BRISTOL WATER - WATER RESOURCES MANAGEMENT PLAN 2024

Strategic Environmental Assessment (SEA)

Scoping Report

Report for: Bristol Water

Ref. WRMP24 Environmental Assessment support

Ricardo Energy & Environment, Gemini Building, Fermi Avenue, Harwell, Oxfordshire, OX11 0QR, UK | +44(0)1235 75 3000 | ee.ricardo.com
Registered company no. 08229264 | VAT no. GB 212 8365 24

Customer:
Bristol Water

Customer reference:
3500077343

Contact:
Dr Stuart Ballinger, 21 Prince Street, Bristol, BS1 4PH, UK

T: +44 (0) 1235 753 353
E: stuart.ballinger@ricardo.com

Author:
Ben Sullivan, Connor Fulham, Jenni Smalley and Ed Fredenham.

Approved by:

Anne Fairhead

Ricardo reference:
ED15765

Date:
15/03/2022

CONTENTS

Appendices

1. INTRODUCTION

1.1 BACKGROUND AND PURPOSE OF REPORT

Like all water companies in England and Wales, Bristol Water is required under the Water Industry Act 1991 to prepare, maintain and publish a Water Resource Management Plan (WRMP). A WRMP sets out the strategy for water resource and demand management to ensure supplies of safe, clean drinking water are maintained to customers throughout the relevant company's region in a way that is economically, socially, and environmentally sustainable. WRMPs are reviewed on a rolling five-year basis; Bristol Water published their most recent WRMP (WRMP19) in 2019. The next cycle of WRMPs (WRMP24) cover the period 2025 to 2050 and beyond. Bristol Water is now reviewing and updating its draft WRMP24 for submission in October 2022.

SEA is a statutory requirement under the Environmental Assessment of Plans and Programmes Regulations 2004 ('the SEA Regulations') requiring the assessment of effects of certain plans and programmes on the environment. The SEA Regulations apply to a wide range of public plans and programmes including WRMPs. SEA in relation to Bristol Water's WRMP is explained further in Section 1.2 below.

Bristol Water provides water supplies to 1.23 million people and all the associated businesses in an area of approximately 2,400 square kilometres in the south west of England. The supply area is centred on Bristol and the towns and villages within a 40km radius of the city. The water supply area stretches from Thornbury and Tetbury in the north, to Street and Glastonbury in the south, and from Weston-Super-Mare in the west to Frome in the east.

Bristol Water relies on 68 water sources, including reservoirs, rivers, springs, wells and boreholes. About 88% of the water supply comprises surface waters while 12% comes from groundwater. Water resources within the Bristol Water supply area alone are not sufficient to meet customer demand for water and therefore 46% of the water supplied within the Bristol Water supply area is sourced from the River Severn via the Gloucester and Sharpness Canal outside the Water Resource Zone (WRZ).

1.2 STRATEGIC ENVIRONMENTAL ASSESSMENT

Strategic Environmental Assessment (SEA) became a statutory requirement following the adoption of the European Union Directive 2001/42/EC. SEA assesses the effects of certain plans and programmes on the environment. This was transposed into legislation on 20 July 2004 as Statutory Instrument 2004 No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004.

The objective of SEA is:

> *"to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans with a view to promoting sustainable development."*

As a water company Bristol Water is required to determine whether the WRMP falls within the scope of the SEA Regulations and whether an SEA must be undertaken. The purposes of the SEA of the WRMP are to:

- identify the potentially significant environmental effects of the WRMP in terms of the feasible (constrained), preferred and revised water resources management options being considered by Bristol Water;
- help identify appropriate options to avoid, reduce or manage adverse effects and to enhance beneficial effects associated with the implementation of the WRMP wherever possible;
- give the statutory SEA bodies, stakeholders and the wider public the ability to see and comment upon the effects that the draft WRMP may have on them, their communities, and their interests, and encourage them to make responses and suggest improvements; and inform Bristol Water's selection of water management options to be taken forward into the final WRMP.

1.3 REQUIREMENTS FOR SEA OF BRISTOL WATER'S WATER RESOURCE MANAGEMENT PLAN

As stated in the WRPG, water companies need to demonstrate that they have investigated whether a SEA is required of its WRMP. As responsible authorities under the SEA Regulations, water companies must themselves determine if its WRMP falls within the scope of the SEA Regulations.

UK Water Industry Research (UKWIR) have developed a number of methodologies which support the WRPG. This includes an updated guidance document for SEA, Habitats Regulations Assessment (HRA), and new guidance for Water Framework Directive (WFD) assessment and natural capital accounting (NCA) for strategic water resource plans and drought plans[1]. The guidance has recently been updated for WRMP24 and regional plans to account for recent developments in regulatory guidance, new legislation and current best practice methods.

The UKWIR Guidance, from which Figure 1-1 is adapted, provides directions as to how the requirement for SEA should be determined for WRMPs. The boxes and arrows highlighted in green on Figure 1-1 describe the provisions and route through the flow chart applicable to Bristol Water's WRMP and demonstrate that the WRMP falls within the scope of the SEA Regulations. Notably, it is likely that the WRMP will include schemes that will require Environmental Impact Assessment (EIA) (Box 3 in Figure 1-1).

Ricardo Energy and Environment has been commissioned by Bristol Water to undertake the SEA of their WRMP24. The SEA will assess likely significant economic, social and environmental effects of the WRMP and will develop ways in which any adverse effects identified can be avoided, minimised or mitigated.

1.4 SEA AND WATER RESOURCES MANAGEMENT PLAN

In the context of water resource management planning, SEA can assist in the identification of the potential environmental effects (adverse and beneficial) of the options available to ensure long-term resilient water supplies to Bristol Water's customers. Knowledge of these effects can help to identify a preferred programme of options for Bristol Water's supply area (which is composed of one water resource zone (WRZ)[2]) to ensure a balance is maintained between available water supplies and demand for water.

The SEA informs the consideration of each option and the programme appraisal process, as well as development of the overall WRMP. The SEA can identify cumulative effects between different environmental and social aspects of a particular option, programme or plan, as well as between alternative options and programmes. SEA also helps identify potential cumulative effects of the WRMP with other plans, programmes and projects. Additionally, it facilitates consultation and complements consideration of Habitats Regulations[3] and WFD implications for the WRMP (see Section 6 below). The WRMP option appraisal will also integrate NCA and a description of the key linkages to the SEA process is included in this Scoping Report (see Section 7.1).

[1] UKWIR (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans. Report Ref 21/WR/02/15.

[2] UK Water Industry Research/Environment Agency define a WRZ as: 'The largest possible zone in which all resources, including external transfers, can be shared, and hence, the zone in which all customers will experience the same risk of supply failure from a resource shortfall.'

[3] The Conservation of Habitats and Species Regulations 2010 (as amended)

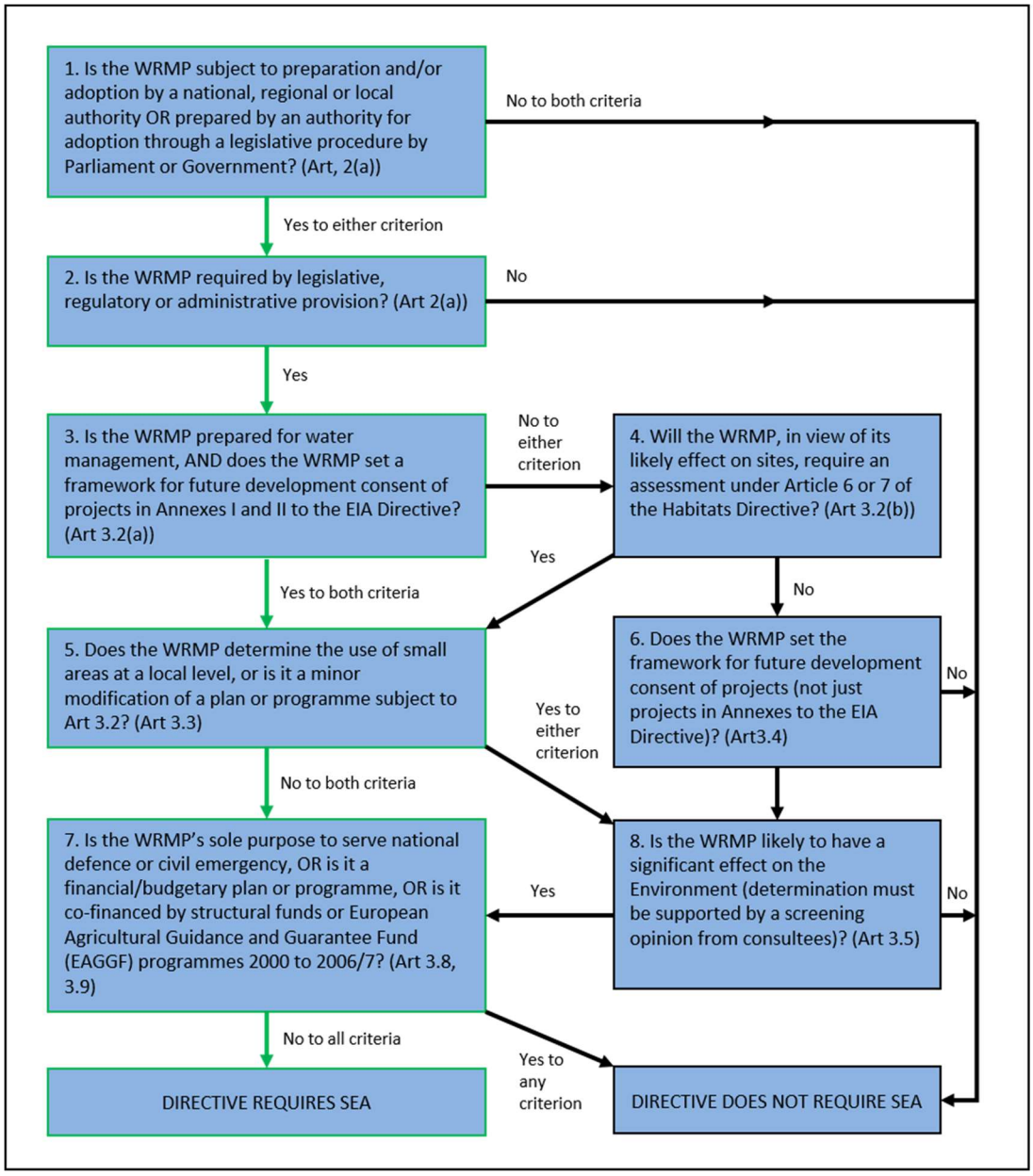


Figure 1-1 SEA Requirement in Relation to the Bristol Water WRMP

1.5 SEA APPROACH

SEA incorporates the following generic stages:

- Stage A: Setting the context, identifying objectives, problems and opportunities, and establishing the environmental baseline (scoping)
- Stage B: Developing and refining options and assessing effects (impact assessment)
- Stage C: Preparing the Environmental Report (recording results)
- Stage D: Consulting on the Draft Plan and the Environmental Report (seeking consensus)
- Stage E: Monitoring the significant effects of the plan or programme on the environment (verification).

Table 1-1 below is an extract from the ODPM Practical Guide[4] (the SEA Practical Guide') that sets out the main stages of the SEA process and the purpose of each task within the process. This Scoping Report represents Stage A: Tasks A1–A4 of the SEA process. Specific guidance on the application of the SEA process to WRMPs is provided by UKWIR[5].

