighbouring authority growth – growth served by infrastructure within or shared with the study area.

Forecasted development in SDNP as outlined above is summarised in Table 2-1.

2.1.1 Assumptions

For residential and employment sites where a temporal projection of how the site will be developed was not provided the following assumptions were made.

- For all allocated sites, trajectory was assumed to be evenly spread across the relevant plan period.
- For committed sites in the planning system (permissions) trajectory was assumed to be evenly spread across 2023/2024 to 2027/2028.
- For completions trajectory was assumed to be in 2022/2023.

Windfall sites are sites that are not specifically allocated in the Local Plan or neighbourhood plans. Local Plans usually provide an allowance to cover this circumstance, consistent with the National Planning Policy Framework (NPPF). For the purpose of the Stage 1 report, windfall sites were distributed between WwTWs based on the proportion of the commitments at each WwTW. This may be revised in Stage 2. The windfall allowance of 952 homes across SDNP was advised by SDNPA as an estimate to inform the WCS. This may be different in the published Local Plan and may change as a result of subsequent monitoring.

2.1.2 Summary

Table 2-1 Summary of the growth forecast across SDNPA's Local Plan Review Plan Period

Type	Number of houses	Employment floorspace (sqm)
Potential allocations	3,059	68,998
Commitments	1,907	84,450
Completions (2022/2023)	1,035	2,642
Windfall	952	N/A
Total	6,953	156,090

Across the plan area there are 6,001 homes and 156,090 sqm of employment area either already in the planning system (with planning permission or allocated in the adopted Local Plan or Made Neighbourhood Development Plans), or as potential allocations, expected to be built by 2042 Of which 1,035 homes and 2,642 sqm of employment area have already been completed in 2022/2023. The estimated number of windfall housing is 952.

2.2 Growth outside SDNPA

2.2.1 General approach

Where growth within a neighbouring Local Planning Authority (LPA) area may be served by infrastructure within or shared with SDNPA, the LPA were contacted as part of a duty to cooperate request to provide information on:

- The latest growth forecast (housing and employment) for the district.
- Details of future growth within the catchments of WwTW which serve part of their council area and SDNPA.

The neighbouring authorities to the SDNPA are displayed in Figure 2.1.

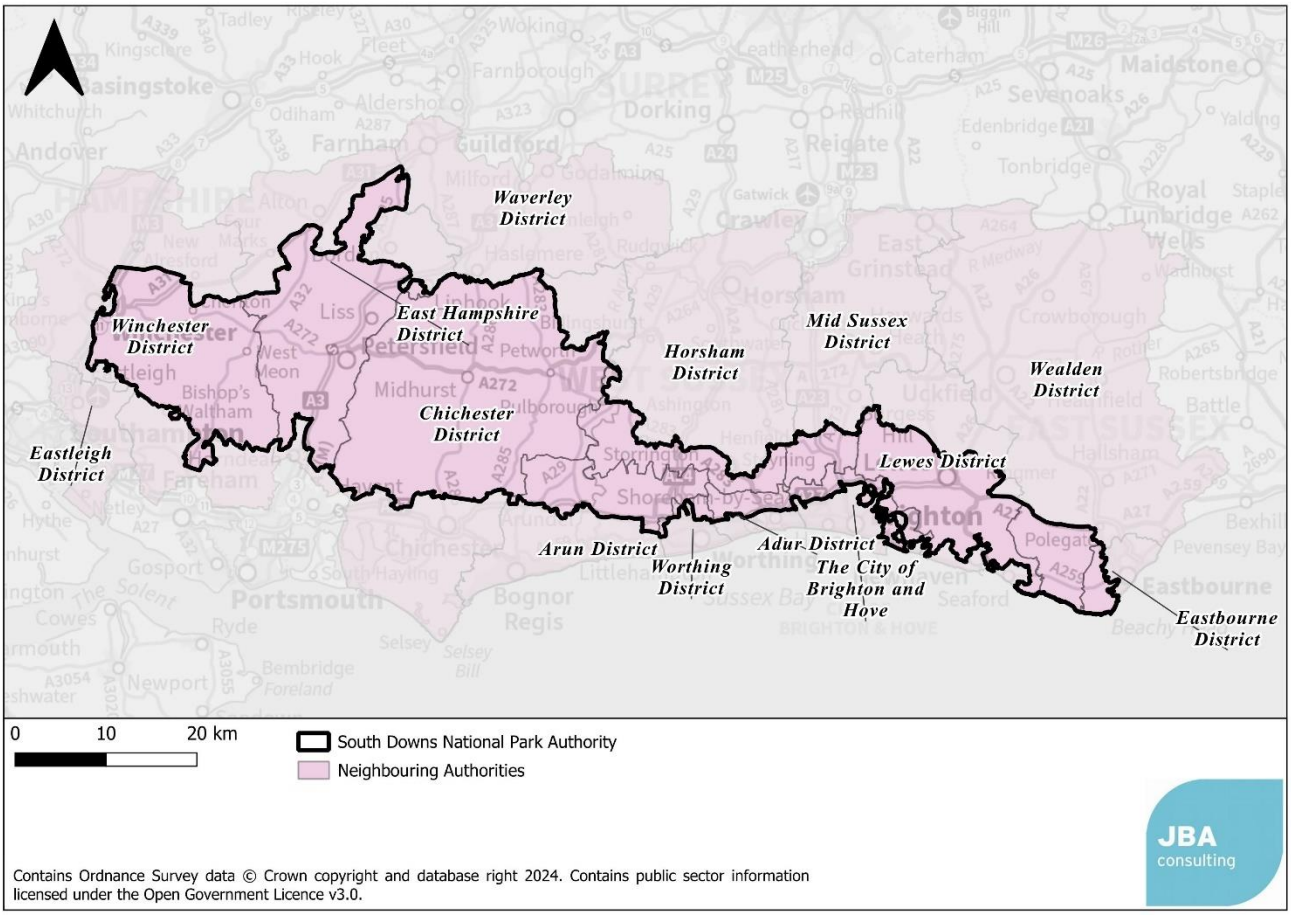


Figure 2.1: Neighbouring authorities to SDNPA

2.2.2 Arun District Council

Arun District Council planning team has provided information on housing and employment allocations. These sites would be served by the Ford WwTW (Thames Water) which is shared with SDNPA.

Table 2-2 Summary of growth in the Arun District area served by infrastructure shared with SDNPA

WwTW	Proposed number of dwellings	Potential Employment Space (m^2)	Period
Ford	11,278	None identified	2022/2023-2038/2039

2.2.3 Adur and Worthing Council

Arun District Council planning team has provided information on housing and employment allocations. These sites would be served by the East Worthing WwTW (Southern Water) which is shared with SDNPA.

Table 2-3 Summary of growth in the Adur and Worthing Council served by infrastructure shared with SDNPA

WwTW	Proposed number of dwellings	Potential Employment Space ($m^{2)}$	Period
East Worthing	1,080	10,000	2022/2023-2031/2032

2.2.4 City of Brighton and Hove

Growth within City of Brighton and Hove has been taken from the allocations data supplied by the City of Brighton and Hove. These sites would be served by Peacehaven WwTWs (Southern Water) which are shared with SDNPA.

Table 2-4 Summary of growth in The City of Brighton and Hove area served by infrastructure shared with SDNPA

WwTW	Proposed number of dwellings	Potential Employment Space (m^2)	Period
Peacehaven	8,908	None identified	2022/2023-2037/2038

2.2.5 Chichester District Council

Site data was not available from Chichester District Council for use in this study. It is proposed to revisit this in the Stage 2 assessment if the data becomes available.

2.2.6 Eastleigh Borough Council

Site data was not available from Eastleigh borough Council for use in this study. It is proposed to revisit this in the Stage 2 assessment if the data becomes available.

2.2.7 East Hampshire District Council

Growth within East Hampshire District Council has been taken from the completions and allocations data supplied by East Hampshire District Council. These sites would be served by Alton, Budds Farm Havant WwTW (Southern Water) Bentley, Burdon WwTW (Thames Water which is shared with SDNPA.

Table 2-5 Summary of growth in East Hampshire District area served by infrastructure shared with SDNPA

WwTW	Proposed number of dwellings	Potential Employment Space ($m^{2)}$	Period
Alton	2,075	8,000	2022/2023-2040/2041
Budds Farm Havant	205	None identified	2022/2023-2040/2041

WwTW	Proposed number of dwellings	Potential Employment Space ($m^{2)}$	Period
Bentley	13	None identified	2023/2024-2041/2042
Burdon	387	None identified	2023/2024-2040/2041
Haslemere	17	None identified	2023/2024-2040/2041

2.2.8 Horsham District Council

Growth within Horsham has been taken from the completions and allocations data supplied by Horsham District Council. These sites would be served by Steyning WwTW (Southern Water) which is shared with SDNPA.

Table 2-6 Summary of growth in Horsham area served by infrastructure shared with SDNPA

WwTW	Proposed number of dwellings	Potential Employment Space ($m^{2)}$	Period
Steyning	354	None identified	2024/2025-2041/2042

2.2.9 Lewes and Eastbourne District Council

Data of growth in Lewis and Eastbourne District Council includes only Lewes sites. No sites from Eastbourne were available. Lewes sites have been taken from the completions and allocation data supplied by Lewes and Eastbourne District Council up to 2030. These sites would be served by Cooksbridge, Ditching, Goddards Green, Neaves Lane Ringmer, Newhaven East, Peacehaven WwTW (Southern Water).

Table 2-7 Summary of growth in Lewes and Eastbourne area served by infrastructure shared with SDNPA

WwTW	Proposed number of dwellings	Potential Employment Space ($m^{2)}$	Period
Ditchling	1	None identified	2022/2023-2029/2030
Goddards Green	259	None identified	2022/2023-2029/2030
Neaves Lane Ringmer	329	None identified	2022/2023-2029/2030
Newhaven East	2,198	144	2022/2023-2029/2030
Peacehaven	495	None	2022/2023-

WwTW	Proposed number of dwellings	Potential Employment Space ($m^{2)}$	Period
		identified	2029/2030

2.2.10 Mid Sussex District Council

Growth within Mid Sussex has been taken from the completions and allocations data supplied by Mid Sussex District Council up to 2039. These sites would be served by Goddards Green WwTW (Southern Water) which is shared with SDNPA.

Table 2-8 Summary of growth in Mid Sussex area served by infrastructure shared with SDNPA

WwTW	Proposed number of dwellings	Potential Employment Space ($m^{2)}$	Period
Goddards Green	8,505	83,640	2020/2021-2038/2039

2.2.11 Waverley District Council

The Waverley planning team has provided information on allocations and completions up to 2032. These sites would be served by the Haslemere, Bentley (Thames Water) and Northchapel WwTW (Southern Water) which are shared with SDNPA.

Table 2-9 Summary of growth in the Waverley area served by infrastructure shared with SDNPA

WwTW	Proposed number of dwellings	Potential Employment Space ($m^{2)}$	Period
Bentley	234	19,600	2022/2023-2031/2032
Haslemere	619	None identified	2022/2023-2031/2032

2.2.12 Winchester

The Winchester planning team provided information on allocations. These sites would be served by Bishop Waltham, Budds Farm Havant, Chickenhall Eastlight, Harestock, Morestead Road Winchester, WwTW (Southern Water) which are shared with SDNPA

Table 2-10 Summary of growth in Winchester area served by infrastructure shared with SDNPA

WwTW	Proposed number of dwellings	Potential Employment Space ($m^{2)}$	Period
Bishop Waltham	530	None identified	2024/2025-2041-2042

WwTW	Proposed number of dwellings	Potential Employment Space ($m^{2)}$	Period
Budds Farm Havant	250	None identified	2024/2025-2041-2042
Chickenhall Eastlight	193	None identified	2024/2025-2041-2042
Harestock	2,720	None identified	2024/2025-2041-2042
Morestead Road Winchester	1,162	51,581	2024/2025-2041-2042

2.2.13 Wealden District Council

The Wealden planning team has provided information on allocations and completions up to 2040. These sites would be served by the Haslemere, Bentley (Thames Water) and Northchapel WwTW (Southern Water) which are shared with SDNPA.

Table 2-11 Summary of growth in the Waverley area served by infrastructure shared with SDNPA

WwTW	Proposed number of dwellings	Potential Employment Space ($m^{2)}$	Period
Neaves Lane Ringmere	660	None Identified	2022/2023-2027/2028

3 Policy and legislation

3.1 Introduction

The following sections introduce several national, regional, and local policies that must be considered by the Local Planning Authority (LPA), water companies and developers during the planning stage. Key extracts from these policies are presented as well as links to the full text. Whilst care has been taken to ensure that the information presented in this report was up to date at the time of writing, policy and guidance can change rapidly and the reader should ensure that the most up to date information is sought.

3.2 Plan-making

The National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023) was originally published in 2012, as part of reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth.

Local Plans are the primary mechanism by which plan-led spatial planning is implemented in England. Local Plans must be prepared by Local Planning Authorities (LPAs) and include:

- Strategic policies which set out the "overall strategy for the pattern, scale and design duality of places", including for the provision of infrastructure, transportation and community facilities.
- Non-strategic policies, which "set out more detailed policies for specific areas, neighbourhoods or types of development. This can include allocating sites, the provision of infrastructure and community facilities at a local level."

Under the Localism Act (HM Government, 2011) new rights were provided to allow local communities to come together and shape the development and growth of their area by preparing Neighbourhood Development Plans, or Neighbourhood Development Orders, where the ambition of the neighbourhood is aligned with strategic needs and priorities for the area. Neighbourhood Plans can make non-strategic policies, aligned to the strategic policies of the Local Plan. As neighbourhoods draw up their proposals, Local Planning Authorities are required to provide technical advice and support to communities.

3.3 Water and the Planning System

3.3.1 National Planning Policy Framework and water

The NPPF provides guidance to planning authorities to take account of flood risk and water and wastewater infrastructure delivery in their Local Plans. Key paragraphs include:

- Paragraph 34: “Plans should set out the contributions expected from development. This should include setting out the levels and types of affordable housing provision required, along with other infrastructure (such as that needed

for education, health, transport, flood and water management, green and digital infrastructure). Such policies should not undermine the deliverability of the plan."

- Paragraph 158: "Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply..."
- Paragraph 180e: "…preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans".

3.3.2 Planning Practice Guidance overview

Planning Practice Guidance (PPG) was originally issued in 2014 by the Department for Communities and Local Government, with the intention of providing guidance on the application of the NPPF. The individual guidance documents are updated periodically. The following guidance documents are particularly relevant to a WCS:

- Water Supply, Wastewater and Water Quality (HM Government, 2019)
- Housing - Optional Technical Standards (HM Government, 2015a)
- Flood Risk and Coastal Change (HM Government, 2022)

3.3.3 PPG - Water Supply, Wastewater and Water Quality

Two key passages from the PPG (Para 002) provide an overview of what needs to be considered plan-making authorities, and provide a basis for the work contained in a WCS or IWMS:

"Early discussions between strategic policy-making authorities and water and sewerage companies can help to ensure that proposed growth and environmental objectives are reflected in company business plans. Growth that requires new water supply should also be reflected in companies' long-term water resources management plans. This will ensure that the necessary infrastructure is funded through the water industry's price review."

"Strategic policy-making authorities will also need to consider the objectives in the government's 25 Year Environment Plan to reduce the damaging abstraction of water from rivers and groundwater, and to reach or exceed objectives for rivers, lakes, coastal and ground waters that are specially protected."

A summary of the advice for plan-makers and for planning applications is contained below but it is recommended that the full text is reviewed.

Plan-making considerations - Infrastructure (Para 005)

- Identification of suitable sites for new or enhanced infrastructure, including the location of existing and proposed development.

- Consider whether new development is appropriate near to water and wastewater infrastructure (for example due to odour concerns).
- Phasing new development so that water and wastewater infrastructure will be in place when needed. Infrastructure should also be in place before any environmental effects occur on designated sites of importance for biodiversity.

Plan-making considerations - Water quality (Para 006)

- How to help protect and enhance local surface water and groundwater in ways that allow new development to proceed and avoids costly assessment at the planning application stage.
- The type or location of new development where an assessment of the potential impacts on water bodies may be required.
- Whether measures to improve water quality, (e.g., SuDS schemes) can be used to address water quality in addition to flood risk.

Plan-making considerations - Wastewater (Para 007)

- The sufficiency and capacity of wastewater infrastructure.
- The circumstances where wastewater from new development would not be expected to drain to a public sewer (such as via a package treatment sewage treatment works or septic tank).
- The capacity of the environment to receive effluent from development without preventing statutory objectives being met.

Early engagement with the LPA, the EA, and relevant water and sewerage companies can help establish whether any particular water and wastewater issues need to be considered.

Considerations for planning applications - Water supply (Para 016)

Water supply planning would normally be addressed through the LPA's strategic policies and reflected in the water companies water resource management plans (WRMPs). Water supply is therefore unlikely to be a consideration for most planning applications. However, some exceptions might include:

- Large developments not identified in plans that are likely to require a large volume of water; and/or
- Significant works required to connect the water supply; and/or
- Where a plan requires enhanced water efficiency in new development as part of a strategy to manage water demand locally.

Considerations for planning applications - Water quality (Para 016)

Water quality is only likely to be a significant planning concern where a proposal would:

- Involve physical modifications to a water body such as flood storage areas, channel diversions and dredging, removing natural barriers, construction of new locks, new culverts, major bridges, new barrages or dams, new weirs, and removal of existing weirs; and/or
- Indirectly affect water bodies, for example:
    - As a result of new development such as the redevelopment of land that may be affected by contamination, mineral workings, water and wastewater

treatment, waste management facilities and transport scheme including culverts and bridges.
    - Result in runoff into surface water sewers that drain directly, or via a combined sewer, into sensitive waterbodies e.g., waterbodies with a local, national or international habitat designation.
    - Through a lack of adequate infrastructure to deal with wastewater.
    - Through a local of adequate infrastructure to deal with wastewater where development occurs in an area where there is strategic water quality plan e.g., a nutrient management plan, River Basin Management Plan, Water Cycle Study, Diffuse Water Pollution plan or sewerage undertakers' drainage strategy which set out strategies to manage water quality locally and help deliver new development.

3.3.4 PPG - Housing - Optional Technical Standards

This guidance advises planning authorities on how to gather evidence to set optional requirements, including for water efficiency. It states that “all new homes already must meet the mandatory national standard set out in the Building Regulations (of 125 litres /person /day). Where there is a clear local need, local planning authorities can set out Local Plan policies requiring new dwellings to meet the tighter Building Regulations optional requirement of 110 litres/person/day. Planning authorities are advised to consult with the EA and water companies to determine where there is a clear local need, and also to consider the impact of setting this optional standard on housing viability.

The evidence for adopting the optional requirements is outlined in section 4.7. Viability is reviewed in section 3.4.4.

3.3.5 PPG - Flood Risk and Coastal Change

This guidance (Department for Levelling Up, Housing and Communities, 2022) sets out how spatial planners, planning authorities and developers should manage flood risk to and from proposed developments, including assessing risk, avoiding flood risk, controlling, managing and mitigating flood risk. The main updates in the 2022 version were:

- Natural Flood Management (NFM)
- Surface water flood risk
- Using multifunctional SuDS
- Application of the sequential and exceptional tests to all sources of flood risk
- Safeguarding land of future flood risk management
- Supporting transition in unsustainable locations

Full details of this PPG are set out in the accompanying Level 1 South Downs National Park Strategic Flood Risk Assessment (SFRA).

3.3.6 PPG - Climate Change

This guidance (Department for Levelling Up, Housing and Communities, 2019) advises how to identify suitable mitigation and adaptation measures in the planning process to address the impacts of climate change. Planning can help increase resilience to climate change impact through the location, mix and design of development. There is a statutory duty on local planning authorities to include policies in their Local Plan to tackle climate change and its impact.

3.3.7 Levelling-up and Regeneration Act 2023

The Levelling-up and Regeneration (HM Government, 2023) aims to support the Government's commitment to reducing geographical disparities between different parts of the UK. Within the Act are several parts relating to the water environment.

Part 7 relates to nutrient pollution standards. Where the Secretary of State considers that a habitats site that is wholly or partly in England is in an unfavourable condition by virtue of pollution from nutrients in water comprising phosphorus or compounds, or nitrogen or compounds, the Secretary of State may designate the catchment area for the habitats site as a phosphorus or nitrogen sensitive area.

It requires sewerage undertakers in England to upgrade phosphorus or nitrogen significant plants in its sewerage system by 2030 in order to meet phosphorus or nitrogen pollution standards.

A phosphorus or nitrogen significant plant is defined as one that discharges treated effluent into a sensitive catchment area and is not exempt in relation to the pollution standard. Unless otherwise defined, the treatment standard for phosphorous is 0.25mg/l, and for nitrogen is 10mg/l.

3.4 Water and design

3.4.1 Building regulations

The Building Regulations (2010) Part G was amended in early 2015 to require that all new dwellings must ensure that the potential water consumption must not exceed 125 litres/person/day, or 110 litres/person/day where required under planning conditions (HM Government, 2015b) (see 3.3.4).

The Environmental Improvement Plan (discussed in 0) contains a commitment to consider a new standard for new homes in England of 105 litres per person per day (l/p/d) and 100 l/p/d where there is a clear local need, such as in areas of serious water stress. Whilst this new standard is only under consideration, it demonstrates the direction of travel for water efficiency standards, and it is highly likely that this or a similar standard will be adopted.

3.4.2 Building Research Establishment

The Building Research Establishment (BRE) publish an internationally recognised environmental assessment methodology for assessing, rating, and certifying the sustainability of a range of buildings.

New homes are most appropriately covered by the Home Quality Mark (HQM) (BRE, 2023a), and commercial, leisure, educational facilities and mixed-use buildings by the Building Research Establishment Environmental Assessment Methodology (BREEAM) UK New Construction Standard (BRE, BREEAM, 2018b).

Using independent, licensed assessors, BREEAM/HQM assesses criteria covering a range of issues in categories that evaluate energy and water use, health and wellbeing, pollution, transport, materials, waste, ecology, and management processes.

In the Homes Quality Mark, 400 credits are available across 11 categories and lead to a star rating. 18 credits are available for water efficiency and water recycling. A greater number of credits are awarded for homes using water efficient fittings (with the highest score achieving 100l/p/d or less), and further credits are awarded for the percentage of water used in toilet flushing that is either sourced from rainwater or from grey water.

The BREEAM New Construction Standard awards credits across nine categories, four of which are related to water: water consumption, water monitoring, leak detection and water efficient equipment. This leads to a percentage score and a rating from “Pass” to “Outstanding”.

Through the Local Plan, the LPA has the opportunity to seek BREEAM or HQM status for all new, residential, and non-residential buildings.

3.4.3 Energy and Water

18% of the UK’s domestic energy usage is for water heating (Department for Energy Security and Net Zero, 2022). If less water was being used within the home, for instance through more water efficient showers, less water would need to be heated, and overall domestic energy usage would be reduced.

The Government is currently analysing the results of a 2019 consultation on a Future Homes Standard that will involve changes to Part L (conservation of fuel and power) of the Building Regulations for new dwellings. Whilst there is no direct mention of water efficiency in this consultation, there is an important link between water use and energy use, and therefore between water use and the whole-life carbon cost of developments.

3.4.4 Viability

The evidence for the costs of meeting the optional 110l/p/d water efficiency target in new homes indicate that the costs are minimal:

- A 2014 study into the cost of implementing sustainability measures in housing found that meeting a standard of 110 litres per person per day would cost only £12 (at 2023 prices) for a four-bedroom house (EC Harris, 2014).

- The Committee on Climate Change report - UK Housing: Fit for the Future - stated that the cost of "requiring all homes in England to be built to 110 l/p/d is possible under Part G of regulations and would be no additional cost."(Committee on Climate Change, 2019)
- Heating water accounts for 18% of energy used in the home (Department for Energy Security and Net Zero, 2022) This would cost a 2-3 person, 3-bed household an average of £352 per year in energy at 2023 costs (British Gas, 2023). Water efficiency is therefore not only viable but of positive economic benefit to both private homeowners and tenants.

There is less evidence available on the costs of going below 110l/p/d. The Sussex North Water Neutrality Strategy (JBA Consulting, 2022) found that the additional cost to meet 85l/p/d using water efficient fittings would be between £349 and £431 per dwelling, or £1,049 to £1,531 where white-goods appliances would not otherwise have been installed in the dwelling (2022 prices).

3.5 The Water Industry

3.5.1 The Water Industry in England

Water and sewerage services in England and Wales are provided by eleven Water and Sewerage Companies (WaSCs) and six 'water-only' companies. The central legislation relating to the industry is the Water Industry Act 1991. The companies operate as regulated monopolies within their supply regions, although very large water users and developments are able to obtain water and/or wastewater services from alternative suppliers - known as inset agreements.

The Water Act 2014 aims to reform the water industry to make it more innovative and to increase resilience to droughts and floods. Key measures could influence the future provision of water and wastewater services:

- Non-domestic customers will be able to switch their water supplier and/or sewerage undertaker;
- New businesses will be able to enter the market to supply these services;
- Measures to promote a national water supply network; and
- Enabling developers to make connections to water and sewerage systems.

The water industry is primarily regulated by three regulatory bodies:

- **Economic regulation:** Office of Water Services (OfWAT) are the economic regulator. They have a statutory duty to protect the interests of consumers, ensuring water companies carry out their functions (customer service standards, environmental rules, drinking water standards etc) and can finance them. Part of this role is setting the limits on pricing of water and sewerage services.
- **Environmental regulation:** The Environment Agency are the environmental regulator. They are responsible for monitoring the impact of the water industry (as

well as others) on the environment and issuing permits for abstraction of water and discharge of wastewater.

- **Drinking water regulation:** Finally, the Drinking Water Inspectorate (DWI) implement standards for drinking water and can take enforcement measures against water companies if those standards are not met.

3.5.2 Funding of the water industry

The water industry works on a five-year cycle called the Asset Management Plan (AMP) period or AMP periods. Every five years a water company submits a Business Plan to OfWAT for a Price Review. These plans set out the companies' operational expenditure (OPEX) and capital expenditure (CAPEX) required to maintain service standards, enhance service (for example where sewer flooding occurs), to accommodate growth and to meet environmental objectives defined by the Environment Agency. OfWAT assesses and compares the plans with the objective of ensuring what are effectively supply monopolies are operating efficiently, and that the company is meeting its obligations. It then sets the allowable price increase for consumers based on the retail prices index, the business plan, and taking into consideration affordability for consumers. The current AMP period is AMP 7 (2020-2025), and the price of water for this period was set by OfWAT late in 2019 in a process referred to as Price Review 19 (PR19). The new price came into effect in April 2020. The next price review will be 2024 (PR24) and will set prices from 2025 to 2030. This system gives stability in pricing. Within this price review process there may also be incentives and penalties on the water company for exceeding or failing to meet targets.

When considering investment requirements to accommodate growing demand, water companies are required to ensure a high degree of certainty that additional assets will be required before funding them. Longer term growth is, however, considered by the companies in their internal asset planning processes and in their 25-year Strategic Direction Statements and WRMPs.

The Water Industry National Environment Programme (WINEP) is a set of actions that are defined by the EA and given to all water companies operating in England for completion during a particular AMP period. The aim of the programme is to support the objectives in the Water Framework regulations. Examples of typical actions could include investigations into the sustainability of an abstraction, a reduction in an abstraction to support river flows, or new permit limits at a wastewater treatment works.

Water and wastewater infrastructure requires significant lead-times to plan, obtain planning and other permissions, finance and construct. The time required to provide new or upgraded infrastructure to serve a development or a larger spatial plan is highly locally specific. The following is provided as an indicative guide to lead-times.

Table 3-1 Indicative lead-times (years) for new infrastructure to serve development

Scale of development	Water supply	Water resources	Wastewater network	Wastewater treatment
Minor	1	N/A	1	N/A
Major	1-3	5-10	1-5	3-5
Strategic / Plan	3-5	10-20	5-10	5-10

3.5.3 Planning for Water

3.5.3.1 Water resource management plans

Water Resource Management Plans (WRMPs) are 25-year strategies that water companies are required to prepare, with updates every five years. In reality, water companies prepare internal updates more regularly. WRMPs are required to assess:

- Future demand (due to population and economic growth).
- Future water availability (including the impact of sustainability reductions).
- Demand management and supply-side measures (e.g., water efficiency and leakage reduction, water transfers and new resource development).
- How the company will address changes to abstraction licences.
- How the impacts of climate change will be mitigated.
- Where necessary, they set out the requirements for developing additional water resources to meet growing demand and describe how the balance between water supply and demand will be balanced over the period 2015 to 2040.
- Using cost-effective demand management, transfer, trading and resource development schemes to meet growth in demand from new development and to restore abstraction to sustainable levels.
- In the medium to long term, ensuring that sufficient water continues to be available for growth and that the supply systems are flexible enough to adapt to climate change.

There are three main water companies operating within the SDNP, and the locations of their published WRMP are listed below (accessed September 2024):

- Portsmouth Water Final WRMP 2024
- South East Water WRMP 2025-2075
- Southern Water Revised Draft WRMP 2024

The WRMPs have been reviewed in detail for the study area in Section 4.3.

3.5.3.2 Drought Plan

Linked to the WRMP is a water company's drought plan. This is a requirement under the Water Industry Act 1991 (as amended by the Water Act 2003). A water company must state how it will maintain a secure water supply and protect the environment during dry weather and drought. The plan will contain:

- Drought triggers - these are points where a water company will take action to manage supply and demand. They are based on monitoring of rainfall levels, river flows, groundwater levels and reservoir stocks.
- Demand management actions - how a water company will reduce demand for water during a drought. Actions that save water before taking more water from the environment must be prioritised. These could include:
    - reducing leakage;
    - carrying out water efficiency campaigns with customers;
    - reducing mains pressure; and
    - restricting water use, for example through temporary use bans which limit hosepipe and sprinkler use.
- Supply management actions - how a water company will maintain water supply during a drought. Actions that have the least effect on the environment must be prioritised. This could include:
    - carrying out engineering work to improve its supply;
    - transferring water in bulk from other water companies;
    - using drought permits and drought orders to abstract more water;
    - using desalination - permanent or temporary plants; and
    - using tankers to supply customers with water directly.
- Extreme drought management actions - the actions it could take in an extreme drought. These could delay the need to use emergency restrictions standpipes and rota cuts.
- Communicating during a drought - a water company must set out how it will communicate in a clear and timely way during a drought with customers, partners or other stakeholders.
- Environmental assessment, monitoring and mitigation. A drought plan must include:
    - an environmental assessment;
    - an environmental monitoring plan for each supply management action; and
    - details of mitigation measures the company plans to take for each supply management action.
- End of a drought - a water company must explain how it will identify when a drought is over or ending and the actions it will take during this stage, communicate this information to customers, and review its performance.

South East Water's Drought Plan (2022-2027) is available from their website.

The Environment Agency is currently undertaking two consultations relating to Drought Plans. These are:

- Proposed changes to the water company drought plan guideline - Environment Agency - Citizen Space (closes 26 Jan 2025)

- Drought: how it is managed in England - Environment Agency - Citizen Space (closes 10 Jan 2025)

3.5.3.3 Regional water resource planning

Water resource planning is taking an increasingly regional focus, recognising the need for collaboration between water companies and sectors in order to address the challenges of climate change, increasing demand for water and protecting the water environment. Five regional groupings have been formed, including the Water Resources South East (WRSE) group which covers the SDNPA. An advisory group consisting of their regulators (Environment Agency and OfWAT) and Defra regularly attend meetings of WRSE.

WRSE have prepared a regional water resource plan for publication in 2023, which in turn will inform the next round of company WRMPs to be published in 2024. As part of this process, they have published an initial water resource position statement which sets out the water resources challenges and opportunities within the region.

3.5.4 Planning for Wastewater

3.5.4.1 21st Century Drainage

The UK Water Industry Research (UKWIR) “21st Century Drainage” programme has brought together water companies, governments, regulators, local authorities, academics, and environmental groups to consider how planning can help to address the challenges of managing drainage in the future. These challenges include climate change, population growth, urban creep and meeting the Water Framework Directive.

The group recognised that great progress has been made by the water industry in its drainage and wastewater planning over the last few decades, but that, in the future, there needs to be greater transparency and consistency of long-term planning. The Drainage and Wastewater Management Plan (DWMP) framework (Water UK, 2018) sets out how the industry intends to approach these goals. Companies were required to published finalised DWMPs in 2023 to inform their business plans for the 2024 Price Review.

3.5.4.2 Drainage and Wastewater Management Plans (DWMPs)

DWMPs are consistently structured plans delivered at three spatial scales: company-wide, regional groupings and individual wastewater catchments. The framework defines drainage to include all organisations and all assets which have a role to play in drainage, although, as the plans will be water company led, it does not seek to address broader surface water management within catchments.

LPAs and LLFAs are recognised as key stakeholders and are invited to join, alongside other stakeholders, the Strategic Planning Groups (SPGs) organised broadly along river basin district catchments.

DWMPs aim to provide more transparent and consistent information on sewer flooding risks and the capacity of sewerage networks and treatment works, and this should be taken into

account in SFRAs, Water Cycle Studies, as well as in site-specific FRAs and Drainage Strategies.

There are two sewage undertakers operating within the SDNP, and the hyperlinks to their final DWMPs, including mapping, are listed below (accessed October 2023):

- Southern Water DWMP.
- Thames Water DWMP.

The WRMPs have been reviewed in detail for the study area in Section 4.

3.5.5 Developer Contributions and connection charges

A significant part of water company business is the interface with developers to facilitate connection to the public water supply and sewerage systems, through their developer services functions. Developments with planning permission have a right to connect to the public water and sewerage systems, however, there is no guarantee that the capacity exists to serve a development.

Developers may requisition a water supply connection or sewerage system or self-build the assets and offer these for adoption by the water company or sewerage undertaker. Self-build and adoption are usually practiced for assets within the site boundary, whereas requisitions are normally used where an extension of upgrading the infrastructure requires construction on third party land. The cost of requisitions is shared between the water company and developer as defined in the Water Industry Act 1991.

The above arrangements are third party transactions because the Town and Country Planning Act Section 106 agreements and Community Infrastructure Levy agreements may not be used to obtain funding for water or wastewater infrastructure.

OfWAT, the water industry's economic regulator, published revised rules covering how water and wastewater companies may charge customers for new connections (OfWAT, 2020). These rules have applied to all companies in England since April 2018. The key changes include:

- More charges will be fixed and published on water company websites. This will provide greater transparency to developers and will also allow alternative connection providers to offer competitive quotations more easily.
- There will be a fixed infrastructure charge for water and one for wastewater.
- The costs of network reinforcement will no longer be charged directly to the developer in their connection charges. Instead, the combined costs of all of the works required on a company's networks, over a five-year rolling period, will be covered by the infrastructure charges paid for all new connections.
- The definition of network reinforcement has changed and will now apply only to works required as a direct consequence of the increased demand due to a development. Where the water company has not been notified of a specific development, for example when developing long-term strategic growth schemes, the expenditure cannot be recovered through infrastructure charges.

Water companies publish their charging arrangement annually. The relevant charging arrangements for water companies within the SDNP include:

- Portsmouth Water charging arrangements.
- South East Water charging arrangements.
- Southern Water charging arrangements.

These charging arrangements incorporate incentives to encourage good design by developers. Charging arrangements for the 2023/24 period include:

- Portsmouth Water offers a discount for evidence of new developments achieving an estimated usage of 100 litres per person per day.

- South East Water offers a discount for smaller diameter connections (20mm instead of 25mm) and is currently reviewing alternative water efficiency incentive methods.
- Southern Water offer discounts on new connection charges for developers that commit to water efficiency through the installation of water efficient devices, rainwater harvesting, grey water recycling, other water reuse technologies and water neutrality.

3.5.6 Water companies and the planning system

Water companies are currently not statutory consultees to planning applications, although they do monitor planning applications and respond to potentially significant applications, or where requested to do so by the LPA. Defra are intending to consult on making water companies statutory consultees for some applications (Department for Environment, Food & Rural Affairs, 2023).

Where a water company is concerned that a new development may impact upon their service to customers or the environment (for example by causing foul sewer flooding or pollution) they may request the LPA to impose a Grampian condition, whereby the planning permission cannot be implemented until a third-party secures the necessary upgrading or contributions.

3.6 Flood Risk and Surface Water

3.6.1 Flood and Water Management Act 2010

The Flood and Water Management Act (FWMA) aims to improve both flood risk management and the way water resources are managed (HM Government, 2010).

The FWMA has created clearer roles and responsibilities and helped to define a more risk-based approach to dealing with flooding. This included the creation of a lead role for LAs, as LLFAs, designed to manage local flood risk (from surface water, ground water and ordinary watercourses) and to provide a strategic overview role of all flood risk for the EA.

The content and implications of the FWMA provide considerable opportunities for improved and integrated land use planning and flood risk management by LAs and other key partners. The integration and synergy of strategies and plans at national, regional, and local scales, is increasingly important to protect vulnerable communities and deliver sustainable regeneration and growth.

Schedule 3 of the Act has not been enacted in England, at the tie of writing (October 2024) the Labour Government elected in July 2024 has not made any announcements on if or when it intends to implement Schedule 3 in England. The enactment of schedule 3 will have the following implications for the planning process:

- Designation of local authorities as SuDS Approval Bodies (SAB) which have a duty to adopt new drainage systems.

- The cessation of the automatic right for new developments to connect to the existing sewer system.
- Developers must ensure that drainage systems are built as per the approved drainage plan that complied with mandatory national standards as outlined in the NPPF and the PPG.

3.6.2 Local Flood Risk Management Strategy (LFRMS)

Local Flood Risk Management Strategies set out how Lead Local Flood Authorities (LLFA) will manage local flood risk from surface water runoff, groundwater and ordinary watercourses, for which they have a responsibility as LLFA. They also set out the work that other Risk Management Authorities are doing to manage flood risk within the area. SNDPA is covered by four LLFAs. The LLFAs and their Local Flood Risk Management Strategies are provided in the below in Table 3-2.

Table 3-2 SNDPA's Lead Local Authorities and their Local Flood Risk Management Strategy's objectives

Lead Local Flood Authority	Local Flood Risk Management Strategy objectives
East Sussex County Council	• Establish and maintain effective partnerships with key organisations and local communities in order to develop collective knowledge, share best practice and secure funding for local flood risk management measures. • Improve the evidence based and understanding of flood to ensure that limited resources are targeted in the areas of highest risk and vulnerability • Empower local communities and landowners to take action in order to be prepared for and limit the impacts of flooding • Avoid increasing flood and coastal erosion risk by encouraging best practice for the maintenance of assets and preventing inappropriate development • Work in partnership to deliver cost-effective flood and coastal erosion risk management measures which take a catchment wide approach and contribute to wider social, economic and environmental benefits.

Lead Local Flood Authority	Local Flood Risk Management Strategy objectives
West Sussex County Council	• Understand the areas that flood • Manage the flood Risk in West Sussex • Enable people, communities, business and public bodies to work together more effectively • Put communities at the heart of what we do and help West Sussex residents during flood events, and recover as quickly as possible after incidents
Brighton & Hove City Council	• Work with Partners, Stakeholders and Local Community Groups to understand and manage flood risk • Continue to improve Brighton & Hove City Council's knowledge and evidence base of local flood risk • Raise public awareness and resilience to flooding • Manage development impact on flood risk through land allocation and development control policy • Work with Partners and Funders to implement sustainable measures to reduce flood risk • Undertake annual inspection, maintenance and improvement, where necessary, of flood defence assets • Work with Partners and Funders to implement sustainable public health protection measures • Ensure that likely environmental effects of implementing the Strategy are considered and understood and any potentially adverse effects are avoided, reduced or minimised.
Hampshire County Council	• Avoiding risks and managing water resources through effective planning and design • Preventing future flooding by reducing or removing existing risks; • Adapting to flood risk in order to minimise the impact and enable normal life to return as soon as possible • Enabling communities to be better prepared to react to flood events and recover more easily • Adopting effective practices that are sustainable and affordable now and in the future.

3.6.3 Strategic Flood Risk Assessment (SFRA)

All LPAs are required, under NPPF, to prepare a SFRA, which forms a key part of the evidence base for their Local Plan. The SFRA must consider flood risks from all sources, collating up-to-date flood risk data and in some cases developing new flood risk modelling. The SFRA is used to inform the Sequential Test, by which Local Plan allocations should be sequentially selected to direct development towards areas of lower flood risk, taking into consideration the vulnerability to flooding of the proposed land use. The SDNPA Level 1 Update and Level 2 SFRA was published in 2017. JBA consulting has prepared a new SFRA for the SDNPA.

3.6.4 Shoreline Management Plan

Shoreline Management Plans (SMPs) help to deliver the ambitions of the National Flood and Coastal Erosion Risk Management Strategy. They set out a planned approach to managing flood and coastal erosion risk around the coast of England to 2105.
All SMPs apply a management approach for each section or 'unit' of the coast through this century. They have been developed by coastal groups in consultation with local communities. They are based on the best available evidence on how the coast is changing and what may be at risk from flooding or erosion now and in the future.

The management approaches are:

- hold the line - maintain or upgrade protection from flooding or erosion by holding the shoreline in broadly the same position
- no active intervention - maintain or encourage a more natural coastline, which may involve discussing adaptation to the risk from flooding or erosion
- managed realignment - change the position of the shoreline in a controlled way, such as by slowing erosion or creating areas of habitat to help manage flooding
- advance the line - actively move shoreline defences significantly seawards

A small part of the SDNPA area is located along the coastline. This area is within the Solent and South Downs Environment Agency area and has management approaches of hold the line and no active intervention.

3.6.5 Surface Water Management Plan

Surface Water Management Plans (SWMPs) outline the preferred surface water management strategy in a given location and establish a long-term action plan to manage surface water. SWMPs are undertaken, when required, by LLFAs in consultation with key local partners who are responsible for surface water management and drainage in their area.

SWMPs are available for the SDNP for the following areas across the four LLFAs, which are listed in Table 3-2:

- East Sussex County Council Lewes Stage 1 SWMP (2017).
- West Sussex County Council Eastbourne SWMP (2015).
- West Sussex County Council Upper Lavant Valley SWMP (2015).

Hampshire County Council have superseded their SWMPs in favour of Catchment Management Plans (CMPs). These assess flood risk from all sources for 18 river catchments within Hampshire. The following CMPs are available for the SDNP for the following areas:

- Hampshire County Council Hamble CMP (2023).
- Hampshire County Council Itchen CMP (2023).
- Hampshire County Council Lavant CMP (2023).
- Hampshire County Council Meon and Wallington CMP (2023).
- Hampshire County Council Rother CMP (2023).
- Hampshire County Council Wey Eastern CMP (2023).
- Hampshire County Council Wey Western CMP (2023).

3.6.6 Sustainable Drainage Systems

From April 2015, Local Planning Authorities (LPA) have been given the responsibility for ensuring that sustainable drainage is implemented on developments of ten or more homes or other forms of major development through the planning system. Under the new arrangements, the key policy and standards relating to the application of SuDS to new developments are:

- The National Planning Policy Framework, which requires that development in areas already at risk of flooding should give priority to sustainable drainage systems.
- The House of Commons written statement (Pickles, 2014) setting out governments intentions that LPAs should “ensure that sustainable drainage systems for the management of run-off are put in place, unless demonstrated to be inappropriate” and “clear arrangements in place for ongoing maintenance over the lifetime of the development.” This requirement is also now incorporated in the 2019 update of the NPPF (paragraph 165). In practice, this has been implemented by making Lead Local Flood Authorities (LLFAs) statutory consultees on the drainage arrangements of major developments.
- The Defra non-statutory technical standards for sustainable drainage systems (HM Government, 2015c). These set out the government’s high-level requirements for managing peak flows and runoff volumes, flood risk from drainage systems and the structural integrity and construction of SuDS. This very short document is not a design manual and makes no reference to the other benefits of SuDS, for example water quality, habitat, and amenity.

LLFAs play a key role in ensuring that the proposed drainage schemes for all new developments comply with technical standards and policies in relation to SuDS. Further information on surface water drainage for each LLFA that cover the SDNPA can be found below:

- Brighton and Hove City Council SuDS guidance.
- East Sussex County Council SuDS guidance.

- Hampshire County Council SuDS guidance.
- West Sussex County Council SuDS guidance.

An updated version of the CIRIA SuDS Manual was published in 2015. The guidance covers the planning, design, construction and maintenance of SuDS for effective implementation within both new and existing developments. The guidance is relevant for a range of roles with the level of technical detail increasing throughout the manual. The guidance does not include detailed information on planning requirements, SuDS approval and adoption processes and standards, as these vary by region and should be checked early in the planning process. The manual itself can be found here.

CIRIA also publish “Guidance on the Construction of SuDS” (C768), which contains detailed guidance on all aspects of SuDS construction, with specific information on each SuDS component available as a downloadable chapter. The downloadable chapter is available here.

Water companies provide guidance on SuDS and surface water management, as detailed below:

- Portsmouth Water provides considerations for SuDS design in its Design and Construction Specification for Portsmouth Water Ltd (2020).
- South East Water advise the relevant foul water supplier is contacted regarding SuDS design and construction.
- Southern Water have produced outline guidance for SuDS.

3.6.7 Design and Construction Guidance

The Design and Construction Guidance (DCG), part of a new Codes for Adoption covering the adoption of new water and wastewater infrastructure by water companies, contains details of the water sector’s approach to the adoption of SuDS, which meet the legal definition of a sewer. This replaces the formerly voluntary Sewers for Adoption The new guidance came into force in April 2020 and compliance by water companies in England is mandatory.

The previous standards, up to and including Sewers for Adoption Version 7, included a narrow definition of sewers to mean below-ground systems comprising of gravity sewers and manholes, pumping stations and rising mains. This essentially excluded the adoption of SuDS by water companies, except for below-ground storage comprising of oversized pipes or chambers.

The new guidance provides a mechanism for water companies to secure the adoption of a wide range of SuDS components which are now compliant with the legal definition of a sewer. There are however several non- adoptable components such as green roofs, pervious pavements, and filter strips. These components may still form part of a drainage design so long as they remain upstream of the adoptable components.

The Design and Construction Guidance states that the drainage layout of a new development should be considered at the earliest stages of design. It is hoped that the new

guidance will lead to better managed and more integrated surface water systems which incorporate amenity, biodiversity, and water quality benefits.

3.7 Environmental Protection and Biodiversity

3.7.1 The Environment Act 2021

The Environment Act (HM Government, 2021) came into UK law in November 2021 with the aim of protecting and enhancing the environment. The Act has objectives to improve air and water quality, biodiversity, waste reduction and resource efficiency. The implementation of the policies within the Environment Act has begun and legally binding environmental targets are being developed. This will be enforced by the newly created Office for Environmental Protection (OEP, more information available here).

The Environment Act (Part 5) contains policies concerning improvements to the water environment. These policies have the following aims:

- Effective collaboration between water companies through statutory water management plans.
- Minimise the damage that water abstraction may cause on environment.
- Modernise the process for modifying water and sewerage company licence conditions.

Further to this, there is specific legislation regarding storm overflows aiming to reduce the discharge of untreated sewage into waterways. This plan includes requirements for water companies to:

- report on the discharges from storm overflows;
- monitor the quality of water potentially affected by discharges;
- progressively reduce the harm caused by storm overflows; and
- report on elimination of discharges from storm overflows.

3.7.2 25-year Environment Plan

The Environmental Improvement Plan (EIP) is the first revision of the 25-year environment plan (25YEP) published in 2018. It contains ten goals which are shown in Figure 3.1. The full text of the EIP can be found here. Government must review and revise the plan, if needed, every five years to ensure continued progress against the ten 25YEP goals.

Of particular importance to a WCS is Goal 3 - Clean and plentiful water.