Table 1-1 SEA Stages and Tasks

SEA Stages and Tasks	Purpose
Stage A: Setting the context and objectives, establishing the baseline and deciding on the scope	
Task A1. Identifying other relevant plans, programmes and environmental protection objectives	To establish how the plan or programme is affected by outside factors to suggest ideas for how any constraints can be addressed, and to help identify SEA objectives.
Task A2. Collecting baseline information	To provide an evidence base for environmental problems, prediction of effects, and monitoring; to help in the development of SEA objectives.
Task A3. Identifying environmental problems	To help focus the SEA and streamline the subsequent stages, including baseline information analysis, setting of the SEA objectives, prediction of effects and monitoring.
Task A4. Developing SEA Objectives	To provide a means by which the environmental performance of the plan or programme and alternatives can be assessed.
Task A5. Consulting on the scope of the SEA	To ensure the SEA covers the likely significant environmental effects of the plan or programme.
Stage B: Developing and refining alternatives and assessing effects	
Task B1. Testing the plan or programme objectives against SEA objectives	To identify potential synergies or inconsistencies between the objectives of the plan or programme and the SEA objectives and help in developing alternatives.
Task B2. Developing strategic alternatives	To develop and refine strategic alternatives.
Task B3. Predicting the effects of the plan or programme, including alternatives	To predict the significant environmental effects of the plan or programme and its alternatives.
Task B4. Evaluating the effects of the plan or programme, including alternatives	To evaluate the predicted effects of the plan or programme and its alternatives and assist in the refinement of the plan or programme.

[4] Office of the Deputy Prime Minister (2005). A Practical Guide to the Strategic Environmental Assessment Directive.

[5] UKWIR (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans. Report Ref 21/WR/02/15.

SEA Stages and Tasks	Purpose
Task B5. Mitigating adverse effects	To ensure that adverse effects are identified, and potential mitigation measures are considered.
Task B6. Proposing measures to monitor the environmental effects of plan or programme implementation	To detail the means by which the environmental performance of the plan or programme can be assessed.
Stage C: Preparing the Environmental Report	
Task C1. Preparing the environmental report	To present the predicted environmental effects of the plan or programme, including alternatives, in a form suitable for public consultation and use by decision-makers.
Stage D: Consulting on the Draft Plan or programme and the Environmental Report	
Task D1. Consulting the public and consultation bodies on the draft plan or programme and the Environmental Report	To give the public and the consultation bodies an opportunity to express their opinions on the findings of the Environmental Report and to use it as a reference point in commenting on the plan or programme. To gather more information through the opinions and concerns of the public
Task D2. Assessing significant changes	To ensure that the environmental implications of any significant changes to the draft plan or programme at this stage are assessed and taken into account.
Task D3. Making decisions and providing information	To provide information on how the Environmental Report and consultees opinions were taken into account in deciding the final form of the plan or programme to be adopted.
Stage E: Monitoring the significant effects of the plan or programme on the environment	
Task E1. Developing aims and methods for monitoring	To track the environmental effects of the plan or programme to show whether they are as predicted; to help identify adverse effects.
Task E2. Responding to adverse effects	To prepare for appropriate responses where adverse effects are identified.

1.6 REGIONAL PLANNING

West Country Water Resources Group (WCWRG)[6] is one of five water resources groups working under the National Framework for Water Resources (the 'National Framework')[7]. WCWRG is designed to oversee water resources planning for the Southwest of England. It is formed of the water providers Bristol Water, South West Water and Wessex Water, with input also from the Environment Agency.

WCWRG's aim is to build upon each individual water company's WRMP, by building a common regional understanding of;

- The current and future availability of water resources in the West Country region;
- The needs of all water users, including those who take water directly from the source rather than being supplied by a water company;

[6] West Country Water Resources Group (wcwrg.org)

[7] National_Framework_for_water_resources_summary.pdf (publishing.service.gov.uk)

- The factors that are likely to affect water supply and demand in the future, such as economic growth, forecast population, and uncertainties of climate change;
- Options for improving the balance of water supply and demand in the West Country Region, including cross-sector solutions made possible by engaging with other water users, considering environmental issues and impacts;
- Options for future water transfers both between water companies in the West Country and to other regions[8].

The Regional Plan environmental assessment methodologies are being developed alongside those of the individual companies WRMPs, including Bristol Water's. They will ensure consistency across the approaches and allow integration of outcomes.

1.7 CONSULTATION

SEA regulations state that the statutory bodies to be consulted on the SEA (including the Scoping Report) in England are the Environment Agency, Natural England and Historic England. Bristol Water has also made the Scoping Report available to stakeholders and the public for comment via its website.

Two key opportunities for SEA consultation have been identified as during the Scoping Stage and on publication of the Environmental Report that will accompany publication of the draft WRMP24.

Consultees are invited to express their views on the scope of the SEA as set out in this scoping report. A five-week consultation period has been provided to in line with SEA Regulations 12(5). The Scoping Report has been made available on Bristol Water's website.

The Environmental Report will be produced according to the scope and approach agreed through consultation on the Scoping Report. The Environmental Report will document the assessed environmental effects of the alternative options and programmes considered for the WRMP. The statutory consultation bodies, as well as stakeholders and the public, will be invited to express their views on the Environmental Report and will have the opportunity to use it as a reference point in expressing their views on Bristol Water's draft WRMP.

On adoption of the final WRMP, following approval by the Secretary of State, Bristol Water will publish an SEA Statement setting out how the SEA and any views expressed by the consultation bodies, or the public have influenced the WRMP. The SEA Statement will also set out the monitoring that will be required during implementation of the plan to assess any significant effects of the plan on the environment (Stage E of the SEA process).

1.7.1 Consultation on the Scoping Report

The consultation period for the scoping report will run from 16 March 2022 to 21 April 2022. Comments can be submitted by email to water.resources@bristolwater.co.uk. Bristol Water will review comments received and publish a report setting out its response to the comments and how the approach to the SEA has changed in response to the comments received.

1.8 STRUCTURE OF SCOPING REPORT

This Scoping Report sets out the activities required under Stage A of the SEA process as described in Section 1.5. It has been prepared to facilitate consultation and agreement on the scope and approach of the SEA of Bristol Water's WRMP. The Scoping Report is structured as follows:

- Section 1 (this section) – describes the requirement for, purpose and process of the SEA, and its context in relation to the WRMP.
- Section 2 – describes Bristol Water's supply system and its approach to water resources management planning; describes how Bristol Water will develop its plan to provide reliable and resilient water supplies to its customers over the long-term planning horizon.
- Section 3 – policy context; identifies key messages and environmental protection and social objectives from a review of relevant policies and plans.

[8] Our Purpose | WCWRG

- Section 0– environmental baseline review; draws out the key environmental and social issues that Bristol Water intends to consider in the SEA. Identifies the current and future baseline conditions within the area of potential influence of the WRMP.
- Section 5– proposed SEA objectives and assessment framework; develops the objectives to form the basis of the assessment and introduces the assessment approach and framework to consider the environmental and social effects of the options, WRZ programmes and the WRMP.
- Section 7– use of SEA in programme appraisal; explains how the outputs of the SEA will be integrated into the development of the WRMP,
- Section 8– next steps; sets out the next stages and tasks in undertaking the SEA, and presents a proposed structure for the Environmental Report.

2. BRISTOL WATER'S SUPPLY SYSTEM AND WATER RESOURCES MANAGEMENT PLANNING

2.1 INTRODUCTION

This section provides an overview of the Water Resources Management Planning process, the Bristol Water supply system and Bristol Water's WRMP. The Bristol Water supply area is shown in Figure 2-1.

Water Resources Management Planning is undertaken by all water companies in England and Wales in order to ensure reliable, resilient water supplies over the long-term planning horizon. The process includes working out and forecasting how much water customers will need over the planning period (assessing demand) and how best to provide it (assessing options to reduce or constrain demand growth and / or augment reliable supplies of water) in an efficient, timely manner (programme appraisal). Companies seek to identify the preferred, 'best value' programme of demand management and water supply options to maintain a balance between reliable supply and demand in each WRZ and for their supply area as a whole.

Water companies in England and Wales have a statutory requirement to prepare a WRMP every five years; the next WRMP must be submitted in draft to the Secretary of State by October 2022. The WRMP also informs the regulatory water company business planning 'Periodic Review' process through which the Water Services Regulation Authority (Ofwat) sets the prices that water companies can charge their customers for water (and wastewater) services. The next periodic review will be in 2024.

Engagement with government, regulators, other licensed water suppliers and water companies, customers and a wide range of stakeholders is key to the WRMP process. Bristol Water's WRMP pre-consultation programme commenced in January 2022 and will continue into early Spring 2022. It will include a wide range of stakeholders and the regulators. Consultation will continue throughout the next two years as the WRMP continues to be developed. It is anticipated that the draft WRMP will be published for formal public consultation in December 2022, accompanied by the SEA Environmental Report.

Following comments on the on the draft WRMP and SEA Environmental Report, a Statement of Response will be prepared by Bristol Water setting out how it intends to take account of the comments received in finalising the WRMP for the Secretary of State's approval.

In developing its WRMP, Bristol Water will examine the supply / demand balance for its sole WRZ and determine how any deficit between forecast demand and reliable water supply availability should be addressed for the appropriate planning period.

Bristol Water have identified feasible options from an unconstrained list which are being investigated further. The feasible list is a set of options that Bristol Water consider are suitable to be taken forward for assessment as part of the process for defining the preferred programme of options required to meet any supply demand deficit.

Each of these options is assessed to understand the costs, the benefits to the supply-demand balance, the effect on carbon emissions and the environmental and social effects (through the SEA process and associated HRA, WFD, NCA, Biodiversity Net Gain (BNG) and Invasive Non-Native Species (INNS) assessments). The options are subsequently compared through comprehensive programme appraisal process to determine the 'best value' programme of options to maintain a supply-demand balance over the planning period for the WRZ. Decisions on the best value programme will take account of a range of factors, such as the implications for

water bills, the resilience to future risks and uncertainties (e.g. climate change), deliverability considerations and the environmental and social effects of the programme (adverse and beneficial, as informed by the SEA).

The UKWIR guidance on integrating SEA into WRMPs and the WRPG provide clear directions as to how SEA outputs should be used in options and programme appraisal. Section 7 of this Scoping Report explains in more detail how the SEA will actively inform the WRMP process at each stage.

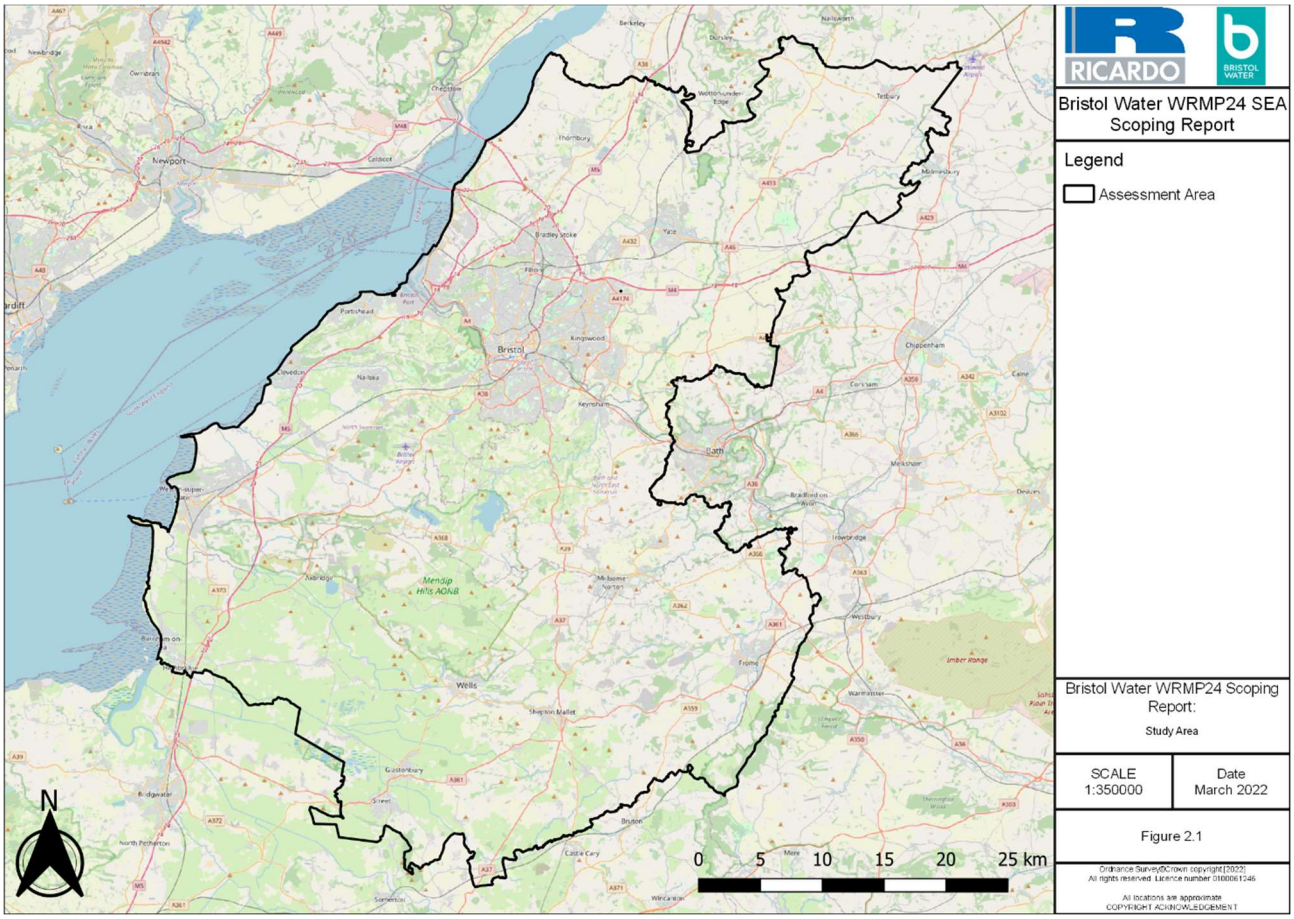


Figure 2-1: Bristol Water Study Area

2.2 BRISTOL WATER'S SUPPLY SYSTEM AND WATER RESOURCES

Bristol Water is a water only company that provides water supplies to 1.23 million people and all the associated businesses in an area of approximately 2,500 square kilometres centred on Bristol and the town and villages within approximately a 30-km radius of the city. The water supply area stretches from Thornbury and Tetbury in the north, to Street and Glastonbury in the south, and from Weston-Super-Mare in the west to Frome in the east. Bristol Water relies various water sources, including reservoirs, rivers, springs, wells and boreholes. Reservoir and river sources each supply between 35% and 50% of the company's total water supply. .

Water resources within the Bristol Water supply area alone are not sufficient to meet customer demand for water and therefore water supplies are also imported from neighbouring areas, including the River Severn. This water is sourced from the Gloucester & Sharpness Canal to supply the largest northern treatment works. This source accounts for approximately 46% of Bristol Water's licensed resources. Bristol Water has an agreement with the Canal & Rivers Trust (the owners of the abstraction licence) to receive water supplies from the Gloucester & Sharpness Canal, which is supplied by the River Severn and other local rivers, the Cam and the Frome. The volume of water available for abstraction from the River Severn is controlled by the Environment Agency according to the River Severn Regulation System operating rules. The Mendip Reservoirs and associated surface water abstractions account for approximately 42% of the available licenced water resource. The remaining 12% of licenced water resources for Bristol Water are derived from groundwater.

There is a significant degree of resilience and connectivity in both the raw water network and the treated water bulk transfer systems. This flexibility permits the sharing of resources and allows optimum use according to seasonable availability. As a result, the Bristol Water supply area is operated as a single WRZ in which all sources are used conjunctively. Bristol Water's supply area is bounded by three other water companies (Thames Water, Wessex Water and Severn Trent Water). A number of water supply transfers are made between Bristol Water and Wessex Water.

The area under consideration for the WRMP SEA is defined by the Bristol Water supply areas as shown in Figure 2-1 above. Should feasible options be included in the WRMP for water transfer from outside the Bristol Water supply area then Environmental Report will include discussion of relevant information pertaining to these options as appropriate.

3. POLICY CONTEXT

3.1 INTRODUCTION

The SEA Regulations require a report containing "*an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes"* (Schedule 2(1)) as well as "*The environmental protection objectives, established at international, (European) Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation"* (Schedule 2(5)),

Identifying other relevant plans, programmes and environmental protection objectives is one of the first steps in undertaking SEA, forming part of Stage A of the ODPM Practical Guide (see Section 1.5). The review identifies how Bristol Water's WRMP might be influenced by other plans, programmes and other environmental protection objectives which Bristol Water should consider in developing its plan. This information helps to identify the objectives for the SEA process.

Relevant plans, policies and programmes were identified from the wide range that have been produced at an international, national, regional and local level. Plans that have no likely interaction with the WRMP (i.e. where they are unlikely to influence the plan, or be influenced by it), were not included in the review.

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
Biodiversity, flora and fauna	Conservation and enhancement of the natural environment and of biodiversity, particularly internationally and nationally designated sites and priority habitats and species (NERC act	*International:* The Convention on Wetlands of International Importance (Ramsar Convention) (1971) The Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
	Section 42 for England), whilst taking into account future climate change. Promote a catchment-wide approach to water use to ensure better protection of biodiversity. To achieve favourable condition for priority habitats and species in particular designated sites. Avoidance of activities likely to cause irreversible damage to natural heritage. Support well-functioning ecosystems, respect environmental limits and capacities, and maintain / enhance coherent ecological networks, including provision for fish passage and connectivity for migratory / mobile species. Strengthen the connections between people and nature and realise the value of biodiversity. Protection, conservation and enhancement of natural capital. Ecosystem services from natural capital contributes to the economy and therefore should be protected and, where possible, enhanced. Avoidance of activities likely to cause the spread of Invasive Non-Native Species (INNS). A need to protect the green infrastructure network.	The Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983) European Commission, Habitats Directive (1992/43/EEC) United Nations (1992) Convention on Biological Diversity (CBD) European Commission, The Water Framework Directive (2000/60/EC) European Commission (2007), Establishing Measures for the Recovery of the Stock of the European Eel (1100/2007) European Commission, Birds Directive (2009/147/EC) European Commission, The EU Biodiversity Strategy for 2030 *National:* Salmon and Freshwater Fisheries Act 1975 (as amended) Wildlife and Countryside Act 1981 (as amended) Environmental Protection Act 1990 (as amended) Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2018 SI2018/574 Water Resources Act 1991 (as amended) Water Industry Act 1991 (as amended) Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 SI3104 The Environment Act 1995 The Environment Act 1995 (Commencement no. 26) Order 2020 The Countryside and Rights of Way (CROW) Act 2000 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 Natural Environment and Rural Communities Act 2006 Environment Agency (2008) Sea trout and salmon fisheries. Our strategy for 2002 – 2021 The Eels (England and Wales) Regulations 2009 (as amended) Environment Agency (2020): EA2025 – Creating a Better Place Defra (2010) Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network Defra (2010) Eel Management Plans for the United Kingdom: South West River Basin District Defra 2011 UK National Ecosystem Assessment and Defra, 2014, UK National Ecosystems Assessment Follow on, Synthesis of Key Findings Defra (2011) Water for Life - Water White Paper Defra (2011) The Natural Choice: Securing the value of nature. The Natural Environment White Paper Defra (2011) Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services Defra (2015) The Great Britain Invasive Non-Native Species Strategy Conservation of Habitats and Species Regulations 2017 (as amended) HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
		Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 MHCLG (2019) National Planning Policy Framework Defra (2020) Enabling a Natural Capital Approach (ENCA) HM Government (2021) Environment Act Environment Agency (undated) Hydroecology: Integration for modern regulation Environment Agency (undated) WFD River Basin Characterisation Project Technical Assessment Method - River abstraction and flow regulation *Regional/Local:* Natural England Site Improvement Plans (2014-15): South West (SIPs) Environment Agency and Defra, (2015) River Basin Management Plan Severn River Basin District Environment Agency and Defra, (2015) South West River Basin District River Basin Management Plan Environment Agency and Defra, (2015) River Basin Management Plan Thames River Basin District Environment Agency, Abstraction Licence Strategies (various dates for relevant catchments) Defra (2010) Eel Management Plans for the United Kingdom: Severn River Basin District Bristol Water (2019) Business Plan 2020-2025: Bristol Water For All Bristol Avon Catchment Partnership (2016) Catchment Plan
Population and human health	Water resources play an important role in supporting the health and recreational needs of local communities and businesses. To ensure all communities have a clean, safe and attractive environment in which people can take pride. To ensure safe, reliable, dependable, sustainable and affordable supplies of water are provided for all communities. Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and wellbeing of communities. Promotion of healthy communities and protection from risks to health and wellbeing. Promotion of sustainable economy supported by access to essential utility and infrastructure services.	*International:* United Nations Economic Commission for Europe (1998) Aarhus Convention - Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters European Commission, Drinking Water Directive (1998/83/EC) and subsequent amendments European Commission, The Water Framework Directive (2000/60/EC) The Environmental Noise Directive (Directive 2002/49/EC) European Commission, Floods Directive (2007) European Commission, 7th Environmental Action Programme (EAP) Environment Action Programme to 2020 'Living well, within the limits of our planet' (1386/2013/EU) European Commission Blueprint to Safeguard Europe's Water Resources *National:* Environmental Protection Act 1990 (as amended) The Countryside and Rights of Way (CRoW) Act, 2000 Defra (2005) Securing the Future; Delivering UK Sustainable Development Strategy The Natural Environment and Rural Communities (NERC) Act (2006) UK Government (2007) The Air Quality Strategy for England, Scotland and Wales

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
		Defra (2011) The Natural Choice: securing the value of nature. The Natural Environment White Paper Defra (2011) Drought Direction 2011 Defra (2011) Water for Life – Water White Paper HM Government (2014)The National Infrastructure Plan Defra (2016) Drought Plan (Direction) Defra, Environment Agency, Natural England, Forestry Commission England (2016) Creating a Great Place for Living HM Government (2016) National Infrastructure Delivery Plan 2016-2021 HM Government (2018) A Green Future: Our 25-year Plan for the Environment MHCLG (2019) National Planning Policy Framework Cabinet Office, Department for International Development, Foreign, Commonwealth and Development Office (2019) Implementing the Sustainable Development Goals *Regional/Local:* Bristol Development Framework: Core Strategy 2011 North Somerset Council Core Strategy, January 2017 Bath and North East Somerset (2018) Local Plan 2016-2036 South Gloucestershire Local Plan Core Strategy 2006-2027 Bristol Health and Wellbeing Policy 2020-2025 Bristol Avon Catchment Partnership (2016) Catchment Plan
Material assets and resource use	Promote sustainable production and consumption whilst seeking to reduce the amount of waste generated by using materials, energy and water more efficiently. Consider issues of water demand, water supply and water quality in the natural environment and ensure a sustainable use of water resources. Contribute to a resource efficient, green and competitive low carbon economy. Maintain a reliable public water supply and ensure there is enough water for human uses, whilst seeking to maintain a healthy water environment. Minimise the production of waste, ensure waste management is in line with the waste hierarchy, and eliminate waste sent to landfill. Promote the sustainable management of natural resources.	*International:* European Commission (1999) Landfill Waste Directive (99/31/EC) United Nations (2002) Commitments arising from the World Summit on Sustainable Development, Johannesburg *National:* Environmental Protection Act 1990 (as amended) The Water Act 2003 (as amended) Defra (2011) Government Review of Waste Policy in England 2011 Defra (2011) Future Water: The Government's water strategy for England Defra (2011), Water for Life, Water White Paper, November 2011 Natural Environment White Paper (2011) Department of Energy and Climate Change (2011) National Policy Statements for Energy Infrastructure HM Government (2011) The Natural Choice: Securing the Value of Nature MHCLG (2019) National Planning Policy Framework HM Treasury Infrastructure UK (2014) National Infrastructure Plan Defra (2019) The government's response to the Natural Capital Committee's sixth annual report HM Treasury Infrastructure UK (2020) National Infrastructure Strategy