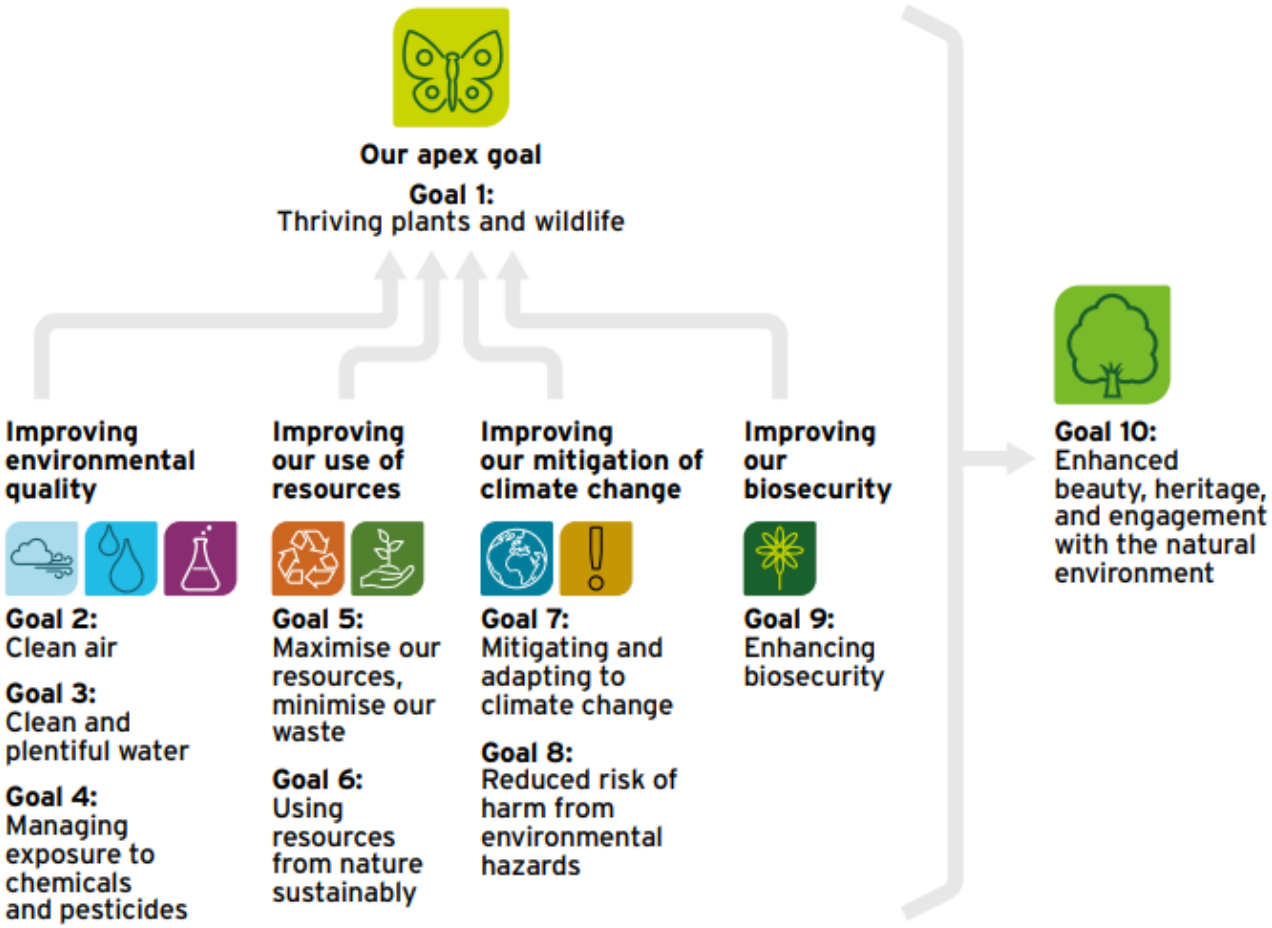


Figure 3.1 The 10 Environmental Improvement Plan goals

Under Goal 3 - Clean and plentiful water, there are eight sets of targets and commitments relating to different aspects of the water environment:

- Reduce nitrogen, phosphorus, and sediment pollution from agriculture into the water environment by at least 40% by 2038, compared to a 2018 baseline, with an interim target of 10% by 31 January 2028, and 15% in catchment containing protected sites in unfavourable condition due to nutrient pollution by 2028.
- Reduce phosphorus loadings from treated wastewater by 50% by 2028 and 80% by 2038 against a 2020 baseline.
- Halve the length of rivers polluted by harmful metals from abandoned mines by 2038, against a baseline of around 1,500km (approximately 930 miles)

- Reduce the use of public water supply in England per head of population by 20% from the 2019-20 baseline, 2038, with interim targets of 9% by 2027 and 14% by 2032, and to reduce leakage by 20% 2027 and 30% by 2032.
- Restore 75% of our water bodies to good ecological status.
- Water companies to cut leaks by 50% by 2050. Leakage will be cut by 20% by 2027 and 30% by 2032.
- Require water companies to have eliminated all adverse ecological impact from sewage discharges at all sensitive sites by 2035, and at all overflows by 2050.
- Target a level of resilience to drought so that emergency measures are needed only once in 500-years."

To deliver these goals, the EIP outlines action across these areas:

- Ensure water companies are delivering on our targets and commitments through enhanced transparency and monitoring mechanisms in the Environment act, targeted enforcement from regulators and increasing the maximum fines.
- Direct water company fines relating to environmental breaches to improving the water environment.
- Crack down on sewage pollution by holding water companies to account for delivering the targets set out in the Storm Overflows Discharge Reduction Plan.
- Require water companies to upgrade 160 of their wastewater treatment works to meet the strictest phosphorus limits by 2028, and upgrade a further 400 by 2038, to reduce harmful nutrient pollution from wastewater.
- Reduce agricultural pollution across England by paying farmers to protect and enhance watercourses through new farming schemes, and investing in improved slurry storage and management through our grants, providing advice to farmers to improve their practices through the expanded Catchment Sensitive Farming partnership scheme, and ensuring farmers are meeting legal standards of responsible farming through our expanded and targeted farm visits programme.
- Increase our resilience to drought by working with regulators and water companies to reduce household and non-household water use, and ensuring water companies are delivering a 50% reduction in leakage by 2050.
- Roll out new water efficiency labelling and deliver our ten actions in the Roadmap to Water Efficiency in new developments.
- Deliver a ten-fold increase in the Water and Abandoned Metal Mines programme, upscaling the existing three treatment schemes with 40 more by 2038, to tackle harmful pollutants from abandoned metal mines.
- Protect our chalk streams by supporting the Chalk Stream Strategy.
- Make Sustainable Drainage Systems mandatory in new developments subject to final decisions, following consultation, on scope, threshold and process.

Progress towards delivering the EIP will be monitored annually.

3.7.3 Defra Plan for Water

Defra's Plan for Water (Department for Environment, Food & Rural Affairs, 2023) provides further detail on the actions towards achieving Goal 3 of the EIP23. It promotes an integrated approach to water management as the foundation of the plan. Whilst many of the actions contained within the Plan for Water are outside of the responsibilities of areas of influence of the LPAs, the following summarises those actions that LPAs should have regard to:

- Require standardised sustainable drainage systems (SuDS) in new housing developments in 2024, subject to final decisions on scope, threshold, and process following consultation in 2023.
- Designate all chalk catchments as water stressed and high priority under the sewer overflows reduction plan, driving action to improve water management.
- The plan reflects the predicted 4 billion litre per day (4,000 ml/d) gap between supply and demand across England and contains measures to both boost supply and reduce demand. Of interest to LPAs is the plan to reduce demand which will address half of the gap.
- A key component in reducing demand for water is improving water efficiency and there is a target under the Environment Act to reduce the use of public water supply in England per head of population by 20% by 2038.A road map on water efficiency in new developments and retrofits has been developed with ten actions to improve water efficiency:
    - **Action 1 -** Implement schedule 3 to the Flood and Water Management Act 2010. The 2024 consultation will consider rainwater harvesting in developing the statutory SuDS National Technical Standards.
    - **Action 2 -** Review the Water Supply (Water Fittings) Regulations 1999, the Water Supply (Water Quality) Regulations 2016 and/or any other relevant legislation to address wasteful product issues with toilets and enable new water efficient technologies.
    - **Action 3 –** Develop clear guidance on ‘water positive’ or ’net zero water’ developments and roles for developers and water companies.
    - **Action 4 –** Review water efficiency options in planning, building regulations and through voluntary schemes for non-household buildings.
    - **Action 5 –** Work with OfWAT to ensure the water industry can play a central role in retrofitting water efficient products in households, businesses, charities and the public sector.
    - **Action 6 –** Work across government to integrate water efficiency into energy efficiency advice and retrofit programmes.
    - **Action 7 -** Review the Building Regulations 2010, and the water efficiency, water reuse and drainage standards including considering a new standard for new homes in England of 105l/p/d and 100 l/p/d where there is a clear local need.
    - **Action 8 –**Mandatory water efficiency labelling scheme.

- **Action 9 –** Investigate dual pipe systems (rainwater harvesting) and water reuse options for new housing development as part of the review of the planning framework.
- **Action 10 –** Enable innovative water efficiency approaches in buildings, including technologies and approaches to funding and maintenance.

3.7.4 Biodiversity Net Gain

Biodiversity net gain (BNG) is designed to contribute to the recovery of nature while developing land. The principle is that the natural environment is in measurably better state after development than it was before. The Environment Act 2021 requires all planning permissions granted in England (except for small sites) to achieve 10% BNG after January 2024. This is now required on small sites as of April 2024.

Defra publishes a biodiversity metric tool, the latest version of which must be used for calculating the BNG deriving from a proposed development.

3.7.5 Local Nature Recovery Strategy

The Environment Act (HM Government, 2021) also established a duty to prepare, by March 2025, Local Nature Recovery Strategies (LNRS), recognising that England is one of the most nature-depleted countries in the world. East Sussex County Council, West Sussex County Council, and Hampshire County Council are the authority responsible for preparing the LNRS in the study area. They are tasked with working with local partners to agree priorities for nature recover and identify "practical, achievable proposals" (Department for Environment Food & Rural Affairs, 2023) to address these priorities. The LNRS should also co-ordinate with neighbouring strategies to form a national Nature Recovery Network.

There is a close linkage with BNG, as developments proposing to create, enhance or recover habitat in locations mapped by the LNRS receive a higher value in the biodiversity metric calculator than in other locations.

3.7.6 Storm Overflow Reduction Plan

The Environment Act placed a legal duty on water companies to progressively reduce the adverse impacts of discharges from storm overflows. The storm overflow reduction plan (Department for Environment, Food & Rural Affairs, 2023) sets the following targets:

- By 2035, water companies will have: improved all overflows discharging into or near every designated bating water; and improved 75% of overflows discharging to high priority sites.
- By 2050, no storm overflows will be permitted to operate outside of unusually heavy rainfall or to cause any adverse ecological harm.

There is also an expectation that water companies ensure their infrastructure keeps pace with increasing external pressures, such as urban growth and climate change, without these pressures leading to greater numbers of discharges.

3.7.7 The Water Framework Directive (WFD) and Water Environment Regulations

3.7.7.1 Introduction

The European Union Water Framework Directive (WFD) 2000 is currently transposed into English and Welsh law by the Water Environment Regulations (HM Government, 2017). They apply to all waterbodies (watercourses, canals, lakes, estuaries and coastal waters), with the objective of meeting Good Ecological Status (GES) or, where heavily modified, Good Ecological Potential (GEP) To meet GES or GEP, a water body must achieve a good or high score for all elements - in the case of surface water, these are biological, physico-chemical, specific pollutants and hydromorphology (Figure 3.2). UK policy remains to meet GES or GEP for all waterbodies by 2027.

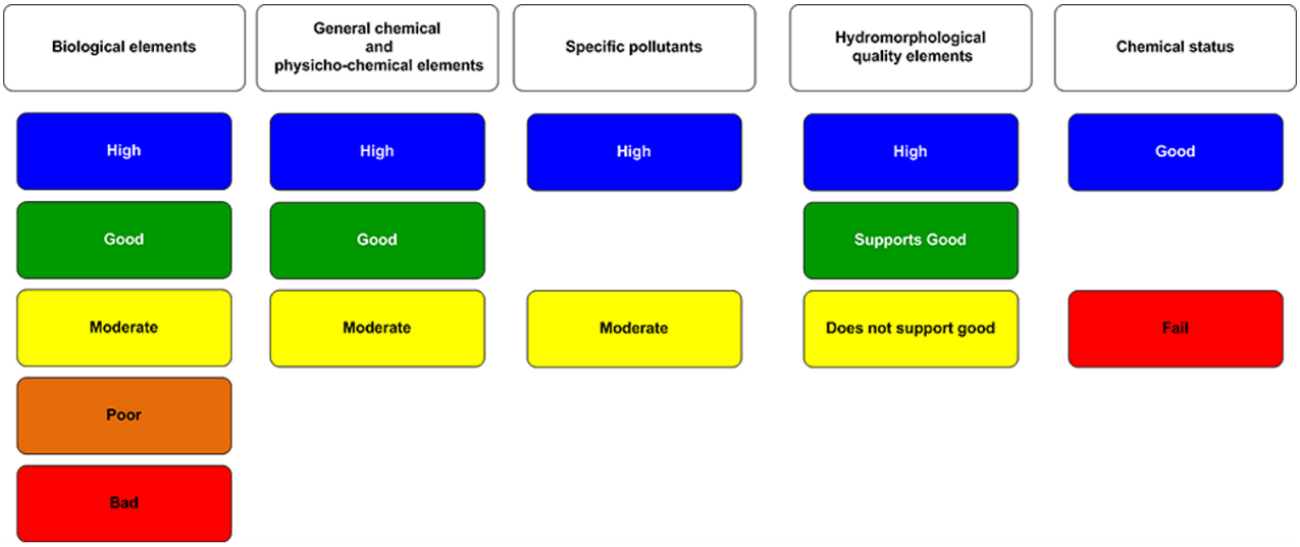


Figure 3.2: Status classification for surface water (Environment Agency, 2023a)

Chemical Status is separately assessed. The Water Framework Directive and the EA recognise a group of ubiquitous chemicals which are persistent, bioaccumulative or toxic (uPBT), and without which over 90% of England's waterbodies would achieve Good Chemical Status. Mercury, Perfluorooctanesulfonic acid (PFOS) and persistent brominated diphenyl ethers (PBDE) are the most ubiquitous causes of failures. Due to the persistent nature of these chemicals, the date for getting all waterbodies to Good Chemical Status is set for 2063.

3.7.7.2 River Basin Management Plans

River Basin Management Plans (RBMP) are required under the WFD and document the baseline classification of each waterbody in the plan area, the objectives, and a programme of measures to achieve those objectives. The SDNP falls within the South East RBD. The third cycle RBMPs were published in 2022. A primary WFD objective is to ensure 'no deterioration' in environmental status, therefore all water bodies must meet the class limits for their status class as declared in the South East River Basin Management Plan. Another equally important objective requires all water bodies to achieve good ecological status. Future development needs to be planned carefully so that it helps towards achieving the WFD and does not result in further pressure on the water environment and compromise WFD objectives. The WFD objectives as outlined in the updated RBMPs are summarised below:

- Preventing deterioration of the status of surface waters and groundwater.
- Achieving objectives and standards for protected areas.
- Aiming to achieve good status for all water bodies.
- Reversing any significant and sustained upward trends in pollutant concentrations in groundwater.
- Cessation of discharges, emissions and losses of priority hazardous substances into surface waters.
- Progressively reducing the pollution of groundwater and preventing or limiting the entry of pollutants.
- Local Planning Authorities (LPAs) must have regard to the Water Framework Directive as implemented in the RBMPs. It is of primary importance when assessing the impact of additional wastewater flows on local river quality.
- Alongside the RBMP documents, the data behind them can be explored further using the Catchment Data Explorer (Environment Agency, 2023a) and map viewer (Environment Agency, 2023b).

3.7.7.3 Protected Area Objectives

The Water Environment Regulations specify that areas requiring special protection under other European Commission Directives, and waters used for the abstraction of drinking water, are identified as protected areas. These areas have their own objectives and standards.

Some areas may require special protection under more than one piece of EU-derived legislation or may have additional (surface water and/or groundwater) objectives. In these cases, all the objectives and standards must be met.

The types of protected areas are:

- Areas designated for the abstraction of water for human consumption (Drinking Water Protected Areas);
- areas designated for the protection of economically significant aquatic species (Freshwater Fish and Shellfish);

- bodies of water designated as recreational waters, including Bathing Waters;
- nutrient-sensitive areas, including areas identified as Nitrate Vulnerable Zones (NVZs) under the Nitrates Directive or areas designated as sensitive under Urban Waste Water Treatment Regulations; and
- areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection including relevant Natura 2000 sites.

3.7.8 Conservation of Habitats Regulations 2017 (as amended)

The Conservation of Habitats and Species Regulations 2010 (commonly referred to as the Habitats Regulations) consolidated the Conservation (Natural Habitats, &c.) Regulations 1994, and transposed the EU Habitats Directive in England and Wales which was aimed at protecting plants, animals and habitats that make up the natural environment. The regulations were further amended in 2017.

The Habitats Regulations define the requirement for a Habitats Regulations Assessment (HRA) to be carried out. The purpose of this is to determine if a plan or project may affect the protected features of a “habitats site”. These include:

- A special area of conservation (SAC).
- A site of Community Importance.
- A site hosting a priority natural habitat type or priority species protected in accordance with Article 5(4) of the Habitats Directive.
- A Special Protection Area (SPA).
- A potential SPA.

All plans and projects (including planning applications) which are not directly connected with, or necessary for the conservation management of a habitat site require consideration of whether the plan or project is likely to have significant effects on that site.

This is referred to as the “Habitats Regulations Assessment screening” and should take into account the potential effects of both the plan/project itself and in combination with other plans or projects.

Part 6 of the conservation of Habitats and Species Regulations 2017 states that where the potential for likely significant effects cannot be excluded, a competent authority must make an appropriate assessment of the implications of the plan or project for that site, in view of the site’s conservation objectives.

The competent authority may agree to the plan or project only after having ruled out adverse effects on the integrity of the habitats site.

If adverse effects cannot be rules out, and where there are no alternative solutions, the plan or project can only proceed if there are imperative reasons of over-riding public interest and if the necessary compensatory measures can be secured.

The “People over Wind” ECJ ruling (C-323/17) clarifies that when making screening decisions for the purposes of deciding whether an appropriate assessment is required,

competent authorities cannot take into account any mitigation measures. This must be part of the appropriate assessment itself.

The implementation of the Conservation of Habitats Regulations have had particular significant implications in two areas related to water and planning:

- Nutrient Neutrality. Natural England (NE) has identified a number of catchment areas where Habitats Sites are in unfavourable condition due to eutrophication (an excess of the nutrients phosphorous and/or nitrogen in water). NE have advised that developments in these catchments must demonstrate that they do not cause harm, and that one way to do this is to introduce mitigation measures in the catchment area which offset the additional nutrients emitted as a result of the development, an approach known as nutrient neutrality. The Solent Catchment (East Hampshire and Chichester Catchment) (for nitrates) and River Itchen Catchment (for nitrates and phosphates) nutrient neutrality areas lie partially within the study area. This issue is further considered in Section 8.
- Water Neutrality. Natural England (NE) has issued a position statement that it cannot be concluded with sufficient certainty that groundwater abstractions in the Arun Valley, West Sussex are causing no adverse effect on Habitats Sites. NE have advised that developments in Sussex North Water Resource Zone must demonstrate that they do not cause harm, and that one way to do this is to introduce mitigation measures in the zone which offset the additional water consumed as a result of the development, an approach known as water neutrality. The Sussex North water resource zone partially covers the study area. This issue is further considered in section 4.8.

Both nutrient and water neutrality designations have resulted in significant impacts on the granting of planning permission in the designated areas.

3.7.9 Wildlife and Countryside Act

Sites of Special Scientific Interest (SSSI) are designated and legally protected under the Wildlife and Countryside Act 1981, Section 28G places a duty to take reasonable steps, consistent with the proper exercise of the authority's functions, to "further to the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which the site is of special scientific interest." (HM Government, 1981).

The Government's 25-year Environment Plan has a target of "restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term." In line with this, and the Wildlife and Countryside Act 1981, Local Authorities should look put forward options that contribute to conservation or restoration of favourable condition, and at the very least must not introduce policies that hinder the restoration of favourable condition by increasing existing issues.

A site is said to be in "favourable condition" when the designated feature(s) within a unit are being adequately conserved and the results from monitoring demonstrate that the feature(s)

in the unit are meeting all the mandatory site-specific monitoring targets set out in the favourable condition targets (FCT).

3.7.10 Ramsar

The Convention on Wetlands of International Importance, more commonly known as the Ramsar convention, aims to protect important wetland sites. Member counties commit to:

- Wise use of all their wetlands.
- Designating sites for the Ramsar list of “Wetlands of International Importance” (Ramsar Sites) and their conservation.
- Cooperating on transboundary wetlands and other shared interests.
- “Wise use” of wetlands is defined under the convention as “the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development”. (Ramsar Convention Secretariat, 2010)
- In the UK, Ramsar Sites are designated by the Joint Nature Conservation Committee (JNCC).

In general, the designation of UK Ramsar sites is underpinned through prior notification of these areas as Sites of Special Scientific Interest (SSSIs). Additionally, the NPPF states that Ramsar sites should be given the same protection in the planning process as sites designated under the EU Habitats Directive.

3.7.11 Bathing Water Regulations

The Bathing Water Directive was first published in 2006 and are currently transposed into English and Welsh law through the Bathing Water Regulations 2013. The aims of the directive are the protection of public health whilst bathing, standardisation of publicly available water quality information and to improve management practices at bathing waters.

The UK has over 600 designated bathing waters defined as areas of inshore waters designated for public swimming, these areas are typically characterised by large numbers of swimmers and visitors per year. The Environment Agency are required to monitor water quality at these sites regularly (usually weekly) throughout the Bathing Water season, between 15th May and 30th September.

Water quality standards are based on the incidence of potentially harmful bacteria, E. coli and intestinal enterococci and are categorised as ‘excellent’, ‘good’, ‘sufficient’ or ‘poor’ on the basis of bacteria levels. Sites are rated annually and on a short-term basis in response to any temporary pollution incidents.

Achieving compliance with the Bathing Water Directive has driven some £2.5bn of investment by UK water companies since the early 1990s to reduce the impact of sewerage systems and treated wastewater discharges. Measures have included storage and surface water management to reduce storm overflow spills, moving or extending effluent outfalls and improving wastewater treatment, including ultra-violet (UV) treatment of final effluent.

In contrast to some other European nations, the UK has not previously designated stretches of river as bathing waters, however there are now 36 inland bathing waters designated in England since 2021, and across England there are numerous campaigns by NGOs and members of the public to designate other stretches of river. Defra has published guidance on applying for bathing water status, including a requirement for at least 100 bathers per day during the season (Department for the Environment, Food and Rural Affairs, 2023).

3.7.12 Environmental Permitting Regulations

Environmental permitting is a process used to manage and regulate activities which may cause harm to the environment. The Environmental Permitting Regulations (HM Government, 2016) were introduced in order to streamline a wide-ranging number of environmental permitting laws under one set of regulations. These include permits for emissions to air, water and land, and cover a range of industrial sectors and waste management streams.

Of particular relevance to this study are the regulations for permitting sewage effluent discharges to surface waters and groundwaters, known as water discharge activities (Environment Agency, 2022).

- The regulations are used to permit discharges from water company and private wastewater treatment works, and for sewer overflows.
- The Environment Agency will usually object to applications for a new private Package Treatment Plan (PTP) or septic tank where it is feasible to connect the development to a public sewerage system. A general rule of 30m per dwelling is used to define a reasonable distance from the site boundary to a public sewer. Hence a development of 10 homes should connect to a public sewer within 300m of the boundary, unless there are significant barriers, such as a river or motorway.
- Where an existing or new development treats its own wastewater, a PTP must be installed if the discharge is directly to surface water. Where the discharge is to ground, a PTP or septic tank may be used, but must be connected to a suitably designed drainage field. A drainage field should meet the definition in BS6297:2007 (+ A1:2008). More information can be found via the gov.uk website – https://www.gov.uk/guidance/infiltration-systems-groundwater-riskassessments

3.7.13 Groundwater protection

Under the regulations, the EA have published a set of position statements on protecting groundwater from various activities (Environment Agency, 2018). The position statements that are relevant to this study with regard to discharges to groundwaters, include surface water drainage and the use of SuDS, discharges from contaminated surfaces (e.g., lorry parks) and from treated sewage effluent.

The EA also maintain a set of maps of Source Protection Zones (SPZs) to help identify high risk areas within which pollution prevention measures should be implemented. The SPZs

show the risk of contamination to public water supplies from activities that may cause pollution in the area, the closer the activity, the greater the risk:

- **Zone 1 (Inner protection zone)** This zone is designed to protect against the transmission of toxic chemicals and water-borne disease. It indicates the area in which pollution can travel to the borehole within 50 days from any point within the zone and applies at and below the water table. There is also a minimum 50 metre protection radius around the borehole.
- **Zone 2 (Outer protection zone)** This zone indicates the area in which pollution takes up to 400 days to travel to the borehole, or 25% of the total catchment area, whichever area is the largest. This is the minimum length of time the Environment Agency think pollutants need to become diluted or reduce in strength by the time they reach the borehole.
- **Zone 3 (Total catchment)** This is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole.
- **Zone of special interest** This is defined on occasions, usually where local conditions mean that industrial sites and other polluters could affect the groundwater source even though they are outside the normal catchment.

3.8 Summary of key new and emerging policy and legislation

The policy and legislation covering the water environment, water and wastewater services and planning is wide and frequently changing. The new and emerging policy and legislation below have been identified as particularly important for consideration in the development of the Local Plan:

- Schedule 3 of the Flood and Water Management Act is expected to be enacted in England in 2024. This will designate Lead Local Flood Authorities as SuDS Approval Bodies (SABs) with a duty to adopt new SuDS and removing the automatic right to connect to public sewers.
- At the time of writing a new draft NPPF was under consultation.
- Defra have signalled their intention, with the Plan for Water, to review the water efficiency standards for new homes, including consideration of a new national 105l/p/d standard and 100l/p/d where there is a clear local need.
- All development sites will be expected to demonstrate at least a 10% net-gain in biodiversity from 2024.
- The designation of specific catchments in England as requiring to demonstrate Nutrient Neutrality under the Conservation of Habitats Regulations has led to significant limitations to development in these areas, as well as the development of offsetting schemes to enable nutrient-neutral development. The Solent Catchment (East Hampshire Catchment and Chichester Catchment) and River Itchen Catchment nutrient neutrality zones are partially located within the SDNP. In 2023 the government unsuccessfully attempted to remove development restrictions in these areas, so further developments might be expected in the near future.

- Similarly, the availability of water resources, and the impact of new water demand on the environment, has led to restrictions on granting planning permission in Sussex North WRZ and a requirement to demonstrate water-neutral development in Cambridge Water WRZ. It is anticipated that LPAs will be increasingly required to demonstrate that there will be sufficient water resources to supply development without causing further harm to the environment through the life of their Local Plans.

4 Water Resources

4.1 Introduction

4.1.1 Objectives

The aim of the water resources assessment is to ensure that sufficient water is available in the region to serve the proposed level of growth, and that it can be abstracted without a detrimental impact on the environment, both during the plan period and into the future. The report characterises the study area, identifying the key surface water and groundwater bodies, and local geology. It highlights the pressures on water resources in the region, identifies existing constraints on abstraction and provides evidence for adopting tighter water efficiency targets.

4.1.2 Water resources in the UK

It is important to set water resources in the SDNP within the context of the overall national picture.

The Environment Agency (Environment Agency, 2024) have published a summary of the revised draft regional and Water Resources Management Plans which includes their view on the overall state of water resources in the UK and the challenges the country faces. They state that:

"In England, our climate is changing, our population is growing, and as a nation we want an improved environment along with a thriving economy, enabled by resilient water supplied. Action is required now to meet these objectives".

"The scale of the challenge we face increases with time and, by 2050, we are looking at a shortfall of nearly 5 billion litres of water per day between the sustainable water supplied available and the expected demand."

"Demand reductions are crucial, particularly in the short term. The Environment Act 2021 sets a target to reduce the use of public water supply in England, per head of population, by 20% by 2037-38 from the 2019-20 baseline."

"Government will be looking to water companies to act quickly and take significant steps forward on installing smart meters and delivering on their wider water efficiency commitments and reducing leakage. This will happen alongside the introduction of a mandatory water label which will enable water efficient decisions across the country. The government has also committed to review water efficiency requirements of building regulations which will be a key action to ensure new homes are water efficient."

There have been several important documents published in recent years, all highlighting the growing awareness and concern about this issue. The National Water Resources Framework led to the creation of the regional water resources planning groups and defined the objective to achieve an average household water efficiency of 110l/p/d by 2050 (including existing housing).

The Government's Environmental Improvement Plan published in January 2023 contains a roadmap for improving water efficiency in new developments and retrofits. This contains an action to review Building Regulations (2010) and consider a new standard for new homes in England of 105 l/p/d and 100 l/p/d where there is a clear local need, such as in areas of serious water stress. Whilst this is not current policy, it is likely that a tighter standard than the 110 l/p/d will be adopted in Building Regulations early in the Local Plan period.

4.2 Characterisation of the study area

4.2.1 Surface Waters

Figure 4.1 displays the main watercourses within the study area, the most significant of which are summarised below:

- River Adur – flows in a southerly direction through Alfriston towards the Cuckmere Haven and the English Channel.
- River Arun – flows in a southerly direction through Harwoods Green towards Arundel and the English Channel.
- Cuckmere River – flows in a southerly direction through Upper Beeding towards Shoreham-by-Sea and the English Channel.
- River Itchen – flows in a westerly, and then southern direction, from Cheriton into Winchester and finally through Colden Common. The River eventually discharges into the Solent at Southampton.
- River Meon – flows in a westerly direction between East Meon and Warnford, and then flows in a southerly direction to Wickham. The River Meon eventually discharges into the Solent at Hill Head Harbour.
- River Ouse – flows in a south-easterly direction through Lewes and into the English Channel at Newhaven.
- River Rother (West Sussex) – locally known as the Western Rother, this river flows in an easterly direction between Empshott and Pulborough, where the river reaches its confluence with the River Arun.

Other main rivers within the SDNP include the Costers Brook (a tributary of the River Rother), Oakhanger Stream and River Lavant.

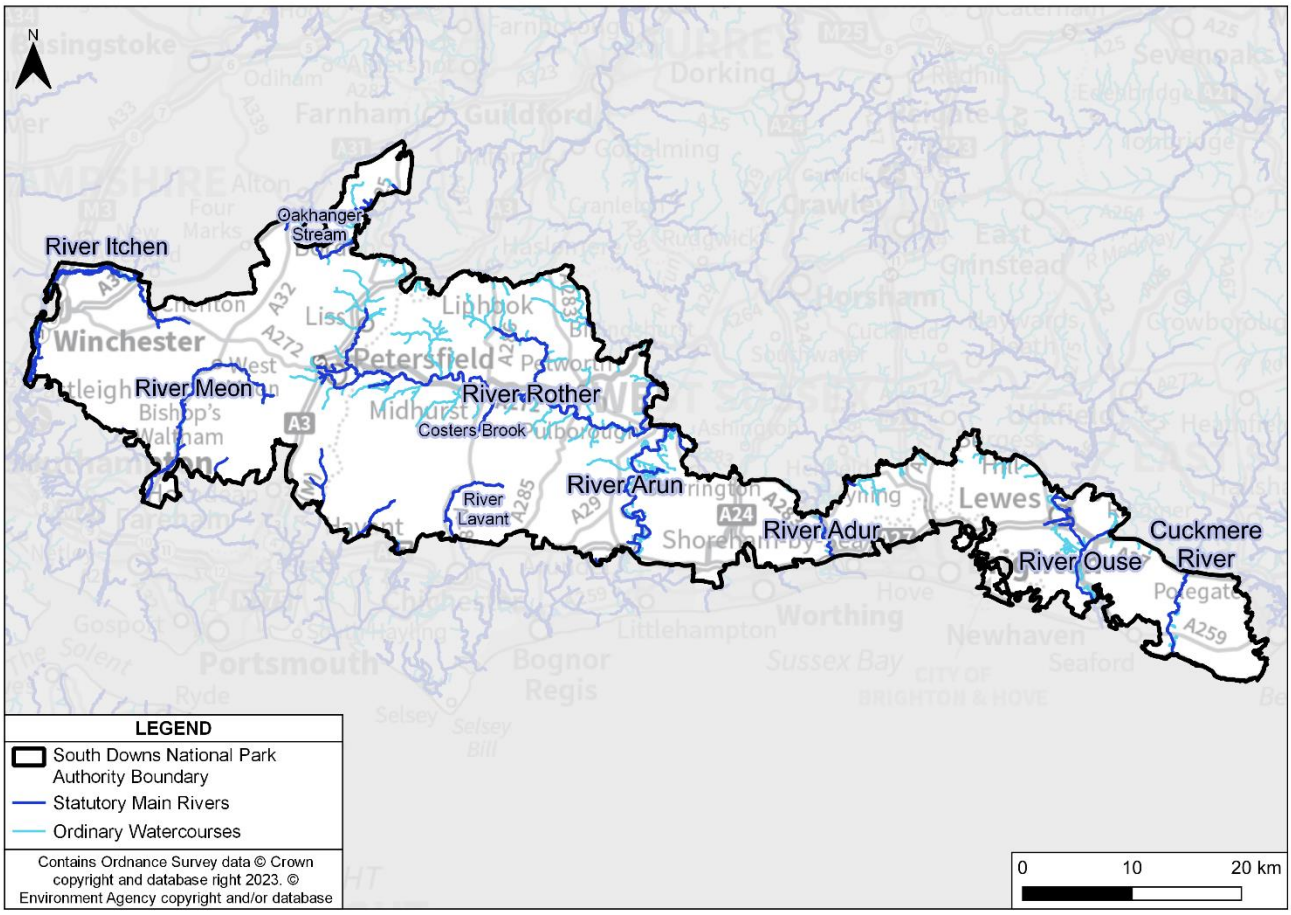


Figure 4.1: Statutory Main Rivers located within the SDNPA boundary

4.2.2 Chalk streams

A chalk stream is broadly defined as a river that derives most of its flow from chalk-fed groundwater, stores of underground water that are replenished when it rains. England is home to 85 per cent of the world's chalk streams.

These rivers, together with the chalk aquifer from which they spring, are crucial water resources providing millions of people with water as well as supporting unique ecosystems. Businesses and farms also rely on chalk streams as without a reliable water source they would not be able to operate.

During the summer months when temperatures are higher and plants are using water, rainfall is less effective at recharging the aquifer. In many cases, this can cause sections of chalk streams to be dry for much of the year. This natural hydrological variation – which can vary from year to year, is separate to the artificial impact of over abstraction.

Balancing the needs of people and the environment is a challenge, and it is getting harder. Population growth, particularly in the south and east of England, means that more and more water is required at a time when climate change is reducing the amount of water that is available.

England’s chalk streams are therefore under considerable pressure. The Environment Agency’s ‘Reasons for Not Achieving Good’ database indicates that one of the reasons for some of the watercourses in the district are not meeting ‘Good’ Water Framework directive (WFD) standards can be related to groundwater and surface water abstractions. Other pressures on chalk streams include pollution from wastewater discharges and agriculture, encroachment by development.

As most of the flow within these streams derives from underground chalk aquifers rather than surface water runoff, they are characterised by result stable base flow. The chalk also has a filtering effect resulting in nutrient-poor and very clear water. Because their water sources are so pure, any agricultural or urban pollution can severely disrupt the ecology of a chalk stream, as can changes in flow.

The health of a chalk stream depends on three things - water quantity, water quality and physical habitat quality (has the stream been modified / constrained and are invasive species present).

The location of these rivers is displayed in Figure 4.2 below (chalk streams which are also main rivers have been labelled). The chalk streams shown in this map have been identified by the recently published Natural England chalk stream mapping. The dataset uses 1:50,000 Biodiversity Action Plan (BAP) chalk river data, British Geological Society (BGS) geology, the World Wide Fund for Nature (WWF) report "The State of England’s Chalk Streams" and stakeholder knowledge to produce an updated chalk river network for England. Watercourses with a 'high certainty' of designation as chalk streams have been included in Figure 4.2. The nationally defined Natural England dataset may not include all chalk streams within the SDNP, and therefore coverage of chalk streams within the SDNP will be reviewed in the Stage 2 WCS. This will consider any local designations, which are currently being assessed by conservation groups in SDNP.

Chalk streams are an important and rare habitat and opportunities should be taken within the Local Plan to define policies to protect these river ecosystems. Further discussion on how Local Plan policy can contribute to the protection of chalk streams should be included in the Stage 2 WCS.

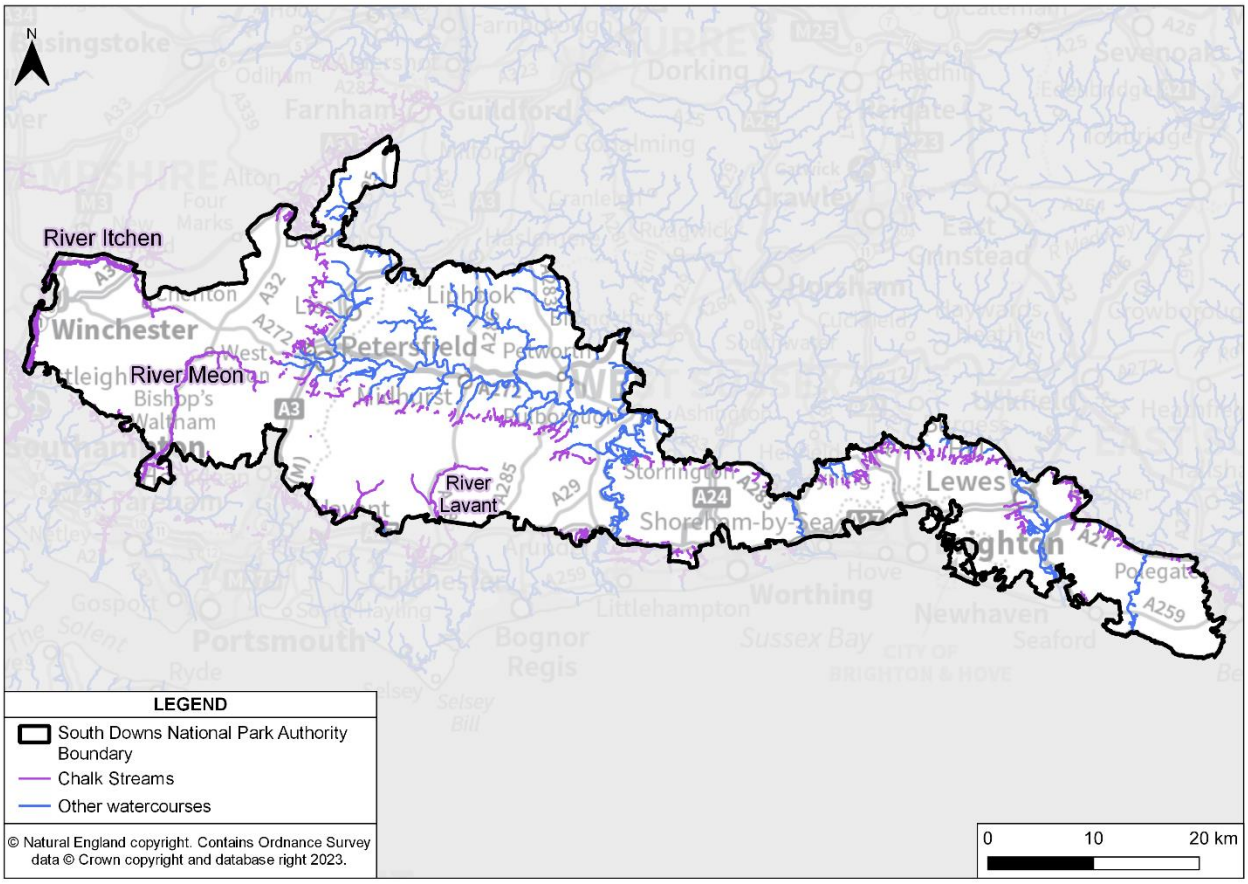


Figure 4.2: Chalk streams located within the South Downs National Park

4.2.3 Groundwaters

A WFD groundwater body represents a distinct body of groundwater flow with a coherent flow unit including recharge and discharge areas with little flow across the boundaries. There are 16 groundwater bodies within the study area which are listed in Figure 4.3 and their corresponding WFD classification is summarised in Table 4-1 below. These are located throughout the SDNPA area.

Nine of the 16 groundwater bodies within the study area have poor quantitative status. The majority of these are located to the south and east of the SDNP. The following groundwater bodies have the potential to impact chalk streams within the study area: Brighton Chalk Block, Chichester Chalk, East Hants Chalk, East Hants Lambeth Group, River Itchen Chalk, Seaford and Eastbourne Chalk Block, and Worthing Chalk.

Table 4-1: WFD status of groundwater bodies

Groundwater Body	Quantitative Status	Chemical Status	Overall Status - WFD Cycle 2 (2019)
Alton Chalk	Good	Poor	Poor
Brighton Chalk Block	Poor	Poor	Poor
Central Hants Lambeth	Good	Good	Good

Groundwater Body	Quantitative Status	Chemical Status	Overall Status - WFD Cycle 2 (2019)
Group			
Chichester Chalk	Poor	Poor	Poor
East Hants Chalk	Poor	Poor	Poor
East Hants Lambeth Group	Poor	Poor	Poor
Godalming Lower Greensand	Good	Poor	Poor
Littlehampton Anticline East	Poor	Good	Poor
Lower Greensand Adur and Ouse	Good	Good	Good
Lower Greensand Arun and Western Streams	Good	Poor	Poor
Lower Greensand Cuckmere and Pevensey Levels	Poor	Good	Poor
River Itchen Chalk	Poor	Poor	Poor
Seaford and Eastbourne Chalk Block	Poor	Poor	Poor
South East Hants Brackelsham Group	Good	Poor	Poor
Sussex Lambeth Group	Good	Good	Good
Worthing Chalk	Poor	Poor	Poor

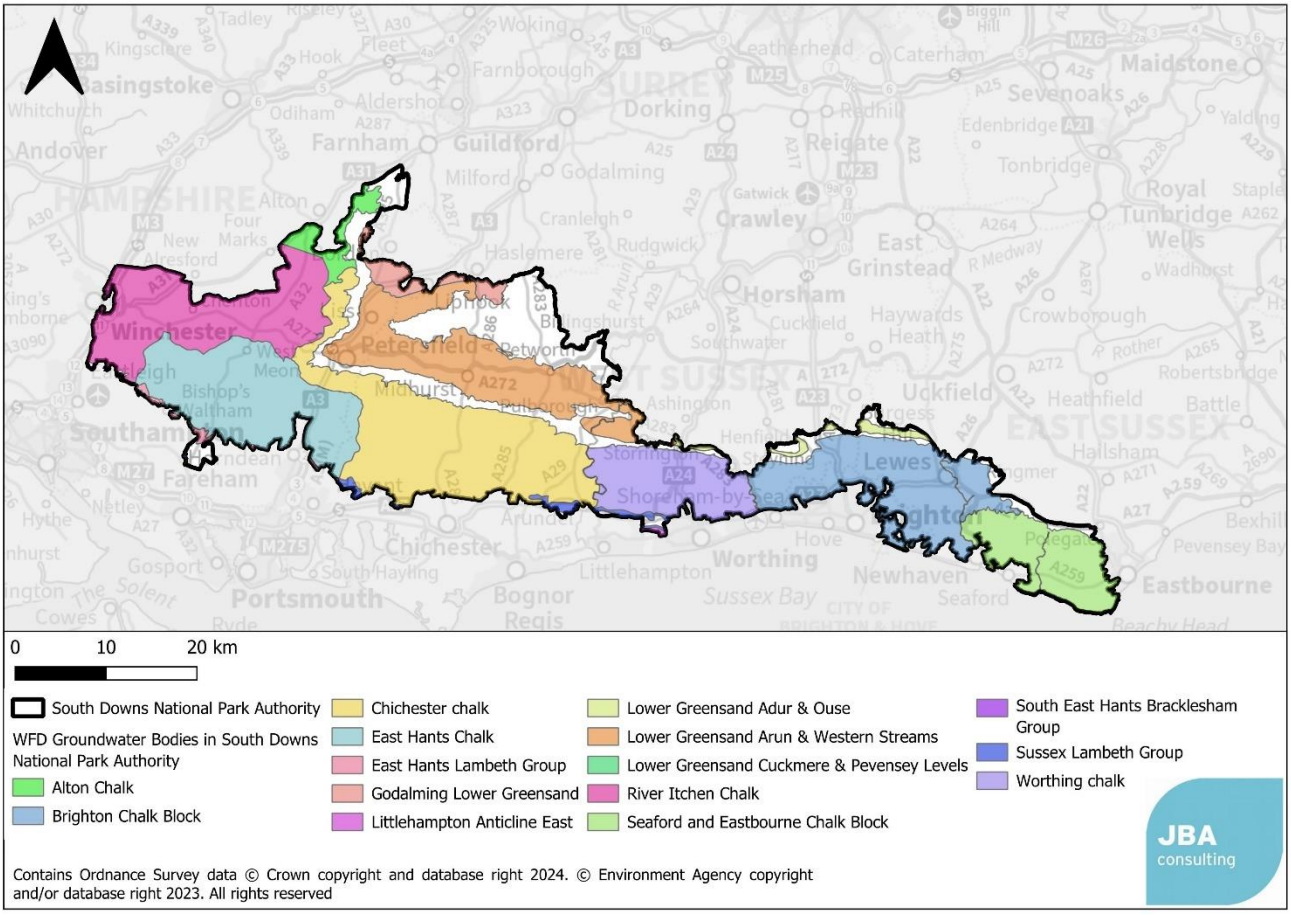


Figure 4.3: Groundwater bodies within the SDNPA boundary

4.2.4 Geology

The geology of the catchment can be an important influencing factor in the way that water runs off the ground surface, and also locally on the type of Sustainable Drainage System (SuDS) that is appropriate for development sites. This is primarily due to variations in the permeability of the surface material and bedrock stratigraphy.

Figure 4.4 displays the bedrock geology within the SDNPA, based on the British Geological Society (BGS) 625K geology dataset. The largest sub-group within the SDNP is Sussex White Chalk, which covers the majority of the west and southern sections of the South Downs between Winchester and Beachy Head. The southern fringes of the SDNP are generally clays, gravels, sand and silt, and are classed as either the Brackelsham Group and Barton Group (undifferentiated) (clay, sand and silt), Lambeth Group (clay, gravel, sand and silt) or Thames Group (clay, gravel, sand and silt). Four different bedrock geologies have been identified in the northern and central portions of the SDNP, including:

- Gault Formation and Upper Greensand formation (undifferentiated) (sandstone and limestone) – located near the centre of the SDNP as a band between Alice Holt Forest to northern Eastbourne, including land to the west of the Petersfield.

- Grey Chalk Group (chalk) – located in the centre of the SDNP between Lower Farringdon (near Alton), East Meon and finally to Folkington.
- Lower Greensand Group (sandstone and mudstone) – in the central northern portion of the SDNP, between Blackmoor and Ditchling (and including Petersfield).
- Wealden Group (mudstone, sandstone and Limestone, or sandstone and siltstone, interbedded) – in the central northern portion of the SDNP, between Petworth and Milland.

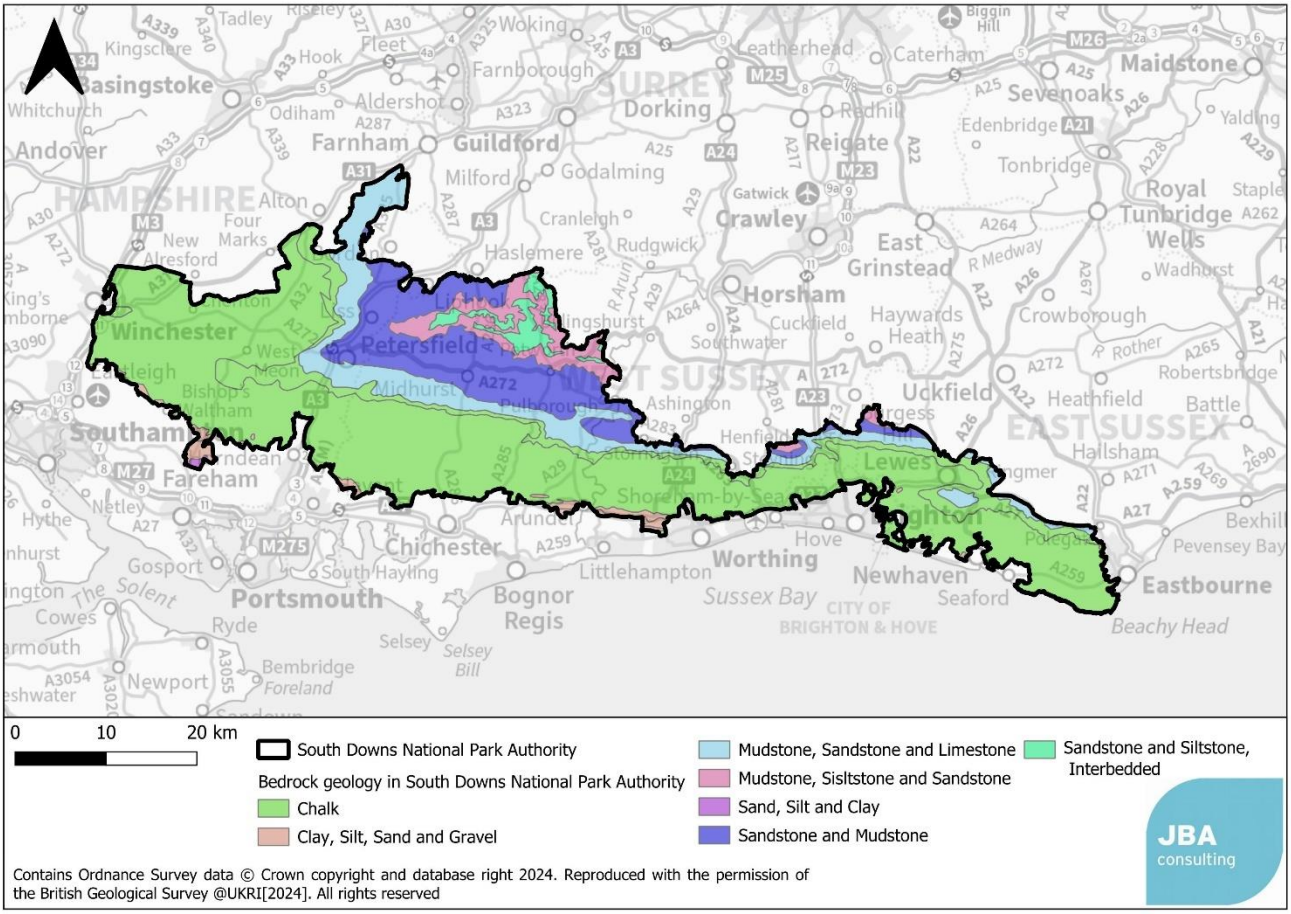


Figure 4.4: Bedrock geology of the SDNP

Figure 4.5 displays the superficial (at the surface) deposits of the SDNP, also based on the BGS 625K Geology dataset. The superficial deposits with the greatest area within the SDNP include alluvium (clay, silt and sand) surrounding the largest river valleys (Rivers Arun, Cuckmere, Itchen, Ouse, Rother and tributaries) and clay with flints, located in isolated regions within the SDNP including East Meon, Lower Farringdon, Patching and the Seven Sisters. Other, more isolated, superficial deposits within the SDNP include lacustrine deposits (undifferentiated) at Amberley near the River Arun, Brick Earth near Arundel and river terrace deposits (undifferentiated) surrounding Chawton, Lewes, Petworth and Pulborough Brooks. Finally, isolated portions of the SDNP are identified as having sands and gravels of an uncertain age and original within them, including Alice Holt Forest, southern Lewes, between Rowland and Arundel (including the River Lavant) at the

southern SDNP boundary, and across isolated patches between Midhurst and Pulborough Brooks.