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
		HM Government (2018) National Infrastructure Delivery Plan 2016-2021 Energy Challenge (2020)
Water	Promote sustainable water resource management, including a reduction in water consumption. Maintain and improve water quality and water resources (surface waters, groundwater and bathing water). Meet protected area targets related to water quality and flow in the Water Framework Directive. Expand the scope of water quality protection measures to all waters, surface waters and groundwater. Improve the quality of the water environment and the ecology which it supports, and continue to provide high levels of drinking water quality. Ensure appropriate management of abstractions and protect flow and level variability across the full range of regimes from low to high conditions. Prevent deterioration of water quality status. Balance the abstraction of water for supply with the other functions and services the water environment performs or provides. Steer new development to areas with the lowest probability of flooding and manage any residual flood risk, taking account of the impacts of climate change. Promote measures to enable and sustain long term improvement in water efficiency. Promote a catchment based approach to the management and work with local stakeholders to deliver catchment based solutions to water quantity and quality.	*International:* European Commission Urban Wastewater Treatment Directive (91/271/EEC) European Commission Nitrates Directive (91/676/EEC) European Commission Drinking Water Directive (1998/83/EC) (amended 2015) European Commission, The Water Framework Directive (2000/60/EC) Directive 2006/118EC of the European Parliament and of the council of 12 December 2006 on the protection of groundwater against pollution and deterioration European Commission Floods Directive (2007/60/EC) *National:* Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 SI3104 Water Resources Act 1991 (as amended) The Water Act 2003 (as amended) The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 Defra (2005) Making Space for Water Environment Agency (2010) Water Resources Action Plan for England and Wales Environment Agency (2009) Water Resources Strategy for England and Wales Flood and Water Management Act (2010) Environment Agency (2010) Water Resources Action Plan for England and Wales Water Industry Act 1991 (as amended by the commencement of Section 38 of the Flood and Water Management Act 2010) Defra (2011) Water for Life - Water White Paper Defra (2011) Drought Direction 2011 Environment Agency (2011) National Flood and Coastal Risk Management Strategy for England Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report Defra (2012) National Policy Statement for Wastewater Environment Agency (2013) Managing Water Abstraction Environment Agency (2013) Climate change approaches in water resources planning – overview of new methods Defra and Welsh Government (2014) River Basin Planning Guidance Defra and Environment Agency (2015) How to Write and Publish a Drought Plan Environment Agency (2015) Drought Response: our framework for England Defra (2016) Drought Direction 2016 Environment Agency (2020) Drought plan guidance

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
	Develop a resilient and flexible water management approach to cope with changing climate, population and economic conditions. Reduce flood risk to people, residential and non-residential properties, community facilities and key transport links, as well as designated nature conservation sites and heritage assets and landscapes of value. Reduce risk of flooding by changing operation of reservoirs.	Defra (2016) Guiding Principles for Water Resources Planning for Water Companies Operating Wholly or Mainly in England. Environment Agency (2017) Drought Response: Our Framework for England MHCLG (2019) The National Planning Policy Framework The State of the Environment: Water Resources 2018 UKTAG on the WFD Guidance Documents (various dates) Environment Agency (2020) Meeting our future water needs: a national framework for water resources *Regional/Local:* Environment Agency (2009 and 2012) Catchment Flood Management Plans; Bristol Avon, Severn Tidal Tributaries, North and Mid Somerset, Bristol Avon Catchment Partnership (2016) Catchment Plan Bristol Avon Catchment Plan Progress Report (2015-2018) Wessex Water (2018) Drought Plan Thames Water (2017) Drought Plan Severn Trent Water (2019) Drought Plan Environment Agency (2015) Drought response: our framework for England Environment Agency Abstraction Licensing Strategies (various dates for different catchments) Bristol Water (2019) Final Water Resources Management Plan 2019 Water Resource Management Plans (2019) for Thames Water, Severn Trent Water and Wessex Water. Environment Agency and Defra, (2015) South West River Basin District River Basin Management Plan Environment Agency and Defra, (2015) River Basin Management Plan Severn River Basin District Environment Agency and Defra, (2015) River Basin Management Plan Thames River Basin District Environment Agency (2016) South West River Basin District, Flood risk management plan 2015-2021
Soil, geology and land use	Protect and enhance and diversity of geology (including geological SSSIs) and soils, including geomorphology and geomorphological processes which can be lost or damaged by insensitive development. Ensure that soils will be protected and managed to optimise the varied functions that soils perform for society (e.g. supporting agriculture and forestry, protecting cultural heritage, supporting biodiversity, as a platform for construction), in keeping with the principles of sustainable development. Promote catchment-wide approach to land management	*International:* European Commission (1999) Landfill of Waste Directive (99/31/EC) Council of Europe (2003) European Soils Charter European Commission (2006) Thematic Strategy for Soil Protection *National:* Wildlife and Countryside Act 1981 (as amended). The Countryside and Rights of Way (CROW) Act (2000) Defra (2004) The First Soil Action Plan for England Defra (2004) Rural Strategy 2004 Defra (2006) Sustainable Farming and Food Strategy: Forward Look Environment Agency (2007) Soil: A Precious Resource: Strategy for Protecting, Managing and Restoring Soil Defra (2009) Safeguarding our Soils – A Strategy for England

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
	by relevant stakeholders, in order to benefit natural resources, reduce pollution and develop resilience to climate change. Promote mixed use developments, and encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions. Encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value.	Natural England (2011) UK Geodiversity Action Plan MHCLG (2019) National Planning Policy Framework *Regional/local:* National Character Area (NCA) profiles Environment Agency and Defra, (2015) River Basin Management Plan South West River Basin District Environment Agency and Defra, (2015) River Basin Management Plan Severn River Basin District
Air and climate	Reduce greenhouse gas emissions. Targets include: reduce the UK's greenhouse gas emissions by at least 80% (relative to 1990 levels) by 2050. Reduce the effects of air pollution on ecosystems. Improve overall air quality. Minimise energy consumption, support the use of sustainable / renewable energy and improve resilience to climate change. Build in adaptation to climate change to future planning and consider the level of urgency of associated risks of climate change impacts accordingly. Need for adaptive measures to respond to likely climate change impacts on water supply and demand. Achieve and sustain compliance with and contribute towards national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas.	*International:* European Commission (2005) Thematic Strategy on Air Pollution European Commission (2008) Ambient Air Quality Directive (2008/50/EC) European Commission (2009) Promotion of the use of energy from renewable sources Directive (2009/28/EC) The Paris Agreement (2016), Cancun Agreement (2011) and Kyoto Agreement (1997) *National:* The Climate Change Act 2008 DECC (2007) Energy White Paper: Meeting the Energy Challenge Defra (2007) The Air Quality Strategy for England, Scotland and Wales Defra (2007) Conserving Biodiversity in a Changing Climate: Guidance on Building Capacity to Adapt Defra (2008), England Biodiversity Strategy – climate change adaptation principles The Climate Change Act 2008 English Heritage (2008) Climate Change and the Historic Environment Department of Energy and Climate Change (2011) Planning our electric future: a White Paper for secure, affordable and low carbon electricity DECC (2007) Energy White Paper: Meeting the Energy Challenge DECC (2011) National Policy Statements for Energy Infrastructure DECC (2011) Planning Our Electric Future; A White Paper for Secure, Affordable and Low Carbon Electricity Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report The Energy Act 2013 Defra (2013) The National Adaptation Programme: Making the country resilient to a changing climate.

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
		HM Government (2016) National Infrastructure Delivery Plan 2016-2021 HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment UKCP (2018): UK Climate Projections 2018 Natural England National Character Area (NCA) Profiles *Regional/Local:* Bristol City Council (2019) Air Quality Annual Status Report Bristol City Council Mayor's Climate Emergency Action Plan (2019) South Gloucestershire Air Quality Annual Status Report (2019) South Gloucestershire Council: Local Greenhouse Gas Report (2019/2020) North Somerset Air Quality Status Report 2018 North Somerset Climate Emergency Strategy 2019
Archaeology and cultural heritage	Built development in the vicinity of historic buildings and Scheduled Monuments could have implications for the setting and/or built fabric and cause damage to any archaeological deposits present on the site. Ensure active management of the Region's environmental and cultural assets. Ensure effects resulting from changes to water level (surface or sub-surface) on all historical and cultural assets are avoided. Consider effects on important wetland areas with potential for paleo-environmental deposit. Promote the conservation and enhancement of the historic environment, including the promotion of heritage and landscape as central to the culture of the region and conserve and enhance distinctive characteristics of landscape and settlement. Conserve and enhance the historic environment, heritage assets and their settings.	*International:* The World Heritage Convention (UNESCO) 1972 – A Global Instrument for the Protection of Cultural and Natural Heritage. The Convention for the Protection of the Architectural Heritage of Europe (Granada Convention 1985) The European Convention on the Protection of Archaeological Heritage (Valletta Convention 1992) European Commission (2007), Floods Directive (2007/60/EC) *National:* Planning (Listed Buildings and Conservation Areas) Act 1990 Defra (2004) The First Soil Action Plan for England Department for Culture, Media and Sport (2001) The Historic Environment – A Force for the Future (2001) English Heritage (2008), Climate Change and the Historic Environment Defra (2011) The Natural Choice: Securing the Value of Nature, The Natural Environment White Paper Defra (2011) UK National Ecosystem Assessment Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment Historic England (2015) The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning Historic England (2016) Climate Change and the Historic Environment Historic England (2020) Heritage at Risk HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment MHCLG (2019) National Planning Policy Framework *Local*

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
		Bristol City Council: Our Inherited City: Heritage Statement Guidance: 2020 Individual Conservation Area Appraisals South Gloucestershire Local Plan: Policies, Sites and Policies Plan Adopted November 2017
Landscape and visual amenity	Protection and enhancement of landscape (including designated landscapes, landscape character, distinctiveness and the countryside). Abstraction and low river flows could negatively affect landscape and visual amenity. Enhance the value of the countryside by protecting the natural environment for this and future generations. Improve access to valued areas of landscape character in sustainable ways to enhance its enjoyment and value by visitors and stakeholders.	*International:* Council of Europe (2000) European Landscape Convention (Florence Convention) Council of Europe (2006) European Landscape Convention *National:* Wildlife and Countryside Act 1981 (as amended) The Countryside and Rights of Way (CRoW) Act (2000) Defra (2010) Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network Defra (2011) The Natural Choice: Securing the value of nature. The Natural Environment White Paper Historic England (2015) Historic Environment Good Practice Advice in Planning Note 3 HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment MHCLG (2019) National Planning Policy Framework *Regional/Local:* Cotswolds AONB Management Plan 2018-2023 Mendip Hills AONB Management Plan 2019-2024 Natural England National Character Area (NCA) Profiles

4. ENVIRONMENTAL BASELINE REVIEW

4.1 INTRODUCTION

An important part of the SEA process is to identify the current baseline conditions, and how they might change over time, in absence of the WRMP. It is only with knowledge of baseline conditions that potential impacts of the WRMP and its schemes can be quantified and if necessary mitigated. This baseline does not constitute a 'do nothing' option, as there will be elements of the Bristol Water WRMP that is active (currently WRMP19) that would continue, even in absence of a new plan. These will continue to alter the baseline.

As discussed, the temporal period covered by the WRMP is lengthy, which introduces uncertainty in considering future baselines.

In this section, the best available projections for environmental and social characteristics have been considered and summarised, but with time comes significant uncertainty. A scenario approach is therefore proposed as part of the assessment process, where known or likely changes are incorporated into the SEA to test the sensitivity and resilience of the options.

Baseline data have been drawn from a range of sources, including a number of plans, policies and programmes reviewed and summarised in Table 3.1 and Appendix A. The sections below also summarise the likely future baseline in the issues considered (where information is available). The key issues arising from the baseline review are summarised at the end of each sub-section.