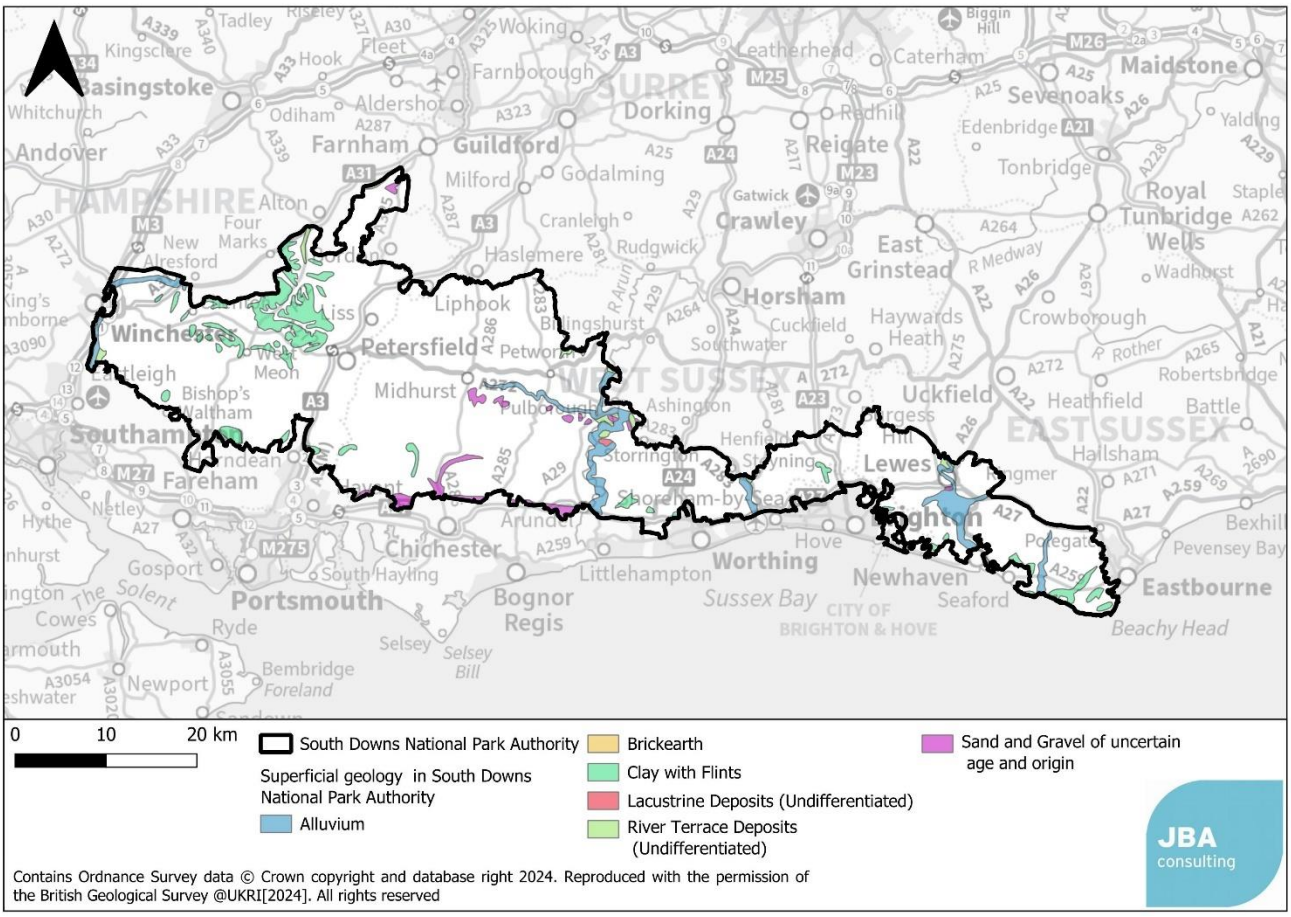


Figure 4.5: Superficial (at surface) geology of the SDNP

4.3 Availability of Water Resources

4.3.1 Abstraction Licencing Strategy

The Environment Agency working through the Catchment Abstraction Management Strategy (CAMS) process, prepare an Abstraction Licensing Strategy (ALS) for each sub-catchment in a river basin. The strategy sets out how water resources are managed within England and contributes to the implementation of the WFD. The ALS report provides information on the resources available and what conditions might apply to new licences. The licences require abstractions to stop or reduce when a flow or water level falls below a specific threshold, as a restriction to protect the environment and manage the balance between supply and demand for water users.

All new licences, and some existing licences are time limited, allowing for periodic review of the area as circumstances may have changed since the licence was first issued. The duration is generally twelve years, but shorter licences may be granted if they are based on resource assessment and environmental sustainability grounds. In some cases, future plans or changes may mean that the EA will grant a shorter time limited licence, so it can

be re-assessed following the change. If a licence is only required for a short time, it can be granted either as a temporary licence or with a short time limit. If a licence is considered to pose a risk to the environment it may be granted with a short time limit while monitoring is carried out. The licences are then replaced with a changed licence, revoked or renewed near to the expiry date.

The ALS are important in terms of the Water Resource Management Plan (WRMP) as this helps to determine the current and future pressures on water resources and how the supply and demand will be managed by the relevant water companies. An abstraction license is needed from Natural Resources Wales or the Environment Agency if abstraction is above 20m^3/ day (4,400 gallons) a day from:

- rivers or streams
- reservoirs, lake or pond
- canal
- spring or
- an underground source

The license is granted depending on the amount of water available. SDNP is covered by the Adur and Ouse, Arun and Western Streams, Cuckmere and Pevensey Levels, East Hampshire, Test and Itchen, and Wey sub catchments.

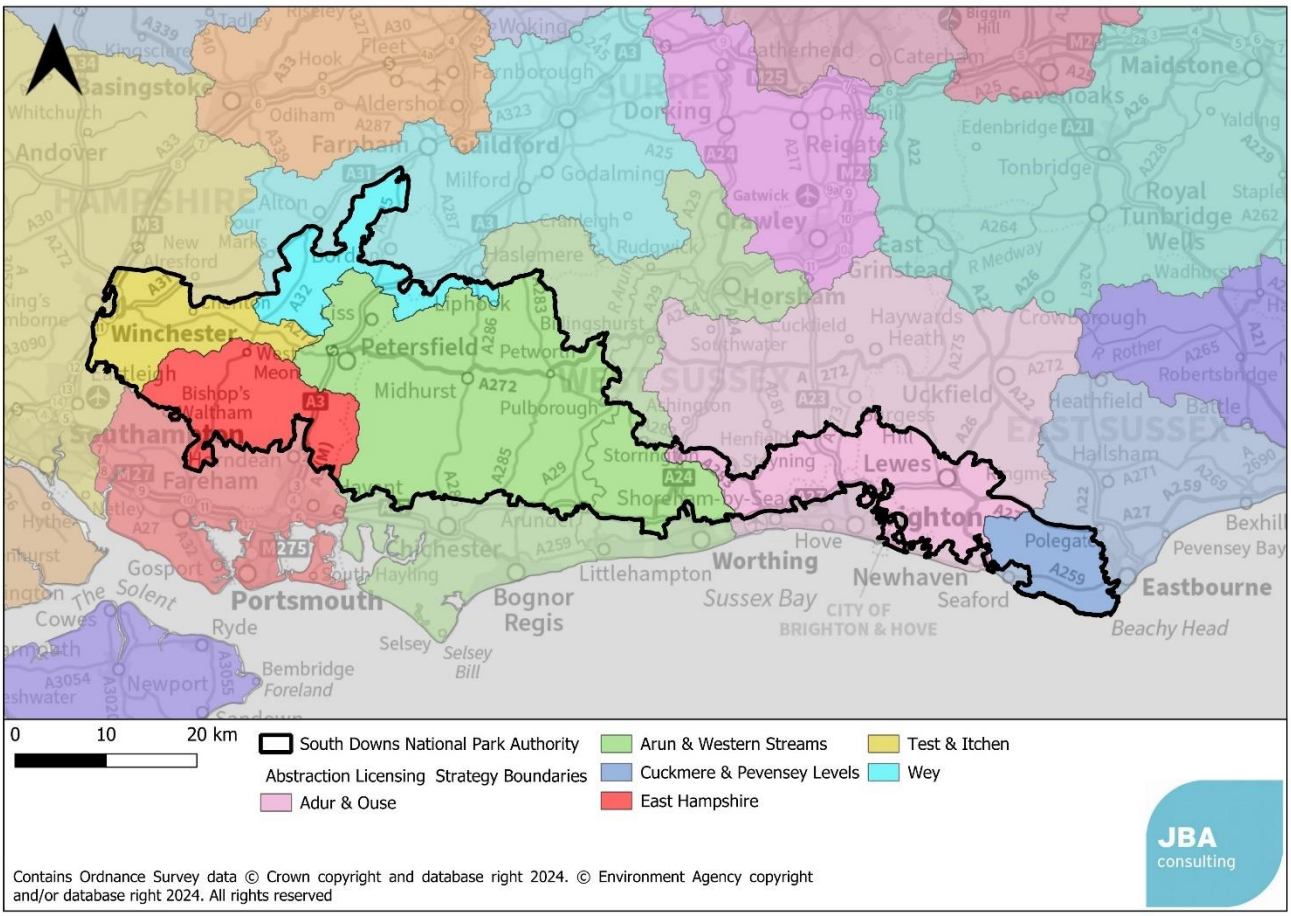


Figure 4.6 CAMS boundaries intersecting SDNP

4.3.2 Resource Availability Assessment

To abstract surface water, it is important to understand what water resources are available within a catchment and where abstraction for consumptive purposes will not pose a risk to resources or the environment. The Environment Agency has developed a classification system which shows:

- The relative balance between the environmental requirements for water and how much has been licensed for abstraction
- Whether there is more water available for abstraction in the area
- Areas where abstraction may need to be reduced

The availability of water for abstraction is determined by the relationship between the fully licensed (all abstraction licences being used to full capacity) and recent actual flows (amount of water abstracted in the last six years) in relation to the Environmental Flow Indicator (EFI). Results are displayed using different water resource availability colours, explained in Table 4-2. In some cases, water may be scarce at low flows, but available for abstraction at higher flows. Licences can be granted that protect low flows, this usually takes the form of a "Hands-off Flow" (HOF) or Hands-off Level (HOL) condition on a licence.

Groundwater availability as a water resource is assessed similarly, unless better information on principle aquifers is available or if there are local issues that need to be considered.

Table 4-2 Implications of surface water resource availability colours

Water Resource Availability Colour	Implications for Licensing
BLUE- High hydrological regime	There is more water than required to meet the needs of the environment. Due to the need to maintain the near pristine nature of the water body, further abstraction is severely restricted.
GREEN- Water available for licensing	There is more water than required to meet the needs of the environment. Licences can be considered depending on local/downstream impacts.
YELLOW- Restricted water available for licensing	Fully Licensed flows fall below the Environmental Flow Indicator (EFI). If all licensed water is abstracted there will not be enough water left for the needs of the environment. No new consumptive licences would be granted. It may also be appropriate to investigate the possibilities for reducing fully licensed risks. Water may be available via licence trading.
RED- Water not available for licensing	Recent Actual flows are below the Environmental Flow Indicator (EFI). This scenario highlights water bodies where flows are below the indicative flow requirement to help support Good Ecological Status. No further licences will be granted. Water may be available via licence trading.
GREY-	These water bodies have a modified flow that is influenced by reservoir

Water Resource Availability Colour	Implications for Licensing
HMWBs (and /or discharge rich water bodies)	compensation releases, or they have flows that are augmented. There may be water available for abstraction in discharge rich catchments.

Water resource availability is assessed under four different flow conditions:

- Q95 – very low flows which are exceeded 95% of the time
- Q70 – low flows which are exceeded 70% of the time
- Q50 – median flows which are exceeded 50% of the time
- Q30 – high flows which are exceeded 30% of the time

The resource availability for the Adur and Ouse, Arun and Western Streams, Cuckmere and Pevensey Levels, East Hampshire, Test and Itchen, and Wey ALSs are summarised below, and for completeness the Water resource ALSs within the study area are presented graphically in Figure 4.7.

4.3.3 Adur and Ouse

The Adur and Ouse catchment is located within the South East river basin district, covering an area of 1073 km^2, containing the Brighton Chalk aquifer. The Ouse River System is dominated by a single surface water abstraction operated by South East Water, and the River Adur is dominated by discharges from WwTWs.

At Q30, water is available for licensing in much of the west of the catchment, and there is restricted water availability for much of the east of the catchment, aside from the far south east, where water is available for licensing. In the most northern, upstream area of the catchment water is not available for licensing at Q30. At Q50, water resource availability throughout the catchment is largely the same, aside from a small sub catchment in the far west, where water becomes unavailable for licensing. At Q70, across much of the catchment water becomes unavailable for licensing, with main waterbodies also becoming "discharge rich". Water is only available for licensing in the west of the catchment and a small area of the southeast. At Q95, the majority of waterbodies in the catchment become "discharge rich" or water is unavailable for licensing. Only in three sub-catchments is water available for licensing at Q95

4.3.4 Arun and Western Streams

The Arun and Western Streams catchment covers an area of 1484 km^2, largely within West Sussex, including main rivers, the River Adur, Western Rother, River Ems, River Lavant, and Coastal Rifes. 55% of water licensed for abstraction is from a groundwater source and 45% is from surface water.

At Q30, water is available for licensing across much of the catchment, aside from in the Lavant catchment and areas in the south east of the catchment near Worthing. At Q50, water becomes unavailable for licensing across much of the central catchment, in the South Downs National Park. Water availability becomes restricted in the north west, leaving the only areas of the catchment with water available for licensing in the north east and far south. At Q70, in much of the north east of the catchment, waterbodies are "discharge rich", with water unavailable for licensing across much of the catchment, aside from areas in the south. Water availability is similar at Q90, with the entirety of waterbodies in the north east becoming "discharge rich", and the only areas where water is available for licensing located in the south.

4.3.5 Cuckmere and Pevensey Levels

The Cuckmere and Pevensey Levels ALS catchment is located within the South East River Basin District, covering an area of 528 km^2, and including the River Cuckmere, Pevensey, Wallers and Combe Havens.

At Q30, water is unavailable for licensing in the west of the catchment, covering the Cuckmere catchment, while water is available for licensing across the east of the ALS catchment. At Q50, water availability across the ALS catchment changes with water either unavailable or restricted across the majority of the catchment, aside from in two coastal catchments at Bexhill and Hastings in the south east. At Q50, water is unavailable for licensing throughout the ALS catchment aside from the two previously mentioned catchments, with the water resources availability situations remaining the same at Q95.

4.3.6 East Hampshire

The East Hampshire ALS catchment cover an area of 517 km^2 in the South East River Basin District, including rural rolling chalk downland in the north and urbanised centres of Portsmouth, Havant, and Waterlooville in the South.

At Q30 water is unavailable for licensing in a central area of the catchment, the Upper Wallington catchment, and an area in the northwest of the ALS catchment. For the rest of the ALS catchment, At Q50, water availability becomes restricted in the Meon catchment, while otherwise, availability remains the same in the ALS catchment. At Q70, in the entire central and north area of the ALS catchment, water becomes unavailable for licensing, with water only available for licensing in the far east, west and south. Water resources availability is largely the same at Q95, aside from water availability for licensing becoming restricted in the far east of the ALS catchment.

4.3.7 Test and Itchen

The Test and Itchen ALS area covers approximately 1,675km^2 including both the Test and Itchen catchments, both of which are underlain by chalk. In the upper and middle reaches of both the Test and Itchen, significant public water abstraction is provided from groundwater sources, while in the lower reaches, there is significant surface water abstraction.

At Q30, water is largely available for licensing across the Test and Itchen ALS catchment, aside from a small sub catchment in the south. At Q50, in the River Test catchment water availability becomes restricted for licensing, alongside an area in the northwest. At Q70, the situation remains the same, aside from water becoming unavailable for licensing in the Upper Anton sub catchment. At Q95, water availability for licensing becomes restricted throughout the River Itchen catchment and unavailable in the River Test catchment.

4.3.8 Wey

The Wey ALS catchment covers an area of approximately 900km^2 in the Wey River Basin District. The Wey joins the River Thames at Weybridge.

At Q30, water availability for licensing is restricted throughout the entire ALS catchment, and water is unavailable for licensing in three sub catchments, located in the west, east, and north. At Q50, Q70, and Q95 water is available for licensing throughout the entirety of the Wey ALS catchment. Given the importance of the Wey for water resources, a bespoke licensing strategy has been developed, with aim of protecting the rights of abstractors and ensuring the health of the River Wey can reach Good Ecological Potential.

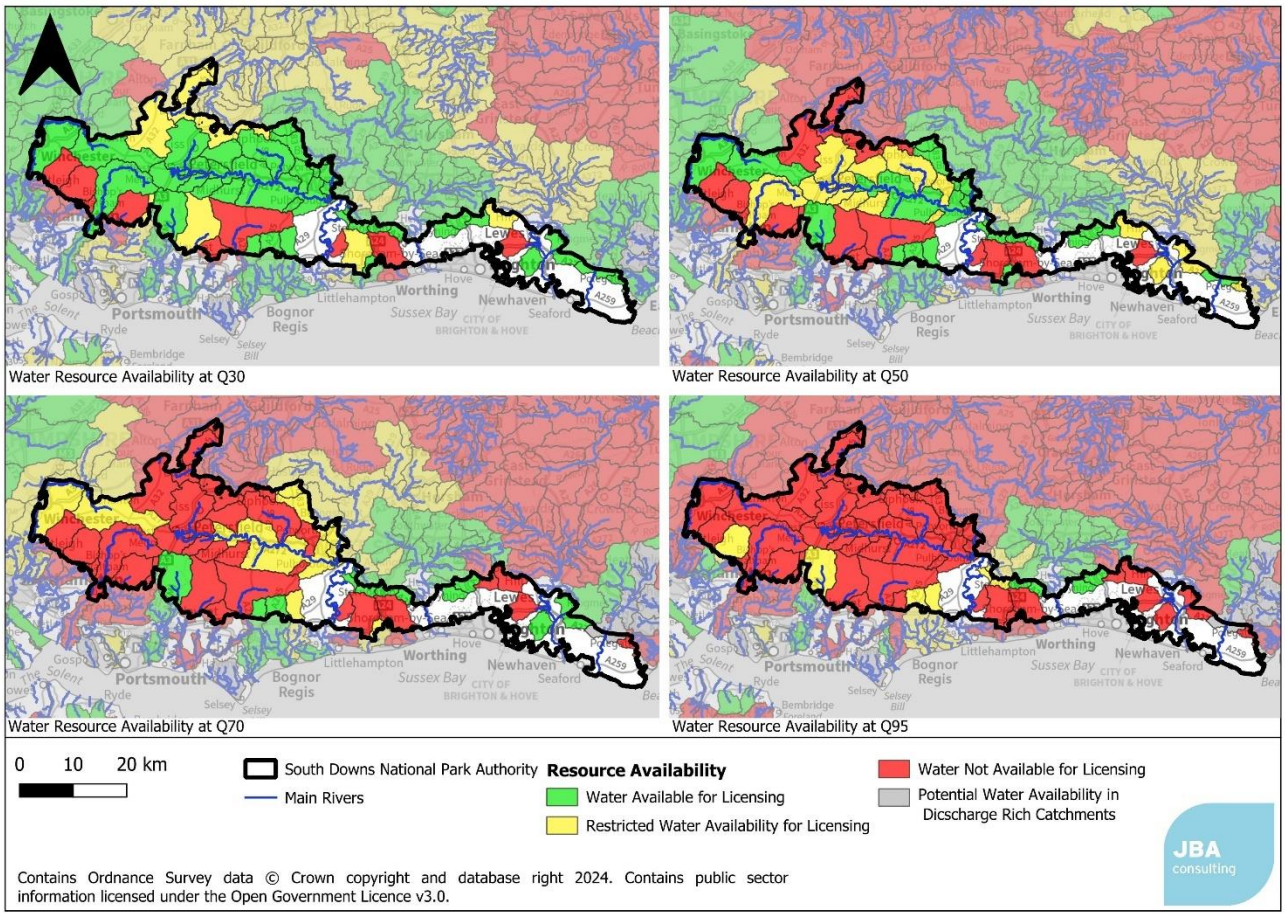


Figure 4.7 Water resource availability in SDNP

4.4 Water Neutrality

Southern Water supplies water to part of the South Downs National Park from its Sussex North Water Resource Zone (WRZ). Within this WRZ there are several water sources, one of which is a groundwater source near Pulborough.

Natural England (NE) has raised significant concerns regarding the current abstraction (and any increase in abstraction required to serve planned development), advising that it cannot conclude with certainty that this process is not having an adverse impact on site integrity through a reduction in water supply and deterioration of habitat at designations including Amberley Wild Brooks Site of Special Scientific Interest (SSSI), Pulborough Brooks SSSI and Arun Valley Special Protection Area (SPA), Arun Valley Special Area of Conservation (SAC) and Arun Valley Ramsar site.

Investigations and discussions between Southern Water (SW), the Environment Agency (EA) and NE on the long-term sustainability of the Pulborough abstraction are ongoing, including a sustainability investigation to assess what level of ground and surface water abstractions are sustainable. In the meantime, NE has advised the Local Planning Authorities (LPAs) that development in the Sussex North WRZ must not add to this potential adverse effect.

The result of this is that development within this area must demonstrate that they are water neutral, either by providing evidence that the development will not result in an increase in water demand, by offsetting their increased water demand by reducing water demand elsewhere, or by buying water credits as part of an LPA scheme. At the time of writing the LPA scheme: the Sussex North Offsetting Water Scheme (SNOWS) was still under development.

The extent of the zone where water neutrality applies is shown in Figure 4.8.

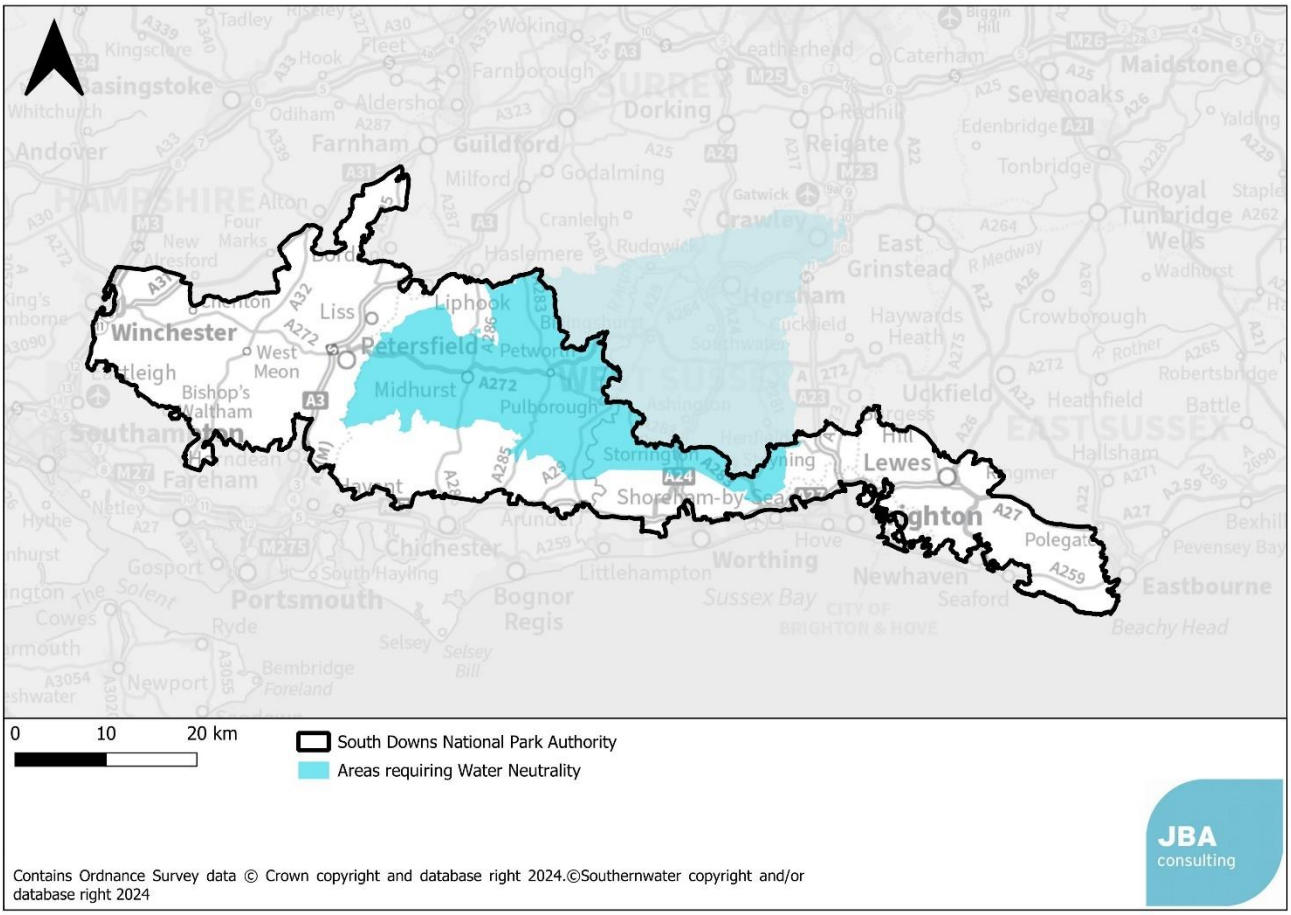


Figure 4.8 Water neutrality zone

4.5 Water Resource Assessment: Water Resource Management Plans

4.5.1 Introduction

Water Resource Management Plans (WRMPs) are 50-year strategies that water companies are required to prepare, with full updates every five years. WRMPs are required to assess:

- Future demand (due to population and economic growth).
- Future water availability (including the impact of sustainability reductions).
- Demand management and supply-side measures (e.g., water efficiency and leakage reduction, water transfers and new resource development).
- How the company will address changes to abstraction licences.
- How the impacts of climate change will be mitigated.
- Where necessary, they set out the requirements for developing additional water resources to meet growing demand and describe how the balance between water supply and demand will be balanced over the next 50 years.
- Using cost-effective demand management, transfer, trading, and resource development schemes to meet growth in demand from new development and to restore abstraction to sustainable levels.

- In the medium to long term, ensuring that sufficient water continues to be available for growth and that the supply systems are flexible enough to adapt to climate change.

When new development within a Local Planning Authority is being planned, it is important to ensure that there are sufficient water resources in the area to cover the increase in demand without risk of shortages in the future or during periods of high demand, and without causing a negative impact on the waterbodies from which water is abstracted.

The aim of this assessment was to compare the future additional demand as a result of development proposed within the emerging Local Plan, with the demand accounted for by Portsmouth Water, South East Water and Southern Water within their Water Resource Management Plans.

This assessment has been undertaken using the draft 2024 Water Resource Management Plans. It is recommended that this section of the WCS is revised at Stage 2, to take account of the final WRMP24s.

4.5.2 Water Resource Planning

Water Resource Zones are defined by the EA as areas in which the management of supply and demand is largely self-contained and where the supply infrastructure is linked such that customers within the zone experience the same risk of supply failure. Within a WRZ a customer may receive their water from anywhere within the zone, and not necessarily from the nearest source.

The areas covered by the four water companies serving SDNPA are shown in Figure 4.9. Thames Water only supply an area of approximately 0.5km^2 and so have not been included in the assessment below.

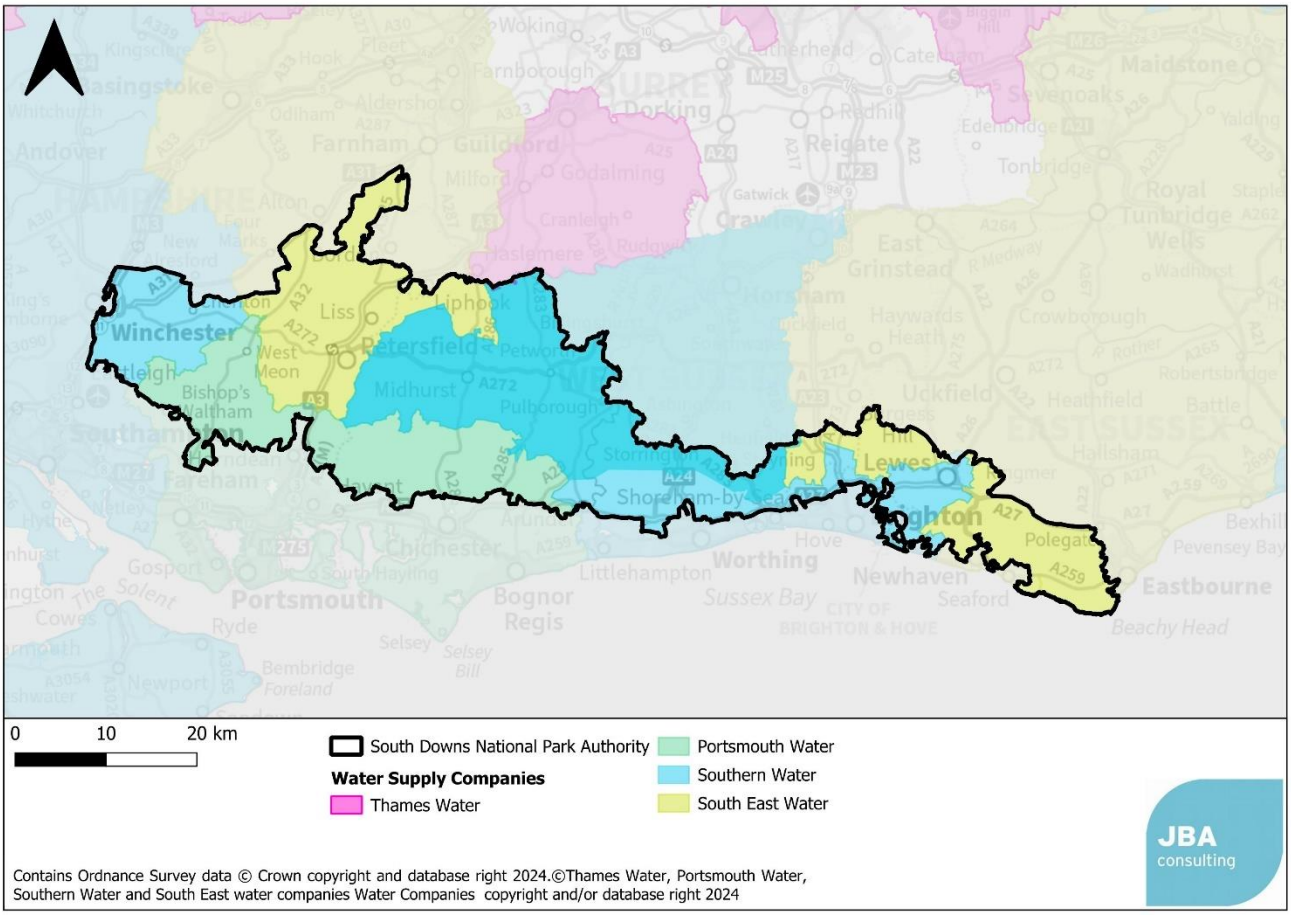


Figure 4.9 Water supply areas

4.5.3 Methodology

The Water Resources Management Plans for the water companies supplying the SDNPA were reviewed. Attention was mainly focussed upon:

- The available water resources and future pressures which may impact upon the supply element of the supply/demand balance.
- The allowance within those plans for housing and population growth and its impact upon the demand side of the supply/demand balance.

The SDNPA HEDNA has been used to provide an estimate of the number of households in 2022 and provide the housing need up to 2042.

4.5.4 Portsmouth Water

Portsmouth Water (PW) is responsible for supplying the southwest of the SDNP with water (see Figure 4.9). For the purposes of water resources planning, the PW supply area is based on one single Water Resource Zone (WRZ) which covers PW's entire supply area, which, within the SDNP, extends between Bishop's Waltham to Bognor Regis.

Across the entire PW WRZ, 100% of the water comes from chalk-based sources. Approximately 60% of this water comes from boreholes and wells, 30% from groundwater springs, and 10% from the River Itchen.

Portsmouth Water's revised draft WRMP24 identifies a supply-demand challenge throughout the next 50-year planning period (2025-2026 to 2074-75). This is based on forecasts in the reduction of water available to supply, mainly related to abstraction reductions to meet environmental protection standards, but also due to the impacts of climate change. PW are also forecasting an increase in demand from needing to supply 54.5 megalitres per day (Ml/d) in 2035 to 179.8Ml/d in 2075. Alternative ways of meeting customer demand need to be found.

Portsmouth Water's rdWRMP24 outlines how they aim to meet customer demand over the next 25-years. The demand-management and supply measures are outlined below:

- Reduce leakage by 50% by 2040 e.g., through use of leakbot technologies.
- Support customers to reduce personal water usage by 25% e.g., through interactive consumption conservations.
- To the extent that this is practically feasible, Portsmouth Water aim to deliver universal domestic smart metering to both household and non-household customers by 2035.
- To help promote water recycling e.g., provision of subsidised water efficiency butts

4.5.5 South East Water

South East Water (SEW) are responsible for supplying the central northern and the eastern portions of the SDNP. The SEW supply area is divided into eight WRMP covering the SEW supply area. There are three WRZs covering the SNP: Haywards Heath (WRZ2), Eastbourne (WRZ3) and Farnham (WRZ5). The WRZ's are sourced from a combination of surface water, groundwater sources and bulk transfer from other WRZs.

South East Water's WRMP24 outlines how they aim to meet customer demand over the next fifty years. South East Water plan to reduce per capital consumption (PCC) for household customers to 141l/h/d by 2025 and to reach an average of 110 l/h/d (in a dry year) by 2050. The demand-management and supply measures are outlined below:

- Behavioural change initiatives, including extending the reach of their Household Neighbour Comparison report.
- Providing free water-saving devices for customers.
- Partnership and community campaigns, including increased media campaigns and school education.
- Targeted assisted home and virtual audits
- Tariffs
- Leaky loo find and fix
- Deploy smart meters to promote water efficiency. South East Water aim to replace 90% existing metered customers with new smart meters by 2035.

4.5.6 Southern Water

Southern Water (SW) is responsible for supplying centre and north-west of the SDNP with water. The SW supply area is divided into 14 WRZs. The SDNP are covered by five WRZs: Hampshire Southampton East WRZ, Hampshire Winchester WRZ, Sussex Brighton WRZ, Sussex North WRZ and the Sussex Worthing WRZ.

Southern Water publish their water supply sources by water resource zone. Within the Hampshire Winchester WRZ and Sussex Brighton WRZ, 100% of the water supply is from groundwater sources. In Hampshire Southampton East WRZ, 52% of the water supply is from rivers, and 48% from groundwater sources. In the Sussex North WRZ, 35% of the water supply is from groundwater sources, 51% from rivers, 8% from reservoirs and 6% from transfers. In the Sussex Worthing WRZ, 98% of the water supply is from groundwater, and 2% from bulk transfers.

Southern Water's rdWRMP24 outlines how they aim to meet future customer demand. Demand-management and supply measures include:

- Finding and fixing leaking pipes using both conventional (e.g., sounding) and enhanced (e.g., by applying digital tools) approaches.
- Communication and marketing to build awareness around water scarcity in the South East and establish a water efficient culture.
- Deploy smart meters to promote water efficiency. Southern Water plan to fully replace current Visual Meter Reads (VMR) and Automated Meter Reads (AMR) with smart meters during AMP8. Smart meters can also monitor for customer side leaks and generate alarms once a leak is detected to improve repair time of leaky pipes.
- Introducing a different tariff structure, including rising block tariffs or seasonal tariffs, for their water-saving potential.
- Continuing to promote water-saving solutions, including water-saving devices or advice.
- Home audits to reduce water demand. Southern Water aim to carry out 45,000 home audits over AMP7 (2020-25).

4.5.7 Population and household growth

Table 4-3 shows the household growth forecasts for the WRZs which serve growth within the SDNP. It is difficult to make direct comparisons between growth in the SDNPA area and the WRZs due to their differing geographies. A percentage growth has therefore been used. The 2024 baseline household forecast is taken from the SDNPA Housing and Economic Development Needs Assessment (HEDNA). The water company forecasts are taken from the revised draft or final WRMP24 planning tables.

Please note that changes proposed in the draft NPPF (being consulted on at the time of writing) may result in significant changes to the housing needs. This comparison may need to be revisited in Stage 2.

Table 4-3 Comparison of household growth forecasts.

Forecast	2022	2042	% increase
Expected growth in Local Plan period based on HEDNA 2022-2042[1]	48,782	55,782	14%
rdWRMP24 Forecast – Portsmouth Water WRZ (Updated Sept 2023)	323,740	396,600	23%
WRMP24 Forecast – South East Water, Haywards Heath WRZ (Updated October 2024)	137,090	163,220	19%
WRMP24 Forecast – South East Water, Eastbourne WRZ (Updated October 2024)	119,490	139,200	16%
WRMP24 Forecast – South East Water, Farnham WRZ (Updated October 2024)	59,690	71,600	20%
rdWRMP24 Forecast – Southern Water, Hampshire Winchester WRZ (Updated Jul7 2024)	31,050	37,370	20%
rdWRMP24 Forecast – Southern Water, Hampshire Southeast WRZ (Updated July 2024)	174,610	200,990	15%
rdWRMP Forecast – Southern Water, Sussex North WRZ (Updated July 2024)	116,200	141,180	21%
rdWRMP24 Forecast – Southern Water, Sussex Brighton WRZ (Updated July 2024)	167,720	188,630	12%

1 South Downs National Park Authority. (2023). South Downs National Park Final Housing and Economic Development Needs Assessment (HEDNA). Available online at: https://www.southdowns.gov.uk/wp-content/uploads/2024/07/SDNP-FInal-HEDNA.pdf [Accessed 24.10.2024]

Forecast	2022	2042	% increase
rdWRMP24 Forecast – Southern Water, Sussex Worthing WRZ (Updated July 2024)	89,530	104.370	17%

Note: these figures are based on the WRMP planning tables some of which formed part of the revised draft WRMPs. This table may need to be updated in the stage 2 WCS once the final WRMP24 tables are available.

4.5.8 Summary

The SDNP is within the Eastbourne, Farnham, Haywards Heath, Hampshire South East, Hampshire Winchester, Portsmouth Water, Sussex Brighton, Sussex North and Sussex Worthing WRZs. Portsmouth Water's, South East Water's and Southern Water's WRMP highlights a deficit between supply and demand forecast and defines the actions required to achieve a supply demand balance to prevent the risk of future environmental deterioration.

Although Portsmouth Water, South East Water and Southern Water have not relied on new homes being more water-efficient than existing metered homes, the opportunity, through the planning system, to ensure that new homes do meet the higher standard of domestic water usage, at no significant additional cost to the developer, would be in line with general principals of sustainable development, and reducing energy consumed in the treatment and supply of water. In Southern Water's Sussex North WRZ, development must be water neutral.

The housing need as stated in the in the HEDNA report[1] is expected to result in an increase in the number of households of 14% during the Local Plan period. This less than the overall predicted increase in the number of households within the WRZs covering the SDNPA area. This table may need to be updated in the Stage 2 WCS once the final WRMP24s are published.

The forecast in these reports refers to the total area that each WRZ covers including regions both inside and outside the SDNPA boundary. SDNPA existing households and growth make a relatively small contribution across the WRZs compared with expected growth in areas outside of the SDNP which extend to larger parts of the WRZ. As a result, while the SDNPA's growth does factor into overall water demand forecasts, its impact is relatively small when compared to the more areas outside the SDNPA boundaries.

4.6 Water Environment National Environment Programme Measures

The Water Industry National Environment Programme (WINEP) is a set of actions that the EA have requested all 20 water companies operating in England to complete in a particular Asset Management Period (AMP) as part of their environmental commitments. Actions may include investigations or actual measures, examples could be reductions in abstraction in a particular river to maintain flow to support WFD objectives, or a reduction in phosphate pollution in a catchment through upgrades to a WwTW. Table 4-4 shows WINEP actions relating to water resources in surface waterbodies in the SDNP. There are no water

resources actions relating to groundwater bodies within the SDNP. Actions relating to water quality are presented in section 9.4 (Water Quality).

Development and population growth can increase abstraction, and so the SDNPA have an opportunity to contribute to these actions indirectly by pursuing policies that promote water efficiency in new development.

Table 4-4 WINEP actions on surface waterbodies in the SDNP

Waterbody Name	WINEP ID	Unique ID	Scheme Name(s)	Type of scheme/notes
Brede	KSL0003	7SO100025	Two boreholes at Cadborough Pumping Station, Rye	Investigation and Options Appraisal Investigation and OA to ascertain impact of licences on waterbodies and sustainability of any planned changes or growth at this location
Mislingford	SSD00086	7PW200003	Soberton	Investigation and Options Appraisal
Arun downstream Pallingham Weir	SSD00121	7SO100080	Hardham Groundwater	Investigation and Options Appraisal
Chilt	SSD00145	7SO100149	Smock Alley at West Chiltington borehole 1&2	Investigation and Options Appraisal
Itchen	SSD00115	7SO100092	Easton	Investigation and Options Appraisal
Itchen	SSD00116	7SO100092a	Easton	Investigation and Options Appraisal
Itchen	CHM00228	7SO300026	Morestead WWTW	Investigation
Itchen	SSD00138	7SO100123	Otterbourne pumping station	Investigation and Options Appraisal

Waterbody Name	WINEP ID	Unique ID	Scheme Name(s)	Type of scheme/notes
Itchen	SSD00126	7SO100142	River Itchen at the Otterbourne Intake	Investigation and Options Appraisal
Western Rother Durford	SSD00141	7SO100143	Rogate Pumping Station borehole 1,2,3	Investigation and Options Appraisal

4.7 Water demand reduction

4.7.1 Water efficiency

It is widely recognised that the climate is changing. Climate change is predicted to increase pressure on water resources, increasing the potential for a supply-demand deficit in the future, and making environmental damage from over abstraction of water resources more likely. Furthermore, the delivery of water and wastewater services and the heating of water in the home require high energy inputs, and therefore contribute directly to emissions of greenhouse gases. Water efficiency therefore reduces energy use and carbon emissions.

It is important therefore that new development does not result in an unsustainable increase in water abstraction. This can be done in a number of ways from reducing the water demand from new houses through to achieving “water neutrality” in a region by offsetting a new developments water demand by improving efficiency in existing buildings.

It is for Local Authorities to establish a clear need to adopt the tighter water efficiency target through the building regulations. This should be based on:

Existing sources of evidence such as:

- The Environment Agency classification of water stress;
- Water resource management plans produced by water companies;
- River Basin Management Plans which describe the river basin district and the pressure that the water environment faces. These include information on where water resources are contributing to a water body being classified as ‘at risk’ or ‘probably at risk’ of failing to achieve good ecological status, due to low flows or reduced water availability;
- consultations with the local water and sewerage company, the Environment Agency and catchment partnerships; and
- consideration of the impact on viability and housing supply of such a requirement

The following sections will set out the available evidence and provide a recommendation for a water efficiency target for the study area.

4.7.2 Water Stress

Water stress is a measure of the level of demand for water (from domestic, business and agricultural users) compared to the available freshwater resources, whether surface or groundwater. Water stress causes deterioration of the water environment in both the quality and quantity of water, and consequently restricts the ability of a waterbody to achieve a “Good” status under the WFD.

The Environment Agency has undertaken an assessment of water stress across the UK. This defines a water stressed area as where:

- "The current household demand for water is a high proportion of the current effective rainfall which is available to meet that demand; or
- The future household demand for water is likely to be a high proportion of the effective rainfall available to meet that demand.

In the Environment Agency assessment of water stressed areas the Portsmouth Water, South East Water and Southern Water supply regions were classified as being an area of serious water stress.

In addition to the EA classification of Water Stress, Natural England have stated that it cannot be concluded that the existing abstraction within the Sussex North Water Supply Zone is not having an impact on the Arun Valley sites. It advises that developments within this zone must not add to this impact.

4.7.3 River Basin Management Plans

The study area is located within both the Thames and South East River Basin Districts. The management recommendations from both RBMP's are listed below:

- **Government and agencies (Environment Agency)** grant licences under the Water Resources Act 1991 to regulate how much water is taken from rivers, lakes estuaries and groundwater. The Environment Agency reviews the sustainability of time-limited abstraction licences as they expire, and the licence holders seek replacement licences.
- **All sectors** take up or encourage water efficiency measures, including water industry work on metering, leakage, audits, providing water efficient products, promoting water efficiency and education.
- **Local Government** sets out local plan policies requiring new homes to meet the tighter water efficiency standard of 110 litres per person per day as described in Part G of Schedule 1 to the Building Regulations 2010.
- **Industry manufacturing and other business** implement tighter levels of water efficiency, as proposed by changes to the Building Regulations.
- **Agriculture and rural land management** manage demand for water and use water more efficiently to have a sustainable water supply for the future.
- **Local government** commissions water cycle studies to inform spatial planning decisions around local water resources.

The RBMP goes on to state that "dealing with unsustainable abstraction and implementing water efficiency measures is essential to prepare and be able to adapt to climate change and increased water demand in the future."

4.7.4 Defra Plan for Water

Through their Plan for Water, Defra has signalled their intention to review the water efficiency standards for new homes, including consideration of a new national 105l/p/d standard and 100l/p/d where there is a clear local need.

The Future Homes Hub was established to "facilitate the collaboration needed within and beyond the new homes sector to help meet the climate and environmental challenges ahead" (Future Homes Hub, 2024). It consists of representatives from the building industry, regulators, water companies, and environmental groups. Defra asked them to support them in the creation of the roadmap towards greater water efficiency. They have proposed a road map for water efficient homes in England and sets out a framework for the homebuilding sector to work in partnership with other stakeholders such as the water sector, local authorities and regulators to deliver it. The proposed roadmap is shown in Figure 4.10 below and outlines a staged approach to reducing per capita consumption. It also allows for a tighter figure of 90l/p/d by 2025 in seriously water stressed areas to enable sustainable growth.

Figure 4.10 Future Homes Hub proposed water efficiency roadmap

4.7.5 National Water Resources Framework

A new National Framework for Water Resources was published by the Government in March 2020. This outlines the water resources challenges facing England and sets out the strategic direction for the work being carried out by regional water resource groups.

A range of options were explored, and the most ambitious scenarios rely on policy change to introduce mandatory labelling of water using fittings and associated standards. The Government is currently reviewing policy on water efficiency following a recent consultation. The framework proposes that regional groups plan to help customers reduce their water use to around 110 l/p/d. This is achievable without policy interventions.

This aligns with the tighter standard of 110 l/p/d per day as described in building regulations. However, in order to achieve an average of 110 l/p/d across the UK, including existing housing, a water efficiency target for new build housing of 110 l/p/d or higher would make this harder to achieve. New build housing should therefore be lower than 110 l/p/d.

4.7.6 Water company advice

- As detailed in their Developer Services Charging Arrangements, Portsmouth Water recognise that South East England is a water stressed region, and are keen to work with and incentivise developers to build new water efficient homes. Portsmouth Water currently offer discounts on infrastructure charges

if Developer Customers can provide evidence of intention to build to a level of 100 l/h/d.