4.1.1 Limitations of the data and assumptions made

The principal limitations surround the aforementioned future social and environmental baseline, where there are substantial differences in the availability and temporal resolution of robust projections across the various SEA topic areas: for example, whilst some water companies are planning up to 80 years ahead and climate change estimates extend to a similar horizon, regional population and housing projections only extend up to the 2040s. Forecasts of changes in the natural environment are shorter still, and subject to considerable uncertainty.

The study area for the SEA covers many different geographical and social regions, which makes establishing an all-encompassing baseline challenging. There are also challenges surrounding the extrapolation of information from data collected at different spatial resolutions. The geographical baseline is presented in figures where possible. In some instances, reporting cycles mean that available information may have been superseded.

SEA is a high-level assessment aimed at highlighting potential environmental concerns. The data to be used in an SEA is based on that which is readily available from existing sources, such as statutory organisations. No primary research or data collection has been carried out specifically to inform the SEA and therefore it is possible that at option level, there may be hyper-local conditions that could influence the WRMP option. At a later stage during the implementation of WRMP options, depending on their extent and nature, some schemes will be subject to substantial environmental appraisal, including EIA where appropriate.

The baseline information presented within this scoping report may not identify specific, localised issues that are reflective of the general trends of the region. For example, this may include locally important sites for recreation or nature conservation.

4.1.2 Baseline Scope

The scope of the assessment is the Bristol Water supply area. The supply area is centred around Bristol in the south west of England and includes the local authorities of Bath and North East Somerset Council, Bristol City Council, Mendip District Council, North Somerset Council, Sedgemoor District Council and South Gloucestershire Council (the supply area also includes parts of Wiltshire, Cotswolds and Stroud local authority areas). It should be noted that the city of Bath lies outside of the Bristol Water supply area.

4.2 BIODIVERSITY, FAUNA AND FLORA

4.2.1 Baseline

Biodiversity is the variety of plants (flora) and animals (fauna) in an area, and their associated habitats. The importance of preserving biodiversity is recognised from an international to a local level. Biodiversity has importance in its own right and has value in terms of quality of life and amenity.

The Bristol Water supply area comprises a large number of statutory designated sites important for biodiversity including Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Ramsar sites; these are listed in Table 4-1and shown in Figure 4-1.

Table 4-2 provides numbers of Sites of Special Scientific Interest (SSSIs) (also shown in Figure 4-2) and National Nature Reserves (NNRs) within Bristol Water's supply area. SSSIs and NNRs relate to the county's best wildlife and geological sites. These national designations are shown in Figure 4-2.

Table 4-1 Special Protection Areas, Special Areas of Conservation and Ramsar within the Bristol Water Supply Area

Designation	Site
SPA	Chew Valley Lake
	Severn Estuary
	Somerset Levels & Moors
SAC	Avon Gorge Woodlands
	Severn Estuary
	Mendip Limestone Grasslands
	North Somerset & Mendip Bats
	Mendip Woodlands
	Mells Valley
Ramsar	Severn Estuary
	Somerset Levels & Moors

Table 4-2 Nationally Designated Nature Conservation Sites within the Bristol Water Supply Area

Number of SSSIs	Number of NNRs
195	24

In addition to the NNRs listed above, there are 67 Local Nature Reserves (LNRs) within the SEA Study Area. Figure 4-2 identifies NNRs and LNRs together with areas of Ancient Woodland. A number of non-statutory designated sites are also present in the region such as sites managed by the Wildlife Trust or the Royal Society for the Preservation of Birds (RSPB).

There are a range of designated Natural Environment and Rural Communities (NERC) Act Section 41 habitats within the Bristol Water supply area. NERC habitats include rivers and streams, blanket bogs, reedbeds, fens and meadows. NERC priority species include:

- Otter
- Water vole
- Atlantic Salmon
- European eel
- Fine-lined Pea Mussel
- Freshwater Pear Mussel
- Depressed River Mussel
- Greater Water Parsnip

- Sea/Brown trout
- River lamprey
- White clawed crayfish
- Snakeshead Fritillary
- Loddon Lilly
- Creeping Marshwort
- Narrow-leaved water-dropwort
- River water-dropwort
- Club-tailed Dragonfly
- Tassel Stonewort
- Desmoulins Whorl Snail
- Snipe
- Lapwing
- Natterer's Bat
- Daubenton's Bat
- Pipistrelle Bat

The Avon Biodiversity Action Plan (BAP)[9] has identified that the west of England (Bristol, Bath and North East Somerset, North Somerset and South Gloucestershire) contains 28 UK BAP priority habitats and 19 of the 27 broad habitat types found in the UK as defined in UK BAP[10]. The West of England supports 47 UK BAP species including dormice, water voles, white-clawed crayfish, otters, barn owls, horseshoe bats and a significant number of butterfly species. Rare plant species include round-headed leek (Bristol onion), Bristol rock-cress, the endemic Bristol whitebeam and nationally notable plants such as lizard orchid, adder's-tongue spearwort and Bath asparagus. Otters are recovering across much of the region and polecats are also making a recovery, spreading south from Gloucestershire.

4.2.1.1 Ancient Woodlands

Ancient woodlands in England are important habitats that should be protected. An ancient woodland is any wooded area that has contained woodland continuously since at least 1600 AD. They tend to be more ecologically diverse and of a higher nature conservation value than those developed recently, or where cover on the site has been intermittent. They often also have cultural importance. Areas of ancient woodland are shown on Figure 4-2.

4.2.1.2 Water Framework Directive - ecological status

The WFD ecological status classification considers the condition of biological quality elements (e.g. aquatic invertebrates, plants and fish), the morphology of the habitat available in each water body (e.g. a defined stretch of river), and concentrations of supporting physico-chemical elements (e.g. oxygen or ammonia and concentrations of specific pollutants). See the 'Water' topic for details on water quality and ecological condition of water bodies.

Water abstraction and associated infrastructure can sometimes result in adverse effects on water-related sites. Impacts on biodiversity may be caused by the drying out of wetland habitats, lower water levels and slower flows in watercourses, deterioration in water quality, change in water temperature, or the transfer or proliferation of invasive species. The various WFD River Basin Management Plans (RBMPs) relevant to the study area identify changes to the natural flow and level of water as one of the major issues affecting the ecology of rivers – these being related to abstraction and flow regulation measures.

The Severn River Basin District experiences a number of pressures. 27% of watercourses are subject to physical modification, 29% experience pollution from wastewater, 12% experience pollution from towns, cities and transport, 40% experience pollution from rural areas, 2% experience pollution from abandoned mines, 7% experience changes to the natural flow and level of water, and approximately 1% experience negative effects from invasive, non-native species (INNS).

4.2.1.3 Invasive Non-native Species

There are approximately 2,000 non-native species established in Britain, predominantly in the terrestrial environment. Invasive species within the Bristol Water WRMP assessment area include well-established species such as mink and Japanese knotweed, as well as species that are present but less extensive, such as sunbleak fish and pennywort[11].

[9] Avon Biodiversity Partnership (2004) Biodiversity Action Plan. Available at: http://www.avonwildlifetrust.org.uk/my-wild-city/my-wild-life (Accessed 7th February 2022).

[10] UK BAP was published in 1994 and sets out a programme for conserving biodiversity in the UK. The UK Biodiversity Framework published in July 2012, succeeds the UK BAP.

[11] Severn Estuary Partnership (2014): Invasive Non-Native Species detected within the Severn Estuary Area: https://severnestuarypartnership.org.uk/sep/estuary/physical-natural-environment/non-native-species/