- South East Water aim to achieve a per capita water consumption of 110l/h/d by 2050.
- Southern Water introduced new environmental efficiency incentives as per their Charging Arrangements 2023-24, which build upon and replace their existing 'Target 100' (100l/h/d) efficiency incentive. These environmental incentives are detailed in Section 4.9.3.
- Additionally, the Southern Water Sussex North WRZ is designated as 'water neutral,' where, for every new development, total water use in the region after the development must be equal or less than the total water-use in the region before the new development. The Sussex North Water Neutrality Strategy recommended a water efficiency target of 85 l/h/d for all new build housing within the WRZ. This is discussed in further detail in Section 4.8.

4.7.7 Impact on viability

As outlined in Section 4.8.1, the cost of installing water-efficient fittings to target a per capita consumption of 110l/d has been estimated as a one-off cost of £9 for a four-bedroom house. Engagement with developers and information from Defra that emerged as part of the Sussex North Water Neutrality Strategy indicated that a target of 100l/p/d could be achieved with "minimal additional cost". Research undertaken for the devolved Scottish and Welsh governments indicated potential annual savings on water and energy bills for householders of £24-£64 per year as a result of such water efficiency measures. Water efficiency is therefore not only viable but of positive economic benefit to both private homeowners and tenants. In addition, financial incentives are available from the water companies to developers to encourage water-efficient design.

Research published by BRE on the delivery of sustainable buildings reports that the cost of achieving lover BREEAM ratings incurs little or no additional cost and targeting higher BREEAM ratings incurs a typical cost of less than 2% above the baseline. The same study reports that the cost of achieving 3 credits in WAT01 (a 40% reduction in water consumption for baseline) would be £13,361 and payback could be achieved between 1 and 2.5 years depending on the price of water.

4.7.8 Water efficiency target for SDNPA

Currently, Building Regulations provide for a water efficiency target of 125l/p/d or 110l/p/d in water stressed areas. Based on the EA classification of water stress and the information contained in the RBMPs alongside the national objective to achieve a water efficiency target of 110l/p/d across the UK by 2050, there is clear evidence to support the 110l/p/d as a minimum.

However, this figure is under review and is expected to change. The Future Homes Hub have proposed a roadmap to achieve the 110l/p/d national target that includes a target of 100l/p/d in water stressed areas from 2025. This figure reduces to 90l/p/d by 2030.

The WCS therefore recommends that in areas outside of the water neutrality zone, SDNPA adopt a policy requiring a water efficiency target of 100l/p/d in their respective Local Plans and allow for a reduction in this target to 90l/p/d from 2030.

This should be supported by the requirement for non-household development to achieve three credits in the assessment category WAT01 of the BREEAM UK New Construction Standard.

In other areas of the UK. some LPAs are now going further than building regulations and adopting Local Plan policies requiring tighter water efficiency standards where there is a clear local need, including:

- Southern Water have committed in their Water Resource Management Plan to a water efficiency policy that aims to achieve a PCC of 100 l/p/d across the whole of their supply area by 2040. Southern Water advises Councils that a target of 100 l/p/d should be adopted in policy for new build properties, and 80l/p/d for strategic developments where master planning and community level schemes can provide greater benefits.
- Within the water neutrality zone, a target of 85l/p/d across all residential development in the WRZ has been recommended (JBA Consulting, 2022). This has been successfully adopted in Crawley Borough Council's Local Plan.
- Within Greater Cambridge, the Environment Agency are objecting to planning applications due to concerns over future water resource availability. A target of 80l/p/d. is being explored by the planning authority.

4.8 Water neutrality concept

Water neutrality is a relatively new concept for managing water resources, but one that is receiving increased interest as deficits in future water supply/demand are identified. The definition adopted by the Government and the Environment Agency is:

"For every development, total water use in the wider area after the development must be equal to or less than total water use in the wider area before development".

(Environment Agency, 2009)

It is useful to also refer to the refined definition developed by Ashton:

"For every new significant development, the predicted increase in total water demand in the region due to the development should be offset by reducing demand in the existing community, where practical to do so, and these water savings must be sustained over time" (V Ashton, 2014)[2]

This definition states the need to sustain water saving measures over time, and the wording "predicted increase in total water demand" reflects the need for water neutrality to be designed in at the planning stage.

2 Water Resources in the Built Environment, edited by Booth and Charlesworth (2014). Published by Wiley.

Both definitions refer to water use in the region or "wider area", and the extent of this area should be appropriate to local authority boundaries, water resource zones, or water abstraction boundaries depending on what is appropriate for that particular location. For instance, if a development site is in an area of water stress relating to a particular abstraction source, offsetting water use in a neighbouring town that is served by a different water source will not help to achieve water neutrality.

In essence water neutrality is about accommodating growth in a region without increasing overall water demand.

Water neutrality can be achieved in a number of ways:

- Reducing leakage from the water supply networks
- Making new developments more water-efficient
- "Offsetting" new demand by retrofitting existing homes with water-efficient devices
- Encouraging existing commercial premises to use less water
- Implementing metering and tariffs to encourage the wise use of water
- Education and awareness-raising amongst individuals

Suggestions for water-efficiency measures are listed in Table 4-5 below.

4.8.1 Consumer water efficiency measures

Many interventions are designed to reduce water use if operated in a particular way, and so rely on the user being aware and engaged with their water use. The educational aspect is therefore important to ensure that homeowners are aware of their role in improving water efficiency. Table 4-5 shows water efficiency measures that can be made by consumers.

Table 4-5 Consumer water efficiency measures

Type of measure	Examples
Education and promotional campaigns	Encourage community establishments (e.g., schools, hospitals) to carry out self-audits on their water use Deliver water conservation message to schools and provide visual material for schools Building awareness with homeowners/tenants
Water-efficient measures for toilets	Cistern displacement devices to reduce volume of water in cistern Retro-fit or replacement dual flush devices Retro-fit interruptible flush devices Replacement low-flush toilets
Water-efficient measures for taps	Tap inserts, such as aerators Low flow restrictors Push taps Infrared taps

Type of measure	Examples
Water-efficient measures for showers and baths	Low-flow shower heads Aerated shower heads Low-flow restrictors Shower timers Reduced volume baths (e.g. 60 litres) Bath measures
Rainwater harvesting and water reuse	Large-scale rainwater harvesting Small-scale rainwater harvesting for example with a water butt, or rainwater tank for toilet flushing Grey water recycling
Water-efficient measures addressing outdoor use	Hosepipe flow restrictors Hosepipe siphons Hose guns (trigger hoses) Drip irrigation systems Mulches and composting
Commercial properties	Commercial water audits Rainwater recycling Grey water recycling Optimising processes Provide water efficiency information to all newly metered businesses
Metering	Promote water companies free meter option Compulsory metering (in water stressed areas) Smart metering (to engage customer with their consumption) Provide interactive websites that allow customers to estimate the savings associated with metering (environmental and financial) Innovative tariffs (seasonal, peak, rising block) Customer supply pipe leakage - supply pope repair and replacement
Other	Household water audits, including DIY or with help of plumber Seek-and-fix internal leaks and/or dripping taps Water efficient white goods, included washing machines and dishwashers Ask customers to spot and report leaks

Source: Adapted from Booth and Charleswell 2014

4.8.2 Rainwater harvesting

Rainwater recycling or rainwater harvesting (RwH) is the capture of water falling on buildings, roads or pathways that would normally be drained via a surface water sewer, infiltrate into the ground or evaporate. In the UK this water cannot currently be used as a drinking water supply as there are strict guidelines on potable water, but it can be used in other systems within domestic or commercial premises.

Systems for collection of rainwater can be simple water butts attached to a drainpipe on a house, or it could be a complex underground storage system, with pumps to supply water for use in toilet flushing and washing machines. By utilising rainwater in this way there is a reduced dependence on mains water supply for a large proportion of the water use in a domestic property.

The benefits of RwH are:

- RwH reduces the dependence on mains water supply – reducing bills for homeowners and businesses
- Less water needs to be abstracted from river, lakes and groundwater
- Stormwater is stored in a RwH system reducing the peak runoff leaving a site providing a flood risk benefit (for smaller storms)
- By reducing surface water flow, RwH can reduce the first flush effect whereby polluted materials adhering to pavement surfaces during dry periods are removed by the first flush of water from a storm and can cause pollution in receiving watercourses.

The challenges of RwH are:

- Dependency on rainfall can limit availability of harvested rainwater during drought and hot weather events.
- Increased capital (construction) costs to build rainwater harvesting infrastructure into new housing (£2,674 for a 3/4bed detached home)
- Payback periods are long as the cost of water is low so there is little incentive for homeowners to invest (Housing Standards Review, 2014).

4.8.3 Greywater harvesting

Greywater refers to water that has been “used” in the home in appliances such as washing machines, showers and hand basins. Greywater recycling or greywater harvesting (GwH) is the treatment and re-use of this water in other systems such as for toilet flushing. By their nature, GwH systems require more treatment and are more complex than RwH systems, and there are limited examples of their use in the UK.

Greywater re-use refers to systems where wastewater is taken from source and used without further treatment. An example of this would be water from a bath or shower being used on plants in the garden. This sort of system is easy to install and maintain, however as mentioned above the lack of treatment to remove organic matter means the water cannot be stored for extended periods.

Greywater recycling refers to systems where wastewater undergoes some treatment before it is used again. These systems are complex and require a much higher level of maintenance than RwH or greywater re-use systems.

Domestic water demand can be significantly reduced by using GwH, and unlike with a RwH system where the availability of water is dependent on the weather, the source of water is usually constant (for instance if it is from bathing and showering). However, the payback period for a GwH system is usually long, as the initial outlay is large, and the cost of water relatively low.

Viability of greywater systems for domestic retrofit applications is therefore currently limited. However, communal systems may offer more opportunities where the cost can be shared between multiple households particularly on larger new build developments, or in new settlements.

4.8.4 Energy and Water use

According to EU statistics (Eurostat 2017), 17% of the UK's domestic energy usage is for water heating. If less water was being used within the home, for instance through more water efficient showers, less water would need to be heated, and overall domestic energy usage would be reduced.

In 2020-2021 the Government consulted on a Future Homes Standard that will involve changes to Part L (conservation of fuel and power) of the Building Regulations for new dwellings. Unfortunately, this fails to identify the role of water efficiency in the home in also reducing energy usage.

4.8.5 Funding for water neutrality

Water neutrality is unlikely to be achieved by just one type of measure, and likewise it is unlikely to be achieved by just one funding source. Funding mechanisms that may be available could be divided into the following categories:

- Infrastructure-related funding (generally from developer payments).
- Fiscal incentives at a national or local level to influence buying decisions of households and businesses.
- Water company activities, either directly funded by the five-year price review or as a consequence of competition and individual company strategies.
- Joint funding through energy efficiency schemes (and possibly to integrate with the heat and energy saving strategy).

Currently in the UK, the main funding resource for the delivery of water efficiency measures is the water companies, with some discretionary spending by property owners or landlords. For water neutrality to be achieved, policy shifts may be required in order to increase investment in water efficiency. Possible measures could include:

- Further incentivisation of water companies to reduce leakage and work with customers to reduce demand.

- Require water efficient design in new development.
- Developer funding to contribute towards encouraging water efficiency measures.
- Require water efficient design in refurbishments when a planning application is made.
- Tighter standards on water using fittings and appliances.

4.9 Water Efficiency Incentives

4.9.1 Portsmouth Water Incentive

Portsmouth Water incentivise developer customers to build water efficient homes.

"If Developer Customers can provide evidence of intention to build to a level of 100 litres per head per day, or less, Portsmouth Water will provide a 50% allowance on infrastructure charges. Portsmouth Water must be made aware of the Developer Customers intention to build to a level of 100 litres per head per day, or less, at the application stage."

Further information on Portsmouth Water water efficiency incentives is available online.

4.9.2 South East Water Incentive

South East Water have a standard infrastructure charge is payable for all first time 25mm (22mm internal) connections for domestic purposes. First time connections include connection to new premises which have been created as a result of the alteration or conversion of existing premises.

To improve water efficiency in new build properties, South East Water have introduced a reduced eco-connection infrastructure charge for connection with a diameter of 20mm (external).

In the 2023/24 financial year, the standard infrastructure charge (excluding VAT) was £633, but the reduced rate for an eco connection infrastructure charge (excluding VAT) was £583.

Further information regarding South East Water water efficiency incentives is available online.

4.9.3 Southern Water Incentive

Southern Water provide water efficiency incentives to promote water efficiency and promote a reduction in demand for new homes. These incentives are tiered and align with the Water Neutrality Hierarchy published by Waterwise in their "Review of Water Neutrality in the UK" (2021). This tiered approach is taken as follows:

Tier 1: Basic Water Efficiency

"[Southern Water] currently offers a water efficiency incentive in the form of a reduced water infrastructure charge. Properties that achieve efficiency ratings of 100/litres/head/day through the installation of water efficient devices will be entitled to a credit of £250."

Tier 2: Greywater Recycling/ Rainwater Harvesting

"[Southern Water] are proposing to offer a significant incentive/contribution where developments utilise technologies to capture and reuse water. This could include solutions that use rainwater harvesting, grey water recycling or other water reuse technologies. They will require evidence to demonstrate that the solution will capture at least 50 litres of water per property per day for reuse. Properties that install water recycling devices will be entitled to redeem a further £800."

Tier 3: Water Neutrality

"[Southern Water] are proposing to offer a service to facilitate water neutrality through water efficiency visits and retrofitting water saving devices to other properties.

Attainment of tier 1 and tier 2 is a pre-requisite to demonstrate that all reasonable efforts have been made to reduce the baseline demand, prior to further water offsetting activity.

Based on achievement of tier 1 (100 litres/person/day) and tier 2 (min 50 litres/property/day reuse), [Southern Water] has calculated the baseline property average daily water demand to be 217 litres/property/day.

Using evidence from our large-scale water efficiency delivery programme which found an average saving of 27.5l/day, [Southern Water] estimate that providing approximately 7 water efficiency visits to existing homes will offset the remainder of this water demand.

[Southern Water] are proposing to offer this service at a subsidised rate of £400 to achieve water neutrality where tier 1 and tier 2 water efficiency has been achieved. This equates to a contribution of approx. £300 per property."

Further information regarding Southern Water efficiency incentives is available online.

4.10 Conclusions

- The SDNP receives its water from Portsmouth Water, South East Water and Southern Water. The SDNP is within Eastbourne, Farnham, Haywards Heath, Hampshire South East, Hampshire Winchester, Portsmouth Water, Sussex Brighton, Sussex North and Sussex Worthing WRZs. In many of the WRZs, the forecast percentage growth is lower than the expected growth during the Local Plan period. This should be investigated further in Stage 2 once the final WRMP24 has been published.
- The Water Industry National Environment Programme (WINEP) is a set of actions that the EA have requested all 20 water companies operating in England to complete in a particular Asset Management Period (AMP) as part of their environmental commitments. A number of investigations are planned or underway to ensure that abstraction of water from both groundwater and rivers, is not leading to unsustainable reductions in flow, particularly in chalk streams. Development and population growth can increase abstraction, and so SDNP have an opportunity to contribute to these actions indirectly by pursuing policies that promote water efficiency in new development.

- It is important that new development does not result in an unsustainable increase in water abstraction. This can be done in a number of ways from reducing the water demand from new houses through to achieving “water neutrality” in a region by offsetting a new developments water demand by improving efficiency in existing buildings.
- Water resources in the UK are under considerable pressure. The Environment Agency have stated that "the scale of the challenge we face increases with time, and, by 2050, we are looking at a shortfall of nearly 5 billion litres of water per day between the sustainable water supplied available and the expected demand."
- The National Water Resources Framework sets the objective to reduce the average per capita consumption in the UK to 110l/p/d by 2050. This is now part of the Environmental Improvement Plan and water companies WRMPs. Within Defra's Plan for Water is the commitment to review Building Regulations and a target of 100l/p/d in water stress areas is suggested.
- The Future Homes Hub, who are supporting Defra to produce a roadmap to greater water efficiency propose a stages reduction in PCC, with a target of 100l/p/d in water stressed areas in place from 2025, and a reduced target of 90l/p/d in place by 2030 (depending on market conditions and customer acceptance).
- This study recommends that as a minimum the proposed new Building Regulations target of 100l/p/d outlined in Defra's Plan for Water be adopted across the study area. This should be achieved using a fittings-based approach.
- This should be supported by the requirement for non-household development to achieve three credits in the assessment category WAT01 of the BREEAM UK New Construction Standard.
- The Local Plan should allow for a future reduction in the Building Regulations target to 90l/p/d in 2030.
- Within the water neutrality zone, a lower target of 85l/p/d should apply, in line with the Water Neutrality Strategy.
- This is supported by Portsmouth Water’s, South-East Water’s and Southern Water’s incentives for water efficient design in new builds outlined in 4.9 where significant inceptives are offered to reduce design consumption below 110l/p/d. Developers (outside of the water neutrality zone) should be encouraged to achieve at least the Tier 2 incentive.

4.11 Recommendations

The recommendations for water resources are provided in Table 4-6 below:

Table 4-6 Recommendations for water resources

Action	Responsibility	Timescale
Continue to regularly review forecast and actual household growth across the supply region through WRMP Annual Update reports, and where significant change is predicted, engage with Local Planning Authorities.	Portsmouth Water, South East Water, Southern Water.	Ongoing
Provide yearly profiles of projected hosing growth to water companies to inform WRMP updates.	South Downs National Park Authority.	Ongoing
The Authority should consider a domestic water efficiency target of 100l/p/d for all new homes, and work with water suppliers to incentivise even lower consumption. This should be achieved using a fittings-based approach.	South Downs National Park Authority.	In South Downs National Park Authority LP
Use planning policy to require new build non-residential development to achieve at least 3 credits in the Wat01 Measure for water in the BREEAM New Construction standard.	South Downs National Park Authority.	In South Downs National Park Authority LP
Within the water neutrality zone, the Water Neutrality Strategy should be applied.	South Downs National Park Authority.	In South Downs National Park Authority LP
Larger residential developments (including new settlements), and commercial developments should consider incorporating greywater recycling and/or rainwater harvesting into development at the master planning stage in order to reduce water demand.	South Downs National Park Authority, Portsmouth Water, South East Water, Southern Water.	In South Downs National Park Authority LP
Water companies should advise the SDNPA of any strategic water resource infrastructure developments within the study, where these may require safeguarding of land to prevent other type of development occurring.	South Downs National Park Authority, Portsmouth Water, South East Water, Southern Water.	Part of South Downs National Park Authority LP process

Action	Responsibility	Timescale
Review this section of the WCS following publication of the final Water Resource Management Plans for 2024.	South Downs National Park Authority, Portsmouth Water, South East Water, Southern Water.	Stage 2 WCS

5 Water Supply Infrastructure

5.1 Introduction

An increase in water demand due to growth can exceed the hydraulic capacity of the existing supply infrastructure. This is likely to manifest itself as low pressure at times of high demand. An assessment is required to identify whether the existing infrastructure is adequate or whether upgrades will be required. The time required to plan, obtain funding and construct major pipeline works can be considerable and therefore water companies and planners need to work closely together to ensure that the infrastructure is able to meet growing demand.

Water supply companies make a distinction between supply infrastructure, the major pipelines, reservoirs and pumps that transfer water around a WRZ, and distribution systems, smaller scale assets which convey water around settlements to customers. This outline study is focused on the supply infrastructure. It is expected that developers should fund water company impact assessments and modelling of the distribution systems to determine requirements for local capacity upgrades to the distribution systems.

In addition to the work undertaken by water companies, there are opportunities for the local authority and other stakeholders to relieve pressure on the existing water supply system by increasing water efficiency in existing properties. This can contribute to reducing water consumption targets and help to deliver wider aims of achieving water neutrality.

A cost-effective solution can be for local authorities to co-ordinate with water supply companies and “piggyback” on planned leakage or metering schemes, to survey and retrofit water efficient fittings into homes[3]. This is particularly feasible within property owned or managed by the local authorities, such as social housing.

5.2 Methodology

Once potential allocations are available, these will be shared with the water companies who will be asked to assess the impact of each site on the water supply network. A red / amber / green score will be assigned to each site based on the presence of any significant constraints and the nature of any upgrades or new infrastructure required to accommodate them.

3 Water Efficiency Retrofitting: A Best Practice Guide, Waterwise (2009). Accessed online at: http://www.waterwise.org.uk/wp-content/uploads/2018/01/Waterwise-2009_Water-efficiency-Retrofitting_Best-practice.pdf on: 10/02/2023.

5.3 Recommendations

Table 5-1 Recommendations for water supply infrastructure

Action	Responsibility	Timescale
Undertake network modelling to ensure adequate provision of water supply is feasible.	Water companies, SDNPA	Ahead of planning applications
SDNPA and Developers should engage early with water companies to ensure infrastructure is in place prior to occupation. It is recommended that a planning condition is in place to ensure that infrastructure is in place prior to occupation.	Water companies, SDNPA, developers	Ongoing

6 Wastewater Collection

6.1 Sewerage undertakers

Southern Water (SW) and Thames Water (TW) are the Sewerage Undertakers (SU) for the study area. The role of the sewerage undertaker includes the collection and treatment of wastewater from domestic and commercial premises, and in some areas, it also includes the drainage of surface water from building curtilages to combined or surface water sewers. It excludes, unless adopted by the SU, systems that do not connect directly to the wastewater network, e.g., Sustainable Drainage Systems (SuDS) or highway drainage.

Increased wastewater flows into collection systems due to growth in populations or per-capita consumption can lead to an overloading of the infrastructure, increasing the risk of sewer flooding and, where present, increasing the frequency of discharges from storm overflows.

Headroom at Wastewater Treatment Works (WwTW) can be eroded by growth in population or per-capita consumption, requiring investment in additional treatment capacity. As the volumes of treated effluent rises, even if the effluent quality is maintained, the pollutant load discharged to the receiving watercourse will increase. In such circumstances the Environment Agency as the environmental regulator, may tighten consented effluent consents to achieve a “load standstill”, i.e., ensuring that as effluent volume increases, the pollutant discharged does not increase. Again, this would require investment by the water company to improve the quality of the treated effluent. Consents can also be tightened to prevent a deterioration in water quality due to growth, or to achieve environmental objectives.

In combined sewerage systems, or foul systems with surface water misconnections, there is potential to create headroom in the system, thus enabling additional growth, by the removal of surface water connections. This can most readily be achieved during the redevelopment of brownfield sites which have combined sewerage systems, where there is potential to discharge surface waters via sustainable drainage systems (SuDS) to groundwater, watercourses or surface water sewers.

SW and TW are supportive of the use of SuDS and SuDS principles to manage surface water run-off. They recommend that the Drainage Hierarchy is used to direct surface water to natural outfall routes such as infiltration to the ground or into watercourses, before utilising sewers, as supported by paragraph 167 of the NPPF. Surface water should also not be permitted to connect to a foul sewer.

6.2 Storm overflows

Storm overflows are an essential component in the sewer network – however when they operate, they can cause environmental damage. They occur on combined sewer systems where the sewer takes both foul flow (sewage from homes and offices) and rainwater

runoff. In normal conditions (Figure 6.1) all of this flow passed through the sewer network and is treated at a wastewater treatment works.

In periods of exceptional rainfall (Figure 6.2), the capacity in a combined sewer may be used up by the additional flow from rooftops and storm drains. Once the capacity is exceeded, wastewater would back up into homes, businesses and on to roads. A storm overflow acts as a relief valve, preventing this from happening.

Storm overflows become problematic when they operate frequently in moderate or light rainfall, or for long periods as a result of groundwater infiltration in the sewerage system – possibly in breach of their permit.

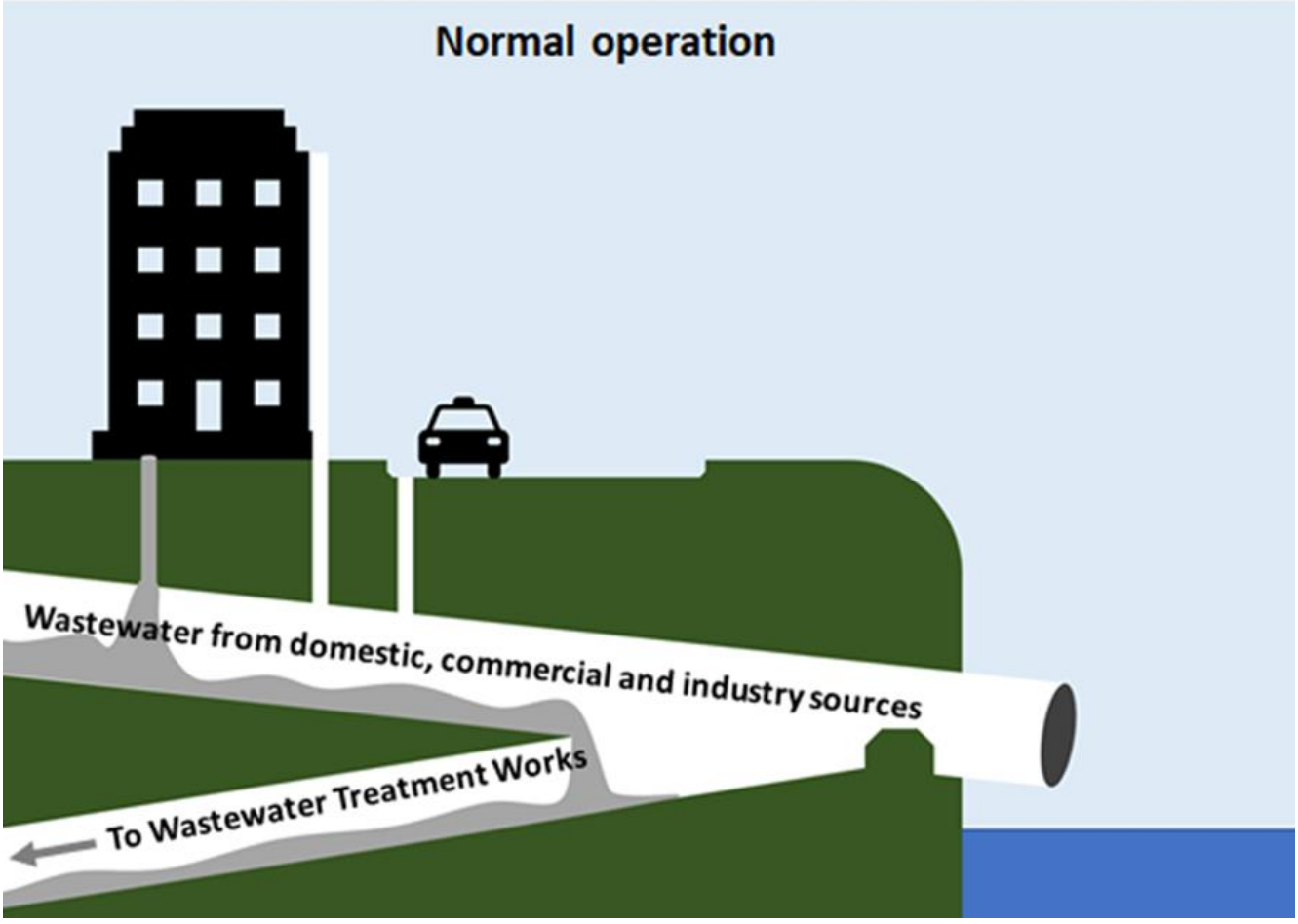


Figure 6.1 Storm overflow operation in normal conditions.

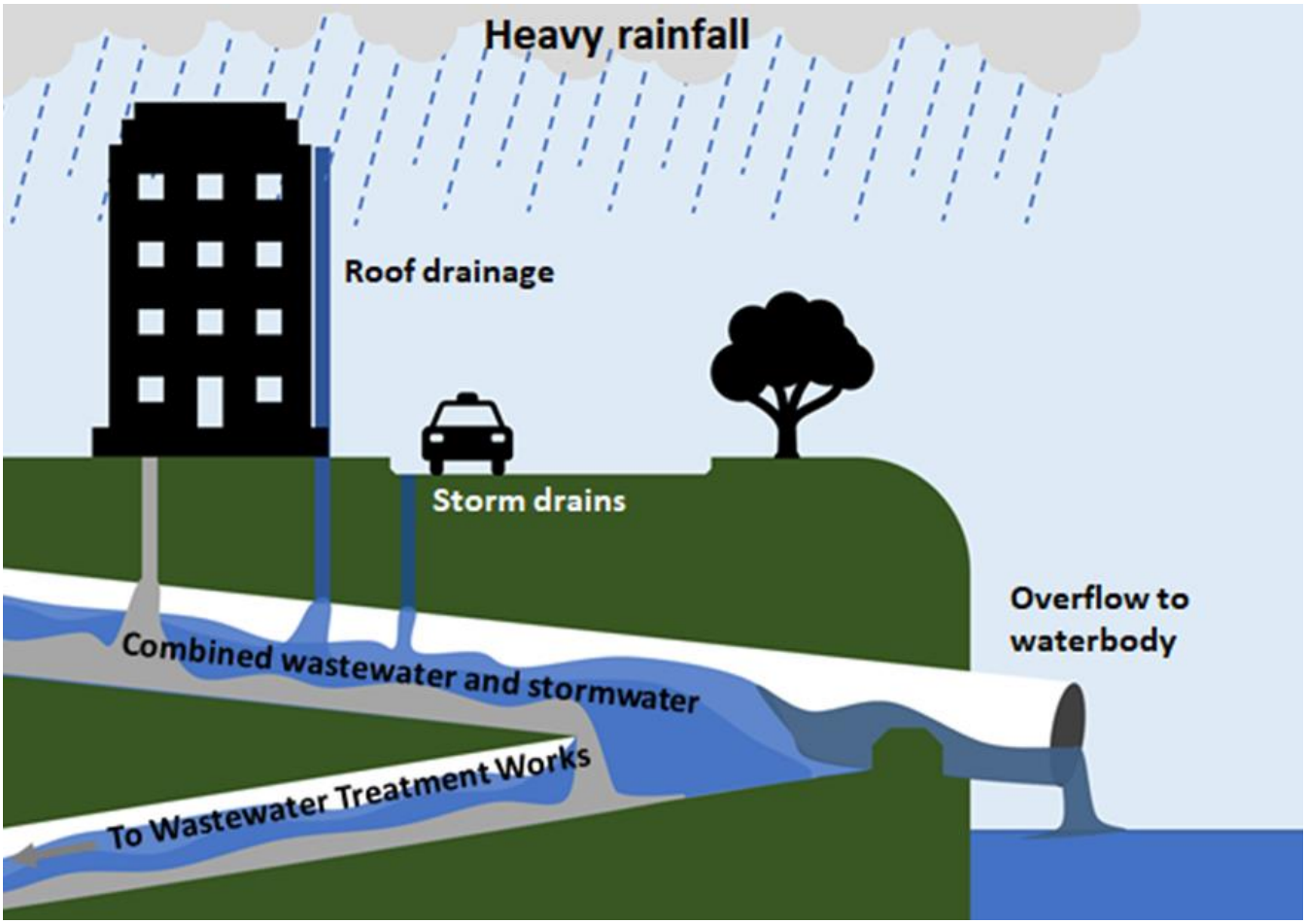


Figure 6.2 Storm overflow operation in exceptional rainfall.

6.3 Methodology

6.3.1 Sewerage System Capacity Assessment

New residential developments and new employment land add pressure to the existing sewerage systems. An assessment is required to identify the available capacity within the existing systems, and the potential to upgrade overloaded systems to accommodate future growth. The scale and cost of upgrading works may vary significantly depending upon the location of the development in relation to the network itself and the receiving WwTW.

It may be the case that an existing sewerage system is already working at its full capacity and further investigations have to be carried out to define which solution is necessary to implement an increase in its capacity. New infrastructure may be required if, for example, a site is not served by an existing system. Such new infrastructure will normally be secured through private third-party agreements between the developer and utility provider.

Sewerage Undertakers must consider the growth in demand for wastewater services when preparing their five-yearly Strategic Business Plans (SBPs) which set out investment for the next Asset Management Plan (AMP) period. Typically, investment is committed to provide new or upgraded sewerage capacity to support allocated growth with a high certainty of

being delivered. Additional sewerage capacity to service windfall sites, smaller infill development or to connect a site to the sewerage network across third party land is normally funded via developer contributions, as third-party arrangements between the developer and utility provider.

6.3.2 Storm overflow assessment

The Environment Act now requires water companies to report and monitor storm overflows as well as reduce the harm caused to the rivers they discharge to. There are 17 network storm overflows, and 23 WwTW storm tank overflows present in the SDNP. Network storm overflows are assessed in this section and overflows at the WwTW are assessed in Section 7. Map of the location of network storm overflows is provided in Figure 6.1.

The Storm Overflow Taskforce[4] has agreed a long-term goal to end the damaging pollution caused by the operation of storm overflows. An important component of this is the monitoring of overflows, and a target has been set to monitor the frequency and duration of operation at all storm overflows by 2023. This is called Event Duration Modelling (EDM). The EDM dataset (which contains performance data on the 16,791 storm overflows in England and Wales monitored in 2023) has been used to provide information on storm overflows in the SDNP. Both Southern Water and Thames Water have confirmed that work is currently underway to investigate storm overflows with the long-term aim of reducing the number of operations of the storm overflows. Southern Water have published a Clean Rivers and Seas Plan which shows how they intend to reduce storm overflows across their region, and contains interactive mapping showing the timetable on which each overflow will be addressed, the cause of poor performance and proposed solution.

The SOAF set a threshold of 60 operations in a year (based on 1 year data, 50 if based on 2 years data, and 40 if based on 3 years), above which a storm overflow should be investigated. As shown in Table 6-2, four of the monitored storm overflows were operating above the threshold for investigation and have been a red RAG score. The Storm Overflow Reduction Plan, which was published in August 2022, sets an objective that "storm overflows will not be permitted to discharge above an average of 10 rainfall events per year by 2050". 12 of the 17 monitored network storm overflows are operating on average above 10 times per year (Table 6-2) and will require action to meet the long-term target.

In this report storm overflows associated with WwTWs have been moved to the section on wastewater treatment.

Unmitigated development within the SDNP could cause the frequency or duration of operation of storm overflows to increase. There are opportunities through the planning system to ease pressure on the wastewater network by separating foul and storm flow in existing combined systems, and not allowing new surface water connections. Surface water can also be better managed by retrofitting SuDS in existing residential areas, and in new

4 Composed of Defra, the EA, OfWAT, Consumer Council for Water, Blueprint for Water and Water UK

development, ensuring SuDS are incorporated into designs at the master planning stage to maximise the potential benefits.

Table 6-1 Classification of storm sewerage overflows based on the Storm Overflow Assessment Framework threshold and 2050 target

Sewer Overflows RAG Score	Number of operations per year (average of available data)	Commentary
Green	0-10	Overflow is currently operating within the long-term (2050) target. Need to ensure that this is maintained in the long-term considering upstream development, climate change and urban creep.
Amber	11 - 39 (based on three years data) 11 - 49 (based on two years data) 11 - 59 (based on one year's data)	An investigation is not required at present, but improvements will need to be made in the network and/or catchment to meet the long-term target.
Red	40+ (based on three years data) 50+ (based on two years data) 60+ (based on one year's data)	The overflow may already be operating beyond the threshold which would trigger an investigation. Upstream development could further increase the discharge frequency, so mitigation should be required prior to significant development.

Table 6-2: Network storm overflow frequency of operation and duration

Overflow (WC site name)	Map Ref.	Number of operations in 2021	Duration of operation in 2021 (hours)	Number of operations in 2022	Duration of operation in 2022 (hours)	Number of operations in 2023	Duration of operation in 2023 (hours)	Average number of Operations 2021-2023	Above investigation threshold? (Y/N)
Alfriston CEO- SW	1	34	461	62	1,009	121	1,420.5	72.3	Y
Barnetts Bridge Graffham CEO- SW	2	132	2,415	105	1,877	154	2998.3	130.3	Y
Chapel Street Petersfield CSO- SW	3	14	28	5	5	10	15.4	9.7	N
College Street Petersfield CSO- SW	4	4	7	0	0	0	0	1.3	N
Court Road Lewes CEO- SW	5	13	157	22	164	67	284.6	34.0	N
Garnier Road Winchester CEO- SW	6	1	1	1	6	0	0	0.7	N
Glebe Road	7	13	49	24	190	30	222.0	22.3	N

Overflow (WC site name)	Map Ref.	Number of operations in 2021	Duration of operation in 2021 (hours)	Number of operations in 2022	Duration of operation in 2022 (hours)	Number of operations in 2023	Duration of operation in 2023 (hours)	Average number of Operations 2021-2023	Above investigation threshold? (Y/N)
Fernhurst CSO- SW									
Glynde North CEO- SW	8	4	5	39	614	17	325.7	20.0	N
Glynde South CEO- SW	9	0	0	7	50	23	295.1	10.0	N
Ham Lane Lewes New SSO- SW	10	61	437	146	2,419	243	4,830.6	150.0	Y
Iping Lane Iping North CEO- SW	11	0	0	0	0	21	149.93	7.0	N
Selbourne SPS - TW	12	13	77	1	2	32	413.8	15.3	N
Singleton Relief CEO - SW	13	164	3,496	5	37	19	175.2	62.7	Y
South Street Ditchling CSO- SW	14	43	225	8	82	0	0	17.0	N

Overflow (WC site name)	Map Ref.	Number of operations in 2021	Duration of operation in 2021 (hours)	Number of operations in 2022	Duration of operation in 2022 (hours)	Number of operations in 2023	Duration of operation in 2023 (hours)	Average number of Operations 2021-2023	Above investigation threshold? (Y/N)
Station Road Liss CSO- SW	15	7	8	0	0	8	20.5	5.0	N
The Leys Fernhurst CSO- SW	16	13	49	25	103	23	86.4	20.3	N
The Wharf Midhurst CEO- SW	17	12	16	12	26	7	46.1	10.3	N

SW – Southern Water

TW –Thames Water

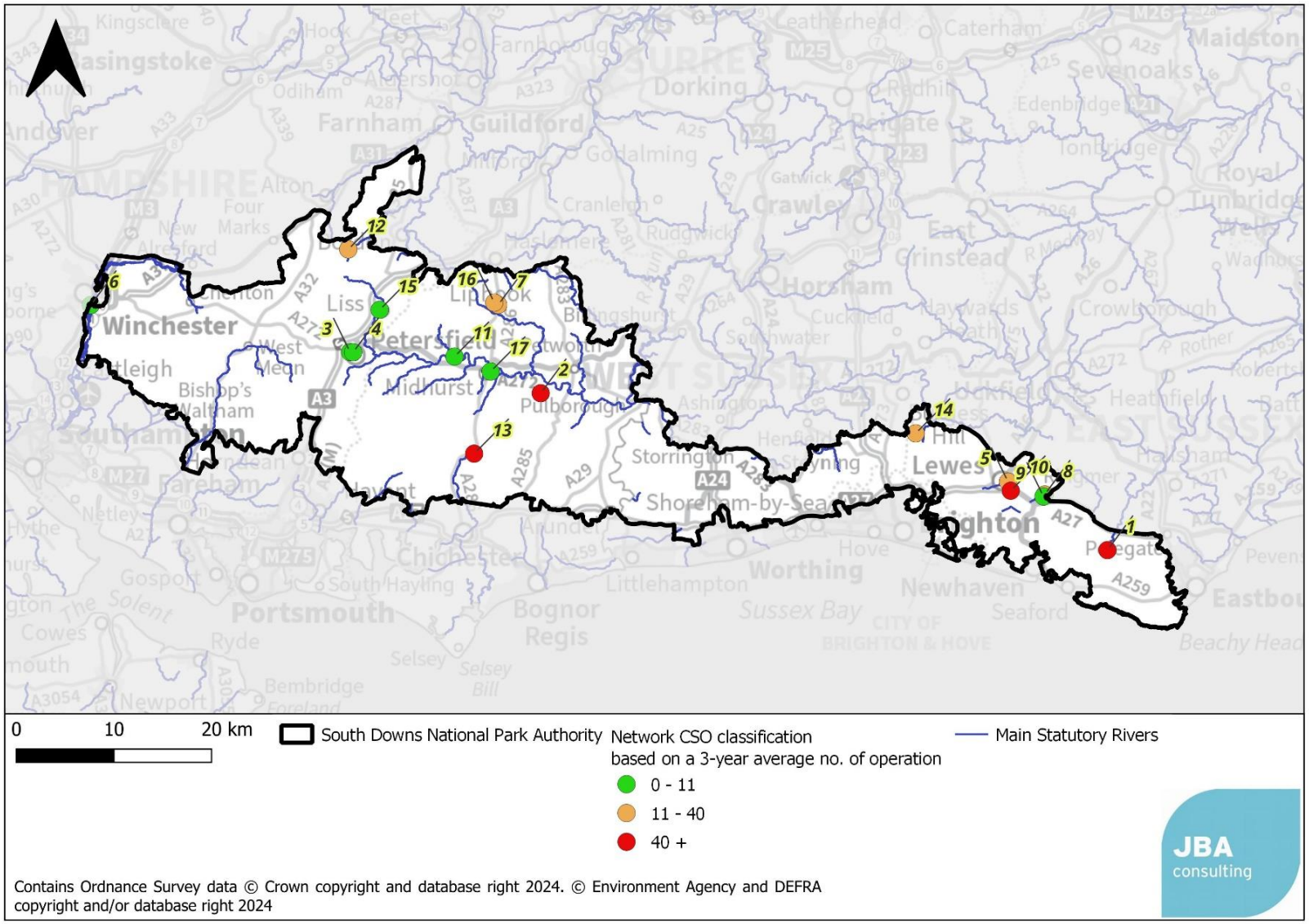


Figure 6.3 Network Storm overflows location and classification based on the 3-year average no. of operations

6.4 Conclusions

Development in areas where there is limited wastewater network capacity will increase pressure on the network, increasing the risk of a detrimental impact on customers, and increasing the likelihood of storm overflow operation. Early engagement with developers, Thames Water and Southern Water is required, and further modelling of the network may be required in the Stage 2 WCS and at the planning application stage. Furthermore, in the Thames Water and Southern Water networks, there are areas where the current network is a combined sewer system, and further separation of foul and surface water may be required, as well as suitably designed SuDS. Four network storm overflows are currently above the threshold for investigation by the EA and 12 overflows will require action to meet the long-term target.

Early engagement between developers, the SDNPA, Thames Water and Southern Water is recommended to allow time for the strategic infrastructure required to serve these developments to be planned.

6.5 Recommendations

Table 6-3 Recommendations from wastewater network assessment

Action	Responsibility	Timescale
Early engagement between SDNPA and Thames Water and Southern Water is required to ensure that where strategic infrastructure is required, it can be planned in by Southern Water and Thames Water, and will not lead to any increase in discharges from sewer overflows.	SDNPA, Southern Water and Thames Water.	Ongoing
Consider wastewater infrastructure constraints in phasing development in partnership with the sewerage undertaker	SDNPA, Southern Water and Thames Water.	Ongoing
Developers will be expected to work with the sewerage undertaker closely and early in the planning promotion process to develop an Outline Drainage Strategy for sites. The Outline Drainage strategy should demonstrate the wastewater assets required, their locations including points of connection to the public foul sewerage, whether the site drainage will be adopted by the	SDNPA and developers	Ongoing

Action	Responsibility	Timescale
water company and if any sewer requisitions will be required.		
Developers will be expected to demonstrate to the Lead Local Flood Authority (LLFA) that surface water from a site will be disposed using a sustainable drainage system (SuDS) with connection to surface water sewers seen as the last option. New connections for surface water to foul sewers will be resisted by the LLFA, SW and TW.	Brighton and Hove City Council, East Sussex County Council, Hampshire County Council and West Sussex County Council as LLFA.	Ongoing

7 Wastewater Treatment

7.1 Wastewater Treatment Works in SDNPA

Southern Water and Thames Water provide wastewater services for development in SDNPA area. Southern Water and Thames Water refer to their wastewater processing plants as Wastewater Treatment Works (WwTW). They may also be referred to as Sewage Treatment Works (STW) in some documents and data sources. For the purposes of this report, both Southern Water and Thames Water's wastewater processing plants will be referred to as WwTWs. The location of the WwTWs in and around SNDPA area are shown in Figure 7.2and Figure 7.3 below.

Sites already allocated in the adopted local plan, or already in the planning system (commitments) as well as an allowance for windfall, were assigned to a WwTW using the sewerage drainage area boundaries provided by each SU to set a baseline for WwTW capacity. Actual connection of a development site to a particular WwTW may be different and will depend on the capacity of the receiving works, and the local sewer network.

Some of the committed and completed sites did not fall within the catchment boundary of any WwTW. Very small developments in rural areas may be suitable for on-site treatment and discharge, however the Environment Agency will not usually permit this where there is a public sewerage system within a distance calculated as 30m per dwelling. There is therefore a localised risk to water quality if all of these small developments were to be served by septic tanks, especially where there are clusters of small-scale new development.

7.2 Wastewater Treatment Works Flow Permit Assessment

7.2.1 Introduction

The Environment Agency is responsible for regulating sewage discharge releases via a system of Environmental Permits (EPs). Monitoring for compliance with these permits is the responsibility of both the EA and the plant operators. Figure 7.1 summarises the different types of wastewater releases that might take place, although precise details vary from works to works depending on the design.

During dry weather, the final effluent from the WwTW should be the only discharge (1). With rainfall, the storm tanks fill and eventually start discharging to the watercourse (2) and Combined Sewer Overflows (CSOs) upstream of the storm tanks start to operate (3). The discharge of storm sewage from treatment works is allowed only under conditions of heavy rain or snow melt, and therefore the flow capacity of treatment systems is required to be sufficient to treat all flows arising in dry weather and the increased flow from smaller rainfall events. After rainfall, storm tanks should be emptied back to full treatment, freeing their capacity for the next rainfall event.

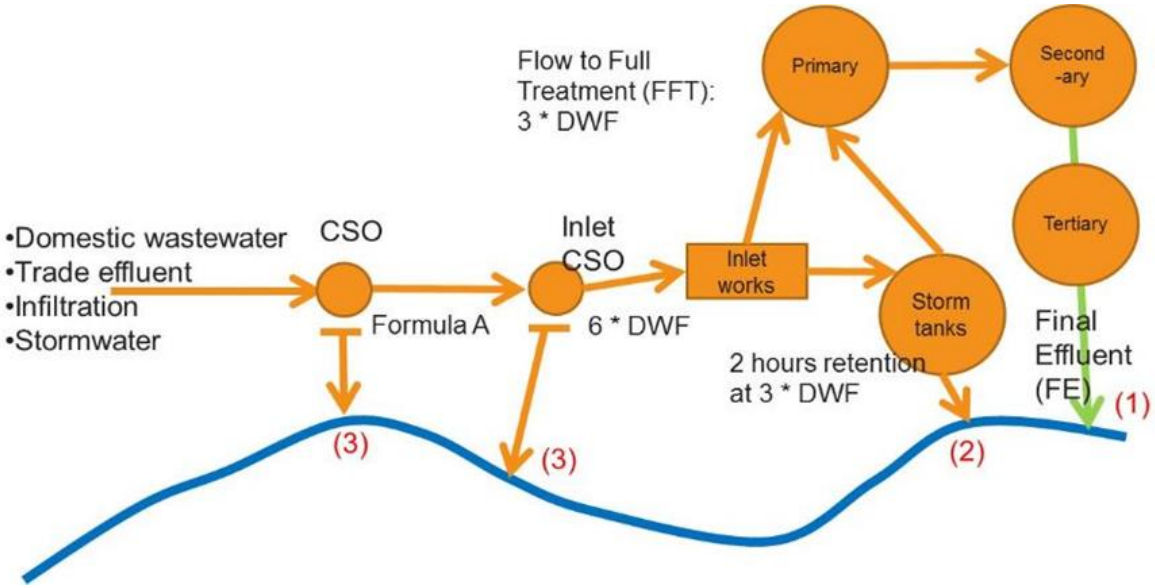


Figure 7.1 Overview of typical combined sewerage system and WwTW discharges

Environmental permits are used alongside water quality limits as a means of controlling the pollutant load discharged from a water recycling centre to a receiving watercourse. Sewage flow rates must be monitored for all WwTWs where the permitted discharge rate is greater than 50 m^3/day in dry weather.

Permitted discharges are based on a statistic known as the Dry Weather Flow (DWF). As well as being used in the setting and enforcement of effluent discharge permits, the DWF is used for WwTW design, as a means of estimating the 'base flow' in sewerage modelling and for determining the flow at which discharges to storm tanks will be permitted by the permit (Flow to Full Treatment, FFT).

WwTW Environmental Permits also consent for maximum concentrations of pollutants, in most cases Suspended Solids (SS), Biochemical Oxygen Demand (BOD) and Ammonia (NH_4). Some works (usually the larger works) also have permits for Phosphorous (P). These are determined by the Environment Agency with the objective of ensuring that the receiving watercourse is not prevented from meeting its environmental objectives, with specific regard to the Chemical Status element of the Water Framework Directive (WFD) classification.