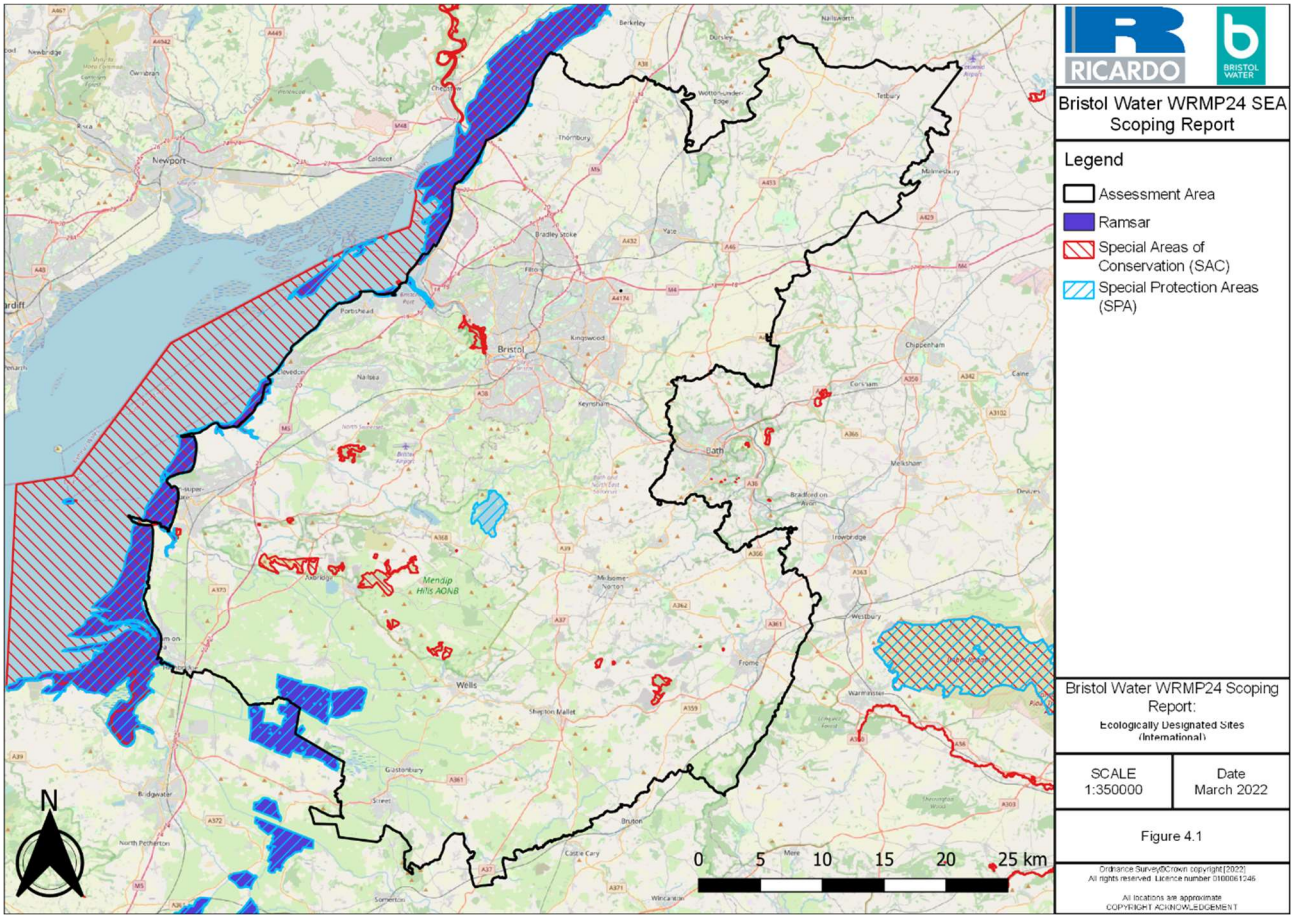


Figure 4-1: International Ecological Designations

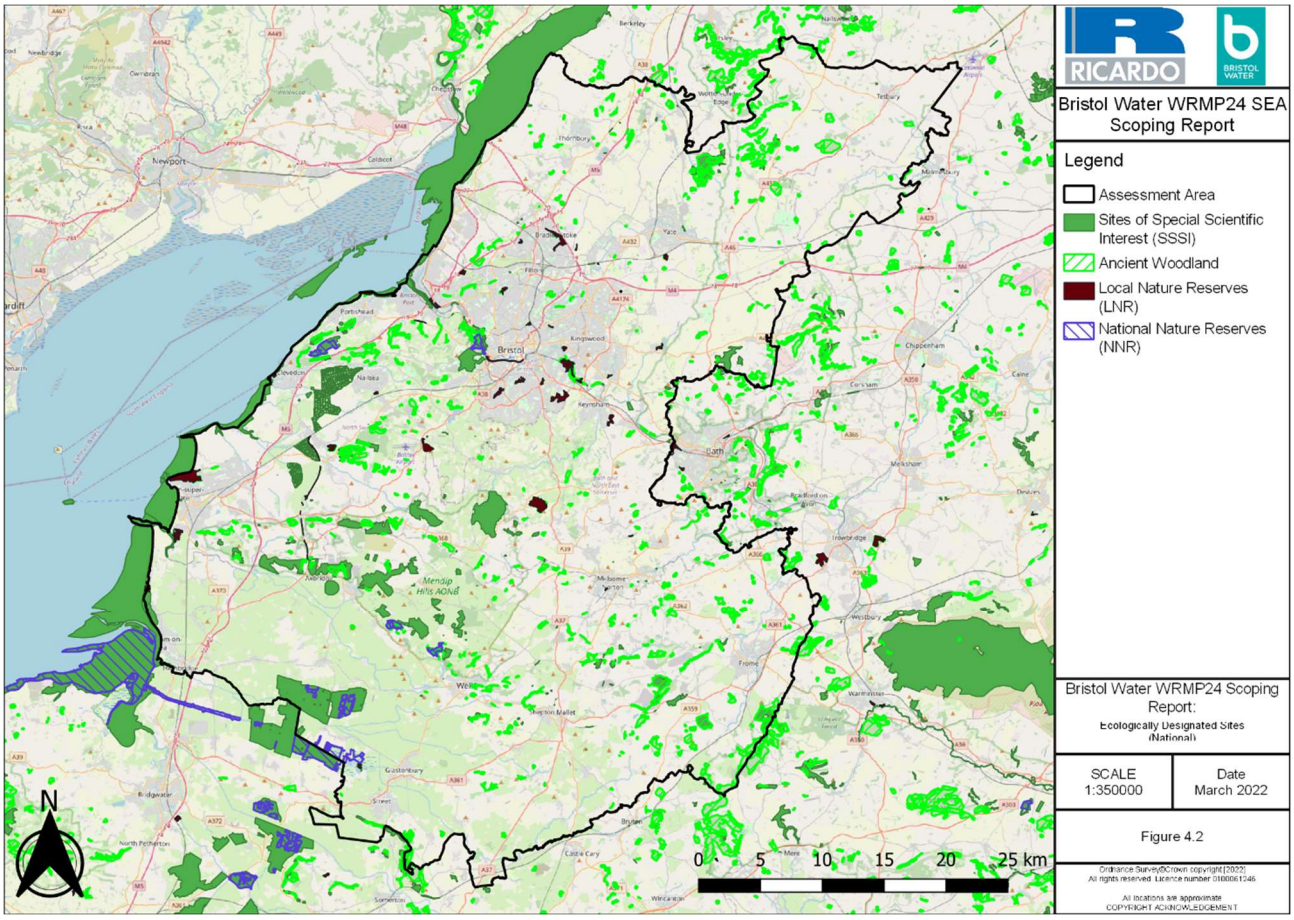


Figure 4-2: National Ecological Designations

4.2.2 Future Baseline

The Defra 25 Year Environment Plan[12] includes a commitment to restore 75% of terrestrial and freshwater protected sites to favourable condition and to create or restore 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits. The 25 Year Plan also proposed an adoption of a 'Biodiversity Net Gain' approach to development, an approach introduced into national planning policy in 2019. The Environment Act[13] enacted in 2021 has now mandated the need for Biodiversity Net Gain assessment.

The 25-year Plan also includes a commitment to support land management at landscape and catchment level and to support the adoption of long-term sustainable land management practices to significantly expand wildlife habitat and provide opportunities for species and ecosystem recovery.

Climate change is anticipated to have an impact on wildlife in the future by exacerbating existing pressures such as changes to the timing of seasonal activity, and water scarcity. It is acknowledged that there is a need to allow wildlife to adapt to the impacts of climate change. Climate may limit species' distributions indirectly though the impact of invasive species on native species along climatic gradients. It will affect the abundance and diversity of natural enemies, competitors and species that constitute resources, as well as a species' ability to compete for resources or resist natural enemies.

The West of England Nature Partnership (WENP) is a cross-sector partnership working to restore the natural environment in the West of England through embedding the value of nature in decision making across spatial planning, public health and economic development. It is the designated Local Nature Partnership (LNP) for the West of England (Bristol City, South Gloucestershire, North Somerset and Bath & North East Somerset). LNPs

[12] UK Government (2018) 25 Year Environment Plan. Available at: https://www.gov.uk/government/publications/25-year-environment-plan (Accessed 7th February 2022).

[13] UK Government (2021) Environment Act. Available at: https://www.legislation.gov.uk/ukpga/2021/30/part/1/enacted (Accessed 7th February 2022).

are a key commitment from the 2011 Government White Paper, The Natural Choice: Securing the Value of Nature, which recognised the need for a more joined-up approach to reverse the loss of biodiversity and degradation of ecosystems. WENP is working to develop a regional Nature Recovery Network for the West of England, aligning with shared principles developed across the south west of England to ensure coherence and strengthened networks across the wider region.

Bristol Water established the Biodiversity Index approach (a ranked assessment of biodiversity gain opportunities) in 2015 with the aim of ensuring a positive impact on the natural environment following operational activity/construction works. All Bristol Water owned sites have been assessed to inform a baseline Biodiversity Index score. The Biodiversity Index now forms the basis of a Performance Commitment under which Bristol Water have committed to improve the overall Biodiversity Index score over time.

4.2.3 Key Issues

The key sustainability issues arising from the baseline assessment for biodiversity are:

- The need to protect or enhance the region's biodiversity, particularly protected sites designated for nature conservation.
- The need to avoid activities likely to cause irreversible damage to natural heritage.
- The need to take opportunities to improve and not reduce connectivity between fragmented habitats.
- The need to control the spread of Invasive Non-Native Species (INNS).
- The need to recognise the importance of allowing wildlife to adapt to climate change.
- The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the ecosystem services.
- The need to deliver an increase in the Bristol Water biodiversity index.

4.3 HUMAN HEALTH AND SOCIO-ECONOMICS

4.3.1 Baseline

The Bristol Water service area has a population of approximately 1.23 million people, with the population centred around the city of Bristol, which also has many populous suburbs. The service area also includes other towns, the largest being Weston-Super-Mare, Yate and Frome. The city of Bath lies just outside of Bristol Water's supply area.

4.3.1.1 Population

The population of the greater West of England area (the Local Authorities of Bath & North East Somerset, the City of Bristol, North Somerset and South Gloucestershire, that represents significant crossover with the Bristol Water service area) is projected to grow substantially over the WRMP period. Based on 2018 figures (the most recent year for which projections are available), between 2022 and 2043 the population of this area is projected to grow by 14.0% (158,000 people), compared to an England-wide average of just 7.8%[14].

Table 4-3 Population and Household Statistics and Projections (millions)

Region	2022		2043		% Change 2022-2043	
	Population	No. Households	Population	No. Households	Population	No. Households
Greater West of England	1.20	0.50	1.36	0.58	+14.0%	+16.3%
South West	5.77	2.49	6.39	2.89	+10.7%	+15.9%
England	57.28	23.87	61.74	26.95	+7.8%	+12.9%

[14] Population projections for local authorities: Table 2 - Office for National Statistics

Population change is the function of natural change (difference between births and deaths) and net migration (the difference between the number of people moving into and out of an area). The balance of factors underlying population change varies by region. Table 4-3 above presents the projected population change in the greater West of England Area, alongside the South West of England (the Greater West of England area, as well as the counties of Cornwall, Devon, Dorset, Gloucestershire, Somerset and Wiltshire) and England to show a comparison. Both internal migration (movement of people within the UK) and external migration (movement of people into the UK from other countries) are expected to substantially contribute to population growth to the West of England over the plan period[15].

4.3.1.2 Human Health and Deprivation

The WRMP has the potential to influence quality of life, including human health, wellbeing, amenity and community, through actions to maintain essential water supplies for public use. There could be beneficial (e.g. actions to provide additional supply of water will help safeguard public health) or adverse impacts (e.g. noise and disruption from the construction of infrastructure).

In comparison to other areas of England (which has an overall life expectancy of 81.3), the local authorities that fall within the Bristol Water area. had relatively high life expectancies (Bath & North East Somerset 83.7, Bristol 80.6, Mendip 82.6, North Somerset 82.6, Sedgemoor 81.7, South Gloucestershire 83.0)[16].

It has been shown that, in some cases, people in disadvantaged areas experience greater exposure to negative impacts on human health including air pollution, flooding, and proximity to large industrial and waste management sites[17]. The Index of Multiple Deprivation combines a number of indicators, chosen to cover a range of economic, social and housing issues[18], into a single deprivation score for each Lower Super Output Area[19] in the UK. This allows each area to be ranked relative to one another according to their level of deprivation. The indices are used widely to analyse patterns of deprivation, identify areas that would benefit from special initiatives or programmes and as a tool to determine eligibility for specific funding streams. How the LSOA's within each of the aforementioned Local Authorities score within the Index of Multiple Deprivation is shown in Figure 4-3. The Index of Multiple Deprivation shown geographically is represented in Figure 4-4.

[15] Bristol City Council (2020): The Population of Bristol - 69aa0aa1-290a-ccf2-ec4f-13a7376b41a8 (bristol.gov.uk)

[16] Life expectancy estimates, all ages, UK - Office for National Statistics (ons.gov.uk)

[17] Defra (2006) Air Quality and Social Deprivation in the UK: an environmental inequalities analysis.

[18] Income Deprivation, Employment Deprivation, Health Deprivation and Disability, Education, Skills and Training Deprivation, Barriers to Housing and Services, Living Environment Deprivation, and Crime.

[19] Super Output Areas (SOAS) are a set of geographical areas developed following the 2001 census. The aim was to produce a set of areas of consistent size, whose boundaries would not change, suitable for the publication of data such as the Indices of Deprivation. They are an aggregation of Output Areas with similar social characteristics. Lower Layer Super Output Areas (LSOAs) typically contain 4 to 6 OAs with a population of about 1,500.