Increased domestic population and/or employment activity can lead to increased wastewater flows arriving at a WwTW. Where there is insufficient headroom at the works to treat these flows, this could lead to failures in flow consents.

7.3 Methodology

An assessment of WwTW capacity was carried out by JBA using measured flow data supplied by the water companies. The process was as follows:

- Southern Water and Thames Water provided their calculated 80th percentile exceedance flow statistic for each WwTW.

- Sites already in the planning system, windfall and neighbouring authority growth was assigned to a WwTW using the sewerage drainage area boundaries.
- For each site, the future DWF was calculated using the occupancy rates and per-capita consumption values obtained from the Water Resource Management Plans (Table 7-1), and the assumption that 95% of water used is returned to sewer. Permitted headroom was used as a substitute for actual designed hydraulic capacity for each WwTW being assessed.
- For employment sites, wastewater was demand was estimated based on the predicted number of new employees. Floor space, employment use types, and employment densities were used to estimate the number of employees.

Table 7-1 Per capita consumption values used in water demand calculations

Water Company	Per capita residential consumption (m^3/person/day)	Occupancy rate (persons per dwelling)	Per capita employment consumption (m^3/person/day)
Southern Water – Sussex North	0.175	2.2	0.1
Southern Water - Sussex Brighton	0.1491	2.5	0.1
Southern Water - Sussex Worthing	0.1797	2.3	0.1
Southern Water - Hampshire Southampton East	0.1651	2.6	0.1
Southern Water - Hampshire Winchester	0.1635	2.5	0.1
Portsmouth Water - Portsmouth	0.1563	2.4	0.1
South East Water - Farnham	0.1742	2.4	0.1
South East Water - Eastbourne	0.1753	2.3	0.1
South East Water - Heywards Heath	0.1878	2.4	0.1
South East Water - Bracknell	0.206	2.4	0.1
Thames Water - Guildford	0.190	2.58	0.1

7.4 Results

The impact of committed growth on wastewater treatment capacity in SDNPA is shown in Figure 7.3 and Appendix A. It should be noted that this map represents the remaining capacity (number of houses) once all committed sites are built and does not take into account planned increases in treatment capacity, or growth from future allocations. The following definition was used by JBA to score each WwTW:

GREEN Likely to be sufficient capacity to accommodate growth	AMBER Likely to be close to or exceed permit during plan period. Upgrades and / or a change to permit limit may be required. No significant constraints have been identified. (Based on less than 10% headroom remaining)	RED WwTW Capacity may be a constraint to growth (defined by Water Company)

There are 80 WwTWs within SDNP of which 45 are likely to serve growth. Once growth from adopted plans and existing commitments is taken into account, 13 WwTWs are likely to be close to or exceeding their permit during the plan period. An increase to the flow permit, and/or upgrades to treatment capacity will be required at these WwTWs.

Where a WwTW is likely to exceed its permit, the permit would be reviewed by the EA and if a higher flow consent was agreed, a tighter permit limit for substance concentrations is very likely to be required. In some cases this may not be possible if that means concentrations tighter than the Technically Accepted Limit (TAL) which is 0.25 mg/l for P for example. This will be assessed in the Stage 2 study.

At the remainder of the WwTWs, there is some capacity within the permit to serve additional growth during the plan period.

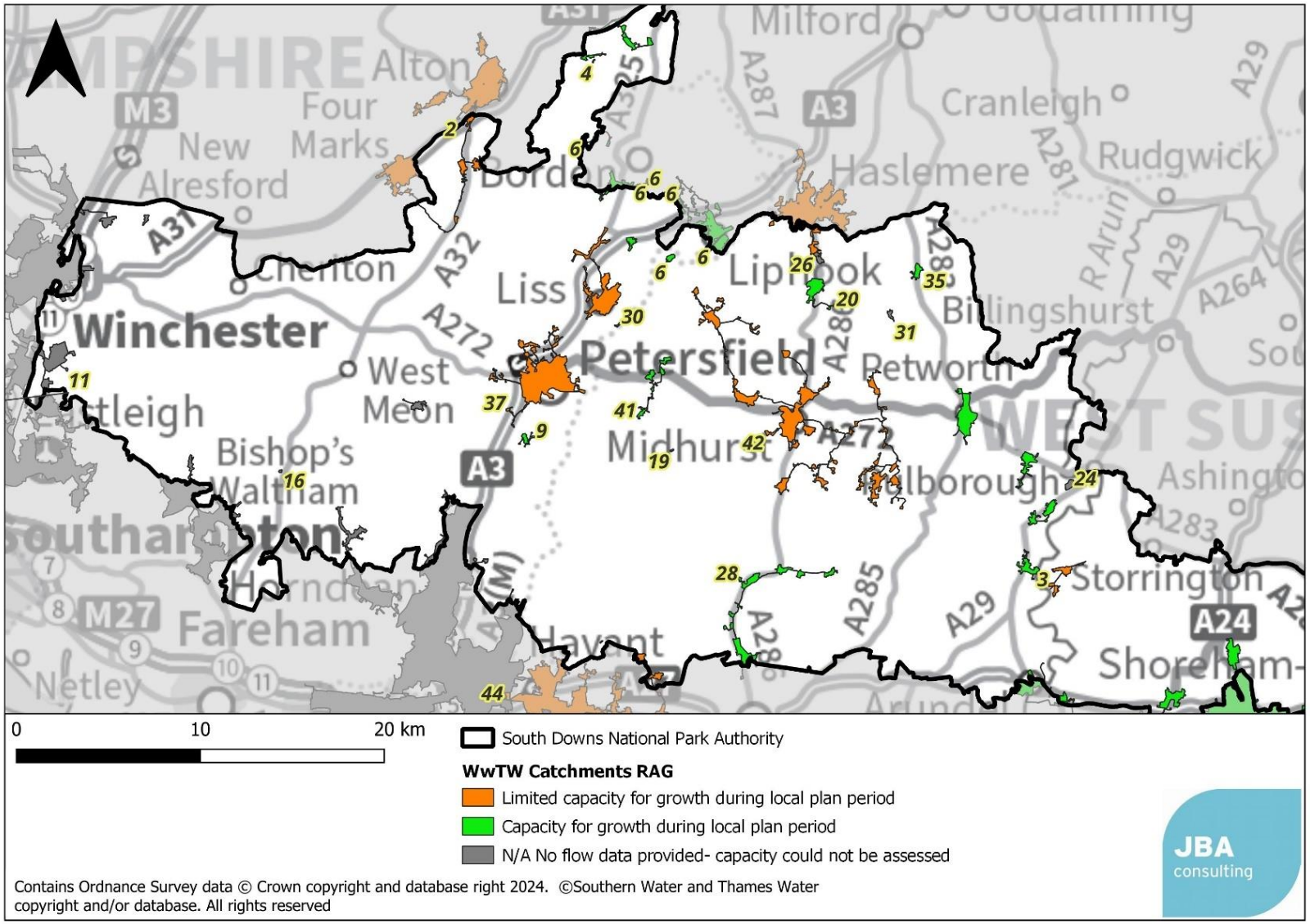


Figure 7.2 JBA WwTW flow capacity RAG results (West)

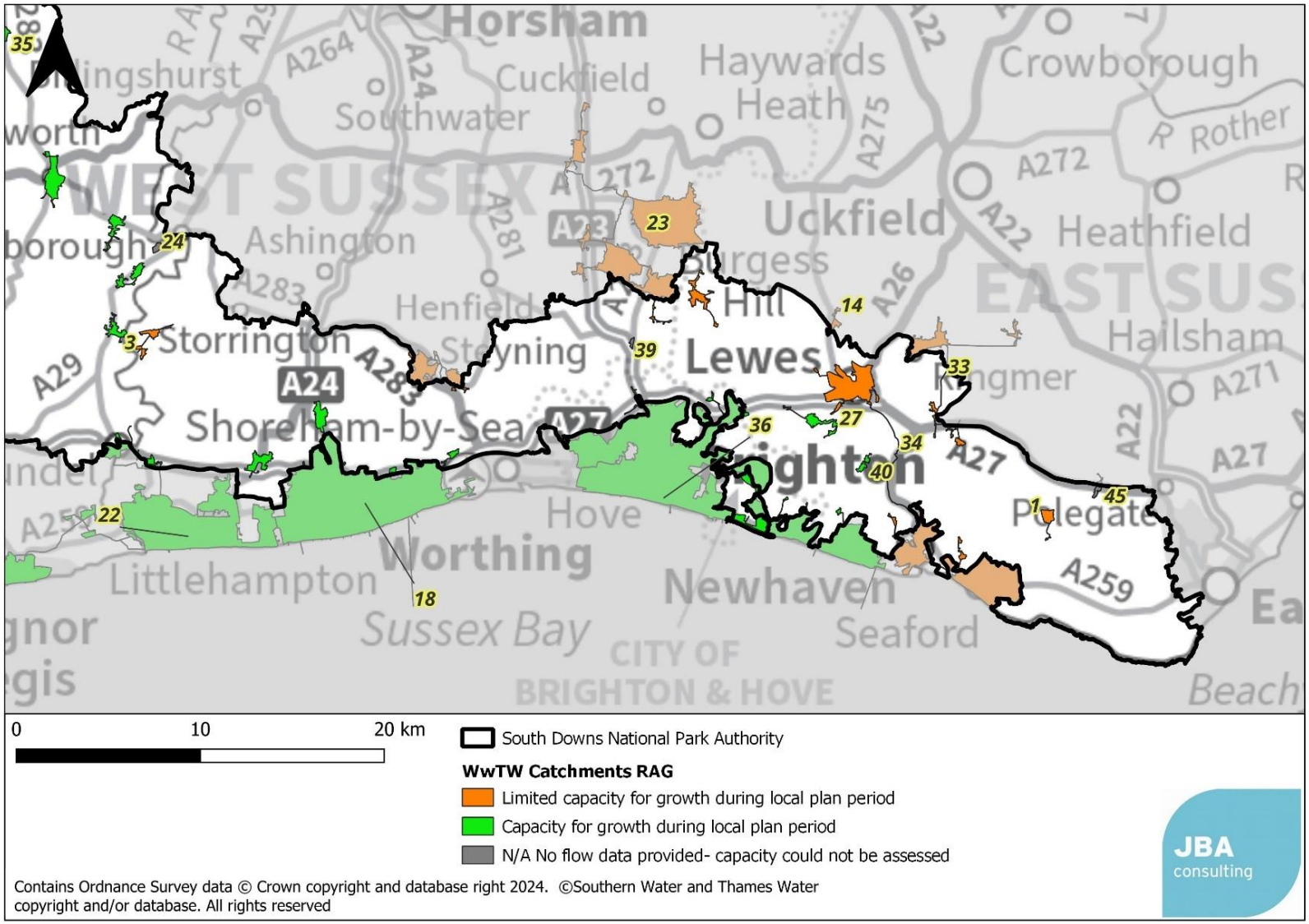


Figure 7.3 JBA WwTW flow capacity RAG results (East)

7.5 Storm tank overflows

The Table 7-2 below presents performance of storm tank overflows at WwTWs in the SDNPA area. 13 of them were operating above the threshold for investigations based on monitoring between 2021 and 2023. Figure 7.4 shows the location and the classification of each overflow based on the SOAF threshold and 2050 target, as explained in Table 6-1 in Section 6.

Where a storm tank overflow is operating in periods of moderate or light rainfall, or even in dry conditions it indicates either an infiltration problem within the network, or that the WwTW or its storm tanks are undersized for the population served. Further development within a catchment that has a poorly performing storm tank overflow is likely to exacerbate the issue.

The local plan can contribute to this by encouraging the use of SuDS to divert storm water away from the sewer network, reducing the volume that reaches the WwTW. This opportunity is greatest at brownfield sites connected to existing combined sewerage systems.

Table 7-2 WwTW storm tanks, pumping stations and emergency combined overflows frequency of operation and duration

Overflow (WC site name)	Map Ref.	Number of operations in 2021	Duration of operation in 2021 (hours)	Number of operations in 2022	Duration of operation in 2022 (hours)	Number of operations in 2023	Duration of operation in 2023 (hours)	Average number of Operations 2021-2023	Above threshold for investigation? (Y/N)
Buriton CEO-SW	1	30	284	16	129	127	2395.0	57. 7	Y
Bury SSO-SW	2	61	1,183	39	837	128	2607.5	76.0	Y
Coldwaltham CSO-SW	3	5	6	0	0	0	0	1.7	N
Ditchling SSO-SW	4	109	1,678	81	1,205	151	2657.2	113. 7	Y
East Dean SSO-SW	5	12	21	18	26	10	31.1	13. 3	N
East Meon SSO-SW	6	14	285	2	7	17	167.6	11.0	N
Fernhurst SSO-SW	7	36	323	25	272	49	652.2	36.7	N
Fittleworth SSO-SW	8	149	2,693	81	1,468	109	2059.8	113.0	Y
Harestock SSO-SW	9	0	0	0	0	10	109.4	3.3	N
Kingston Hollow CEO-SW	10	26	57	36	181	77	481.8	46.3	Y
Liss SSO-SW	11	55	607	47	543	83	1437.9	61.7	Y

Overflow (WC site name)	Map Ref.	Number of operations in 2021	Duration of operation in 2021 (hours)	Number of operations in 2022	Duration of operation in 2022 (hours)	Number of operations in 2023	Duration of operation in 2023 (hours)	Average number of Operations 2021-2023	Above threshold for investigation? (Y/N)
Lurgashall SSO-SW	12	10	77	11	88	21	212.3	14.0	N
Morestead Road Winchester SSO-SW	13	2	5	5	4	8	41.5	5.0	N
Northchapel SSO-SW	14	58	738	46	491	101	1905.7	68.3	Y
Petersfield SSO-SW	15	46	330	41	329	54	543.0	47.0	Y
Petworth CSO-SW	16	No data	No data	26	166	29	87.6	27.5	N
Poynings SSO-SW	17	No data	No data	4	31	6	118.6	5.0	N
Pulborough SSO -SW	18	22	203	44	620	109	1495.2	58.3	Y
Rogate SSO-SW	19	49	323	33	260	60	773.0	47.3	Y
Selborne STW-TW	20	70	1,322	39	417	115	2132.8	74.7	Y
South Ambersham SSO-SW	21	36	251	40	497	93	1250.8	56.3	Y

Overflow (WC site name)	Map Ref.	Number of operations in 2021	Duration of operation in 2021 (hours)	Number of operations in 2022	Duration of operation in 2022 (hours)	Number of operations in 2023	Duration of operation in 2023 (hours)	Average number of Operations 2021-2023	Above threshold for investigation? (Y/N)
South Harting SSO -SW	22	161	3,406	141	3,155	111	2,164.12	137.7	Y

SW- Southern Water

TW-Thames Water

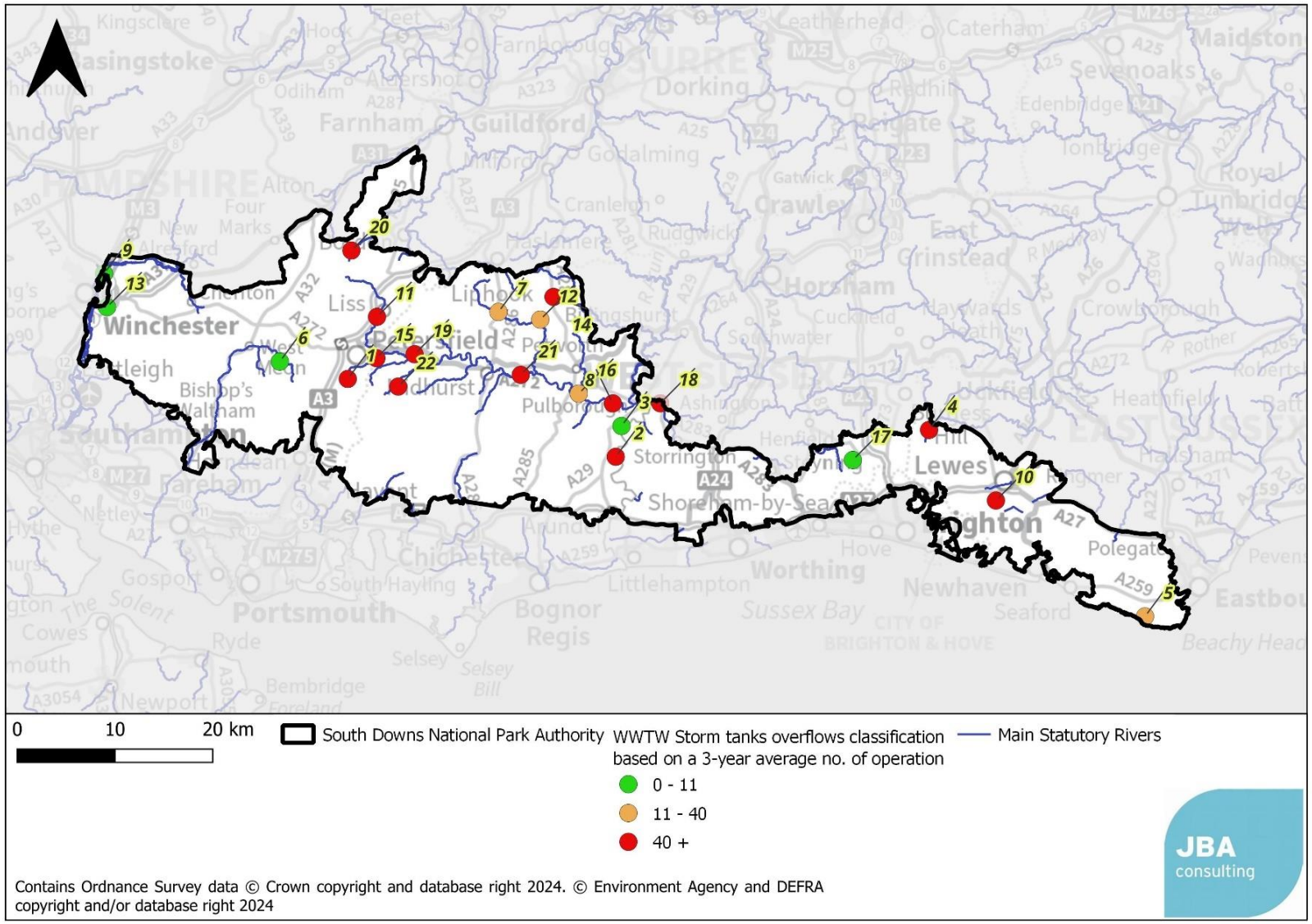


Figure 7.4 Three-year average of WwTW storm overflow spill

7.6 Wastewater Treatment Works Odour Assessment

7.6.1 Overview

Where new developments encroach upon an existing Wastewater Treatment Works (WwTW), odour from that sire may become a cause for nuisance and complaints from residents. Managing odour at WwTWs can add considerable capital and operational costs, particularly when retro fitted to existing WwTWs. National Planning Policy Guidance recommends that plan makers consider whether new development is appropriate near to sites used (or proposed) for water and wastewater infrastructure, due to the risk of odour nuisance.

7.6.2 Methodology

Sewerage undertakers recommend that an odour assessment may be required if the site of a proposed development is close to a WwTW and is encroaching closer to the WwTW than existing urban areas.

A GIS assessment was carried out to identify areas that the sewerage undertaker considers may be at risk from odour nuisance due to encroachment on an existing WwTW. For Thames Water, this is defined as development sites less than 800m from the WwTW and encroaching closer to the WwTW than existing urbanised areas. For Southern Water, this is defined as development sites less than 500m from the WwTW. If there are no existing houses close to a WwTW it is more likely than an odour assessment is needed. These would typically be undertaken by the developer as part of the planning process.

7.6.3 Results

Areas where an odour impact assessment would be recommended for new development are shown in Figure 7.5 for Southern Water WwTW and Figure 7.6 for Thames Water WwTW.

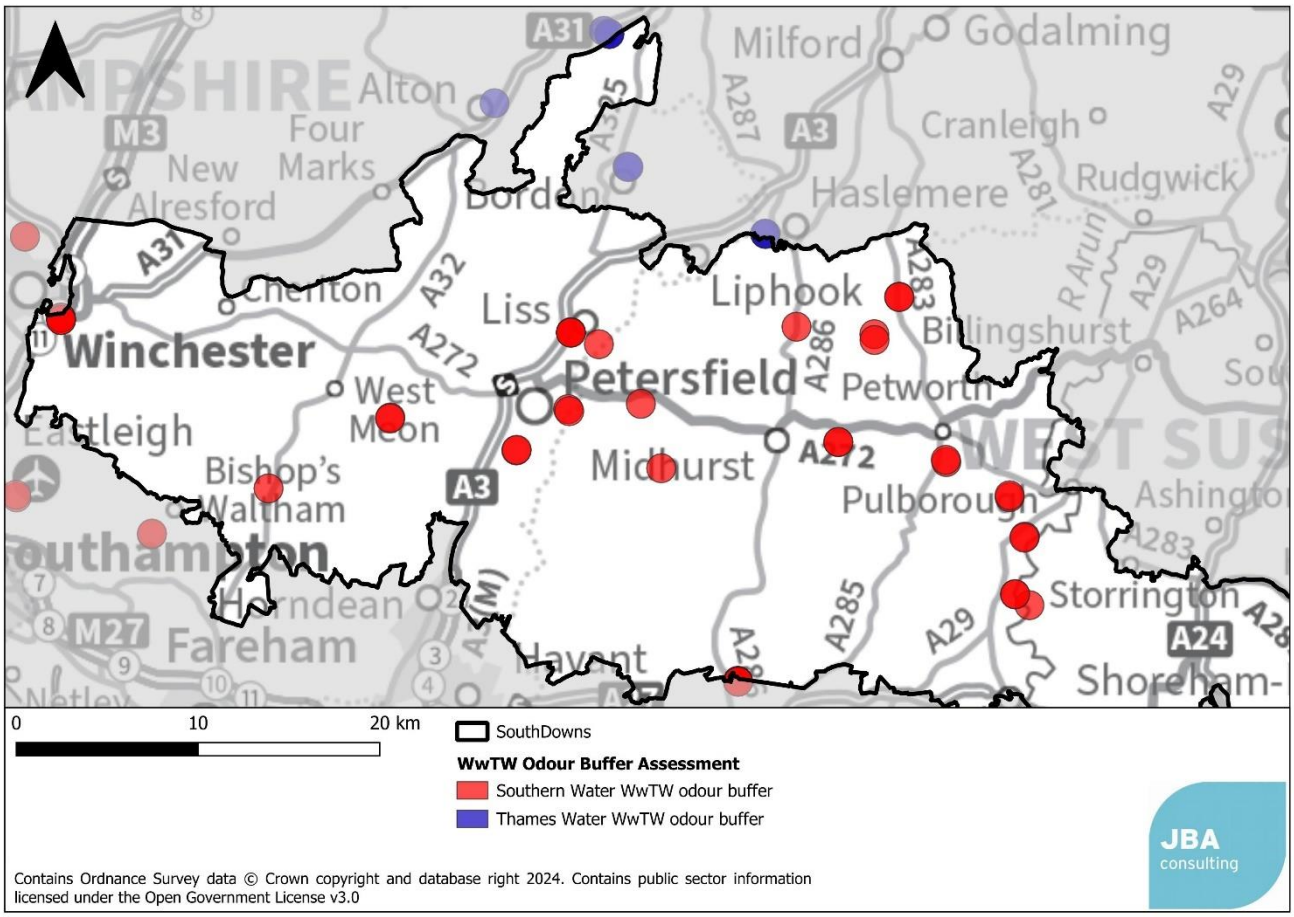


Figure 7.5 800m WwTW odour assessment buffer (West)

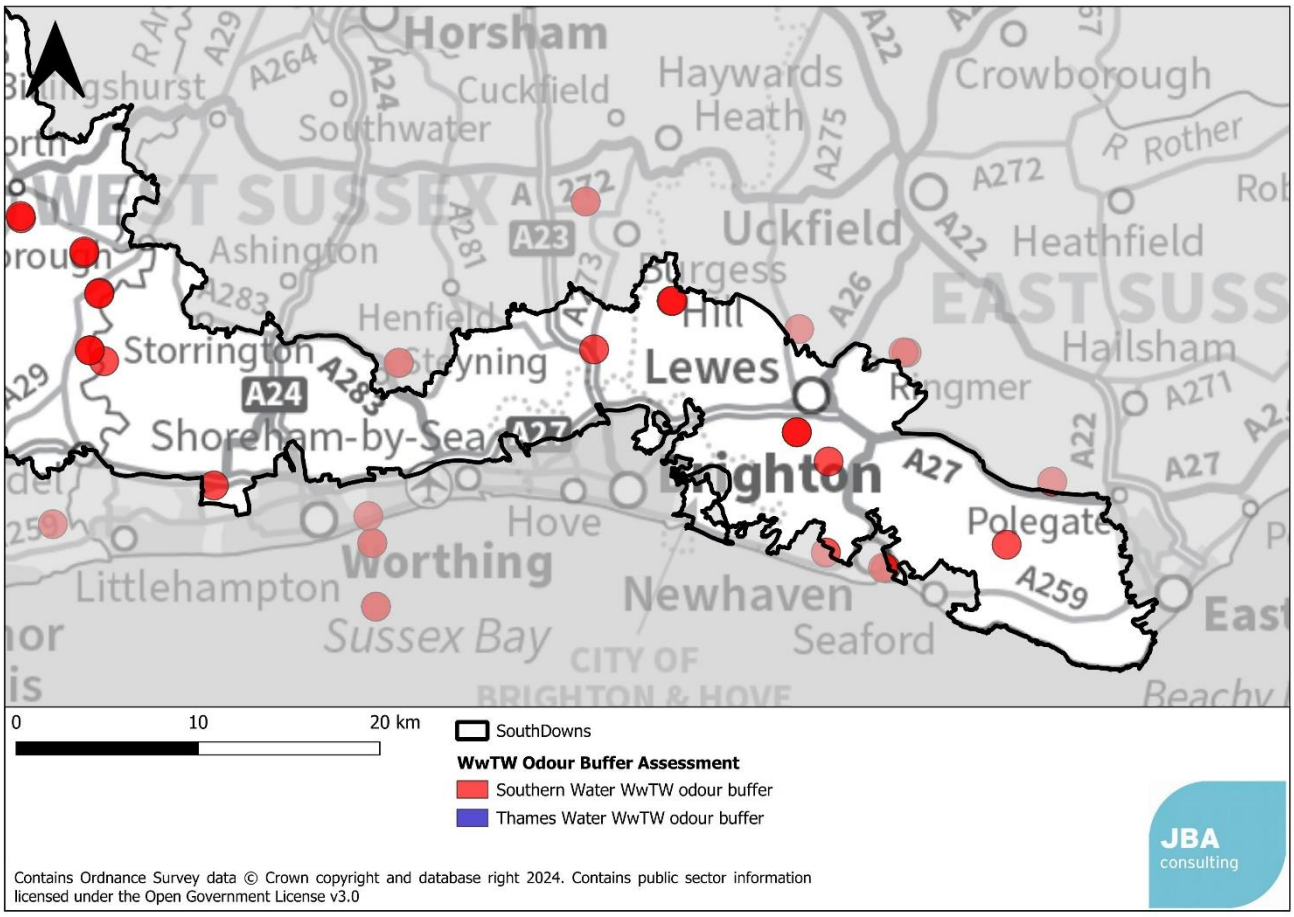


Figure 7.6 800m WwTW odour assessment buffer (west)

7.7 Conclusions

A headroom assessment was carried out comparing the current flow from each WwTW, making allowance for growth already planned, with the permit limit. This provides an estimate of the spare capacity in wastewater treatment infrastructure in SDNP.

13 of the 45 the WwTWs expected to serve growth in the study area are likely to be close to or exceeding their permit during the Local Plan period. An increase in the permit limit, and / or upgrades to treatment capacity may be required at these WwTWs in order to accommodate further growth.

Consideration should be given to using capacity in existing permits as this provides a lower carbon cost than upgrading capacity at existing WwTW or building new treatment works.

There are a number of poorly performing storm tank overflows at WwTWs in SDNP. Growth within these catchments could result in an increase in the operations of these overflows contributing to a worsening of water quality in the area. Action should be taken by the water companies to address these overflows prior to an increase in wastewater demand being generated by new development.

New development proposed within the Thames Water and Southern Water's WwTW odour buffer zones are recommended to undergo an odour assessment, to be paid for by the

developer as part of the planning process. Preferred sites, if available, will be assessed at Stage 2 to determine their proximity to WwTWs.

7.8 Recommendations

Table 7-3 Recommendations for wastewater treatment

Action	Responsibility	Timescale
Early engagement with Southern Water and Thames Water is required to ensure that provision of WwTW capacity is aligned with delivery of development.	SDNPA	Ongoing
Provide Annual Monitoring Reports to Southern Water and Thames Water detailing projected housing growth.	SDNPA	Ongoing
Southern Water and Thames Water to assess growth demands as part of their wastewater asset planning activities and feedback to the Council if concerns arise.	Southern Water, Thames Water	Ongoing
Carry out an odour assessment for sites which fall within the buffer zone of WwTW.	SDNPA, developers	Ongoing

8 Nutrient Neutrality

8.1 Introduction

Within SDNP, there are two catchments where nutrient neutrality is required, the River Itchen SAC and the Solent. These areas are displayed in Figure 8.1 In 2022, Natural England sent letters to LPAs across the country, outlining their advice for development proposals with the potential to affect water quality resulting in adverse nutrient impacts on habitats sites. Nutrient neutrality is a means of ensuring that a plan or project does not add to existing nutrient burdens to designated sites so there is no overall increase in nutrients because of the plan or project (Natural England, 2022). Where nutrient neutrality is required to prevent increased nutrient loading of a designated waterbody, Local Plans and developers need to prove the project or new plans will be nutrient neutral before they are implemented. This comes in the form of nutrient offsetting and the use of phosphate and nitrogen credits, SuDS, or onsite land use change.

The Solent and River Itchen are internationally important for their wildlife. These sites are vulnerable to elevated nutrient (nitrogen and phosphorous) levels. Sources of nutrients include agriculture such as fertiliser run off, and wastewater outputs from new development.

The Solent nutrient neutrality area covers the south of England including Chichester and Langstone Harbours SPA/Ramsar, Solent and Southampton Water SPA/Ramsar, Solent Maritime SAC, Portsmouth Harbour SPA/Ramsar. Environmental sites within the Solent are vulnerable to elevated nitrate levels. Within the SDNPA area, the districts of Winchester, East Hampshire, Eastleigh, Havant, and Chichester fall within this nutrient neutrality zone.

The River Itchen nutrient neutrality zone contains the River Itchen which is designated as a SAC and SSSI. In Natural England's latest assessment of the site[5], water quality measurements showed phosphorous concentrations that exceeded along most of the reach. As the most downstream reaches also fail, inputs in the upper catchment also contribute and need to be mitigated. Within the SDNPA area, the districts of Winchester, East Hampshire, and Eastleigh fall within this nutrient neutrality zone.

A range of potentially feasible schemes have been identified in the SDNP Nutrient Guidance[6] which aim to manage nutrients in the River Itchen and Solent catchments through nature-based solutions, and drainage and wastewater-based interventions.

5 https://publications.naturalengland.org.uk/file/6097363337478144

6 https://www.southdowns.gov.uk/nature-recovery-information-for-delivery-partners/call-for-nature-sites/call-for-nature-sites-faqs/mechanisms/nitrates-offsetting-site/nutrient-neutrality/

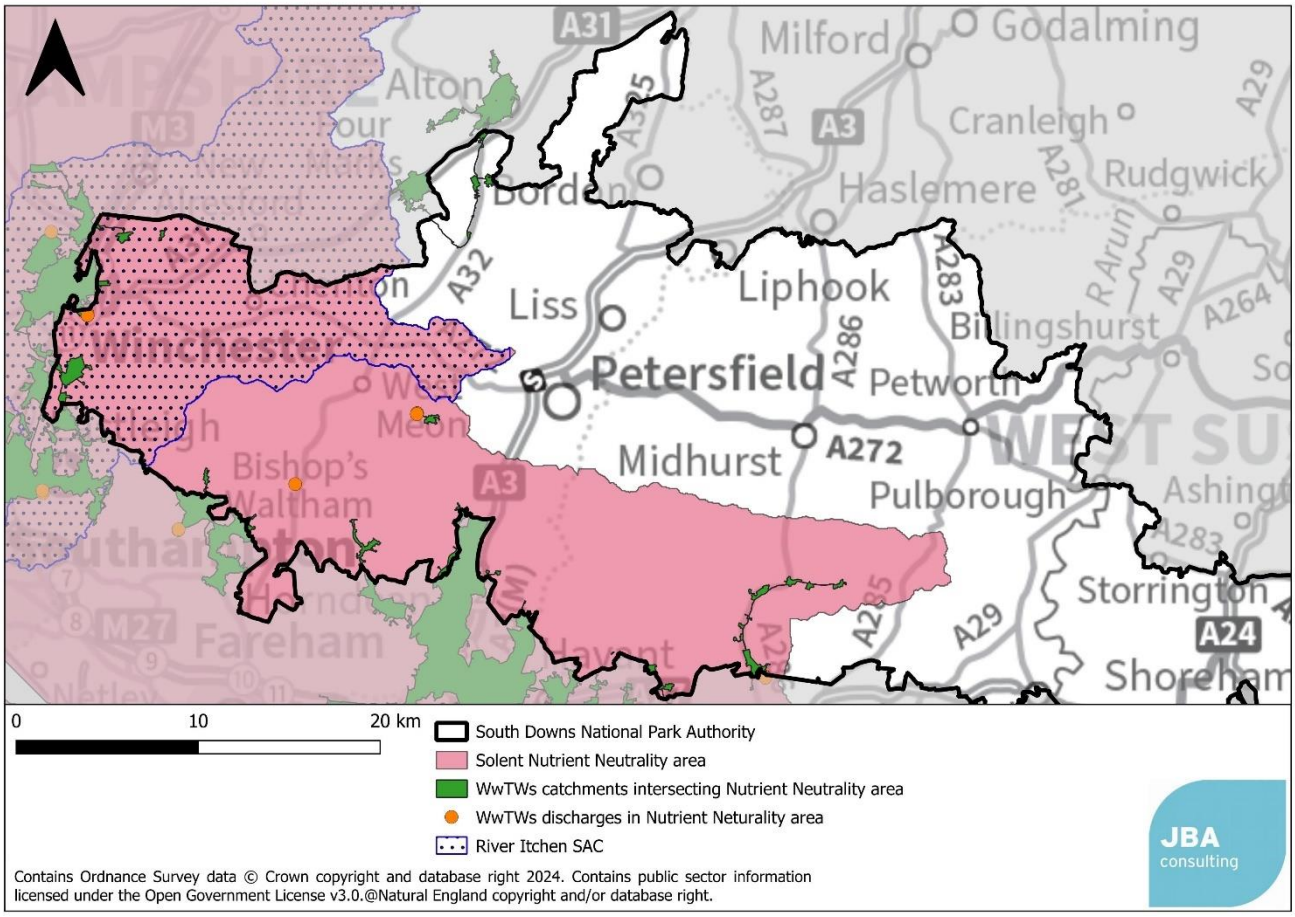


Figure 8.1 WwTW catchments intersecting Nutrient Neutrality areas including WwTW discharges within Nutrient Neutrality areas

There are 15 treatment works within SDNP that are located within the Nutrient Neutrality catchments. Of these, 9 are proposed to serve growth in the future. Nutrient pollution standards (0.25mg/l of phosphorous) have been set at 3 WwTWs within the catchment. Standards for nitrate (10mg/l) have been set at 8 WwTWs. These must be achieved by 1st April 2030. None of these WwTWs are currently operating at TAL. The WwTWs are listed below:

Table 8-1: Wastewater treatment works to meet the nutrient pollution standard for phosphate

Sensitive catchment area	Wastewater treatment works	Proposed SDNP growth (housing)	Proposed growth (employment)
River Itchen	Chickenhall Eastleigh	252	5,188m^2
River Itchen	Harestock	29	None
River Itchen	Morestead	None	6,825m^2

Note: Housing figures include potential allocations, adopted SDLP allocations, NDP allocations, commitments and an estimate of windfall.

Table 8-2: Wastewater treatment works to meet the nutrient pollution standard for nitrates

Sensitive catchment area	Wastewater treatment works	Proposed growth (housing)	Proposed growth (employment)
Solent	Bishops Waltham	21	1,533m^2
Solent	Bosham	25	None
Solent	Budds Farm	9	225m^2
Solent	Chickenhall Eastleigh	252	5,188m^2
Solent	Harestock	29	None
Solent	Lavant	146	None
Solent	Morestead	None	6,825m^2
Solent	Thornham	None	1,370 m^2

8.2 Current nutrient neutrality strategies and offsetting schemes

A nutrient budget must be calculated for applications lying within either nutrient neutrality catchment intersecting SDNP. It is encouraged that applicants identify their own nutrient mitigation followed by the LPA carrying out an Appropriate Assessment (AA) to be certain that the development will not have an adverse impact. To carry out the nutrient budget calculation, the Natural England calculator can be used. The Natural England calculators for both catchments can be accessed here or from the SDNPA website here.

In 2023, SDNPA launched ReNature credits whereby developers can invest in schemes that promote and contribute to nutrient neutrality and Biodiversity Net Gain within South Downs National Park to offset new development. Details of this scheme can be found here.

8.3 Implications for development in South Downs

Development located within the designated nutrient neutrality catchment areas, or outside of them but which would drain foul and or surface water into them, will need to demonstrate nutrient neutrality. Some developers with access to substantial additional adjacent or nearby land may be able to develop their own nutrient offsetting schemes. Where this is not possible, they will need to purchase nutrient credits from schemes developed by LPAs, Natural England or third parties. It is anticipated that the availability of offsetting schemes may limit the volume or timing of development within these areas.

Water quality modelling in the stage 2 WCS should consider the limitations on growth in these catchments, considering the Technically Achievable Limits (TAL) for treatment of phosphates and nitrates in urban wastewater. Where nutrient sensitive plants have been identified by the government an additional simulation will be carried out to test the impact of the Local Plan development on the receiving water bodies, with the published nutrient pollution standard set in the model.

9 Water Quality

9.1 Introduction

An increase in the discharge of effluent from Wastewater Treatment Works (WwTW) as a result of development and growth in the area in which they serve can lead to a negative impact on the quality of the receiving watercourse. Under the Water Framework Directive (WFD), a watercourse is not allowed to deteriorate from its current WFD classification (either as an overall watercourse or for individual elements assessed).

It is Environment Agency (EA) policy to model the impact of increasing effluent volumes on the receiving watercourses. Where the scale of development is such that a deterioration is predicted, a variation to the Environmental Permit (EP) may be required for the WwTW to improve the quality of the final effluent, so that the increased pollution load will not result in a deterioration in the water quality of the watercourse. This is known as "no deterioration" or "load standstill". The need to meet river quality targets is also taken into consideration when setting or varying a permit.

The Environment Agency operational instructions on water quality planning and no-deterioration are currently being reviewed. Previous operational instructions[7] (now withdrawn but with no published replacement) set out a hierarchy for how the no-deterioration requirements of the WFD should be implemented on inland waters. The potential impact of development should be assessed in relation to the following objectives:

- **Could the development cause a greater than 10% deterioration in water quality?** This objective is to ensure that all the environmental capacity is not taken up by one stage of development and there is sufficient capacity for future growth.
- **Could the development cause a deterioration in WFD class of any element assessed?** This is a requirement of the Water Framework Directive to prevent a deterioration in class of individual contaminants. The "Weser Ruling"8 by the European Court of Justice in 2015 specified that individual projects should not be permitted where they may cause a deterioration of the status of a water body. If a water body is already at the lowest status ("bad"), any impairment of a quality element was considered to be a deterioration. Emerging practice is that a 3% limit of deterioration is applied.

7 Water Quality Planning: no deterioration and the Water Framework Directive, Environment Agency (2012). Accessed online at: http://www.fwr.org/WQreg/Appendices/No_deterioration_and_the_WFD_50_12.pdf on: 10/02/2023.

8 PRESS RELEASE No 74/15, European Court of Justice (2015). Accessed online at: https://curia.europa.eu/jcms/upload/docs/application/pdf/2015-07/cp150074en.pdf on: 10/02/2023.

- **Could the development alone prevent the receiving watercourse from reaching Good Ecological Status (GES) or Potential?** Is GES possible with current technology or is GES technically possible after development with any potential WwTW upgrades.

The overall WFD classification of a water body is based on a wide range of ecological and chemical classifications. This assessment focuses on three physio-chemical quality elements; Biochemical Oxygen Demand (BOD), Ammonia, and Phosphate which are key to Water Framework Directive compliance.

9.2 Methodology

In Stage 1 the water quality baseline will be defined using the published WFD for waterbodies in the study area, alongside the reasons for not achieving good status. It is recommended that detailed water quality modelling using the EA's SIMCAT modelling tool is carried out using the final growth figures in a Stage 2 WCS.

9.3 Results

9.3.1 Water Framework Directive Overview

The Water Framework Directive (WFD) aims to ensure "no deterioration" in the environmental status of rivers and sets objectives to improve rivers to meet "good" status. LPAs must have regard to the WFD and associated statutory objectives as implemented in the EA's River Basin Management Plans (RBMPs).

Figure 9.1 shows the overall WFD classification (2019) for waterbodies in SDNPA. Several of the WwTWs discharge to small watercourses which are not within the WFD classifications. These WwTW will still be included in the water quality modelling to be undertaken in Stage 2 and the impact of additional wastewater on the resulting water quality assessed.

Within SDNPA area all the water bodies have either “moderate” or "poor" overall WFD status.

The overall WFD status is made of Ecological and Chemical status, which are further broken down into sub-elements, the measurement of which is prioritised for each waterbody based on its characteristics and risk, hence not all elements are reported for each river.

The WFD ecological classification varies across the study area from "good" to "poor". River Itchen has a good ecological status. Invertebrate status is an indicator of the overall health of the aquatic ecology and other biological elements. River Itchen, Western Rother, Elsted Stream, Harting Stream, Lod and Meon classification on invertebrates is High as per the last assessment (2022). Regarding WFD fish status, River Itchen is classified as "high" while the fish classification has changed from good (2019) to "moderate" (2022)

Maps showing the WFD Overall Status, Ecological Status, Fish Status and Invertebrates status of the waterbodies in SDNPA are also shown below in Figure 8-1 to Figure 8-4.

Invertebrate and fish statuses are used within the WFD as indicators of the overall health of the aquatic ecology and water quality.