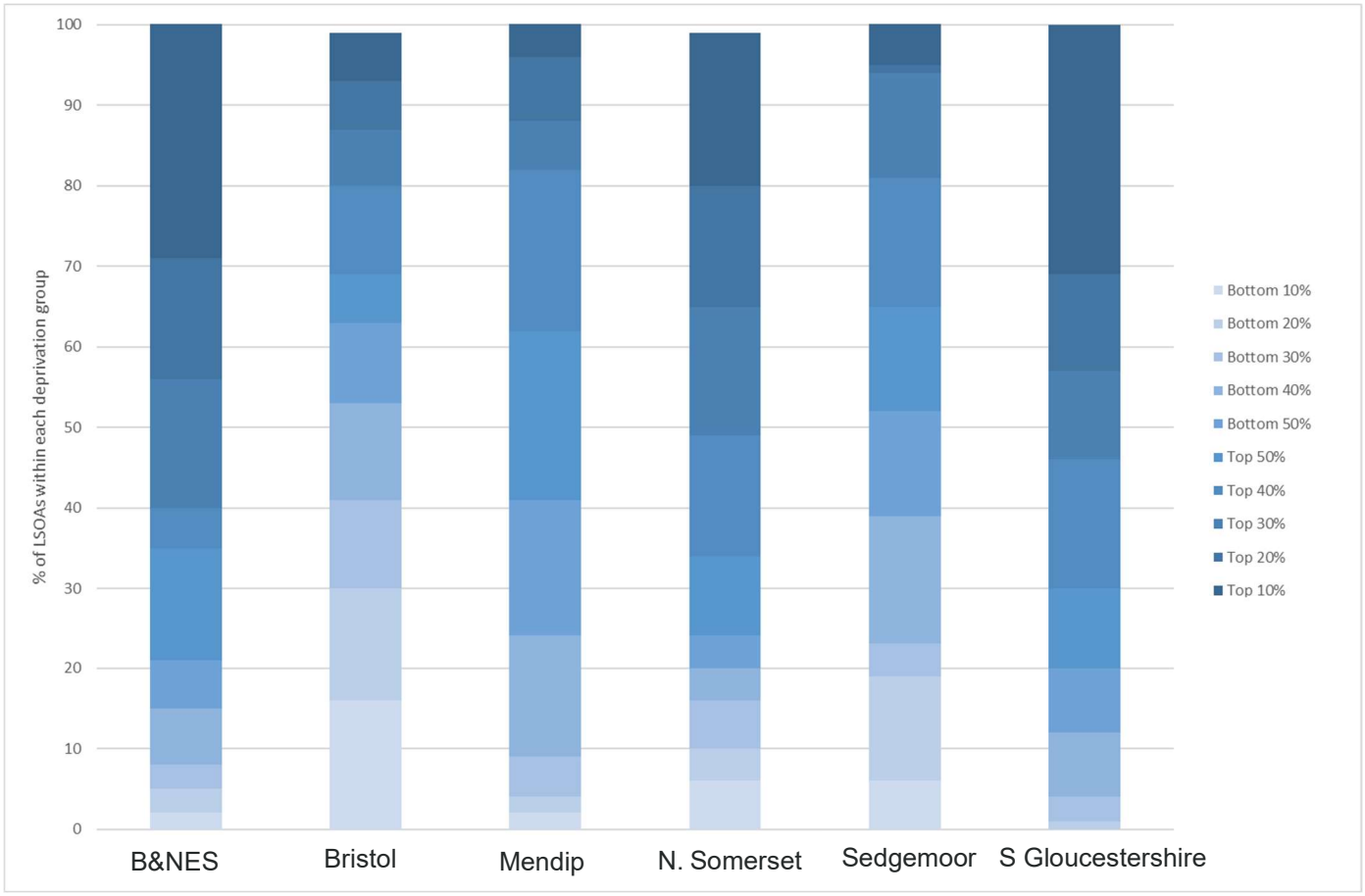


Figure 4-3: Percentage of LSOAs within each deprivation band, for local authorities within Bristol Water's service area[20]

[20] English indices of deprivation 2019 - GOV.UK (www.gov.uk)

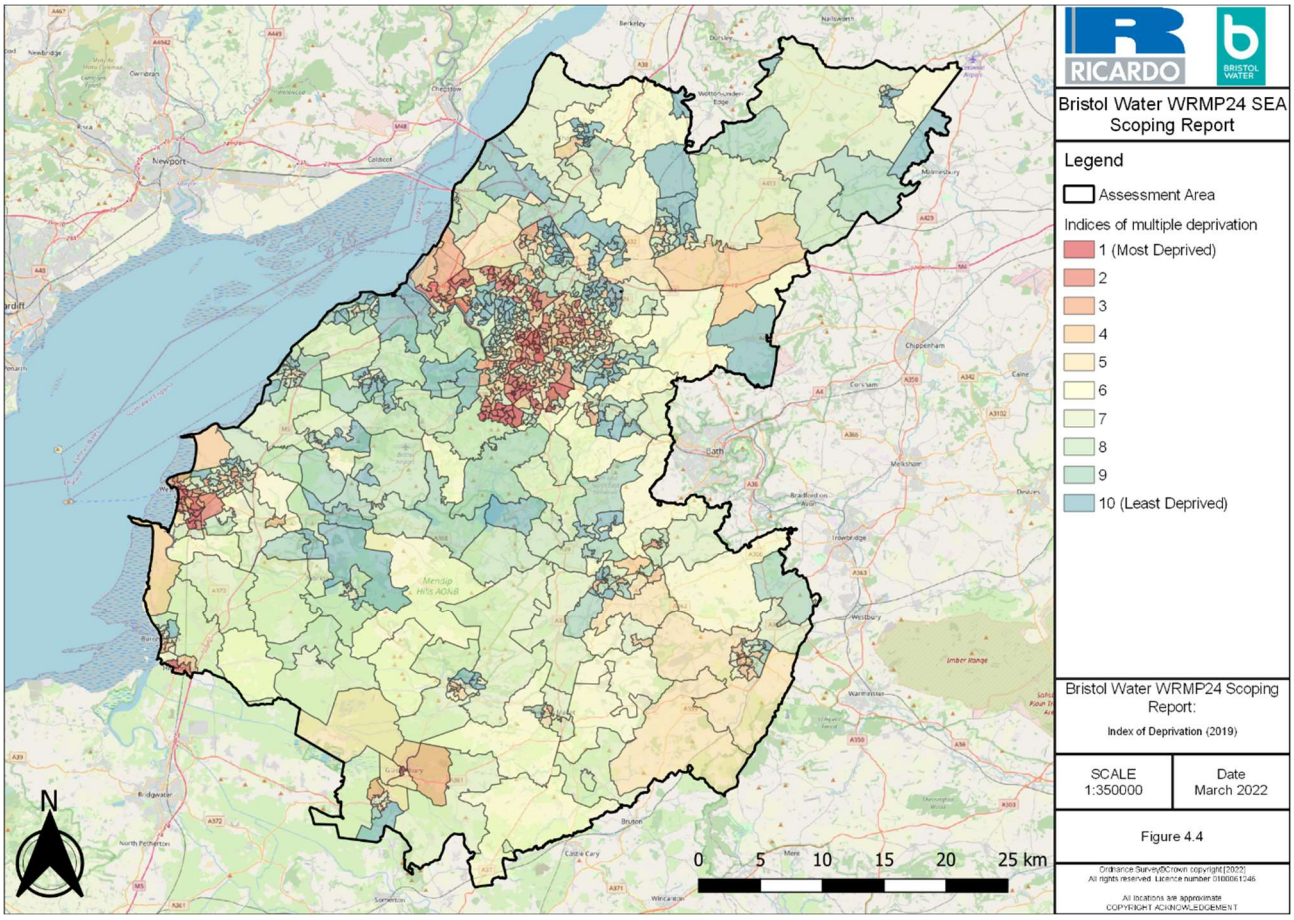


Figure 4-4: Index of Multiple Deprivation

4.3.1.3 Recreation and Tourism

In 2019, 18.9 million UK domestic overnight trips were made to the south west of England, accounting for 19% of overnight trips in England and generating a total spend of £4.13 billion[21] (data collected pre-COVID19). With specific regard to water resources, large seasonal fluxes in tourist numbers create additional demand on water resources in summer months when demand is already at its highest. Bristol Water owns land and reservoirs in scenic areas of south west England. These reservoirs are accessible to the public and provide a range of recreation facilities, including birdwatching, walking, sailing or fishing. Some sections of rivers and canals in the area are of particular importance with respect to navigation (e.g., the Kennet and Avon Canal) and angling (e.g., Bristol Harbour). Figure 4-5 shows recreation areas within the Bristol Water region.

[21] Visit Britain (2020) *England - All Trip Purposes 2019*. Available at: https://www.visitbritain.org/gb-tourism-survey-2019-overview (Accessed 7th February 2022).

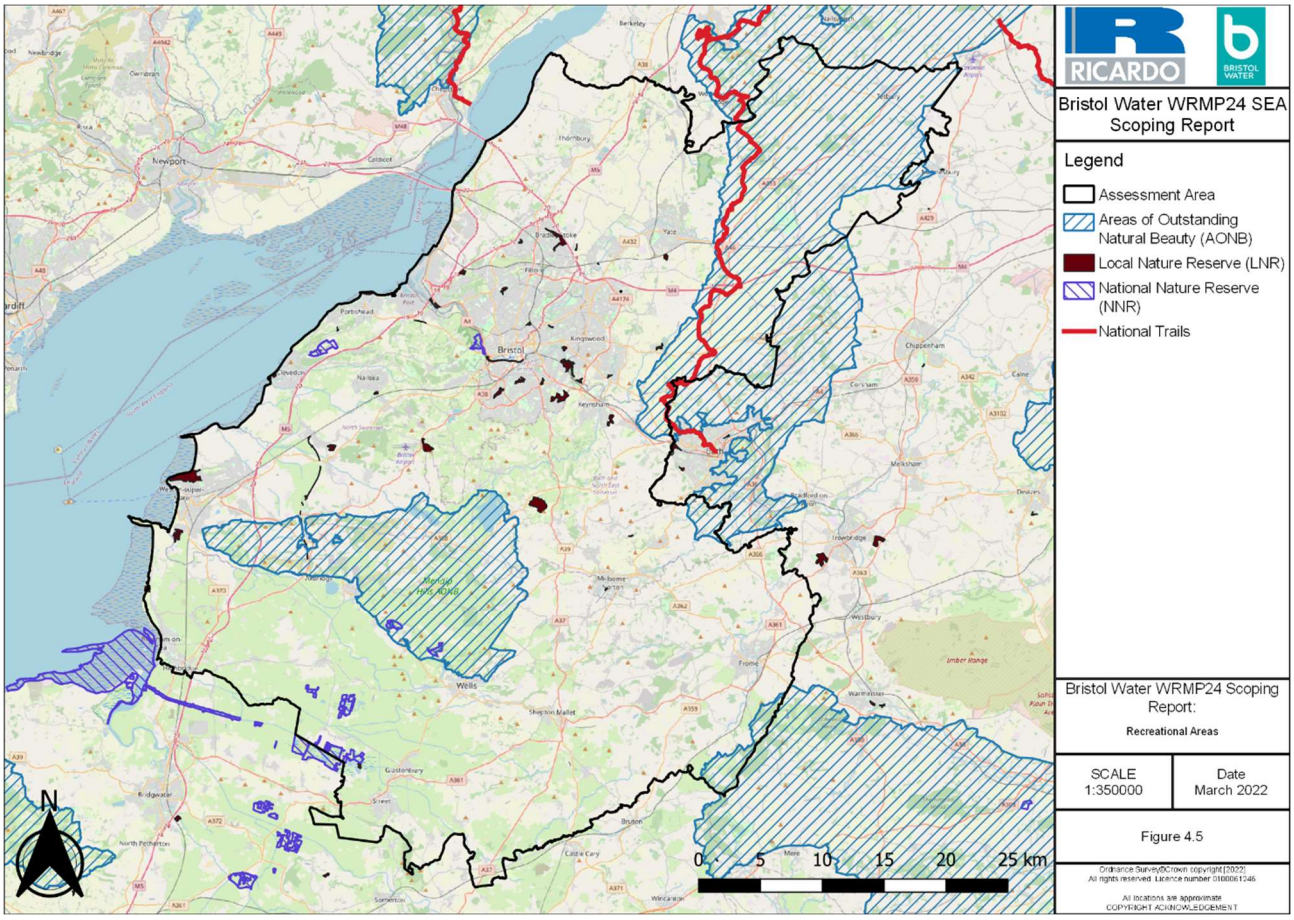


Figure 4-5: Recreational Areas

4.3.1.4 Economy and Employment

The Bristol Water service area has a varied economy that is centred around the city of Bristol, and to a lesser extent, the city of Bath. Within the West of England Combined Authority (which contains the majority of the Bristol Water customer population) 81% of the population between 16 and 64 are employed, compared to 78.5% in Great Britain. Of the 118,000 individuals who are not employed, 45,100 (28%) are full-time students. The largest industries by workforce numbers in the West of England are Human Health & Social Work (70,000 people), Wholesale & Retail Trade (66,000 people) and Professional, Scientific & Technical Activities (57,000 people)[22].

The West of England Combined Authority had a GDP of £40.8 billion in 2019, or £35,257 per worker. It also had a GVA per hour worked of £34.60. 96.5% of households had access to Superfast Broadband, approximately in line with the rest of the UK[23].