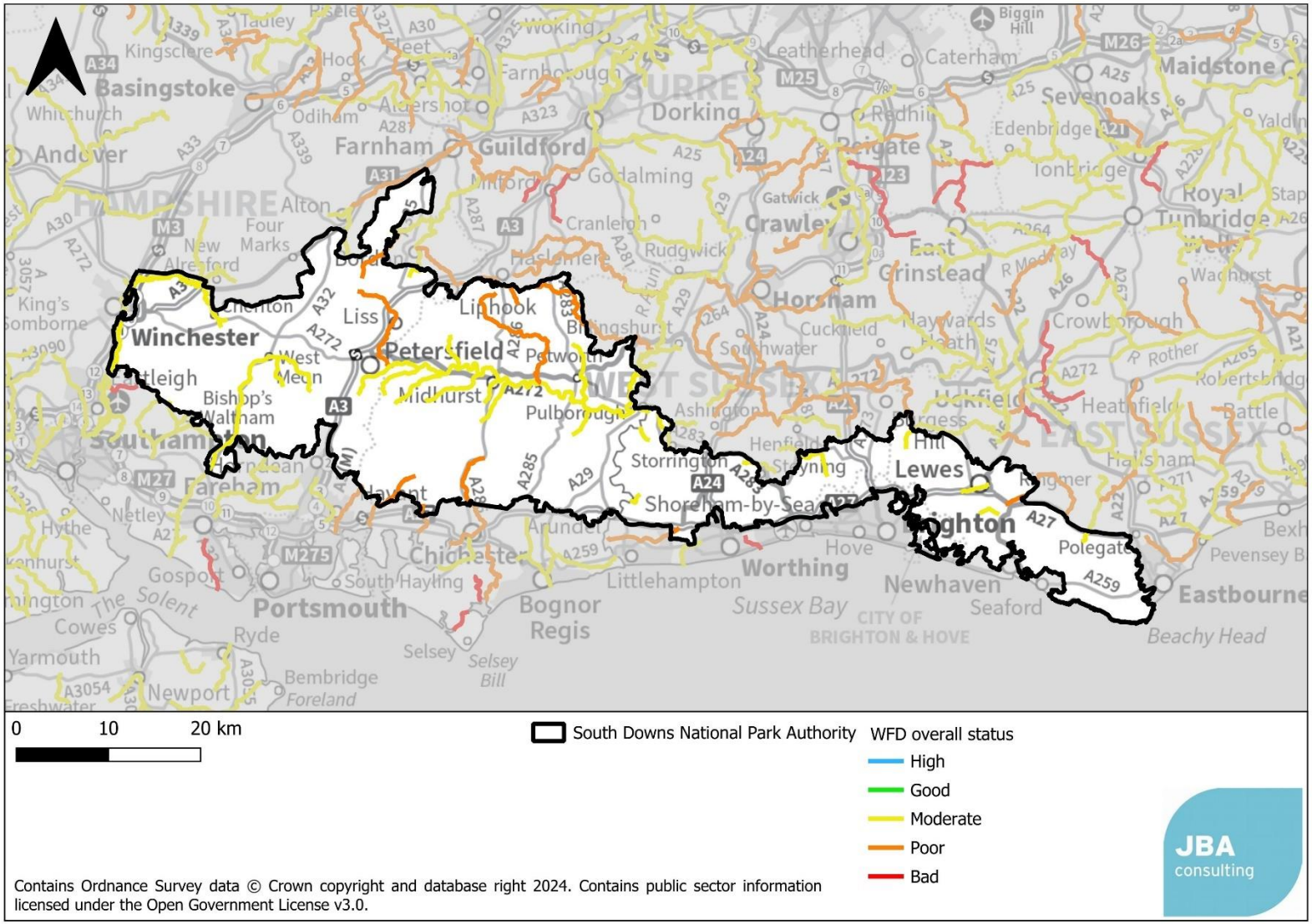


Figure 9.1 Overall WFD status for waterbodies in SDNPA

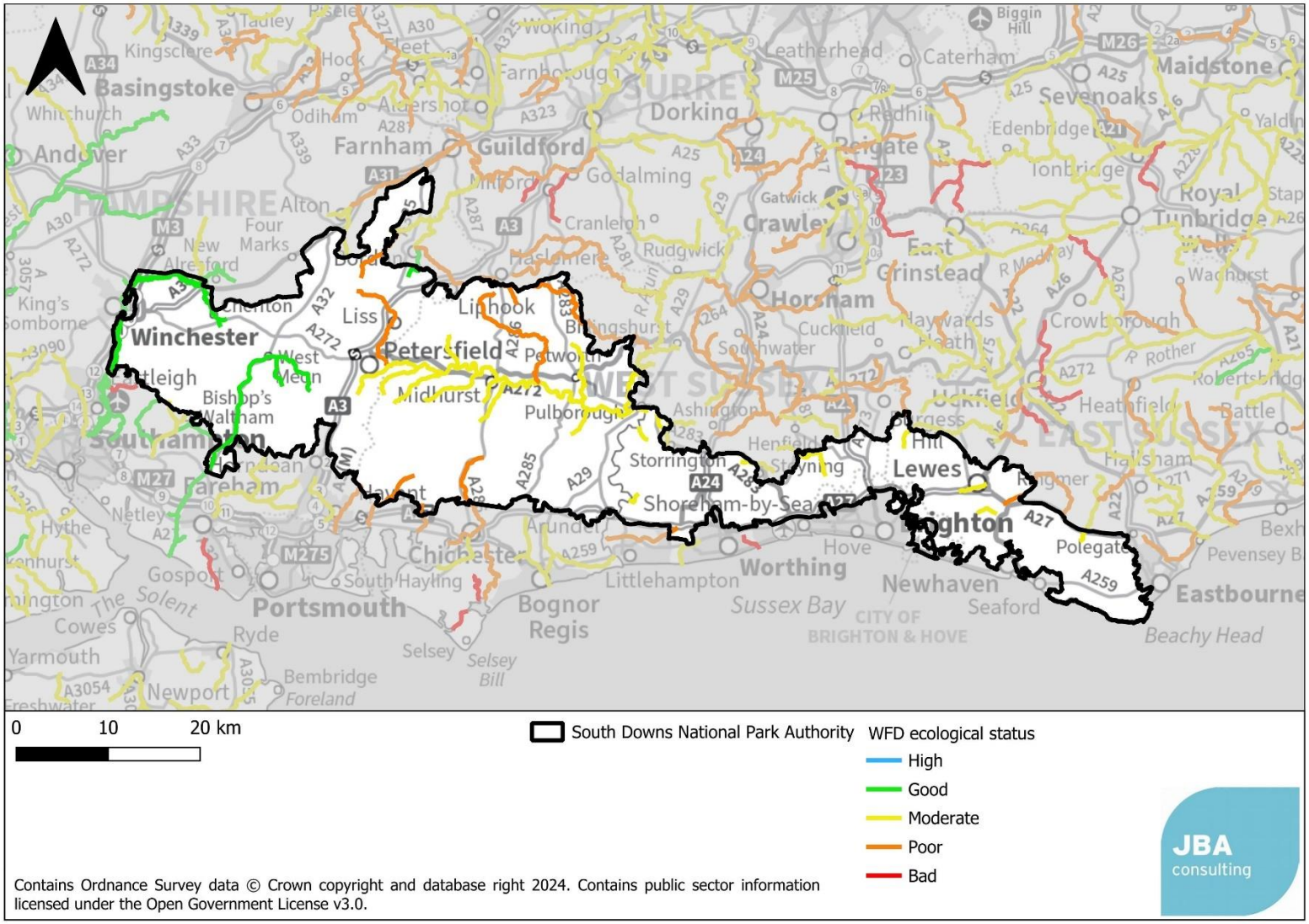


Figure 9.2 WFD ecological status for waterbodies in SDNPA

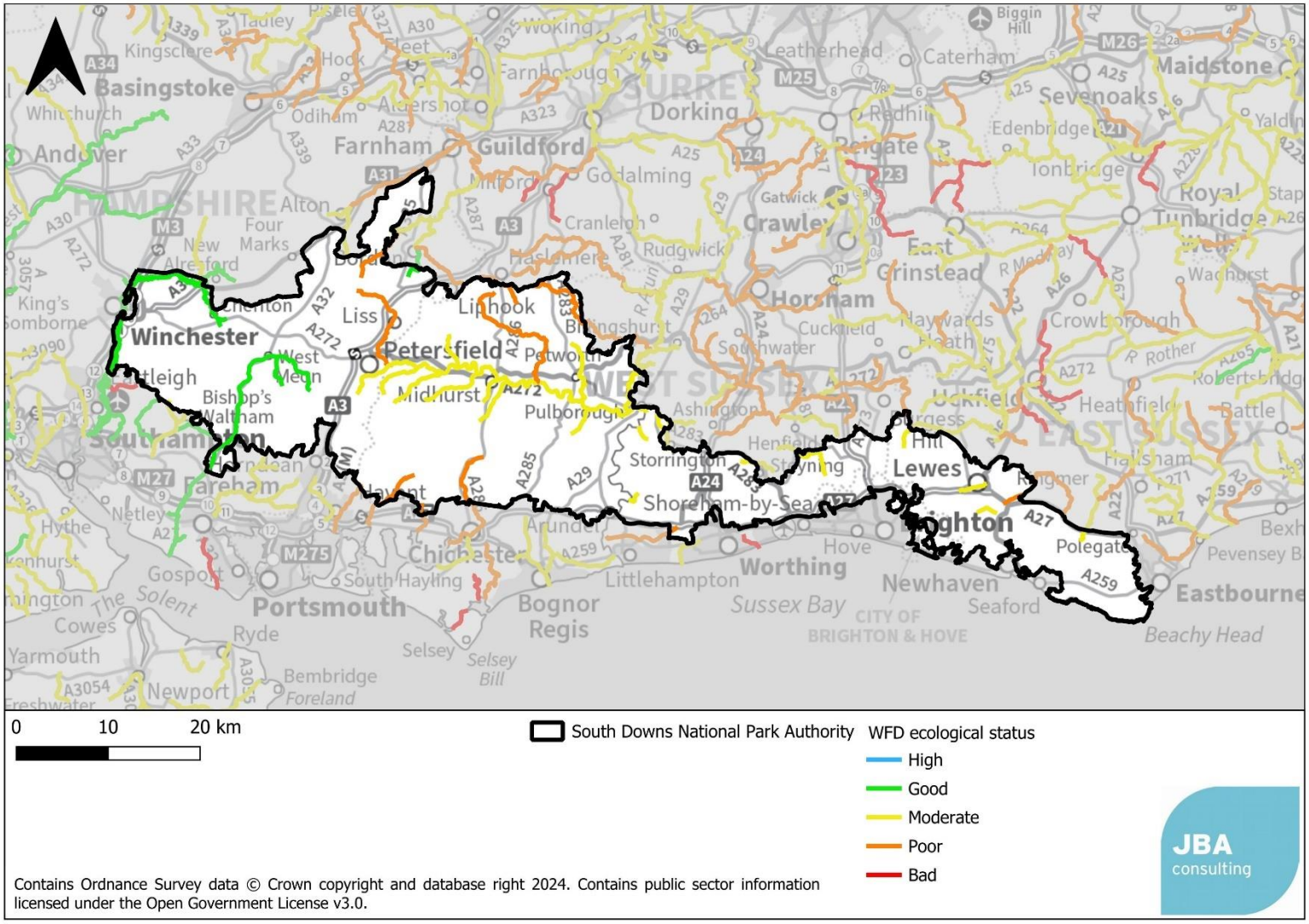


Figure 9.3 WFD fish status for waterbodies in SDNPA

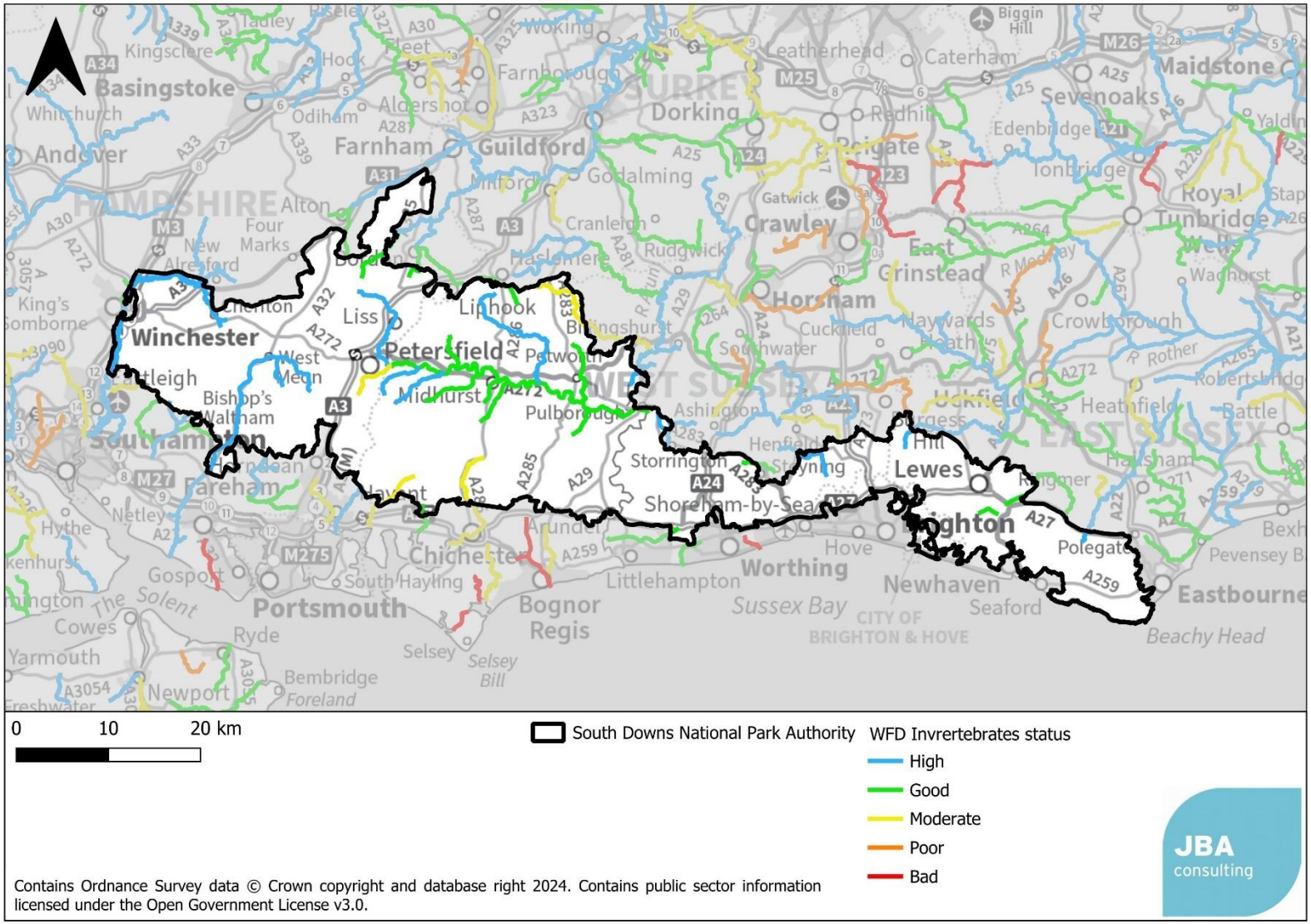


Figure 9.4 WFD waterbodies Invertebrates Status

9.3.2 Reasons for Not Achieving Good (RNAG)

The latest Water Framework Directive assessment data shows that watercourses in SDNPA have an overall “moderate” and "poor" status. The EA reasons for not achieving good (RNAG) dataset indicates that, the water industry (groundwater abstractions, sewerage discharge, barriers and impoundment) and agriculture and rural land management (poor livestock and nutrient management) are the main reasons for watercourses not achieving good status in this area.

9.3.3 Priority substances

As well as the physico-chemical water quality elements (BOD, Ammonia, Phosphate etc.) addressed above, a watercourse can fail to achieve Good Ecological Status due to exceeding permissible concentrations of hazardous substances. Currently 45 substances[9] are defined as hazardous or priority hazardous substances, with others under review. Such substances may pose risks both to humans (when contained in drinking water) and to aquatic life and animals feeding in aquatic life. These substances are managed by a range of different approaches, including EU and international bans on manufacturing and use, targeted bans, selection of safer alternatives and end-of-pipe treatment solutions. There is considerable concern within the UK water industry that regulation of these substances by setting permit values which require their removal at wastewater treatment works will place a huge cost burden upon the industry and its customers, and that this approach would be out of keeping with the "polluter pays" principle.

We also consider how the planning system might be used to manage priority substances:

- Industrial sources – whilst this report covers potential employment sites, it doesn't consider the type of industry and therefore likely sources of priority substances are unknown. It is recommended that developers should discuss potential uses which may be sources of priority substances from planned industrial facilities at an early stage with the EA and, where they are seeking a trade effluent consent, with the sewerage undertaker.
- Agricultural sources - There is limited scope for the planning system to change or regulate agricultural practices. UK water companies are involved in a range of “Catchment-based Approach” schemes aimed at reducing diffuse sources of pollutants, including agricultural pesticides.
- Surface water runoff sources - some priority substances e.g., heavy metals, are present in urban surface water runoff. It is recommended that future developments would manage these sources by using SuDS that provide water quality treatment, designed following the CIRIA SuDS Manual. This is covered in more detail in Sections 10.5.2 and 10.5.3.

9 River basin management plans, updated 2022: summary programmes of measures – mechanisms - 12. Chemicals and priority substances - Guidance - GOV.UK (www.gov.uk)

- Domestic wastewater sources - some priority substances are found in domestic wastewater as a result of domestic cleaning chemicals, detergents, pharmaceuticals, pesticides, or materials used within the home. Whilst an increase in the population due to housing growth could increase the total volumes of such substances being discharged to the environment, it would be more appropriate to manage these substances through regulation at source, rather than through restricting housing growth through the planning system.

No further analysis of priority substances will be undertaken as part of this study.

9.4 WINEP

The actions from the Water Industry National Environment Programme that relate to water quality are set out in Appendix B and show that most WwTWs in the study area have an action against them. In most cases these include monitoring of storm overflows and the volume of sewage being treated. In many, a permit condition to limit the concentration of phosphorus and ammonia in the treated effluent is being applied in order to improve downstream water quality.

9.5 Stage 2 Water Quality modelling

Water quality sensitivity modelling has not been undertaken at Stage 1. Detailed water quality modelling, incorporating the final proposed growth figures for SDNP will be included at Stage 2. This will include an assessment of WFD status and deterioration, as a result of growth, within waterbodies and adjacent to environmental sites. The impact of growth on Good Ecological Status (GES) will also be assessed.

9.6 Conclusions

The EA "reasons for not achieving good" (RNAG) dataset indicates that the water industry (groundwater abstractions, sewerage discharge, barriers and impoundment) and agriculture and rural land management (poor livestock and nutrient management) are the main reasons for watercourses not achieving good status in this area. Growth during the local plan period will also increase the discharge of treated wastewater from WwTWs in South Downs National Park. There is a potential for this to cause a deterioration in water quality in the receiving watercourses and this must be carefully considered. A significant deterioration in water quality is not acceptable under the Water Framework Directive, and large-scale investment in treating effluent to higher standards may therefore be required. Detailed modelling will be undertaken in the Stage 2 WCS.

9.7 Recommendations

Table 9-1 Recommendations for water quality

Action	Responsibility	Timescale
Provide annual monitoring reports to TW and SW detailing projected housing growth in the Local Authority	SDNPA	Ongoing

Action	Responsibility	Timescale
When preferred options for growth are identified, undertake water quality impact modelling as part of a Stage 2 WCS.	SDNPA	Ongoing
Take into account the full volume of growth (from SDNPA and neighbouring authorities within the catchment when considering WINEP schemes or upgrades at WwTWs	Southern Water and Thames Water	Ongoing

10 Environmental Opportunities and Constraints

10.1 Introduction

Development has the potential to cause an adverse impact on the environment through a number of routes, such as worsening of air quality, pollution to the aquatic environment or disturbance to wildlife. In the context of a Water Cycle Study, the impact of development on the aquatic environment is assessed. This chapter considered both water quantity (impact of abstraction) and water quality (impact of wastewater discharge and runoff) on protected sites. Protected sites considered in this report are:

- Special Areas of Conservation (SAC) (and candidate SACs)
- Special Protected Areas (SPA) (and candidate SPAs)
- Sites of Special Scientific Interest (SSSI)
- Ramsar sites (and potential Ramsar sites)

A source-pathway-receptor approach can be taken to investigate the risk and identify where further assessment or action is required.

10.2 Impact of abstraction

10.2.1 Overview

Abstraction of water within a catchment, either from groundwater or surface water sources, is necessary to provide a public water supply, for industrial processes and for agriculture. When the volume of water being abstracted becomes too high, it can cause environmental damage by reducing river flow or lowering the water table.

Changes in river flow can impact sensitive ecosystems, for example trout require a clean gravel bed to lay their eggs. A reduction in river flow can cause sediment to build up, blocking the spaces the fish require to lay their eggs impacting their reproductive cycle. Changes in groundwater levels can also affect the flow regime in rivers and can cause drying of wetland sites.

Chalk stream catchments are particularly sensitive to changes in groundwater levels.

The precise location of abstraction points for public water supply in England is not available for reasons of national security. Furthermore, water demand within a WRZ can be met by anywhere within that WRZ, or from a neighbouring WRZ if the transfer between WRZs is used to provide some of the water available for use. It is therefore not possible to trace an impact of an individual development site back to a particular water abstraction and therefore to an environmental impact. The assessments in this report therefore rely on information in the public domain.

10.2.2 Methodology

SDNPA is served by:

- South East Water via its Eastbourne, Bracknell, Haywards Heath and Farnham WRZs;
- Southern Water via its Sussex Worthing, Sussex North, Sussex Brighton, Hampshire Southampton and Hampshire Winchester WRZ;
- Portsmouth WRZ; and
- A small area by the Thames Water Guildford WRZ.

Abstraction either from surface water sources or from groundwater sources can occur anywhere within these zones. However, the impact of the abstraction could be felt outside of the WRZ within the same groundwater body, or downstream in surface waterbodies. In both cases this could be well outside the LPA boundary.

Groundwater dependent ecosystems

Figure 10.1 shows a schematic of how Groundwater Dependent Terrestrial Ecosystems (GWDTEs) were identified. The LPA boundary is within a WRZ. Water abstracted anywhere within that WRZ could be used to serve growth within the LPA. In the diagram below, there are two abstraction points. Abstraction 1 could impact an area outside of both the LPA boundary and the WRZ. However, there are no protected sites within that groundwater body. Abstraction 2 also impacts an area both within and outside of the LPA boundary. Protected site A is within the WRZ but may not be impacted directly by an abstraction. Protected site B is outside of the WRZ and outside of the groundwater body containing an abstraction and is therefore unlikely to be impacted by growth. Protected site C is within a groundwater body containing an abstraction. There is a risk that an increase in abstraction could impact the protected site.

The location of abstraction points within the study area is not known, and so the approach must be taken that GWDTE anywhere within the combined extent of the WRZ and groundwater bodies overlapping the WRZ could be impacted by an increase in abstraction.

A further check was done on whether abstraction may already be an issue in those GWDTEs. The Water Framework Directive (WFD) records "Significant Water Management Issues" (SWMIs) in each water body. These are pressures on the water environment that put our ability to achieve the environmental objectives of the WFD most at risk.

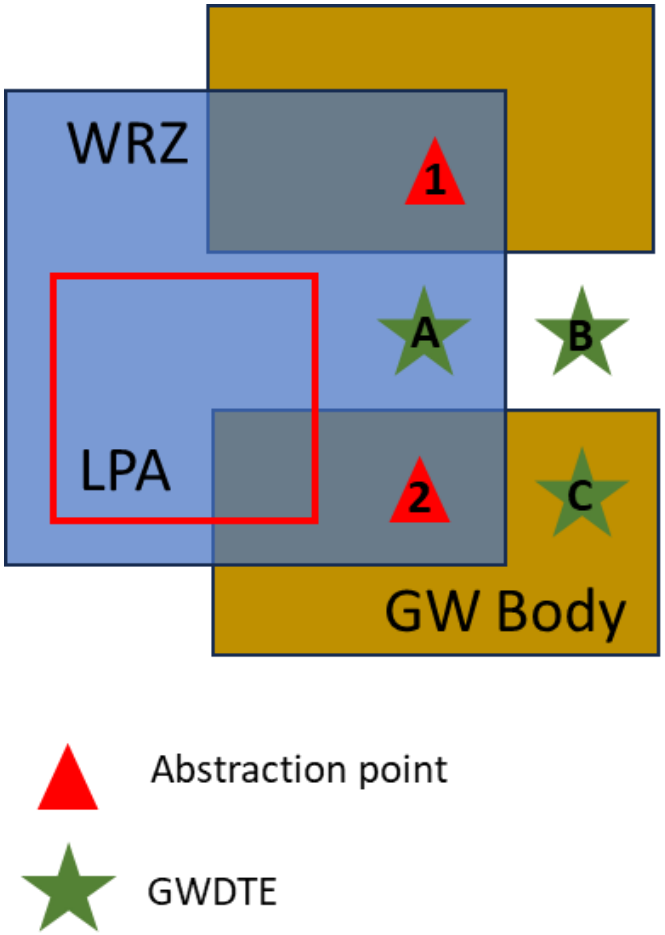


Figure 10.1 Definition of groundwater study area

The following procedure was followed:

- Define study area for SDNPA - based on extent of WRZ and WFD Groundwater bodies that overlap with the WRZs.
- Identify Groundwater Dependent Terrestrial Ecosystems (GWDTE) within the study area using the EA's GWDTE dataset.
- Identify GWDTEs that are within groundwater bodies with flow identified as a Significant Water Management Issue (SWMI).

Surface water-based ecosystems

Figure 10.2 shows a schematic of how protected sites on surface waterbodies were identified. As in the groundwater example, water could be abstracted from anywhere within the WRZ. Protected site A is downstream of an abstraction and so could be impacted by changes in river flow resulting from the abstraction. Protected site B whilst further downstream in the river basin, it is on a tributary not connected with the WRZ, abstraction is unlikely to have an impact. Protected site C is upstream of the abstraction so would not be impacted.

As with the groundwater abstractions, their location was not available as part of this study. The approach is therefore taken that any protected site directly on a waterbody that flows

through or is downstream of the WRZ could be impacted by abstraction. Protected sites upstream or on tributaries that have not flowed through the WRZ are ignored.

In order to identify protected sites that may be at risk, Flood Zone 2 from the Risk of Flooding from Rivers and the Sea mapping was used to define an area that was either adjacent to a river or could be reasonably expected to receive surface water from a river.

The following procedure was followed:

- Define study area for SDNPA - based on extent of WRZ and WFD Surface water bodies that overlap with the WRZs.
- Identify protected sites within the study area.
- Filter these based on their proximity to waterbodies within the study area defined using Flood Zone 2 as a proxy.
- Identify the protected sites within a catchment where flow is recorded as a significant water management issue.

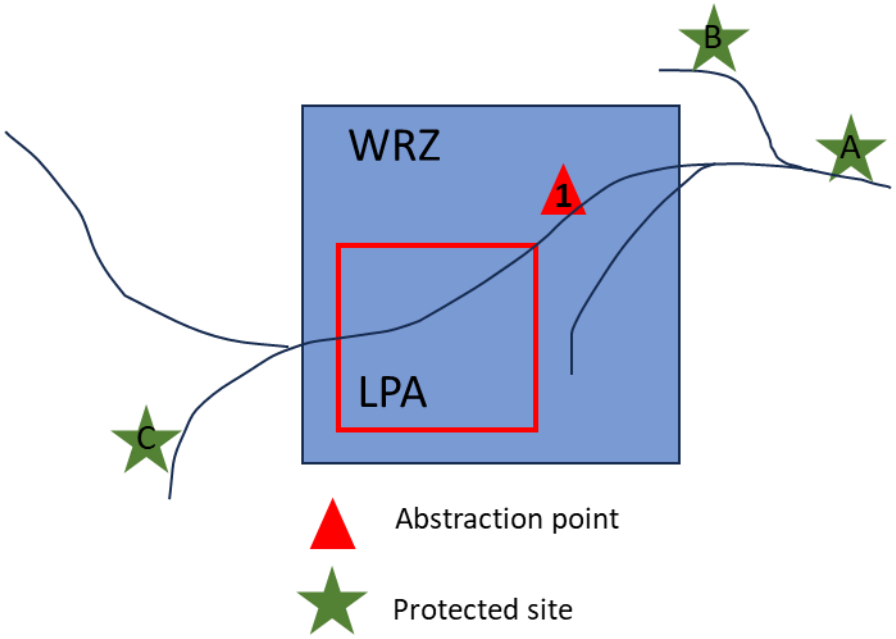


Figure 10.2 Definition of surface water study area

10.2.3 Results

Table 11-1 in Appendix C.1 shows the GWDTEs within the WRZs serving SDNPA that are in a groundwater body that overlaps with the water resource zones serving SDNPA. It also provides information if the flow (either groundwater or surface water abstraction) has been identified as a significant water management issue (SWMI).

The precise location of abstraction points for public water supply in England is not available for reasons of national security. Furthermore, water demand within a WRZ can be met by anywhere within that WRZ, or from a neighbouring WRZ if the transfer between WRZs is used to provide some of the water available for use. It is therefore not possible to trace an impact of an individual development site back to a particular water abstraction and therefore

to an environmental impact. Rather there is a general risk to all designated sites sensitive to changes in water levels or flow that are within groundwater bodies containing abstraction points or surface water bodies with abstraction upstream.

The impact of water company abstraction has been taken into account in the Strategic Environmental Assessment (SEA) within the WRMP24, which is been reviewed and approved by the EA, NE, Defra and Ofwat. This plan contains a forecast of growth, resulting in a water demand, and how this will be met while meeting the water company's environmental objectives, including reductions in certain abstractions for sustainability.

Section 4.5.7 showed that SDNPA's growth plans results in an increase in the number of households above the predicted percentage increase for most of the WRZs serving the SDNP. It is therefore recommended that the difference between the WRMP24 and the growth plan is investigated in a Stage 2 WCS to ensure that the WRMP24 has accounted for a sufficient level of growth and that delivery of the SDNPA growth plan does not lead to an unsustainable increase in abstraction.

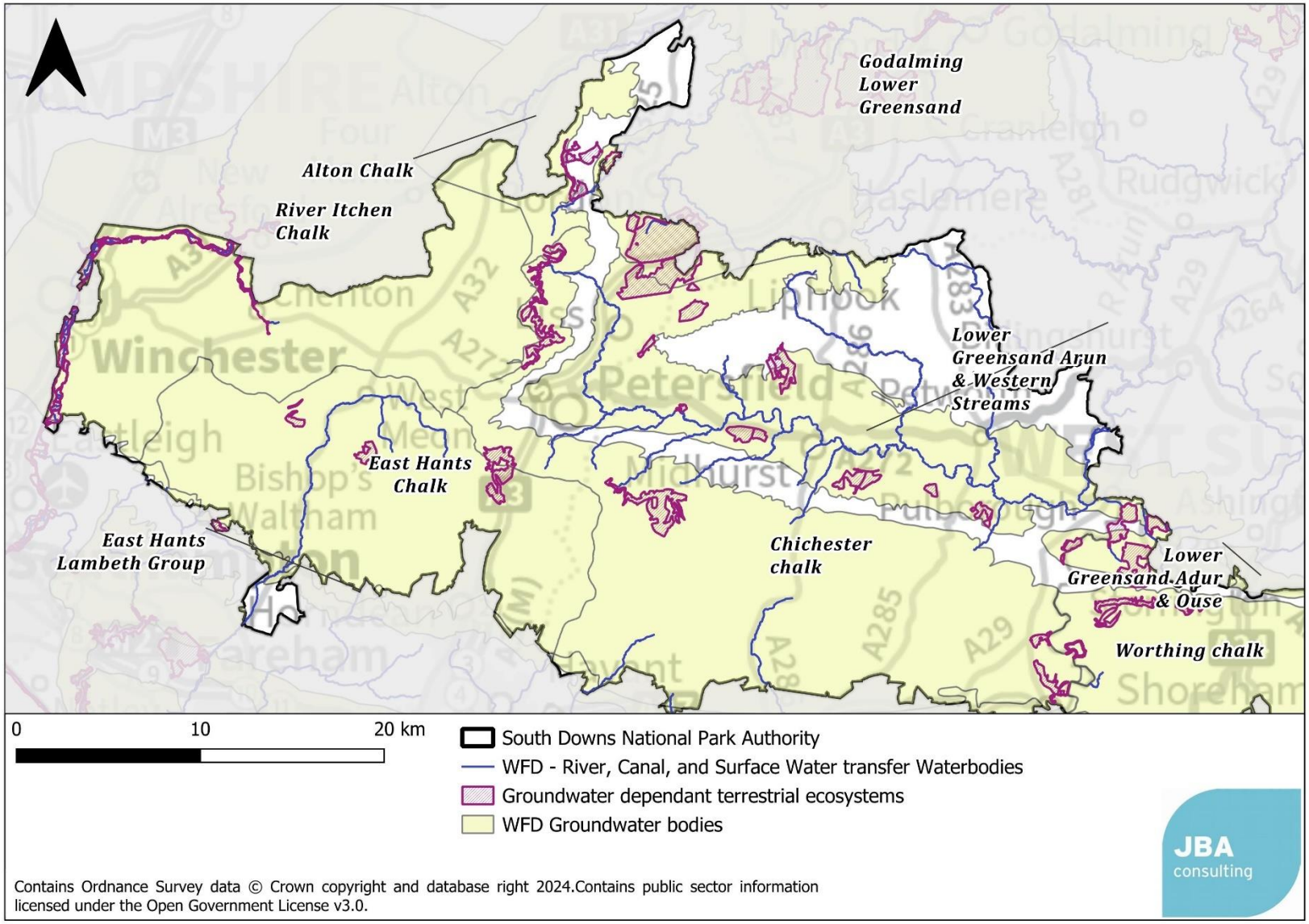


Figure 10.3 Groundwater Dependant Terrestrial Ecosystems (West)

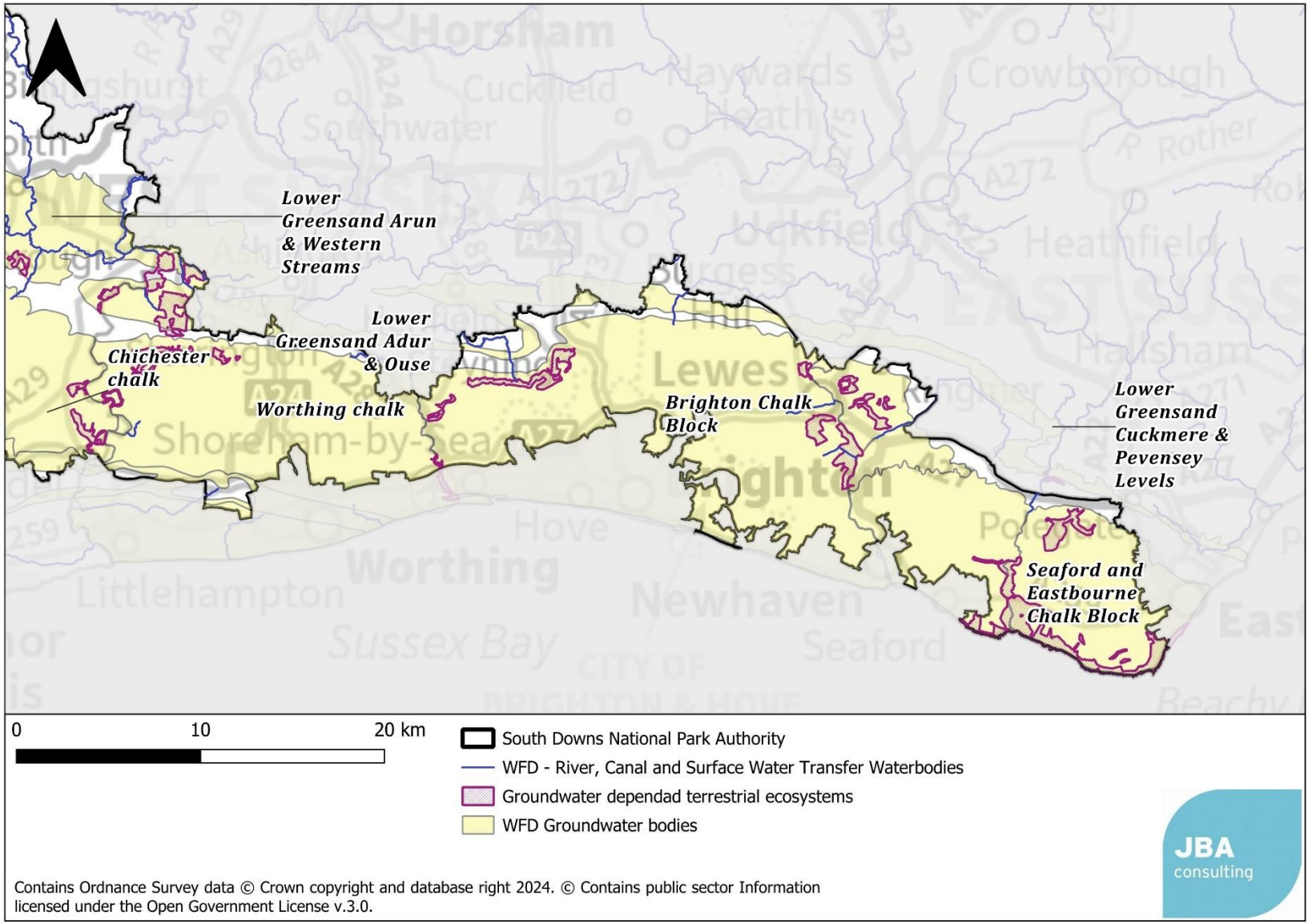


Figure 10.4 Groundwater Dependant Terrestrial Ecosystems (East)

Table 11-2 to Table 11-5, in Appendix C show the protected sites that are adjacent to waterbodies within the WRZs serving SDNPA (based on Flood Zone 2). Protected areas within a waterbody that has flow (abstraction from surface water) identified as a significant water management issue is also noted.

The location of all the protected areas identified adjacent to rivers (within SDNPA only) are shown in Figure 10.5 and Figure 10.6. Other protected areas are present downstream outside of the study area.

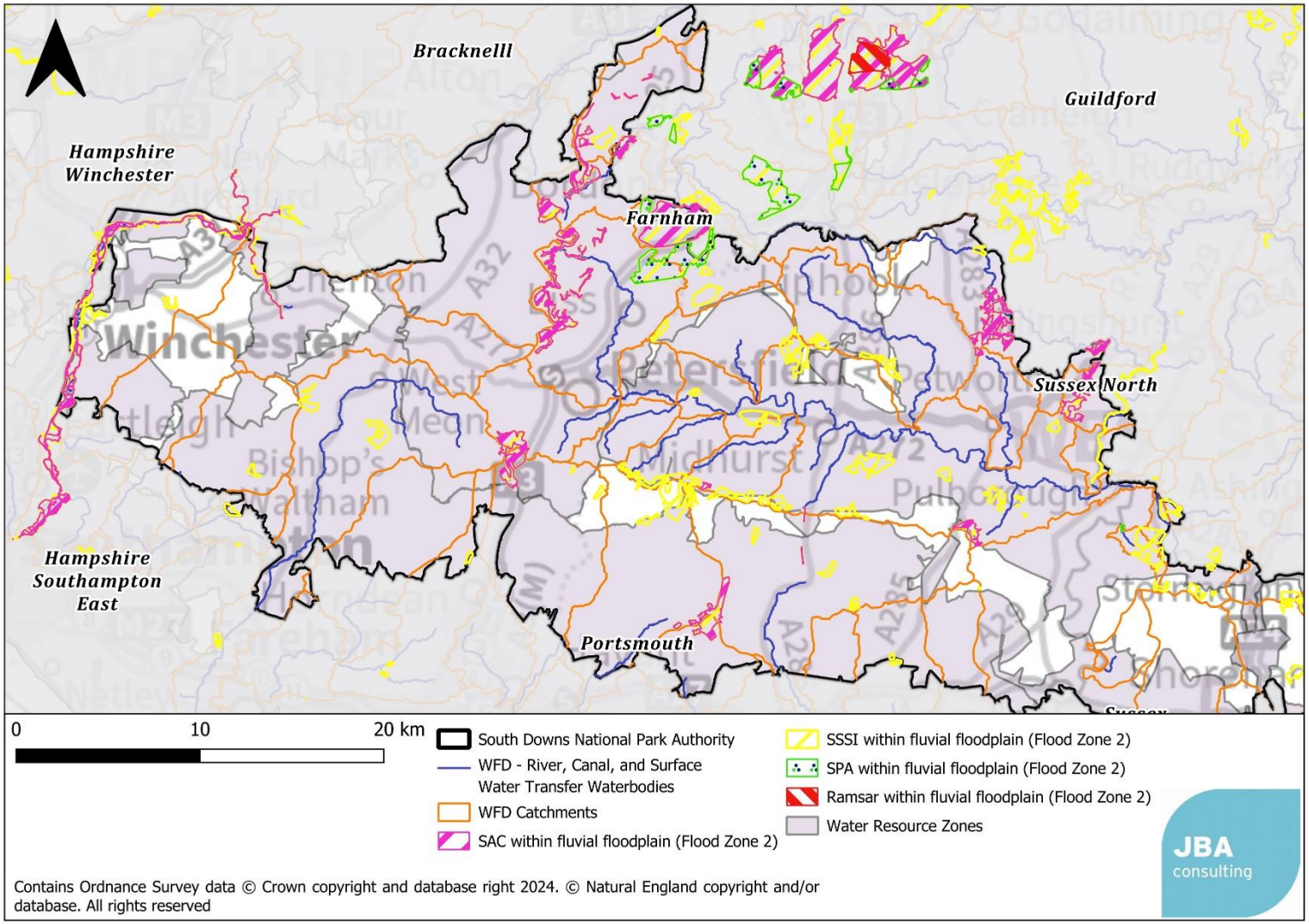


Figure 10.5 Protected areas adjacent to surface waterbodies within WRZs serving SDNPA (West)

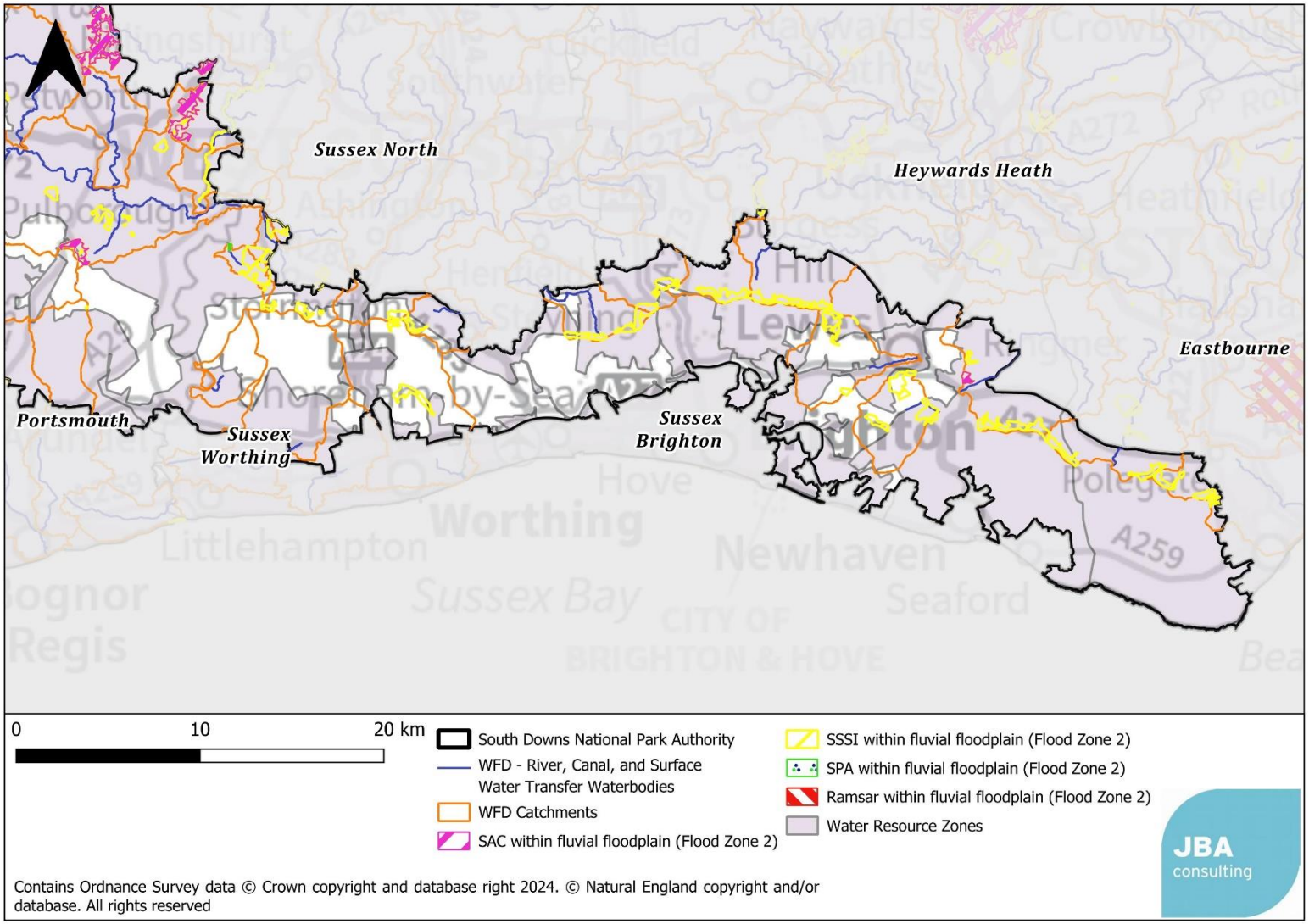


Figure 10.6 Protected areas adjacent to surface waterbodies within WRZs serving SDNPA (East)

10.3 Water quality impact

10.3.1 Sources of pollution

Water pollution is usually categorised as either diffuse or point source. Point source sources come from a single well-defined point, an example being the discharge from a WwTW.

Diffuse pollution is defined as “unplanned and unlicensed pollution from farming, old mine workings, homes and roads. It includes urban and rural activity and arises from industry, commerce, agriculture and civil functions and the way we live our lives.”

Examples of diffuse sources of water pollution include:

- Contaminated runoff from roads – this can include metals and chemicals
- Drainage from housing estates
- Misconnected sewers (foul drains to surface water drains)
- Accidental chemical/oil spills from commercial sites
- Surplus nutrients, pesticides and eroded soils from farmland
- Septic tanks and non-mains sewer systems

The most likely sources of diffuse pollution from new developments include drainage from housing estates, runoff from roads and discharges from commercial and industrial premises. The pollution risk posed by a site will depend on the sensitivity of the receiving environment, the pathway between the source of the runoff and the receiving waters, and the level of dilution available. After or during heavy rainfall, the first flush of water carrying accumulated dust and dirt is often highly polluting.

Whilst the threat posed by an individual site may be low, a number of sites together may pose a cumulative impact within the catchment.

Runoff from development sites should be managed by a suitably designed SuDS scheme. More information on SuDS can be found in Section 10.5.2. Potential impacts on receiving surface waters include the blanketing of riverbeds with sediment, a reduction in light penetration from suspended solids, and a reduction in natural oxygen levels, all of which can lead to a loss in biodiversity.

10.3.2 Pathways

Pollutants can take a number of different pathways from their source to a “receptor” – a habitat or species that can be impacted. This could be overland via surface water flow paths, via the river system, or via groundwater or a combination of all three. For the purpose of this study, it should be assumed at any protected site has the potential to be impacted by surface runoff from adjacent development sites. Linkages between development sites and protected sites will be explored further in Stage 2 once potential allocations are identified. The potential for a protected site to be impacted by pollution from

WwTWs via the river system will be explored by a screening exercise in Stage 1 and water quality modelling in Stage 2.

10.3.3 Receptors

A receptor in this case is a habitat or species that is adversely impacted by a pollutant. Both the rivers and groundwater as well as being pathways, can also be considered to be receptors. Groundwater bodies are also given a status under the WFD which is reported in Section 4.2.3 for the groundwater bodies across SDNPA.

Within the study area and downstream are many sites with environmental designations such as:

- Special Areas of Conservation (SAC) (and candidate SACs)
- Special Protection Areas (SPA) (and candidate SPAs)
- Sites of Special Scientific Interest (SSSI)
- Ramsar sites (Wetlands of International Importance) (and potential Ramsar sites)
- Priority Habitats and Priority Headwaters

Protected sites within SDNPA can be seen in Figure 10.7 and Figure 10.8.

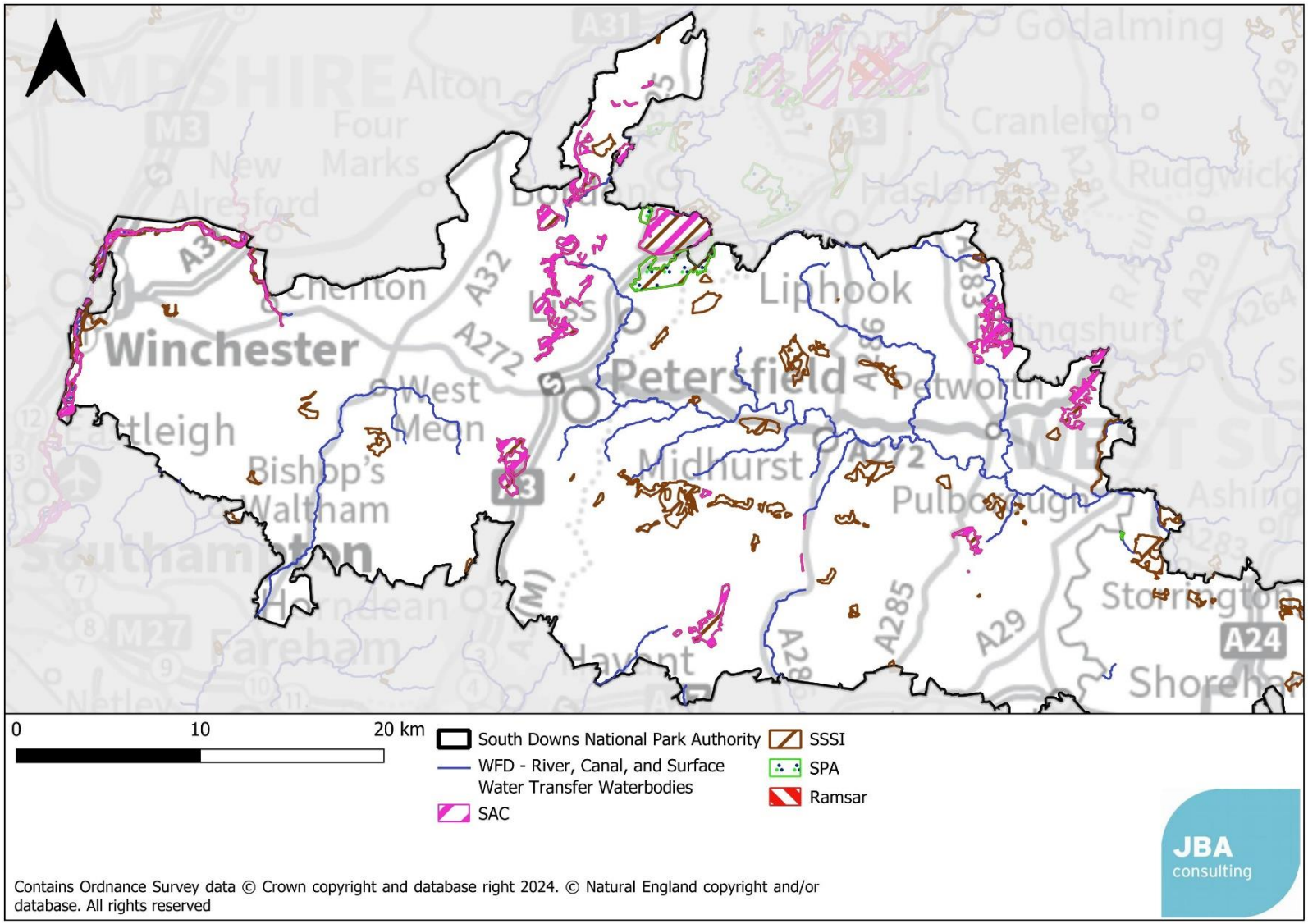


Figure 10.7 Protected sites in SDNPA (West)

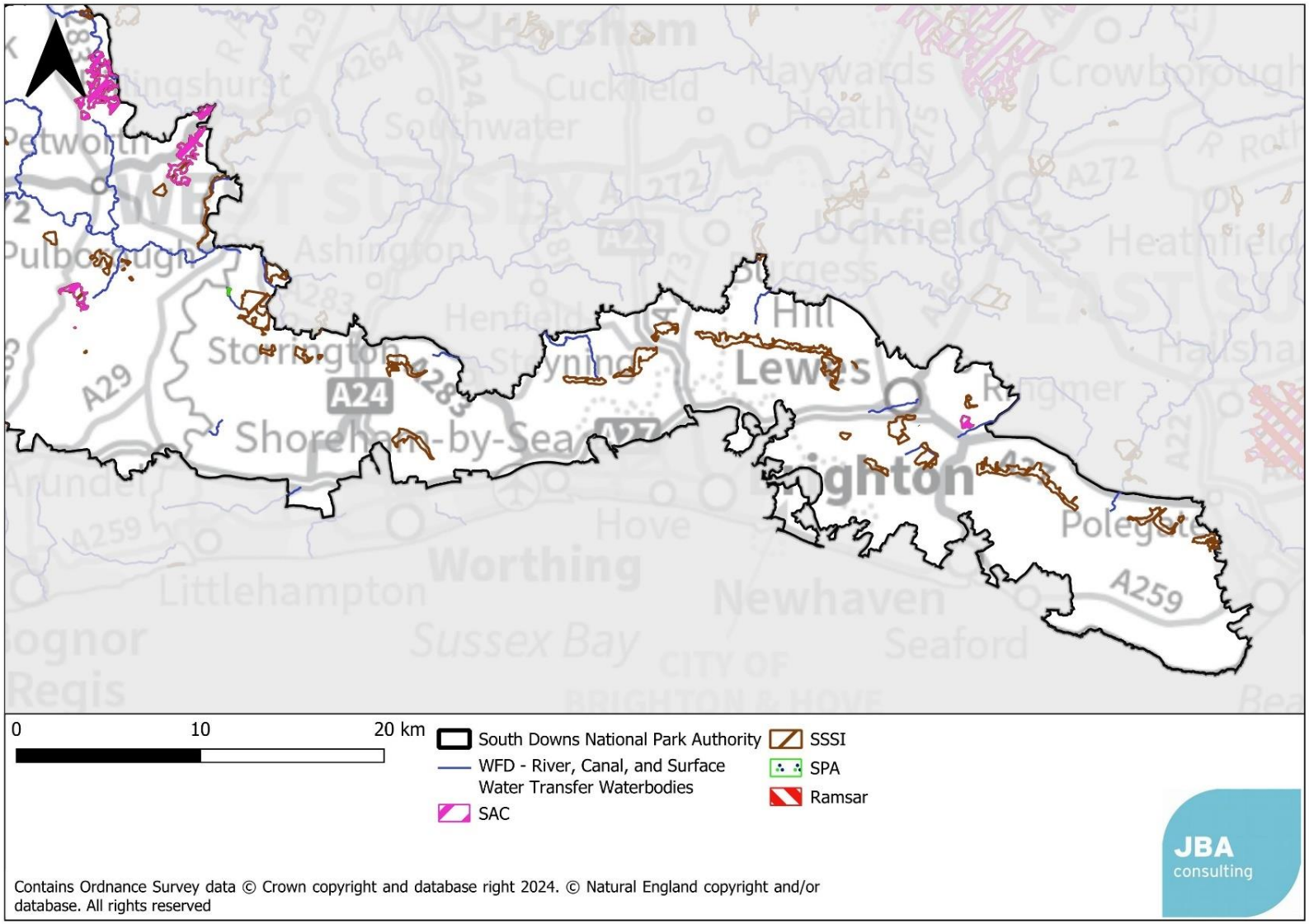


Figure 10.8 Protected sites in SDNPA (East)

All of these sites should be considered to be at risk from surface water runoff should development occur in the vicinity. This will be explored further in Stage 2 once potential development sites are available.

Protected sites within SDNPA which may be at risk from an increase in the discharge of treated effluent due to growth are identified in Table 10-1 to Table 10-3. The relevant legislation that defined and protects them can be found in Section 3.7.

In order to identify protected sites that may be at risk, Flood Zone 2 from the Risk of Flooding from Rivers and the Sea mapping was used to define an area that was either adjacent to a river or could be reasonably expected to receive water from a river. This method has limitations in that pathways between ordinary watercourses and protected sites may not be identified. A manual check will be performed in Stage 2 before water quality modelling is undertaken. Where a WwTW was present in the catchment upstream of the protected site, it was considered that there was a risk of deterioration in water quality due to growth during the local plan period, and the first WwTW upstream of the site is reported in the table (other WwTWs must also be considered in future analysis). Where there were no WwTWs serving growth upstream, risk of deterioration is considered to be low, and would not be shown by water quality modelling. However, in these cases the overall catchment water quality should be considered where for example they are designated for migratory fish species that may spend part of their lifecycle elsewhere in the catchment.

Priority Habitats are available to view on the DEFRA Magic Map website[10].

Table 10-1 SAC sites which could be affected by a change in WwTW discharge

Site	Reference	First Upstream WwTW
Ebbernoe Common	UK0012715	Northchapel
River Itchen	UK0012599	Morestead, Harestock, Chickenhall
Shortheath Common	UK0030275	Bordon
Solent Maritime	UK0030059	Budds Farm, Thornham, Bosham
The Mens	UK0012716	Northchapel
Thursley, Ash, Pilbright and Chobham	UK0012793	Bordon

Table 10-2 SSSI sites which could be affected by a change in WwTW discharge

Site	Reference	First Upstream WwTW
Bramshott and Ludshott Commons	SU847353	Haslemere
Broxhead and Kingsley Commons	SU804374	Bordon

10 DEFRA Magic Map- https://magic.defra.gov.uk/magicmap.aspx

Site	Reference	First Upstream WwTW
Charleshill	SU895440	Bordon
Charterhouse to Eashing	SU951443	Bordon
Chichester Harbour	SU779071	Lavant, Bosham
Climping Beach	TQ021010	Ford
Ebbernoe Common	SU975271	Northchapel
Fyning Moor	SU814233	Rogate, Petersfield
Lee-on-the-Solent to Itchen Estuary	SU510034	Droxford
Lewes Brooks	TQ427071	Rodmell, Kingston Hollow
Milton Gate Marsh	TQ537058	Wilmington
Moor Park	SU868458	Bentley
Papercourt	TQ043565	Bordon
River Itchen	SU476240	Morestead, Harestock, Chickenhall
The Mens	TQ024236	Northchapel
Thursley, Hankley and Frensham Commons	SU892409	Bordon
Titchfield Haven	SU538033	Droxfield
Upper Arun	TQ059245	Northchapel
Wey Valley Meadows	SU993462	Bordon, Bentley

Table 10-3 Ramsar and SPA sites which could be affected by a change in WwTW discharge

Site	Reference	First Upstream WwTW
Arun Valley (SPA and RAMSAR)	UK9020281/UK11004	Fittleworth
Solent and Southampton Water (SPA and RAMSAR)	UK9011061/UK11063	Droxford
Solent and Dorset Coast	UK9020330	Budds Farm
Thames Basin Heaths	UK9012141	Bordon, Bentley
Thursley, Hankley and Frensham Commons	UK9012131	Bordon
Chichester and Langstone Harbours	UK11013	Thornham, Bosham

10.5 Protection and mitigation

10.5.1 Groundwater Protection

Groundwater is an important source of water in England and Wales.

The Environment Agency is responsible for the protection of "controlled waters" from pollution under the Water Resources Act 1991. These controlled waters include all watercourses and groundwater contained in underground strata.

The zones are based on an estimate of the time it would take for a pollutant which enters the saturated zone of an aquifer to reach the source of abstraction or discharge point (Zone 1 = 50 days, Zone 2 = 400 days, Zone 3 is the total catchment area). The Environment Agency will use Source Protection Zones (SPZs) alongside other datasets such as the Drinking Water Protected Areas (DrWPAs) and aquifer designations as a screening tool to show:

- Areas where the EA would object in principle to certain potentially polluting activities, or other activities that could damage groundwater,
- Areas where additional controls or restrictions on activities may be needed to protect water intended for human consumption,
- How it prioritises responses to incidents.

The EA have published a position paper[11] outlining its approach to groundwater protection which includes direct discharges to groundwater, discharges of effluents to ground and surface water runoff. This is of relevance to this water cycle study where a development may manage surface water through SuDS.

The majority of SSDs do not require an environmental permit if they comply with certain qualifying conditions. SSDs must comply with the General Binding Rules available on the gov.uk website. A permit will be required for all SSDs in source protection zone 1

Sewage and Trade Effluent

Discharge of treated sewage of 2m^3 per day or less to ground are called small sewage discharges (SSDs). The majority of SSDs do not require an environmental permit if they comply with certain qualifying conditions. A permit will be required for all SSDs in source protection zone 1 (SPZ1).

For treated sewage effluent discharges, the EA requires the use of shallow infiltration systems, which maximise the attenuation within the drainage blanket and the underlying unsaturated zone. Whilst some sewage effluent discharges may not pose a risk to groundwater quality individually, the cumulative risk of pollution from aggregations of

11 The Environment Agency's approach to groundwater protection, Environment Agency (2018). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692989/Envirnment-Agency-approach-to-groundwater-protection.pdf on: 10/02/2023.

discharges can be significant. Improvement or pre-operational conditions may be imposed before granting an environmental permit. The EA will only agree to developments where the addition of new sewage effluent discharges to ground in an area of existing discharges is unlikely to lead to an unacceptable cumulative impact.

Generally, the Environment Agency will only agree to developments involving release of sewage effluent, trade effluent or other contaminated discharges to ground if it is satisfied that it is not reasonable to make a connection to the public foul sewer. The EA would normally expect to only permit new private discharges where the distance to connect to the nearest public sewer exceeds the number of dwellings multiplied by 30m. So, for example, a development of 100 dwellings would need to be more than 3km from a public sewer. The developer would have to provide evidence of why the proposed development cannot connect to the foul sewer in the planning application. This position will not normally apply to surface water run-off via sustainable drainage systems and discharges from sewage treatment works operated by sewerage undertakers with appropriate treatment and discharge controls.

Deep infiltration systems (such as boreholes and shafts) are not generally accepted by the EA for discharge of sewage effluent as they bypass soil layers and reduce the opportunity for attenuation of pollutants.

Discharges of surface water run-off to ground at sites affected by land contamination, or from sites for the storage of potential pollutants are likely to require an environmental permit. This could include sites such as garage forecourts and coach and lorry parks. These sites would be subject to a risk assessment with acceptable effluent treatment provided.

Discharge of Clean Water

“Clean water” discharges such as runoff from roofs or from roads, may not require a permit. However, they are still a potential source of groundwater pollution if they are not appropriately designed and maintained.

Where infiltration SuDS schemes are proposed to manage surface runoff they should:

- Be suitably designed;
- Meet Government non-statutory technical standards[12] for sustainable drainage systems – these should be used in conjunction with the NPPF and PPG; and
- Use a SuDS management treatment train

A hydrogeological risk assessment is required where infiltration SuDS is proposed for anything other than clean roof drainage in a SPZ1.

12 Sustainable Drainage Systems: non-statutory technical standards, Department for Environment, Food & Rural Affairs (2015). Accessed online at: https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards on: 10/02/2023.

Source Protection Zones in SDNPA

Source protection zones (SPZs) form a key part of the Environment Agency's approach to controlling the risk to groundwater supplies from potentially polluting activities and accidental releases of pollutants.

The Environment Agency's Manual for the Production of Groundwater Source Protection Zones[13], details position statements which provide information about the Environment Agency's approach to managing and protecting groundwater.

Proposed development locations within or close to Source Protection Zones, should be assessed in relation to the relevant Environment Agency position statements. The Source Protections Zones (SPZs) that are present within SDNPA are shown on Figure 10.9.

13 Manual for the Production of Groundwater Source Protection Zones, Environment Agency (2019). Accessed online at: https://www.gov.uk/government/publications/groundwater-source-protection-zones-spz-production-manual on: 10/02/2023.

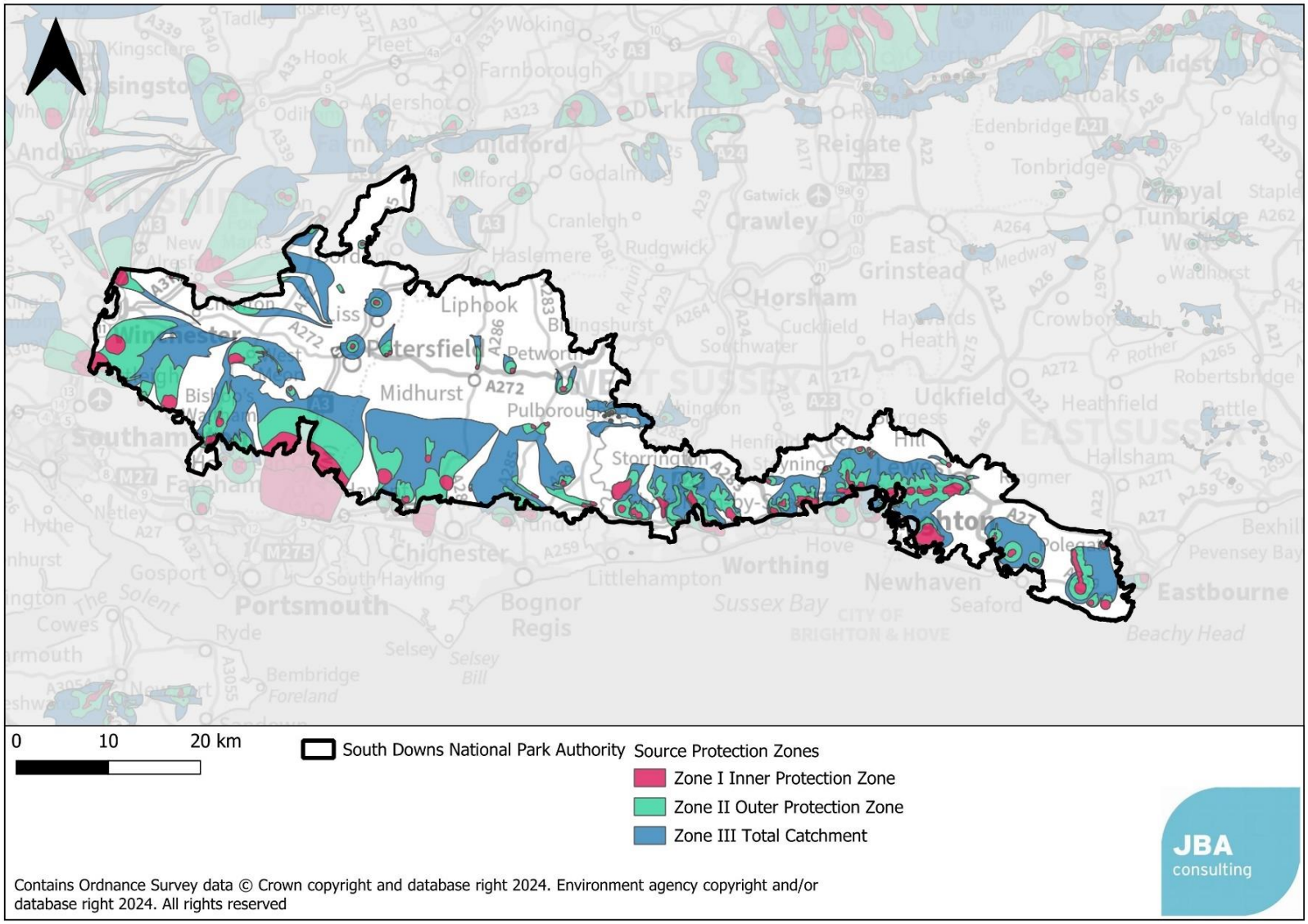


Figure 10.9 Source Protection Zones in SDNPA

10.5.2 Surface Water Drainage and SuDS

Since April 2015[14], management of the rate and volume of surface water has been a requirement for all major development sites, through the use of Sustainable Drainage Systems (SuDS).

Lead Local Flood Authorities (LLFAs) are the statutory consultees to the planning system for surface water management within major development, which covers the following development scenarios:

- 10 or more dwellings
- a site larger than 0.5 hectares, where the number of dwellings is unknown
- a building greater than 1,000 square metres
- a site larger than 1 hectare

SuDS are drainage features which attempt to replicate natural drainage patterns, through capturing rainwater at source, and releasing it slowly into the ground or a water body. They can help to manage flooding through controlling the quantity of surface water generated by a development and improve water quality by treating urban runoff. SuDS can also deliver multiple benefits, through creating habitats for wildlife and green spaces for the community. SuDS also have the advantage of providing effective Blue and Green infrastructure and ecological and public amenity benefits when designed and maintained properly.

National standards on the management of surface water are outlined within the Defra Non-statutory Standards for Sustainable Drainage Systems[15]. The CIRIA C753 SuDS Manual[16] and Guidance for the Construction of SuDS[17] provide the industry best practice guidance for design and management of SuDS.

Local guidance, provided by the Lead Local Flood Authorities covering the study area, is detailed below:

14 House of Commons: Written Statement (HCWS161) Written Statement made by: The Secretary of State for Communities and Local Government (Mr Eric Pickles) on 18 Dec 2014. Accessed online at: https://www.parliament.uk/documents/commons-vote-office/December%202014/18%20December/6.%20DCLG-sustainable-drainage-systems.pdf on: 10/02/2023.

15 Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems, DEFRA (2015). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf on: 10/02/2023.

16 CIRIA Report C753 The SuDS Manual, CIRIA (2015). Accessed online at: https://www.ciria.org/Memberships/The_SuDs_Manual_C753_Chapters.aspx on: 10/02/2023.

17 Guidance on the Construction of SuDS (C768), CIRIA (2017), Accessed online at: https://www.ciria.org/ItemDetail?iProductcode=C768&Category=BOOK on: 10/02/2023.

There are four LLFA within the SDNPA responsible for ensuring that the proposed drainage schemes for all new developments comply with the technical standards and policies in relation to SUDs. Each of them; Brighton and Hove City Council, East Sussex County Council, Hampshire County Council and West Sussex County Council provide SUDs guidance, as provided in Section 3.6.6.

The UK Government is in the process of implementing Schedule 3 of the Flood and Water Management Act. In January 2023, the UK Government released their report setting out the findings of a review into the implementation of Schedule 3 of The Flood and Water Management Act 2010, which outlined the possibility of LLFAs becoming a SuDS Approving Body (SAB). This would create a new process for the approval and adoption of SuDS, separate to the planning system.

Enactment of Schedule 3 would also remove the automatic right to connect surface water into the public sewer network. Instead, the right to connect would become conditional upon the drainage system being approved by the SAB, in consultation with the Water and Sewerage Companies, before construction can commence. The SAB approval will be separate from the planning application system; applicants' schemes would need to be approved both by the SAB and the Local Planning Authority.

10.5.3 Use of SuDS in Water Quality Management

SuDS allow the management of diffuse pollution generated by urban areas through the sequential treatment of surface water reducing the pollutants entering lakes and rivers, resulting in lower levels of water supply and wastewater treatment being required. This treatment of diffuse pollution at source can contribute to meeting WFD water quality targets, as well as national objectives for sustainable development.

This is usually facilitated via a SuDS Management Train of a number of components in series that provide a range of treatment processes delivering gradual improvement in water quality and providing an environmental buffer for accidental spills or unexpected high pollutant loadings from the site. Considerations for SuDS design for water quality are summarised in Table 10-4 below.

Table 10-4 Considerations for SuDS Design for Water Quality

Goal	Action
Manage surface water close to source	Where practicable, treatment systems should be designed to be close to source of runoff. It is easier to design effective treatment when the flow rate and pollutant loadings are relatively low. Treatment provided can be proportionate to pollutant loadings and sensitivity receptor. Accidental spills or other pollution events can be isolated more easily without affecting the downstream drainage system. Encourages ownership of pollution. Poor treatment performance or component damage/ failure can be dealt with more effectively without impacting on the whole site.
Treat surface water runoff on the surface	Where practicable, treatment systems should be designed to be on the surface. Where sediments are exposed to UV light, photolysis and volatilisation processes can act to break down contaminants. If sediment is trapped in accessible parts of the SuDS, it can be removed more easily as part of maintenance. It enables use of evapotranspiration and some infiltration to the ground to reduce runoff volumes and associated total contamination loads (provided risk to groundwater is managed appropriately). It allows treatment to be delivered by vegetation. Sources of pollution can be easily identified. Accidental spills or misconnections are visible immediately and can be dealt with rapidly. Poor treatment performance can be easily identified during routine inspections, and remedial works can be planned efficiently.
Treat surface water runoff to remove a range of contaminants	SuDS design should consider the likely presence and significance of any contaminant that may pose a risk to the receiving environment. The SuDS component or combination of components selected should include treatment processes that, in combination, are likely to reduce this risk to acceptably low levels.
Minimise risk of sediment remobilisation	The SuDS design should consider and mitigate the risks of sediments (and other contaminants) being remobilised and washed into receiving surface waters during events greater than those which the component has been specifically designed for.
Minimise impacts from accidental spills	By using several components in series, SuDS can help ensure that accidental spills are trapped in/on upstream component surfaces, facilitating contamination management and removal. The selected SuDS components should deliver a robust treatment design that manages risks appropriately - considering the

Goal	Action
	uncertainty and variability of pollution loadings, sensitivity of receptors and treatment processes.

Managing pollution close to its source can help keep pollutant levels and accumulation rates low, allowing natural processes to be more effective. Treatment can often be delivered within the same components that are delivering water quantity design criteria, requiring no additional cost or land-take.

SuDS designs should control the 'first flush' of pollutants (usually mobilised by the first 5mm of rainfall) at source, to ensure contaminants are not released from the site. Best practise is that no runoff should be discharged from the site to receiving watercourses or sewers for the majority of small (e.g., less than 5mm) rainfall events.

Infiltration techniques will need to consider Groundwater Source Protection Zones and are likely to require consultation with the Environment Agency. Early consideration of SuDS within master planning will typically allow a more effective scheme to be designed.

Further guidance on designing SuDS to reduce phosphorus[18] and nitrogen[19] in surface water runoff can be found in the relevant CIRIA guidance documents.

10.5.4 Additional Benefits

Flood Risk

The SDNPA Level 1 SFRA contains recommendations for SuDS to manage surface water on development sites, with the primary aim of reducing flood risk.

SuDS are most effective at reducing flood risk for relatively high intensity, short and medium duration events, and are particularly important in mitigating potential increases in surface water flooding, sewer flooding and flooding from small and medium sized watercourses resulting from development.

Water Resources

A central principle of SuDS is the use of surface water as a resource. Traditionally, surface water drainage involved the rapid disposal of rainwater, by conveying it directly into a sewer or wastewater treatment works.

18 CIRIA (2022) Using SuDS to reduce phosphorus in surface water runoff (C808F). Accessed online at: Using SuDS to reduce phosphorus in surface water runoff (ciria.org) on: 05/12/2023.

19 CIRIA (2023) Using SuDS to reduce nitrogen in surface water runoff (C815F). Accessed online at: New guidance for Using SuDS to reduce nitrogen in surface water runoff (ciria.org) on: 05/12/2023.

SuDS techniques such as rainwater harvesting, allow rainwater to be collected and re-used as non-potable water supply within homes and gardens, reducing the demand on water resources and supply infrastructure.

Climate Resilience

Climate projections for the UK suggest that winters may become milder, and wetter and summers may become warmer, but with more frequent higher intensity rainfall events, particularly in the south east. This would be expected to increase the volume of runoff, and therefore the risk of flooding from surface water, and diffuse pollution, and reduce water availability.

SuDS offer a more adaptable way of draining surfaces, controlling the rate and volume of runoff leaving urban areas during high intensity rainfall, and reducing flood risk to downstream communities through storage and controlled release of rainwater from development sites.

Through allowing rainwater to soak into the ground, SuDS are effective at retaining soil moisture and groundwater levels, which allows the recharge of the watercourses and underlying aquifers. This is particularly important where water resource availability is limited, and likely to become increasingly scarce under future drier climates**.**

Biodiversity

The water within a SuDS component is an essential resource for the growth and development of plants and animals, and biodiversity benefits can be delivered even by very small, isolated schemes. The greatest value can be achieved where SuDS are planned as part of a wider green landscape, providing important habitat, and wildlife connectivity. With careful design, SuDS can provide shelter, food, foraging and breeding opportunities for a variety of species including plants, amphibians, invertebrates, birds, bats and other animals.

Amenity

Designs using surface water management systems to help structure the urban landscape can enrich its aesthetic and recreational value, promoting health and well-being and supporting green infrastructure. Water managed on the surface rather than underground can help reduce summer temperatures, provide habitat for flora and fauna and act a resource for local environmental education programmes and working groups and directly influence the sense of community in an area. Although there are few comparative studies, the sites compared in available studies indicate that SuDS are more cost-effective than traditional drainage systems[20].

20 Susdrain (2023) Comparisons of costs and benefits. Available at: Comparison of costs and benefits (susdrain.org)

North Street Quarter, Lewes - SuDS Case Study

A development of 400 dwellings in Lewes, in construction includes SUDs schemes aiming to create habitats for wildlife, while improving the quality of life for the new community. The design includes interwoven greenroofs, rain gardens and bioswales.

Carden Primary School in Brighton – SuDS Case Study

Within a partnership project between SDNPA and The Aquifer Partnership SuDs were implemented at the Carden Primary School in Brighton. The project aimed to improve water quality, reduce flood risk and enhance wildlife habitat and provide educational opportunities for students. The SuDs scheme included creation of pond and infiltration area that diverts rainwater through a swale into a natural feature as provided in the picture below.

Figure 10.10 SuDS in Carden Primary School

© Picture taken from Our Sustainable Drainage Solution For Carden Primary School (metisconsultants.co.uk)

10.5.5 Suitable SuDS Techniques

The hydraulic and geological characteristics of each property development site across SDNPA should be assessed to identify the most appropriate forms of surface water management and any constraining factors to the utilisation of SuDS. These assessments are designed to inform the early-stage site planning process and should be followed up the site-specific detailed drainage assessments.

Appropriate SuDS techniques have been categorised into five main groups, as shown in Table 10-5, with further details provided on the Susdrain website[21]. Further site-specific investigation should be conducted to determine what SuDS techniques could be used on a particular development, informed by detailed ground investigations.

Table 10-5 Summary of SuDS Categories

SuDS Type[22]	Technique
Source Control	Green Roof, Rainwater Harvesting, Pervious Pavements, Rain Gardens
Infiltration	Infiltration Trench, Infiltration Basin, Soakaway
Detention	Pond, Wetland, Subsurface Storage, Shallow Wetland, Extended Detention Wetland, Pocket Wetland, Submerged Gravel Wetland, Wetland Channel, Detention Basin
Filtration	Surface Sand filter, Sub-Surface Sand Filter, Perimeter Sand Filter, Bioretention, Filter Strip, Filter Trench
Conveyance[23]	Dry Swale, Under-drained Swale, Wet Swale

10.5.6 Natural Flood Management

Natural Flood Management (NFM) is used to protect, restore, and re-naturalise the function of catchments and rivers to reduce flood risk. A wide range of techniques can be used that aim to reduce flooding by working with natural features and processes in order to store or slow down flood waters before they can damage flood risk receptors (e.g., people, property, infrastructure, etc.).

Techniques and measures, which could be applied in SDNP include:

- Peatland and moorland restoration in upland catchments
- Offline storage areas
- Re-meandering streams
- Targeted woodland planting
- Reconnection and restoration of functional floodplains
- Restoration of rivers and removal of redundant structures

21 SuDS components overview (susdrain.org)
22 SuDS components overview (susdrain.org)
23 Swales & conveyance channels overview (susdrain.org)

- Installation or retainment of large woody material in river channels
- Improvements in management of soil and land use
- Creation of rural and urban SuDS

In 2017, the Environment Agency published an online evidence base[24] to support the implementation of NFM and with JBA produced maps showing locations with the potential for NFM measures[25]. These maps are intended to be used alongside the evidence directory to help practitioners think about the types of measure that may work in a catchment and the best places in which to locate them. There are limitations with the maps; however, it is a useful tool to help start dialogue with key partners.

10.5.7 Multiple Benefits of NFM

In addition to flood risk benefits, there are also significant benefits in other areas such as habitat provision, air quality, climate regulation and water quality.

Many NFM measures have the ability to reduce nutrient and sediment sources by reducing surface runoff flows from higher ground, reducing soil erosion, trapping sediment at the edge of agricultural land, or encouraging deposition of sediments behind natural dams upstream in watercourses.

Suitable techniques may include:

- Leaky dams
- Woodland planting
- Buffer strips
- Runoff retention ponds
- Land management techniques (soil aeration, cover crops etc.)

Case Study – Adur Adaptation Project

The Adur Adaptation Project is an ongoing initiative that aims to mitigate flood risks to vulnerable properties through NFM measures including leaky dams, creation of woodlands, river restoration and realignment, planting of floodplain woodland and soil structure improvement.

24 Working with natural processes to reduce flood risk, Environment Agency (2018). Accessed online at: https://www.gov.uk/government/publications/working-with-natural-processes-to-reduce-flood-risk on: 10/02/2023.

25 Mapping the potential for working with natural process, Environment Agency and JBA (2017). Accessed online at: https://www.arcgis.com/home/item.html?id=7315f943998847e2b3797a85665f5438 on: 10/02/2023.

Figure 10.11 Floodplain woodland planting in Adur Catchment

© Ouse & Adur River Trust, Adur Adaptation Project

10.5.8 Integrated Constructed Wetlands

An integrated constructed wetland (ICW) is an artificial wetland created for the purpose of treating polluted water, whether this is municipal wastewater, grey water from residential properties, or agricultural runoff.

They are usually unlined, free surface flow wetlands, designed to contain and treat influents within emergent vegetated areas.

Defra carried out a systematic review of the effectiveness of various wetland types, including ICWs for mitigating agricultural pollution such as phosphate and nitrate. The overall conclusion was that all wetland types are very effective at reducing major nutrients and suspended sediments, with the exception of nitrite in ICWs. Nitrate is only reduced when passing through overland buffer strips and through constructed wetlands with vegetation, where the systematic review showed a mean reduction of 29% across the evidence included in the study.

The mean reduction in Total Phosphorus across the evidence base was 78%. The EA have advised that although ICWs have been shown to be effective at "polishing" final effluent

discharges to help achieve the lower end of phosphate removal, the effectiveness of treating high levels of phosphate is less certain.

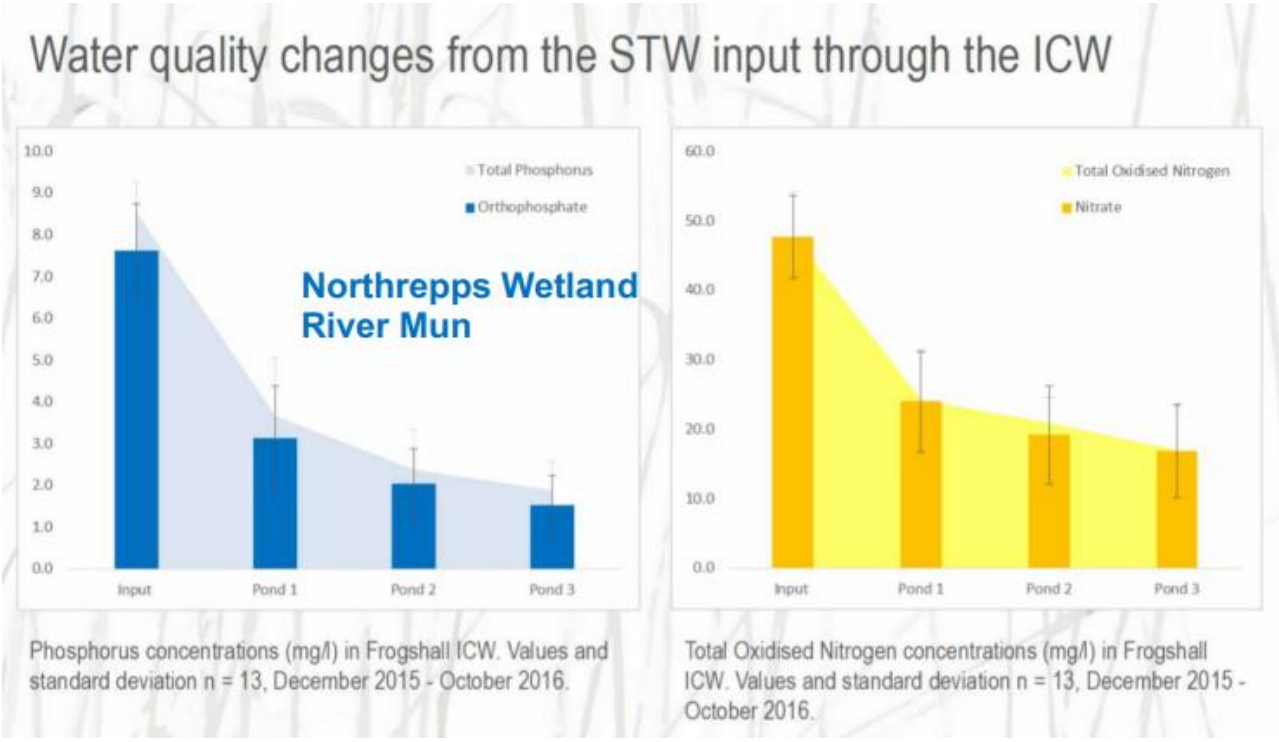
Other techniques to manage nutrients are possible such as catchment nutrient balancing, where excess nutrients are managed at a catchment level, as well as catchment permitting. These techniques are recommended where environmental capacity is restrictive to growth.

Case Study - Frogshall ICW

The Upper River Mun in Norfolk was experiencing chronic pollution, and a loss in biodiversity in the river. Investigation found that nutrients from a Sewage Treatment Works upstream were contributing to this issue.

A pilot ICW was created consisting of three shallow ponds, filled with 18,000 emergent aquatic plants, and the outfall from the treatment works was diverted to pass through the wetland.

Early monitoring has shown that 90% of the phosphate is being removed by the wetland, and a large increase in biodiversity downstream observed.



Phosphorus concentrations (mg/l) in Frogshall ICW. Values and standard deviation n = 13, December 2015 - October 2016.

Total Oxidised Nitrogen concentrations (mg/l) in Frogshall ICW. Values and standard deviation n = 13, December 2015 - October 2016.

Reproduced from “Stripping the Phosphate” a presentation by the Norfolk Rivers Trust (2018). https://www.theriverstrust.org/media/2018/08/2.-Stripping-the-phosphate-David-Diggens-Norfolk-Rivers-Trust.pdf

10.5.9 Agricultural Management

The Environment Agency's 'Reason for Not Achieving Good' database indicates that one of the reasons for some of the watercourses in the area not to meet 'Good' WFD standards can be related to agriculture and rural land use. The cause of this includes pollution from fertilisers, manures, pesticides and soils washing into streams when it rains or percolating into the groundwater. Other pressures from agriculture include deepening, widening or re-routing of streams for land drainage, gravel removal and bankside erosion.

There is a big potential to improve water quality by interventions aimed at agricultural sources, especially considering the measures already taken by the water companies to reduce their contribution to phosphate load.

Potential schemes could include:

- Buffer strips
- Cross slope tree planting
- Runoff retention basins
- Contour ploughing
- Cover crops

There is considerable overlap with NFM measures, and the challenges are also very similar. Exact impacts are difficult to measure, although modelling tools such as Farmscoper[26] exist to help with this. Once a scheme is implemented it relies on the landowner to continue to maintain it in order to maintain the mitigation benefit.

Funding for agricultural interventions could come from Catchment Sensitive Farming or a Payment for Ecosystem Services approach.

Case Study - Wessex Water - EnTrade

Wessex Water catchment team used EnTrade to invite farmers to bid to grow cover crops over winter to reduce the nitrogen leaching into the watercourse.

This avoided the need to upgrade Dorchester WwTW to provide the same nitrogen removal capacity.

A trial auction was held in 2015, and two further auctions have since taken place attracting 557 bids from 63 farmers to save 153 tonnes of nitrogen.

26 Farmscoper webpage, ADAS (2020). https://www.adas.uk/Service/farmscoper Accessed on 10/02/2023.

“Using EnTrade to create a market in measures to deliver reductions in nitrogen has delivered a 30% saving for Wessex Water compared to traditional catchment approaches.” - Ruth Barden, Director of Environmental Strategy, Wessex Water

10.5.10 Barriers

Whilst there are many benefits to implementing NFM and constructed wetlands, or modifying agricultural practises, the impact of these techniques is hard to quantify, and relies on ongoing maintenance to maintain that benefit. Where a potential scheme is not on a development site it will also require permission and support of the landowner. It may not be possible to influence this through planning policy.

10.6 Conclusions

- The potential impact of development on a number of protected sites such as SAC and SSSIs within, or downstream of the study area should be carefully considered in future plan making. There are also a large number of Priority Habitats within SDNP.
- Water quality modelling should be undertaken in a Stage 2 WCS to identify potential deterioration in water quality in waterbodies adjacent to protected sites.
- The growth forecast for SDNPA is higher than the percentage growth predicted within most of the WRZs serving SDNP. It is therefore recommended that the difference between the rdWRMP24 and the growth plans is investigated in a Stage 2 WCS to ensure that the WRMP24 has accounted for a sufficient level of growth and that delivery of the SDNPA growth plan does not lead to an unsustainable increase in abstraction
- There are a number of groundwater Source Protection Zones (SPZs) within SDNP. The impact of future development on groundwater should be investigated in Stage 2.

- Development sites within the study area could be sources of diffuse pollution from surface runoff.
- SuDS are required on all development sites. Their design should consider both water quantity and water quality and site level investigations should be undertaken to define the most appropriate SuDS types for each specific development.
- Opportunities exist for these SuDS schemes to offer multiple benefits of flood risk reduction, amenity value and biodiversity.
- SDNPA should be consulted at an early stage of development to ensure that SuDS are implemented and designed in response to site characteristics and policy factors
- In the wider area, opportunities exist to implement natural flood management techniques to achieve multiple benefits of flood risk, water quality and habitat creation

10.7 Recommendations

Table 10-6 Recommendations for Environmental Impact

Action	Responsibility	Timescale
Consider the environmental impact of development on protected sites downstream of receiving wastewater treatment works in the Habitats Regulations Assessment	SDNPA	Local Plan Development
The Local Plan should include policies that require all development proposals with the potential to impact on areas with environmental designations to be considered in line with the relevant legislation and where stated, in consultation with Natural England (for national and international designations and priority habitats).	SDNPA	Ongoing
The Local Plan should include policies that require development sites to adopt SuDS to manage water quality of surface runoff.	SDNPA	Ongoing
In partnership, identify opportunities for incorporating SuDS into open spaces and green infrastructure, to deliver strategic flood risk management and meet WFD water quality targets.	SDNPA, PW, SEW, SW, TW	Ongoing

11 Summary of overall conclusions and recommendations

11.1 Conclusions

Assessment	Conclusion
Water resources	The SDNP receives its water from Portsmouth Water, South East Water and Southern Water. The SDNP is within Eastbourne, Farnham, Haywards Heath, Hampshire South East, Hampshire Winchester, Portsmouth Water, Sussex Brighton, Sussex North and Sussex Worthing WRZs (WRZs). In all of the WRZs, the forecast percentage growth is higher than the expected growth during the Local Plan period. This may need to be updated once the final WRMP24s have been published. In addition, changes proposed in the draft NPPF (being consulted on at the time of writing) may result in significant changes to the housing need. The Water Industry National Environment Programme (WINEP) is a set of actions that the EA have requested all 20 water companies operating in England to complete in a particular Asset Management Period (AMP) as part of their environmental commitments. A number of investigations are planned or underway to ensure that abstraction of water from both groundwater and rivers, is not leading to unsustainable reductions in flow, particularly in chalk streams. Development and population growth can increase abstraction, and so SDNP have an opportunity to contribute to these actions indirectly by pursuing policies that promote water efficiency in new development. It is important that new development does not result in an unsustainable increase in water abstraction. This can be done in a number of ways from reducing the water demand from new houses through to achieving “water neutrality” in a region by offsetting a new developments water demand by improving efficiency in existing buildings. Water resources in the UK are under considerable pressure. The Environment Agency have stated that "the scale of the challenge we face increases with time, and, by 2050, we are looking at a shortfall of nearly 5 billion litres of water per day between the sustainable water supplied available and the expected demand."

Assessment	Conclusion
	The National Water Resources Framework sets the objective to reduce the average per capita consumption in the UK to 110l/p/d by 2050. This is now part of the Environmental Improvement Plan and water companies WRMPs. Within Defra's Plan for Water is the commitment to review Building Regulations and a target of 100l/p/d in water stress areas is suggested. The Future Homes Hub, who are supporting Defra to produce a roadmap to greater water efficiency propose a stages reduction in PCC, with a target of 100l/p/d in water stressed areas in place from 2025, and a reduced target of 90l/p/d in place by 2030 (depending on market conditions and customer acceptance). This study recommends that as a minimum the proposed new Building Regulations target of 100l/p/d outlined in Defra's Plan for Water be adopted across the study area. This should be achieved using a fittings-based approach. This should be supported by the requirement for non-household development to achieve three credits in the assessment category WAT01 of the BREEAM UK New Construction Standard. The Local Plan should allow for a future reduction in the Building Regulations target to 90l/p/d in 2030. Within the water neutrality zone, a lower target of 85l/p/d should apply, in line with the Water Neutrality Strategy. This is supported by Portsmouth Water's, South-East Water's and Southern Water's incentives for water efficient design in new builds outlined in 4.6 where significant inceptives are offered to reduce design consumption below 110l/p/d. Developers (outside of the water neutrality zone) should be encouraged to achieve at least the Tier 2 incentive.

Assessment	Conclusion
Wastewater collection	Development in areas where there is limited wastewater network capacity will increase pressure on the network, increasing the risk of a detrimental impact on customers, and increasing the likelihood of storm overflow operation. Early engagement with developers, Thames Water and Southern Water is required, and further modelling of the network may be required in the Stage 2 WCS and at the planning application stage. Furthermore, in the Thames Water and Southern Water networks, there are areas where the current network is a combined sewer system, and further separation of foul and surface water may be required, as well as suitably designed SuDS. Early engagement between developers, the SDNPA, Thames Water and Southern Water is recommended to allow time for the strategic infrastructure required to serve these developments to be planned.
Wastewater treatment assessment	A headroom assessment was carried out comparing the current flow from each WwTW, making allowance for growth already planned, with the permit limit. This provides an estimate of the spare capacity in wastewater treatment infrastructure in SDNP. 13 of the 45 WwTWs expected to serve growth in the study area are likely to be close to or exceeding their permit during the Local Plan period. An increase in the permit limit, and / or upgrades to treatment capacity may be required at these WwTWs in order to accommodate further growth. Consideration should be given to using capacity in existing permits as this provides a lower carbon cost than upgrading capacity at existing WwTW or building new treatment works. There are a number of poorly performing storm tank overflows at WwTWs in SDNP. Growth within these catchments could result in an increase in the operations of these overflows contributing to a worsening of water quality in the area. Action should be taken by the water companies to address these overflows prior to an increase in wastewater demand being generated by new development. New development proposed within the Thames Water and Southern Water's WwTW odour buffer zones are recommended to undergo an odour assessment, to be paid for by the developer as part of the planning process. Preferred sites, if available, will be assessed at Stage 2 to determine their proximity to WwTWs.

Assessment	Conclusion
Water quality	The EA "reasons for not achieving good" (RNAG) dataset indicates that the water industry (groundwater abstractions, sewerage discharge, barriers and impoundment) and agriculture and rural land management (poor livestock and nutrient management) are the main reasons for watercourses not achieving good status in this area. Growth during the local plan period will also increase the discharge of treated wastewater from WwTWs in South Downs National Park. There is a potential for this to cause a deterioration in water quality in the receiving watercourses and this must be carefully considered. A significant deterioration in water quality is not acceptable under the Water Framework Directive, and large-scale investment in treating effluent to higher standards may therefore be required. Detailed modelling will be undertaken in the Stage 2 WCS.
Environmental constraints and opportunities	The potential impact of development on a number of protected sites such as SAC and SSSIs within, or downstream of the study area should be carefully considered in future plan making. There are also a large number of Priority Habitats within SDNP. Water quality modelling should be undertaken in a Stage 2 WCS to identify potential deterioration in water quality in waterbodies adjacent to protected sites. The growth forecast for SDNPA is higher than the percentage growth predicted within most of the WRZs serving SDNP. It is therefore recommended that the difference between the rdWRMP24 and the growth plans is investigated in a Stage 2 WCS to ensure that the WRMP24 has accounted for a sufficient level of growth and that delivery of the SDNPA growth plan does not lead to an unsustainable increase in abstraction There are a number of groundwater Source Protection Zones (SPZs) within SDNP. The impact of future development on groundwater should be investigated in Stage 2. Development sites within the study area could be sources of diffuse pollution from surface runoff. SuDS are required on all development sites. Their design should consider both water quantity and water quality and site level investigations should be undertaken to define the most appropriate SuDS types for each specific development.

Assessment	Conclusion
	Opportunities exist for these SuDS schemes to offer multiple benefits of flood risk reduction, amenity value and biodiversity. SDNPA should be consulted at an early stage of development to ensure that SuDS are implemented and designed in response to site characteristics and policy factors In the wider area, opportunities exist to implement natural flood management techniques to achieve multiple benefits of flood risk, water quality and habitat creation

11.2 Recommendations

Aspect	Action	Responsibility	Timescale
Water resources	Continue to regularly review forecast and actual household growth across the supply region through WRMP Annual Update reports, and where significant change is predicted, engage with Local Planning Authorities.	Portsmouth Water, South East Water, Southern Water.	Ongoing
Water resources	Provide yearly profiles of projected hosing growth to water companies to inform WRMP updates.	South Downs National Park Authority.	Ongoing
Water resources	The council should consider a domestic water efficiency target of 100l/p/d for all new homes, and work with water suppliers to incentivise even lower consumption. This should be achieved using a fittings-based approach.	South Downs National Park Authority.	In South Downs National Park Authority LP

Aspect	Action	Responsibility	Timescale
Water resources	Use planning policy to require new build non-residential development to achieve at least 3 credits in the Wat01 Measure for water in the BREEAM New Construction standard.	South Downs National Park Authority.	In South Downs National Park Authority LP
Water resources	Within the water neutrality zone, the Water Neutrality Strategy should be applied.	South Downs National Park Authority.	In South Downs National Park Authority LP
Water resources	Larger residential developments (including new settlements), and commercial developments should consider incorporating greywater recycling and/or rainwater harvesting into development at the master planning stage in order to reduce water demand.	South Downs National Park Authority, Portsmouth Water, South East Water, Southern Water.	In South Downs National Park Authority LP
Water resources	Water companies should advise the SDNPA of any strategic water resource infrastructure developments within the study, where these may require safeguarding of land to prevent other type of development occurring.	South Downs National Park Authority, Portsmouth Water, South East Water, Southern Water.	Part of South Downs National Park Authority LP process

Aspect	Action	Responsibility	Timescale
Water resources	Review this section of the WCS following publication of the final Water Resource Management Plans for 2024.	South Downs National Park Authority, Portsmouth Water, South East Water, Southern Water.	Stage 2 WCS
Water supply	Undertake network modelling to ensure adequate provision of water supply is feasible.	Water companies, SDNPA	Ahead of planning applications
Water supply	SDNPA and Developers should engage early with water companies to ensure infrastructure is in place prior to occupation.	Water companies, SDNPA, developers	Ongoing
Wastewater network	Early engagement between SDNPA and Thames Water and Southern Water is required to ensure that where strategic infrastructure is required, it can be planned in by Southern Water and Thames Water, and will not lead to any increase in discharges from sewer overflows.	SDNPA, Southern Water and Thames Water.	Ongoing
Wastewater network	Consider wastewater infrastructure constraints in phasing development in partnership with the sewerage undertaker	SDNPA, Southern Water and Thames Water.	Ongoing
Wastewater network	Developers will be expected to work with the sewerage undertaker closely and early in the planning promotion process to develop an	SDNPA and developers	Ongoing

Aspect	Action	Responsibility	Timescale
	Outline Drainage Strategy for sites. The Outline Drainage strategy should demonstrate the wastewater assets required, their locations including points of connection to the public foul sewerage, whether the site drainage will be adopted by the water company and if any sewer requisitions will be required.		
Wastewater network	Developers will be expected to demonstrate to the Lead Local Flood Authority (LLFA) that surface water from a site will be disposed using a sustainable drainage system (SuDS) with connection to surface water sewers seen as the last option. New connections for surface water to foul sewers will be resisted by the LLFA, SW and TW.	Brighton and Hove City Council, East Sussex County Council, Hampshire County Council and West Sussex County Council as LLFA.	Ongoing
Wastewater treatment	Early engagement with Southern Water and Thames Water is required to ensure that provision of WwTW capacity is aligned with delivery of development.	SDNPA	Ongoing

Aspect	Action	Responsibility	Timescale
Wastewater treatment	Provide Annual Monitoring Reports to Southern Water and Thames Water detailing projected housing growth.	SDNPA	Ongoing
Wastewater treatment	Southern Water and Thames Water to assess growth demands as part of their wastewater asset planning activities and feedback to the Council if concerns arise.	Southern Water, Thames Water	Ongoing
Wastewater treatment	Carry out an odour assessment for sites which fall within the buffer zone of WwTW.	SDNPA, developers	Ongoing
Water quality	Provide annual monitoring reports to TW and SW detailing projected housing growth in the Local Authority	SDNPA	Ongoing
Water quality	When preferred options for growth are identified, undertake water quality impact modelling as part of a Stage 2 WCS.	SDNPA	Ongoing
Water quality	Take into account the full volume of growth (from SDNPA and neighbouring authorities within the catchment when considering WINEP schemes or upgrades at WwTWs	Southern Water and Thames Water	Ongoing

Aspect	Action	Responsibility	Timescale
Environmental impact	Consider the environmental impact of development on protected sites downstream of receiving wastewater treatment works in the Habitats Regulations Assessment	SDNPA	Local Plan Development
Environmental impact	The Local Plan should include policies that require all development proposals with the potential to impact on areas with environmental designations to be considered in line with the relevant legislation and where stated, in consultation with Natural England (for national and international designations and priority habitats).	SDNPA	Ongoing
Environmental impact	The Local Plan should include policies that require development sites to adopt SuDS to manage water quality of surface runoff.	SDNPA	Ongoing
Environmental impact	In partnership, identify opportunities for incorporating SuDS into open spaces and green infrastructure, to deliver strategic flood risk management and meet WFD water quality targets.	SDNPA, PW, SEW, SW, TW	Ongoing

A WwTW flow capacity assessment

WwTW	Map Ref.	Proposed housing growth over Local Plan period	Proposed employment growth over Local Plan period (m^2)	Approximate remaining headroom (no. dwellings) following all planned growth	Is DWF flow forecasted to exceed permitted flow over local plan period? (JBA Assessment)
ALFRISTON	1	44	0	-196	Yes
ALTON	2	2,096	8,000	3,601	No
AMBERLEY	3	95	0	-79	Yes
BENTLEY	4	259	19,939	814	No
BISHOPS WALTHAM	5	536	1,533	N/A	N/A
BORDON	6	736	0	4,205	No
BOSHAM	7	25	0	-230	Yes
BUDDS FARM HAVANT	8	464	225	N/A	N/A
BURITON	9	12	0	139	No
BURY	10	16	1,300	142	No
CHICKENHALL EASTLEIGH	11	252	5,188	N/A	N/A
CLAPHAM	12	35	6,840	89	No
COLDWALTHAM	13	0	2,335	290	No
COOKSBRIDGE	14	36	0	-14	Yes
DITCHLING	15	2	0	11	No

WwTW	Map Ref.	Proposed housing growth over Local Plan period	Proposed employment growth over Local Plan period (m^2)	Approximate remaining headroom (no. dwellings) following all planned growth	Is DWF flow forecasted to exceed permitted flow over local plan period? (JBA Assessment)
DROXFORD	16	30	0	N/A	N/A
EAST MEON	17	46	860	N/A	N/A
EAST WORTHING (Worthing)	18	1,173	22,370	33,714	No
ELSTED	19	14	0	N/A	N/A
FERNHURST	20	0	583	2,006	No
FITTLEWORTH	21	23	0	388	No
FORD	22	11,292	0	27,298	No
GODDARDS GREEN	23	8,768	83640	-15,902	Yes
HARDHAM	24	32	770	N/A	N/A
HARESTOCK	25	2,749	0	N/A	N/A
HASLEMERE	26	904	0	-172	No
KINGSTON HOLLOW	27	6	435	218	No
LAVANT	28	138	0	3,721	No
LISS	29	1,566	47,804	-636	Yes
LISS HILLBROW	30	1	0	N/A	N/A
LURGASHALL	31	2	0	N/A	N/A

WwTW	Map Ref.	Proposed housing growth over Local Plan period	Proposed employment growth over Local Plan period (m^2)	Approximate remaining headroom (no. dwellings) following all planned growth	Is DWF flow forecasted to exceed permitted flow over local plan period? (JBA Assessment)
MORESTEAD ROAD WINCHESTER	32	1,162	58,406	N/A	N/A
NEAVES LANE RINGMER	33	990	898.37	-163	Yes
NEWHAVEN EAST	34	4,124	9,836	-5,080	Yes
NORTHCHAPEL	35	2,507	0	218	No
PEACEHAVEN	36	9,478	396	88,583	No
PETERSFIELD	37	409	4,250	1,293	No
PETWORTH	38	203	3,600	541	No
PYECOMBE EAST	39	5	0	N/A	N/A
RODMELL	40	0	1,017	185	No
ROGATE	41	15	0	519	No
SOUTH AMBERSHAM	42	1,005	680	339	No
STEYNING	43	721	46,780	860	No
THORNHAM	44	0	1,370	2,217	No
WILMINGTON	45	1	0	N/A	N/A

B WINEP actions relating to water quality

Waterbody Name	WINEP ID	Unique ID	Scheme Name(s)	Type of scheme/notes	Completion date
Caker Stream	THM00575	7TW200737	ALTON STW	WFD_IMPm – phos 0.25mg/l	22/12/2024
North Wey (Alton to Tilford)	FLO01237 THM00126 THM00307 THM00581	7TW200893 7TW200288 7TW200469 7TW200743	BENTLEY STW	U_IMP6 U_MON3 U_INV2 WFD_IMPm – phos 0.9	31/03/2025 31/03/2025 31/03/2022 22/12/2024
Upper Hamble	SSD00338	7SO200351	Bishops Waltham WWTW	WFD_IMPg – phos 0.4mg/l (AA)	22/12/2024
South Wey (Bordon to River Slea confluence)	THM00133 THM00314	7TW200295 7TW200476	BORDON STW	U_MON3 U_MON4	31/03/2022 31/03/2021
South Wey (Haslemere to Bordon)	THM00497	7TW200659	BORDON STW	WFD_IMPg – phos 0.25mg/l	22/12/2024
CHICHESTER HARBOUR	EDM01052	7SO300314	Bosham WWTW	SW_MON	31/03/2021
LANGSTONE HARBOUR	EDM01027	7SO300289	Budds Farm WWTW	SW_MON	31/03/2021
Arun & Western	EDM01140	7SO300398	Buriton WWTW	U_MON1	31/03/2025
Stanbridge Stream	SSD00327 SSD00342	7SO200340 7SO200355	Buriton WWTW	WFD_IMPg – amm 8mg/l (95th) WFD_IMPg – phos 0.7mg/l (AA)	22/12/2024 22/12/2024
Itchen	EDM00934 SSD00559	7SO300196 7SO300433	Chickenhall WWTW	U_MON1 HD_IMP – phos – 0.6mg/l (AA)	31/03/2024 31/03/2025
Worthing chalk	SSD00288	7SO200309	Nitrate investigations in SWS SSD groundwater sources: Clapham	WFDGW_NDINV_GWQ – Catchment investigations by Southern Water to characterise groundwater catchment at Clapham. This investigation in to rising concentrations of nitrates {or other substance) will include enhanced monitoring, data analysis, land use mapping and catchment walkover. It will identify and recommend measures leading to a draft action plan for Southern Water mitigation actions within the catchment, in readiness for the next AMP period. This will include an options appraisal and a cost effectiveness analysis.	31/03/2022
OUSE	EDM01023	7SO300285	Cooksbridge WPS	BW_MON	31/03/2021
Meon	EDM00927 SSD00347	7SO300189 7SO200360	East Meon WWTW	SW_MON WFD_IMPg – phos 0.6mg/l (AA)	31/03/2021 22/12/2024
Teville Stream	EDM00871 EDM00872	7SO300133 7SO300134	Worthing WWTW	U_MON1 U_MON1	31/03/2022 31/03/2022

Waterbody Name	WINEP ID	Unique ID	Scheme Name(s)	Type of scheme/notes	Completion date
Adur East (Goddards Green)	SSD00352	7SO200365	Burgess Hill Goddards Green WWTW	WFD_IMPm – phos 0.25mg/l (Aa)	22/12/2024
Nun's Walk Stream	EDM00940 SSD00560	7SO300202 7SO300434	Harestock WWTW	U_MON1 HD_IMP – phos 0.25mg/l (AA)	31/03/2024 31/03/2025
South Wey (Haslemere to Bordon)	THM00531	7TW200693	Haslemere STW	WFD_IMPg – phos 0.25mg/l (AA)	22/12/2024
Itchen	CHM00228 EDM00933	7SO300026 7SO300195	Morestead WWTW	WFD_INV_CHEM1 U_MON1	30/09/2021 31/03/2024
Glynde Reach	EDM00889	7SO300151	Ringmer Neaves Lane WWTW	U_MON1	31/03/2023
OUSE	EDM01022	7SO300284	Newhaven	BW_MON	31/03/2021
Kird	EDM00876 SSD00367 SSD00548	7SO300138 7SO200380 7SO300423	Northchapel WWTW	U_MON1 WFD_IMPg – phos 0.7mg/l (AA) WFD_ND – amm 4mg/l (95th)	31/03/2023 22/12/2024 31/03/2025
Arun & Western	EDM01131	7SO300389	Petersfield WWTW	U_MON1	31/03/2025
Stanbridge Stream	SSD00370	7SO200383	Petersfield WWTW	WFD_IMPg - phos	22/12/2024
Western Rother	CHM00237 SSD00380	7SO300035 7SO200393	South Ambersham WWTW	WFD_MON_CHEM – Influent and effluent spot sampling at operator self-monitoring (OSM) frequency. Monitoring for the full 5 years of AMP7 WFD_IMPg – phos – 1.5mg/l (AA)	31/03/2025 22/12/2024
CHICHESTER HARBOUR	CHM00238 EDM01053 EDM01054 EDM01055	7SO300036 7SO300315 7SO300316 7SO300317	Thornham WWTW	WFD_MON_CHEM - Influent and effluent spot sampling at operator self-monitoring (OSM) frequency. Monitoring for the full 5 years of AMP7 SW_MON SW_MON SW_MON	31/03/2025 31/03/2021 31/03/2021 31/03/2021

Legend:

C Environment Opportunities and Constraints Appendix

C.1 Impact of abstraction within groundwater bodies

Table 11-1 Groundwater Dependent Terrestrial Ecosystems within groundwater bodies and Indication of significant water management Issue

Protected Site	Waterbody Name	Flow identified as a significant water management issue
Adur Estuary (SSSI)	Worthing chalk	Yes
Adur Estuary (SSSI)	Brighton Chalk Block	Yes
Alresford Pond (SSSI)	River Itchen Chalk	Yes
Amberley Mount to Sullington Hill (SSSI)	Worthing chalk	Yes
Ambersham Common (SSSI)	Lower Greensand Arun & Western Streams	No
Arun Banks (SSSI)	Chichester chalk	Yes
Arun Banks (SSSI)	Worthing chalk	Yes
Arundel Park (SSSI)	Chichester chalk	Yes
Beacon Hill, Warnford (SSSI)	East Hants Chalk	Yes
Beeding Hill to Newtimber Hill (SSSI)	Brighton Chalk Block	Yes
Binswood (SSSI)		
Botley Wood & Everett's & Mushes Copses (SSSI)	South East Hants Bracklesham Group	No
Botley Wood & Everett's & Mushes Copses (SSSI)	East Hants Chalk	Yes
Bracklesham Bay (SSSI)	South East Hants Bracklesham Group	No
Burton Park (SSSI)	Lower Greensand Arun & Western Streams	No
Butser Hill (SSSI)	Chichester chalk	Yes
Butser Hill (SSSI)	East Hants Chalk	Yes
Chapel Common (SSSI)	Lower Greensand Arun & Western Streams	No
Charleshill (SSSI)	Godalming Lower Greensand	Yes

Protected Site	Waterbody Name	Flow identified as a significant water management issue
Charterhouse to Eashing (SSSI)	Godalming Lower Greensand	Yes
Chichester Harbour (SSSI)	Sussex Lambeth Group	No
Chichester Harbour (SSSI)	Chichester chalk	Yes
Chichester Harbour (SSSI)	South East Hants Bracklesham Group	No
Chichester Harbour (SSSI)	East Hants Chalk	Yes
Colyers Hanger (SSSI)	Godalming Lower Greensand	Yes
Forest Mere (SSSI)	Lower Greensand Arun & Western Streams	No
Fyning Moor (SSSI)	Lower Greensand Arun & Western Streams	No
Harting Downs (SSSI)	Chichester chalk	Yes
Hurston Warren (SSSI)	Lower Greensand Arun & Western Streams	No
Iping Common (SSSI)	Lower Greensand Arun & Western Streams	No
Langstone Harbour (SSSI)	South East Hants Bracklesham Group	No
Langstone Harbour (SSSI)	East Hants Chalk	Yes
Lavington Common (SSSI)	Lower Greensand Arun & Western Streams	No
Lee-on-the Solent to Itchen Estuary (SSSI)	South East Hants Bracklesham Group	No
Leith Hill (SSSI)	Godalming Lower Greensand	Yes
Lewes Brooks (SSSI)	Brighton Chalk Block	Yes
Lewes Downs (SSSI)	Brighton Chalk Block	Yes
Lincegrove & Hackett's Marshes (SSSI)	South East Hants Bracklesham Group	No
Milton Gate Marsh (SSSI)	Lower Greensand Cuckmere & Pevensey Levels	No
Moor Park (SSSI)	Godalming Lower Greensand	Yes
Moorgreen Meadows (SSSI)	South East Hants Bracklesham Group	No

Protected Site	Waterbody Name	Flow identified as a significant water management issue
Noar Hill (SSSI)	Chichester chalk	Yes
Noar Hill (SSSI)	Alton Chalk	No
Offham Marshes (SSSI)	Brighton Chalk Block	Yes
Old Winchester Hill (SSSI)	East Hants Chalk	Yes
Pagham Harbour (SSSI)	South East Hants Bracklesham Group	No
Parham Park (SSSI)	Lower Greensand Arun & Western Streams	No
Pulborough Brooks (SSSI)	Lower Greensand Arun & Western Streams	No
Puttenham & Crooksbury Commons (SSSI)	Godalming Lower Greensand	Yes
Rake Hanger (SSSI)	Lower Greensand Arun & Western Streams	No
River Itchen (SSSI)	River Itchen Chalk	Yes
Seaford to Beachy Head (SSSI)	Seaford and Eastbourne Chalk Block	No
Shortheath Common (SSSI)	Godalming Lower Greensand	Yes
The Moors, Bishop's Waltham (SSSI)	East Hants Lambeth Group	No
The Moors, Bishop's Waltham (SSSI)	East Hants Chalk	Yes
The Wild Grounds (SSSI)	South East Hants Bracklesham Group	No
Thursley, Hankley & Frensham Commons (SSSI)	Godalming Lower Greensand	Yes
Titchfield Haven (SSSI)	South East Hants Bracklesham Group	No
Upper Hamble Estuary & Woods (SSSI)	South East Hants Bracklesham Group	No
Waltham Brooks (SSSI)	Lower Greensand Arun & Western Streams	No
Warblington Meadow (SSSI)	East Hants Chalk	Yes
Wealden Edge Hangers (SSSI)	Chichester chalk	Yes
Wey Valley Meadows	Godalming Lower	Yes

Protected Site	Waterbody Name	Flow identified as a significant water management issue
(SSSI)	Greensand	
Wick Wood & Worldham Hangers (SSSI)	Alton Chalk	No
Wilmington Downs (SSSI)	Seaford and Eastbourne Chalk Block	No
Woolbeding & Pound Commons (SSSI)	Lower Greensand Arun & Western Streams	No
Woolmer Forest (SSSI)	Lower Greensand Arun & Western Streams	No
Woolmer Forest (SSSI)	Godalming Lower Greensand	Yes

C.2 Impact of abstraction within surface water bodies

Table 11-2 SSSI sites adjacent to rivers within WRZ serving SDNPA

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
Ambersham Common	Western Rother	Yes
Arlington Reservoir	Cuckmere from Alfriston to Arlington	No
Arlington Reservoir	Cuckmere from Alfriston to Arlington	No
Ash to Brookwood Heaths	Hoe Stream (Normandy to Pirbright)	No
Ash to Brookwood Heaths	Clasford Brook and Wood Street Brook	No
Ash to Brookwood Heaths	Hoe Stream (Pirbright to River Wey confluence at Woking)	No
Ash to Brookwood Heaths	Blackwater (Aldershot to Cove Brook confluence at Hawley)	No
Ash to Brookwood Heaths	Hoe Stream (Normandy to Pirbright)	No
Ash to Brookwood Heaths	Clasford Brook and Wood Street Brook	No
Ash to Brookwood Heaths	Hoe Stream (Normandy to Pirbright)	No
Ash to Brookwood Heaths	Hoe Stream (Pirbright to	No

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
	River Wey confluence at Woking)	
Ashburnham Park	Ashbourne and Hugletts Streams	No
Ashdown Forest	Medway at Weir Wood	No
Ashdown Forest	Pippingford Brook	No
Ashdown Forest	Friars Gate Stream	No
Ashdown Forest	Shortbridge Stream	No
Ashdown Forest	Sheffield Park Stream	No
Ashdown Forest	Cockhaise Brook	No
Ashford Hill Woods and Meadows	Baughurst Brook	No
Ashford Hill Woods and Meadows	Baughurst Brook	No
Ashford Hill Woods and Meadows	Baughurst Brook	No
Basingstoke Canal	Hart (Crondall to Elvetham)	No
Basingstoke Canal	Fleet Brook	No
Basingstoke Canal	Cove Brook	No
Basingstoke Canal	Wey Navigation (Pyrford reach)	No
Basingstoke Canal	Blackwater (Aldershot to Cove Brook confluence at Hawley)	No
Basingstoke Canal	Whitewater	No
Basingstoke Canal	Wey Navigation (Pyrford reach)	No
Bere Mill Meadows	Test (Upper)	No
Binswood	Slea (Kingsley to Sleaford)	No
Bisham Woods	Thames (Reading to Cookham)	No
Bisham Woods	Maidenhead Ditch	No
Blackwater Valley	Blackwater (Hawley to Whitewater confluence at Bramshill)	No
Bourley and Long Valley	Fleet Brook	No
Bourley and Long Valley	Cove Brook	No
Bourley and Long Valley	Hart (Crondall to Elvetham)	No

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
Bourley and Long Valley	Fleet Brook	No
Bourley and Long Valley	Cove Brook	No
Bourley and Long Valley	North Wey (Alton to Tilford)	No
Bourley and Long Valley	Blackwater (Aldershot to Cove Brook confluence at Hawley)	No
Bourley and Long Valley	Fleet Brook	No
Bourley and Long Valley	Cove Brook	No
Bourley and Long Valley	Fleet Brook	No
Bourley and Long Valley	Fleet Brook	No
Bourley and Long Valley	Fleet Brook	No
Bracklesham Bay	Broad Rife	No
Bramshill	Blackwater (Hawley to Whitewater confluence at Bramshill)	No
Bramshott and Ludshott Commons	South Wey (River Slea confluence to Tilford)	No
Bramshott and Ludshott Commons	South Wey (Haslemere to Bordon)	No
Bramshott and Ludshott Commons	South Wey (Bordon to River Slea confluence)	No
Bransbury Common	Test - conf Dever to conf Anton	No
Bransbury Common	Dever	No
Bransbury Common	Test - Bourne Rivulet to conf Dever	No
Bray Meadows	Maidenhead Ditch	No
Bray Pennyroyal Field	Thames (Cookham to Egham)	No
Broadmoor to Bagshot Woods and Heaths	Blackwater (Hawley to Whitewater confluence at Bramshill)	No
Broadmoor to Bagshot Woods and Heaths	Emm Brook	No
Broadmoor to Bagshot Woods and Heaths	Hale/Mill Bourne (Bagshot to Addlestone Bourne confluence near Ch	No
Broadmoor to Bagshot	Cut at west Bracknell	No

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
Woods and Heaths		
Broadmoor to Bagshot Woods and Heaths	Bull Brook	No
Browndown	Alver	No
Broxhead and Kingsley Commons	Slea (Kingsley to Sleaford)	No
Burton Park	Western Rother	Yes
Buxted Park	Tickerage Stream	No
Buxted Park	Uck Upstream of Buxted	No
Buxted Park	Tributary of River Uck north of Uckfield	No
Castle Bottom to Yateley and Hawley Commons	Blackwater (Hawley to Whitewater confluence at Bramshill)	No
Castle Bottom to Yateley and Hawley Commons	Hart (Elvetham to Hartley Wintney)	No
Castle Bottom to Yateley and Hawley Commons	Blackwater (Hawley to Whitewater confluence at Bramshill)	No
Castle Bottom to Yateley and Hawley Commons	Blackwater (Hawley to Whitewater confluence at Bramshill)	No
Chailey Common	Longford Stream	No
Chantry Mill	Stor	No
Charleshill	Wey (Tilford to Shalford)	No
Charterhouse to Eashing	Wey (Tilford to Shalford)	No
Charterhouse to Eashing	Wey (Tilford to Shalford)	No
Charterhouse to Eashing	Wey (Tilford to Shalford)	No
Chichester Harbour	Bosham Stream	Yes
Chichester Harbour	Lavant (Sussex)	No
Chiddingfold Forest	Loxwood Stream	No
Chiddingfold Forest	Kird	No
Chiddingfold Forest	Loxwood Stream	No
Chiddingfold Forest	Loxwood/Chiddingfold Trib	No
Chiddingfold Forest	Loxwood Stream	No
Chiddingfold Forest	Loxwood/Chiddingfold Trib	No
Chiddingfold Forest	Loxwood Stream	No

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
Chiddingfold Forest	Loxwood Stm-Hambledon Trb	No
Chiddingfold Forest	Loxwood Stream	No
Chiddingfold Forest	Loxwood Stream	No
Chilbolton Common	Test - conf Dever to conf Anton	No
Climping Beach	Ryebank Rife	No
Cock Marsh	Maidenhead Ditch	No
Colony Bog and Bagshot Heath	Wey Navigation (Pyrford reach)	No
Colony Bog and Bagshot Heath	Addlestone Bourne (West End to Hale/Mill Bourne confluence at Mim	No
Colony Bog and Bagshot Heath	Hale/Mill Bourne (Bagshot to Addlestone Bourne confluence near Ch	No
Colony Bog and Bagshot Heath	Blackwater (Aldershot to Cove Brook confluence at Hawley)	No
Colony Bog and Bagshot Heath	Wey Navigation (Pyrford reach)	No
Colony Bog and Bagshot Heath	Addlestone Bourne (West End to Hale/Mill Bourne confluence at Mim	No
Colyers Hanger	Tillingbourne	Yes
Combe Haven	Combe Haven between Powdermill Str conf and Coast	No
Combe Haven	Watermill Stream	No
Combe Haven	Powdermill Stream	No
Coombe Wood and The Lythe	Oakhanger Stream	No
Dallington Forest	Dudwell	No
Dungeness, Romney Marsh and Rye Bay	Brede	No
Dungeness, Romney Marsh and Rye Bay	Lower Rother from Etchingham to Scot's Float	No
Dungeness, Romney Marsh and Rye Bay	Walland Marsh/RMC (Iden to Appledore)	No

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
Dungeness, Romney Marsh and Rye Bay	Brede	No
Dungeness, Romney Marsh and Rye Bay	Lower Rother from Etchingham to Scot's Float	No
Dungeness, Romney Marsh and Rye Bay	Lower Rother from Etchingham to Scot's Float	No
Dungeness, Romney Marsh and Rye Bay	Lower Rother from Etchingham to Scot's Float	No
Dungeness, Romney Marsh and Rye Bay	Brede	No
Dungeness, Romney Marsh and Rye Bay	Brede	No
Dungeness, Romney Marsh and Rye Bay	Lower Rother from Etchingham to Scot's Float	No
East Aston Common	Test - Bourne Rivulet to conf Dever	No
Ebernoe Common	Kird	No
Eridge Park	Upper Eridge Stream	No
Eridge Park	Bartley Mill Stream	No
Eridge Park	Eridge Stream	No
Eridge Park	Grom	No
Eridge Park	Eridge Stream	No
Fleet Pond	Fleet Brook	No
Fore Wood	Powdermill Stream	No
Foxlease and Ancells Meadows	Fleet Brook	No
Freshfield Lane	Cockhaise Brook	No
Fyning Moor	Western Rother	Yes
Great Thrift Wood	Cut (Binfield to River Thames confluence) and Maidenhead Ditch	No
Greywell Fen	Whitewater	No
Hazeley Heath	Hart (Elvetham to Hartley Wintney)	No
Hazeley Heath	Whitewater	No
Heath Lake	Emm Brook	No
Hedgecourt	Eden Brook	No

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
Hedgecourt	Eden Brook	No
Hook Heath Meadows	Potwell Trib	No
Horsell Common	Wey Navigation (Pyrford reach)	No
Horsell Common	Addlestone Bourne (West End to Hale/Mill Bourne confluence at Mim	No
Horsell Common	Addlestone Bourne (West End to Hale/Mill Bourne confluence at Mim	No
Horsell Common	Addlestone Bourne (West End to Hale/Mill Bourne confluence at Mim	No
Hurston Warren	Stor	No
Hurston Warren	Chilt	No
Langham Pond	Thames (Cookham to Egham)	No
Leasam Heronry Wood	Tillingham	No
Lee-on-the Solent to Itchen Estuary	Meon	No
Lewes Brooks	Iford Marshes	No
Lewes Brooks	Iford Marshes	No
Lingfield Cernes	Eden Brook	No
Lodge Wood & Sandford Mill	Loddon (Swallowfield to River Thames confluence)	No
Lodge Wood & Sandford Mill	Loddon (Swallowfield to River Thames confluence)	No
Lye Heath Marsh	Potwell Trib	No
Mapledurwell Fen	Lyde	No
Marline Valley Woods	Combe Haven between Powdermill Str conf and Coast	No
Milton Gate Marsh	Cuckmere from Alfriston to Arlington	No
Milton Gate Marsh	Cuckmere from Alfriston to Arlington	No
Moor Park	North Wey (Alton to Tilford)	No
Moor Park	North Wey (Alton to Tilford)	No

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
Moorgreen Meadows	Horton Heath Stream	No
Ockham and Wisley Commons	Wey (Shalford to River Thames confluence at Weybridge)	No
Odiham Common with Bagwell Green and Shaw	Whitewater	No
Pagham Harbour	Pagham Rife	No
Pagham Harbour	Broad Rife	No
Pagham Harbour	Bremere Rife	No
Pagham Harbour	Broad Rife	No
Pamber Forest and Silchester Common	Bow Brook (Pamber End to Bramley)	No
Pamber Forest and Silchester Common	Silchester Brook	No
Papercourt	East Clandon Stream	No
Papercourt	Wey (Shalford to River Thames confluence at Weybridge)	No
Papercourt	Wey (Shalford to River Thames confluence at Weybridge)	No
Papercourt	Wey (Shalford to River Thames confluence at Weybridge)	No
Papercourt	Wey (Shalford to River Thames confluence at Weybridge)	No
Pevensey Levels	Horse Eye Sewer	No
Pevensey Levels	East Stream	No
Pevensey Levels	Waller Haven between Windmill Hill and Coast	No
Pevensey Levels	Hurst Haven at Hailsham	No
Pevensey Levels	Langney Sewer at Eastbourne	No
Pevensey Levels	Pevensey Haven	No
Pevensey Levels	Nunningham Stream	No
Plashett Park Wood	Iron River	No
Pulborough Brooks	Pulborough Brooks	No

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
Puttenham & Crooksbury Commons	Wey (Tilford to Shalford)	No
Puttenham & Crooksbury Commons	Wey (Tilford to Shalford)	No
River Itchen	Monks Brook	No
River Itchen	Itchen (Cheriton Stream)	No
River Itchen	Nun's Walk Stream	No
River Itchen	Arle	No
River Itchen	Itchen	No
River Itchen	Candover Brook	No
River Test	Fairbourne Stream to Fishlake Meadows	No
River Test	Test - conf Dever to conf Anton	No
River Test	Dever	No
River Test	Test - conf Anton to conf Dun	No
River Test	Test - Bourne Rivulet to conf Dever	No
River Test	Test (Upper)	No
River Test	Test - Bourne Rivulet to conf Dever	No
Rock Wood	Shortbridge Stream	No
Rodbed Wood	Thames (Reading to Cookham)	No
Sandhurst to Owlsmoor Bogs and Heaths	Blackwater (Hawley to Whitewater confluence at Bramshill)	No
Scotney Castle	Bewl	No
Scotney Castle	Teise at Lamberhurst	No
Shillinglee Lake	Kird	No
Shortheath Common	Slea (Kingsley to Sleaford)	No
Shortheath Common	Oakhanger Stream	No
Slinfold Stream and Quarry	Arun Horsham	No
Smart's and Prey Heaths	Hoe Stream (Pirbright to River Wey confluence at Woking)	No

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
Smart's and Prey Heaths	Hoe Stream (Pirbright to River Wey confluence at Woking)	No
South Lodge Pit	Roundmoor Ditch and Boveney Ditch	No
St. Leonard's Forest	Arun Source	No
Staines Moor	Thames (Cookham to Egham)	No
Stanford End Mill and River Loddon	Loddon (Sherfield on Loddon to Swallowfield)	No
Stockbridge Common Marsh	Test - conf Anton to conf Dun	No
Stockbridge Fen	Test - conf Anton to conf Dun	No
Temple Island Meadows	Thames (Reading to Cookham)	No
The Mens	Kird	No
The Mens	Kird	No
The Wild Grounds	Alver	No
Thursley, Hankley & Frensham Commons	Royal Brook	No
Thursley, Hankley & Frensham Commons	Truxford Brook	No
Thursley, Hankley & Frensham Commons	Wey (Tilford to Shalford)	No
Thursley, Hankley & Frensham Commons	Truxford Brook	No
Thursley, Hankley & Frensham Commons	South Wey (River Slea confluence to Tilford)	No
Thursley, Hankley & Frensham Commons	Wey (Tilford to Shalford)	No
Thursley, Hankley & Frensham Commons	South Wey (River Slea confluence to Tilford)	No
Thursley, Hankley & Frensham Commons	South Wey (River Slea confluence to Tilford)	No
Thursley, Hankley & Frensham Commons	Wey (Tilford to Shalford)	No
Thursley, Hankley & Frensham Commons	South Wey (River Slea confluence to Tilford)	No

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
Thursley, Hankley & Frensham Commons	Royal Brook	No
Titchfield Haven	Meon	No
Trodds Copse	Monks Brook	No
Upper Arun	Arun downstream Pallingham Weir	No
Upper Arun	Arun (U/S Pallingham)	No
Upper Greensand Hangers : Empshott to Hawkley	Western Rother (Upstream Petersfield)	No
Upper Greensand Hangers : Empshott to Hawkley	Western Rother (Upstream Petersfield)	No
Vann Lake and Ockley Woods	North River	No
Wakehurst & Chiddingly Woods	Shell Brook upstream of Ardingly Reservoir	No
Wakehurst & Chiddingly Woods	Shell Brook upstream of Ardingly Reservoir	No
Warnborough Green	Whitewater	No
Warnborough Green	Whitewater	No
Weir Wood Reservoir	Medway at Weir Wood	No
Wey Valley Meadows	Wey (Tilford to Shalford)	No
Wey Valley Meadows	Cranleigh Waters	No
Wey Valley Meadows	Wey (Tilford to Shalford)	No
Wey Valley Meadows	Wey (Shalford to River Thames confluence at Weybridge)	No
Wey Valley Meadows	Wey (Shalford to River Thames confluence at Weybridge)	No
Wey Valley Meadows	Wey (Shalford to River Thames confluence at Weybridge)	No
Wey Valley Meadows	Wey (Tilford to Shalford)	No
Wey Valley Meadows	Wey (Tilford to Shalford)	No
Wey Valley Meadows	Wey (Shalford to River Thames confluence at Weybridge)	No

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
Wey Valley Meadows	Wey (Shalford to River Thames confluence at Weybridge)	No
Wey Valley Meadows	Wey (Tilford to Shalford)	No
Wey Valley Meadows	Cranleigh Waters	No
Wey Valley Meadows	Wey (Tilford to Shalford)	No
Wey Valley Meadows	Wey (Shalford to River Thames confluence at Weybridge)	No
Wey Valley Meadows	Wey (Tilford to Shalford)	No
Wey Valley Meadows	Wey (Shalford to River Thames confluence at Weybridge)	No
Whitmoor Common	Hoe Stream (Pirbright to River Wey confluence at Woking)	No
Whitmoor Common	Wey (Shalford to River Thames confluence at Weybridge)	No
Whitmoor Common	Hoe Stream (Pirbright to River Wey confluence at Woking)	No
Whitmoor Common	Wey (Shalford to River Thames confluence at Weybridge)	No
Whitmoor Common	Hoe Stream (Pirbright to River Wey confluence at Woking)	No
Wick Wood and Worldham Hangers	Slea (Kingsley to Sleaford)	No
Wick Wood and Worldham Hangers	Oakhanger Stream	No
Wick Wood and Worldham Hangers	Caker Stream	No
Willingford Meadows	Dudwell	No
Willingford Meadows	Dudwell	No
Windsor Forest and Great Park	Thames (Cookham to Egham)	No
Windsor Forest and Great Park	Cut (Ascot to Bull Brook confluence at Warfield)	No

Protected Site (SSSI)	Waterbody Name	Flow identified as a significant water management issue
Windsor Forest and Great Park	Thames (Cookham to Egham)	No
Windsor Forest and Great Park	Cut (Ascot to Bull Brook confluence at Warfield)	No
Windsor Forest and Great Park	Thames (Cookham to Egham)	No
Woolmer Forest	Hollywater and Deadwater at Bordon	No
Woolmer Forest	South Wey (Haslemere to Bordon)	No
Worth Forest	Stanford Brook	No
Wraysbury & Hythe End Gravel Pits	Thames (Cookham to Egham)	No
Wraysbury No. 1 Gravel Pit	Thames (Cookham to Egham)	No
Wraysbury Reservoir	Thames (Cookham to Egham)	No

Table 11-3 Ramsar sites adjacent to rivers within WRZ serving SDNPA

Protected Site (Ramsar)	Waterbody Name	Flow identified as a significant water management issue
Pevensey Levels	Horse Eye Sewer	No
Pevensey Levels	East Stream	No
Pevensey Levels	Waller Haven between Windmill Hill and Coast	No
Pevensey Levels	Hurst Haven at Hailsham	No
Pevensey Levels	Langney Sewer at Eastbourne	No
Pevensey Levels	Pevensey Haven	No
Pevensey Levels	Nunningham Stream	No
Solent & Southampton Water	Meon	No
Solent & Southampton Water	Meon	No
Arun Valley	Pulborough Brooks	No
Pagham Harbour	Pagham Rife	No
Pagham Harbour	Broad Rife	No

Protected Site (Ramsar)	Waterbody Name	Flow identified as a significant water management issue
Pagham Harbour	Bremere Rife	No
Pagham Harbour	Broad Rife	No
Chichester and Langstone Harbours	Bosham Stream	Yes
Chichester and Langstone Harbours	Lavant (Sussex)	No
South West London Waterbodies	Thames (Cookham to Egham)	No
South West London Waterbodies	Thames (Cookham to Egham)	No
South West London Waterbodies	Thames (Cookham to Egham)	No
Thursley & Ockley Bogs	Royal Brook	No
Thursley & Ockley Bogs	Truxford Brook	No
Dungeness, Romney Marsh and Rye Bay	Brede	No
Dungeness, Romney Marsh and Rye Bay	Brede	No
Dungeness, Romney Marsh and Rye Bay	Brede	No
Dungeness, Romney Marsh and Rye Bay	Lower Rother from Etchingham to Scot's Float	No
Dungeness, Romney Marsh and Rye Bay	Lower Rother from Etchingham to Scot's Float	No
Dungeness, Romney Marsh and Rye Bay	Lower Rother from Etchingham to Scot's Float	No
Dungeness, Romney Marsh and Rye Bay	Lower Rother from Etchingham to Scot's Float	No
Dungeness, Romney Marsh and Rye Bay	Lower Rother from Etchingham to Scot's Float	No
Dungeness, Romney Marsh and Rye Bay	Brede	No
Dungeness, Romney Marsh and Rye Bay	Lower Rother from Etchingham to Scot's Float	No
Dungeness, Romney Marsh and Rye Bay	Walland Marsh/RMC (Iden to Appledore)	No

Table 11-4 SAC sites adjacent to rivers within the WRZ serving SDNPA

Protected Site (SAC)	Waterbody Name	Flow identified as a significant water management issue
Woolmer Forest	Hollywater and Deadwater at Bordon	No
Pevensey Levels	Horse Eye Sewer	No
Pevensey Levels	East Stream	No
Pevensey Levels	Waller Haven between Windmill Hill and Coast	No
Pevensey Levels	Hurst Haven at Hailsham	No
Pevensey Levels	Langney Sewer at Eastbourne	No
Pevensey Levels	Pevensey Haven	No
Pevensey Levels	Nunningham Stream	No
River Itchen	Monks Brook	No
River Itchen	Nun's Walk Stream	No
River Itchen	Itchen	No
River Itchen	Itchen (Cheriton Stream)	No
River Itchen	Arle	No
River Itchen	Itchen	No
River Itchen	Candover Brook	No
River Itchen	Itchen (Cheriton Stream)	No
The Mens	Kird	No
The Mens	Kird	No
Chilterns Beechwoods	Thames (Reading to Cookham)	No
Chilterns Beechwoods	Maidenhead Ditch	No
Windsor Forest & Great Park	Thames (Cookham to Egham)	No
Windsor Forest & Great Park	Cut (Ascot to Bull Brook confluence at Warfield)	No
Windsor Forest & Great Park	Thames (Cookham to Egham)	No
Windsor Forest & Great Park	Thames (Cookham to Egham)	No
Thursley, Ash, Pirbright & Chobham	Hoe Stream (Normandy to Pirbright)	No
Thursley, Ash, Pirbright & Chobham	Clasford Brook and Wood Street Brook	No

Protected Site (SAC)	Waterbody Name	Flow identified as a significant water management issue
Thursley, Ash, Pirbright & Chobham	Hoe Stream (Pirbright to River Wey confluence at Woking)	No
Thursley, Ash, Pirbright & Chobham	Blackwater (Aldershot to Cove Brook confluence at Hawley)	No
Thursley, Ash, Pirbright & Chobham	Wey Navigation (Pyrford reach)	No
Thursley, Ash, Pirbright & Chobham	Addlestone Bourne (West End to Hale/Mill Bourne confluence at Mim	No
Thursley, Ash, Pirbright & Chobham	Hale/Mill Bourne (Bagshot to Addlestone Bourne confluence near Ch	No
Thursley, Ash, Pirbright & Chobham	Blackwater (Aldershot to Cove Brook confluence at Hawley)	No
Thursley, Ash, Pirbright & Chobham	Royal Brook	No
Thursley, Ash, Pirbright & Chobham	Truxford Brook	No
Thursley, Ash, Pirbright & Chobham	Wey (Tilford to Shalford)	No
Thursley, Ash, Pirbright & Chobham	Truxford Brook	No
Thursley, Ash, Pirbright & Chobham	South Wey (River Slea confluence to Tilford)	No
Thursley, Ash, Pirbright & Chobham	Wey (Tilford to Shalford)	No
Thursley, Ash, Pirbright & Chobham	South Wey (River Slea confluence to Tilford)	No
Thursley, Ash, Pirbright & Chobham	South Wey (River Slea confluence to Tilford)	No
Thursley, Ash, Pirbright & Chobham	Wey (Tilford to Shalford)	No
Thursley, Ash, Pirbright & Chobham	South Wey (River Slea confluence to Tilford)	No
Thursley, Ash, Pirbright & Chobham	Hoe Stream (Normandy to Pirbright)	No

Protected Site (SAC)	Waterbody Name	Flow identified as a significant water management issue
Thursley, Ash, Pirbright & Chobham	Clasford Brook and Wood Street Brook	No
Thursley, Ash, Pirbright & Chobham	Hoe Stream (Normandy to Pirbright)	No
Thursley, Ash, Pirbright & Chobham	Hoe Stream (Pirbright to River Wey confluence at Woking)	No
Thursley, Ash, Pirbright & Chobham	Royal Brook	No
Shortheath Common	Slea (Kingsley to Sleaford)	No
Shortheath Common	Oakhanger Stream	No
Dungeness	Brede	No
Ashdown Forest	Medway at Weir Wood	No
Ashdown Forest	Pippingford Brook	No
Ashdown Forest	Friars Gate Stream	No
Ashdown Forest	Shortbridge Stream	No
Ashdown Forest	Sheffield Park Stream	No
Ashdown Forest	Cockhaise Brook	No
Ebernoe Common	Kird	No
Solent Maritime	Bosham Stream	Yes
Solent Maritime	Lavant (Sussex)	No
Arun Valley	Pulborough Brooks	No
East Hampshire Hangers	Slea (Kingsley to Sleaford)	No
East Hampshire Hangers	Oakhanger Stream	No
East Hampshire Hangers	Caker Stream	No
East Hampshire Hangers	Western Rother (Upstream Petersfield)	No
East Hampshire Hangers	Western Rother (Upstream Petersfield)	No

Table 11-5 SPA sites adjacent to rivers within the WRZ serving SDNPA

Protected Site (SPA)	Waterbody Name	Flow identified as a significant water management issue
Solent and Dorset Coast	Alver	No
Solent and Dorset Coast	Wallington below Southwick	No
Solent and Dorset Coast	Monks Brook	No

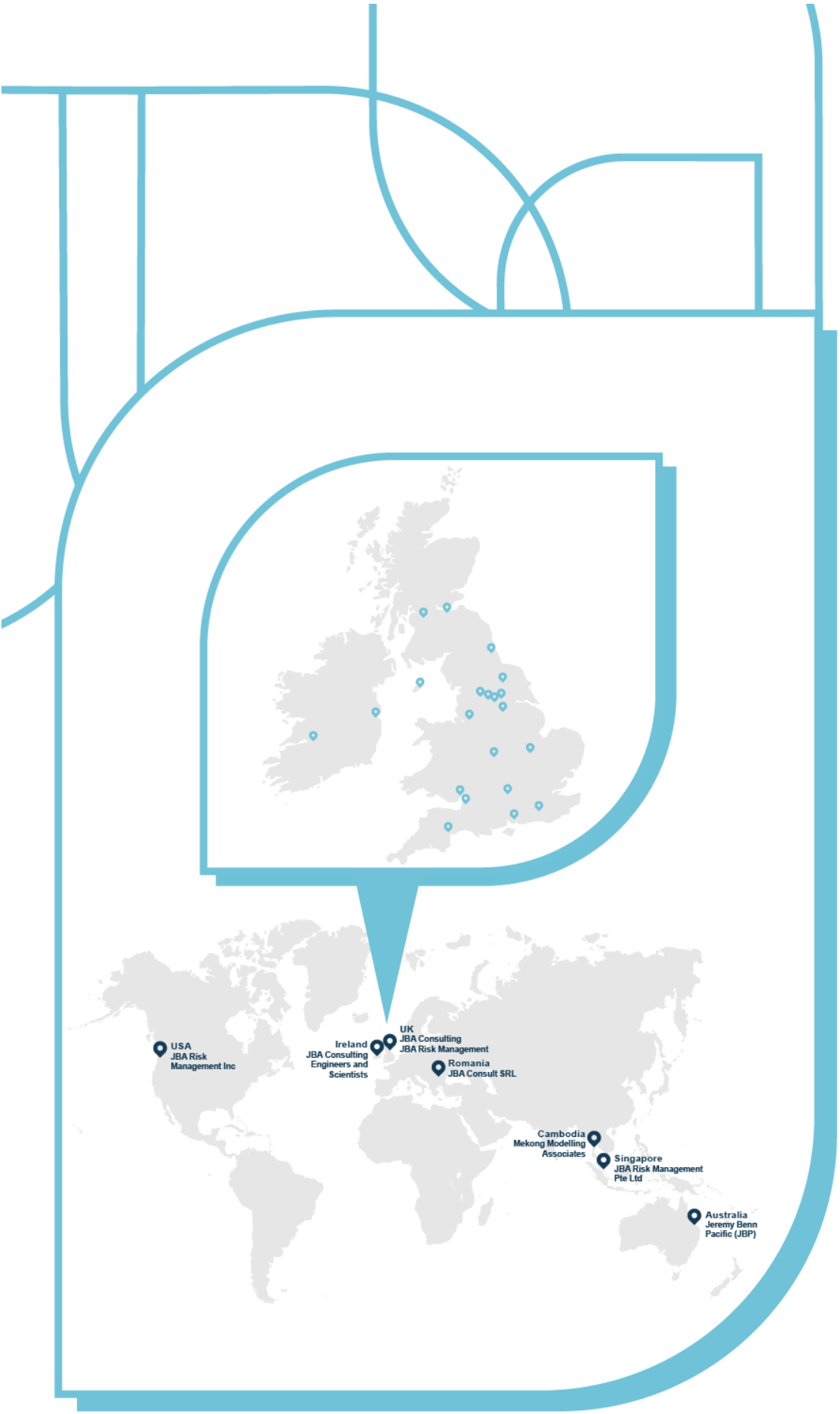
Protected Site (SPA)	Waterbody Name	Flow identified as a significant water management issue
Solent and Dorset Coast	Pagham Rife	No
Solent and Dorset Coast	Broad Rife	No
Solent and Dorset Coast	Bremere Rife	No
Solent and Dorset Coast	Meon	No
Solent and Dorset Coast	Ryebank Rife	No
Dungeness, Romney Marsh and Rye Bay	East Stream	No
Dungeness, Romney Marsh and Rye Bay	Combe Haven between Powdermill Str conf and Coast	No
Dungeness, Romney Marsh and Rye Bay	Brede	No
Dungeness, Romney Marsh and Rye Bay	Lower Rother from Etchingham to Scot's Float	No
Wealden Heaths Phase II	Hollywater and Deadwater at Bordon	No
Wealden Heaths Phase II	South Wey (Haslemere to Bordon)	No
Wealden Heaths Phase II	South Wey (River Slea confluence to Tilford)	No
Wealden Heaths Phase II	South Wey (Haslemere to Bordon)	No
Wealden Heaths Phase II	South Wey (Bordon to River Slea confluence)	No
Wealden Heaths Phase II	Slea (Kingsley to Sleaford)	No
Thursley, Hankley & Frensham Commons	Royal Brook	No
Thursley, Hankley & Frensham Commons	Truxford Brook	No
Thursley, Hankley & Frensham Commons	Wey (Tilford to Shalford)	No
Thursley, Hankley & Frensham Commons	South Wey (River Slea confluence to Tilford)	No
Thursley, Hankley & Frensham Commons	South Wey (River Slea confluence to Tilford)	No
Thursley, Hankley & Frensham Commons	Wey (Tilford to Shalford)	No
Thursley, Hankley & Frensham Commons	South Wey (River Slea confluence to Tilford)	No

Protected Site (SPA)	Waterbody Name	Flow identified as a significant water management issue
Thursley, Hankley & Frensham Commons	Royal Brook	No
South West London Waterbodies	Thames (Cookham to Egham)	No
South West London Waterbodies	Thames (Cookham to Egham)	No
South West London Waterbodies	Thames (Cookham to Egham)	No
Ashdown Forest	Medway at Weir Wood	No
Ashdown Forest	Pippingford Brook	No
Ashdown Forest	Friars Gate Stream	No
Ashdown Forest	Shortbridge Stream	No
Ashdown Forest	Sheffield Park Stream	No
Ashdown Forest	Cockhaise Brook	No
Thames Basin Heaths	Blackwater (Hawley to Whitewater confluence at Bramshill)	No
Thames Basin Heaths	Emm Brook	No
Thames Basin Heaths	Hale/Mill Bourne (Bagshot to Addlestone Bourne confluence near Ch	No
Thames Basin Heaths	Cut at west Bracknell	No
Thames Basin Heaths	Bull Brook	No
Thames Basin Heaths	Hoe Stream (Normandy to Pirbright)	No
Thames Basin Heaths	Clasford Brook and Wood Street Brook	No
Thames Basin Heaths	Hoe Stream (Pirbright to River Wey confluence at Woking)	No
Thames Basin Heaths	Blackwater (Aldershot to Cove Brook confluence at Hawley)	No
Thames Basin Heaths	Wey Navigation (Pyrford reach)	No
Thames Basin Heaths	Addlestone Bourne (West End to Hale/Mill Bourne confluence at Mim	No
Thames Basin Heaths	Hale/Mill Bourne (Bagshot	No

Protected Site (SPA)	Waterbody Name	Flow identified as a significant water management issue
	to Addlestone Bourne confluence near Ch	
Thames Basin Heaths	Blackwater (Aldershot to Cove Brook confluence at Hawley)	No
Thames Basin Heaths	Fleet Brook	No
Thames Basin Heaths	Cove Brook	No
Thames Basin Heaths	Hart (Crondall to Elvetham)	No
Thames Basin Heaths	Fleet Brook	No
Thames Basin Heaths	Cove Brook	No
Thames Basin Heaths	North Wey (Alton to Tilford)	No
Thames Basin Heaths	Blackwater (Aldershot to Cove Brook confluence at Hawley)	No
Thames Basin Heaths	Blackwater (Hawley to Whitewater confluence at Bramshill)	No
Thames Basin Heaths	Hart (Elvetham to Hartley Wintney)	No
Thames Basin Heaths	Whitewater	No
Thames Basin Heaths	Hoe Stream (Pirbright to River Wey confluence at Woking)	No
Thames Basin Heaths	Wey (Shalford to River Thames confluence at Weybridge)	No
Thames Basin Heaths	Fleet Brook	No
Thames Basin Heaths	Cove Brook	No
Thames Basin Heaths	Wey (Shalford to River Thames confluence at Weybridge)	No
Thames Basin Heaths	Wey Navigation (Pyrford reach)	No
Thames Basin Heaths	Addlestone Bourne (West End to Hale/Mill Bourne confluence at Mim	No
Thames Basin Heaths	Blackwater (Hawley to Whitewater confluence at Bramshill)	No

Protected Site (SPA)	Waterbody Name	Flow identified as a significant water management issue
Thames Basin Heaths	Blackwater (Hawley to Whitewater confluence at Bramshill)	No
Thames Basin Heaths	Hoe Stream (Normandy to Pirbright)	No
Thames Basin Heaths	Clasford Brook and Wood Street Brook	No
Thames Basin Heaths	Hoe Stream (Normandy to Pirbright)	No
Thames Basin Heaths	Hoe Stream (Pirbright to River Wey confluence at Woking)	No
Thames Basin Heaths	Wey Navigation (Pyrford reach)	No
Thames Basin Heaths	Addlestone Bourne (West End to Hale/Mill Bourne confluence at Mim	No
Thames Basin Heaths	Fleet Brook	No
Thames Basin Heaths	Addlestone Bourne (West End to Hale/Mill Bourne confluence at Mim	No
Thames Basin Heaths	Blackwater (Hawley to Whitewater confluence at Bramshill)	No
Thames Basin Heaths	Hoe Stream (Pirbright to River Wey confluence at Woking)	No
Thames Basin Heaths	Wey (Shalford to River Thames confluence at Weybridge)	No
Thames Basin Heaths	Fleet Brook	No
Thames Basin Heaths	Addlestone Bourne (West End to Hale/Mill Bourne confluence at Mim	No
Solent & Southampton Water	Meon	No
Solent & Southampton Water	Meon	No
Arun Valley	Pulborough Brooks	No
Pagham Harbour	Pagham Rife	No

Protected Site (SPA)	Waterbody Name	Flow identified as a significant water management issue
Pagham Harbour	Broad Rife	No
Pagham Harbour	Bremere Rife	No
Pagham Harbour	Broad Rife	No



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