4.3.2 Future Baseline

Population is expected to grow at a rate of approximately 14% across the region (see Table 4-3), with an increasing proportion of people at or above state pension age. Household projections show potential increases of approximately 16% across the region, with an increasing proportion of one person households (shown, as household numbers are anticipated to rise faster than population).

In response to recent studies access to the recreational resources, green spaces and the historic environment will have greater importance in future planning[24]. The NPPF suggests a range of areas that should be taken into account, including the provision of appropriate facilities for recreation that preserve the openness of the green belt.

[22] Labour Market Profile - Nomis - Official Labour Market Statistics (nomisweb.co.uk)
[23] 2021-Q4-Quarterly-Bulletin-Oct.pdf (westofengland-ca.gov.uk)
[24] Defra (2011) The Natural Choice: securing the value of nature, The Natural Environment White Paper

The National Ecosystem Assessment and the Marmot Review; 'Fair Society, Healthy Lives' demonstrate the positive impact that nature has on mental and physical health and as a result the Government intends to establish a Green Infrastructure[25] Partnership with civil society to support the development of green infrastructure in England.

Improvements to the quality of the water environment and certain potential climate change impacts will present opportunities for an expanding tourist industry in the region[26].

4.3.3 Key Issues

The key sustainability issues arising from the baseline assessment for population and human health are:

- The need to ensure water supplies remain affordable especially for deprived or vulnerable communities.
- The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas.
- The need to ensure public awareness of drought conditions and importance of maintaining resilient, reliable public water supplies without the need for emergency drought measures.
- The need to ensure water quantity and quality is maintained for other users including tourists, recreational users and other users such as farmers.
- The need to ensure a balance between different aspects of the built and natural environment that will help to provide opportunities for local residents and tourists, including opportunities for access to recreation resources and the natural and historic environment.
- The need to accommodate an increasing population.
- The need to contribute towards maintaining sustainable growth in the region.
- Sites of nature conservation importance, heritage assets, water resources, important landscapes and public rights of way contribute to recreation and tourism opportunities and subsequently health and well-being and the economy.

4.4 MATERIAL ASSETS

4.4.1 Baseline

4.4.1.1 Water Use

Bristol Water supplies nearly 276 million litres of drinking water each day from its 16 water treatment works through over 6,700 kilometres of water mains to customers' taps. Currently, 60.26% (2020/21) of households are metered although Bristol Water plans to reach a metered household rate of 75% by 20225/26. Water consumption in 2020/21 was 161.1 litres per person per day for Bristol Water, this is higher than the national average of approximately 150 litres per person per day[27].

Bristol Water has one of the lowest leakage levels in the industry in the UK. Between 2015 and 2040, Bristol Water proposes to reduce water leakage from 18% of the total water supplied to the network to less than 10%. Leakage has been reduced from 37 Ml/d (megalitres per day) in 2019/20 to 35.52 Ml/d in 2020/21[28].

Bristol Water is actively pursuing measures to encourage its customers to reduce their water use and use water wisely, particularly in dry conditions. These measures of water efficiency activities help to safeguard essential water supplies.

In 2015, Bristol Water generated an estimated 0.50 Ml/d in water efficiency savings, by giving out 30,000 free water saving devices. Bristol Water also helps local schools to save water and money through the Eco School Challenge, during which a water audit for the school is carried out, water workshops for the children take place and water-saving devices for teachers and pupils are distributed for them to take home. Bristol Water continues

[25] Green infrastructure is a term used to refer to the living network of green spaces, water and other environmental features in both urban and rural areas.

[26] UK Climate Change Risk Assessment 2022 (publishing.service.gov.uk).

[27] Ofwat (2022) *Conserving Water*. Available at: http://www.ofwat.gov.uk/households/conservingwater/ (Accessed 8th February 2022).

[28] Bristol Water (2021) *Annual Performance Report*. Available at: https://f.hubspotusercontent30.net/hubfs/7850638/BW_AnnualReport-2021_artwork-new(digital).pdf (Accessed 8th February 2022).

to have the 'Peter the Meter' campaign in place to encourage customers to realise the benefits of a water meter, the campaign was negatively impacted by COVID-19, yet Bristol Water still met its internal target of 60.14% by 2021[28].

4.4.1.2 Resource Use and Waste

Bristol Water is a large user of energy due to the energy needed to treat and pump water. Use amounts to just over 78 million kilowatt hours of electrical energy to treat and distribute water and accounts for almost 91% of total carbon footprint[29]. Between April 2015 and March 2016, Bristol Water's carbon footprint on account of energy use equated to around 42 kilotonnes of CO2 equivalent, with around 1.4% of its total energy use derived from renewable sources. Bristol Water's carbon emissions figure per megalitre of water supplied was 489 kg/CO2e/Ml in 2012. The aim of the water industry sector is to achieve net zero carbon emissions by 2030[29].

The south west of England is a relatively high producer and consumer of energy. Total energy consumption in the region was 115.8 terawatt hours in 2017 (Total All Fuels), about 8.04% of the total UK figure. This represents a decrease of 9.5% energy consumption over a 10-year period, from the 2007 total of 127.9 terawatt hours[30].

There is an ongoing need for society to reduce the amount of waste it generates, by using materials more efficiently and improving the management of waste that is produced. Waste in England going to landfill has fallen by over 80% over the period 2004/5 to 2018/19 (19,822 thousand tonnes to 2,756 thousand tonnes); household recycling rates reached 44.7% in 2018 (down from a high of 45.2% in 2017[31]); waste generated by businesses declined by 29% in the six years to 2009 and business recycling rates are above 50%[32]. In line with the widely adopted 'waste hierarchy', best practice for waste management is to reduce, re-use, recycle and recover, and only then should disposal (or storage) in landfill be considered.

Data on waste arisings are collected in a range of categories. The activities of the water industry contribute to construction, demolition and excavation waste (CDEW), through construction of new infrastructure. The water industry also contributes to several waste streams through the operation of its treatment facilities. Waste streams include commercial and industrial waste (statistics include waste arisings from the power and utilities sector, which includes water supply and sewage removal), and also hazardous wastes. Table 4-4 shows waste data according to economic activity in England in 2018 against 2014 data.

Table 4-4 Waste Generation Split by Responsible Economic Activity in England

Sector	2014 ('000 tonnes)	Recycle Rate (%)	2018 ('000 tonnes)	Recycle Rate (%)
Commercial and Industrial	19,849	-	25,938	-
Construction	49,109	91.4	119,429	93.8
Household	22,355	44.8	22,033	44.8
Other (municipal waste)	13,714	-	886	-

Currently, 98% of the waste disposed by Bristol Water complies with Environmental Permitting Regulations against a target of 100%[33].

The south west of England has the highest recycling rate of 48.7% according to the 2020/21 data published by Defra. North Somerset Council had the highest recycling rate in the south west region at 63.6%[34].

[29] Bristol Water (2021) *Annual Performance Report*. Available at: https://f.hubspotusercontent30.net/hubfs/7850638/BW_AnnualReport-2021_artwork-new(digital).pdf (Accessed 8th February 2022).

[30] DEIS (2019) *Sub-national total final energy consumption in the United Kingdom* (2005-2017). Available at: https://www.gov.uk/government/statistical-data-sets/total-final-energy-consumption-at-regional-and-local-authority-level (Accessed 8th February 2022).

[31] Defra (2015) Local Authority collected waste statistics 2018/19 (28th November 2019)

[32] Defra (2011) Government Review of Waste Policy in England 2011

[33] Bristol Water (2021) *Bristol Water Annual Performance Report*. Available at BW_APR-2021_Web(Linked).pdf (hubspotusercontent30.net).

[34] Defra (2021) Statistics on waste managed by local authorities in England in 2020/21. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1040756/Statistics_on_waste_managed_by_local_authorities_in_England_in_2020_v2rev_accessible.pdf (Accessed 8th February 2022).

4.4.2 Future Baseline

Bristol Water aims to reduce leakage from its water distribution network over the next 25 years with several schemes planned to support the reduction. Bristol Water's aim is to manage water resources more efficiently in order to improve the reliability of water provision to its customers. To this effect, Bristol Water has a Level of Service of 1 in 15 years for restrictions on customer's water use, such as Temporary Use Bans[35] average.. Bristol Water has set a target of a 21.2% reduction in leakage by 2025[36].

As part of Bristol Water's drive to meet challenging efficiency targets for AMP7, it is reducing the electricity that is imported from the grid by installing gas generators at the Purton treatment works, its biggest energy consumer. This will marginally increase carbon footprint and Bristol Water will seek to mitigate this by sourcing renewable and environmentally sustainable opportunities across operations[29].

The Government's National Infrastructure Strategy[37](2020) outlines a legal commitment to decarbonise the economy by 2050, strategies to rebuild the economy following the COVID-19 pandemic and plans to 'level-up' UK cities and regional powerhouses. The UK Government plans to accelerate the deployment of green technology through private sector investment in the retrofitting of existing stock, carbon capture and low-carbon hydrogen.

4.4.3 Key Issues

The key sustainability issues arising from the baseline assessment for Material Assets and Resource Use are:

- The need to minimise the consumption of resources, including water and energy.
- The need to reduce the total amount of waste produced in the region, from all sources, and to reduce the proportion of this waste sent to landfill.
- The need to continue to reduce leakage from the water supply system.
- Daily consumption of water is higher than the national average in the area and consequently there is a continued need to encourage more efficient water use.
- The need to support regional and national commitments to decarbonisation.

4.5 WATER

4.5.1 Baseline

In the context of the WFD, the water environment includes rivers, lakes, estuaries, groundwater and coastal waters out to one nautical mile. The WFD brings together the planning processes of a range of other water-related European Directives. These Directives establish protected areas to manage water, nutrients, chemicals, economically significant species, and wildlife, and have been brought in line with the planning timescales of the WFD.

4.5.1.1 Surface Waters: Rivers and Canals

The area under consideration lies within the Severn River Basin District and the South West River Basin District.

Bristol Water is a water only company that provides water supplies to 1.23 million people and all the associated businesses in an area of approximately 2,400 square kilometres centred on Bristol and the town and villages within approximately a 35-kilometre radius of the city. The water supply area stretches from Thornbury and Tetbury in the north, to Street and Glastonbury in the south, and from Weston-Super-Mare in the west to Frome in the east.

---

[35] Bristol Water (2022) Bristol Water Drought Plan 2022-2027. Available at: https://f.hubspotusercontent30.net/hubfs/7850638/Bristol%20Water%20Drought%20Plan%20non-technical%20summary%202021.pdf?__hstc=48568761.f91f868400fcb0478f740b3a7e7b18b3.1643813791502.1646238226168.1647268925111.9&__hssc=48568761.4.1647268925111&__hsfp=1201343946&hsCtaTracking=6eaaf7c2-99a8-4818-8527-07d3d5feb87b%7C5968b24b-f260-479a-bdc6-e3d924e71e4b (Accessed 14th March 2022).

[36] Bristol Water (2021) Annual Performance Report. Available at: https://f.hubspotusercontent30.net/hubfs/7850638/BW_APR-2021_Web(Linked).pdf (Accessed 14th March 2022).

[37] HM Treasury Infrastructure UK (2020) *National Infrastructure Strategy*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938539/NIS_Report_Web_Accessible.pdf (Accessed 8th February 2022).

85% of the water supply managed by Bristol Water comprises surface waters while 15% comes from groundwater. A major abstraction is taken from the Gloucester and Sharpness Canal under agreement with the Canal & River Trust which is supplied by the Rivers Severn, Cam and Frome. This single abstraction provides approximately 50% of the water available to Bristol Water. Abstraction from the River Severn is controlled by statutory and abstraction licence conditions. In dry periods, use of water supplies from the River Severn is increased by Bristol Water to conserve water stored in reservoirs.

Surface water features in the study area are shown in Figure 4-6.

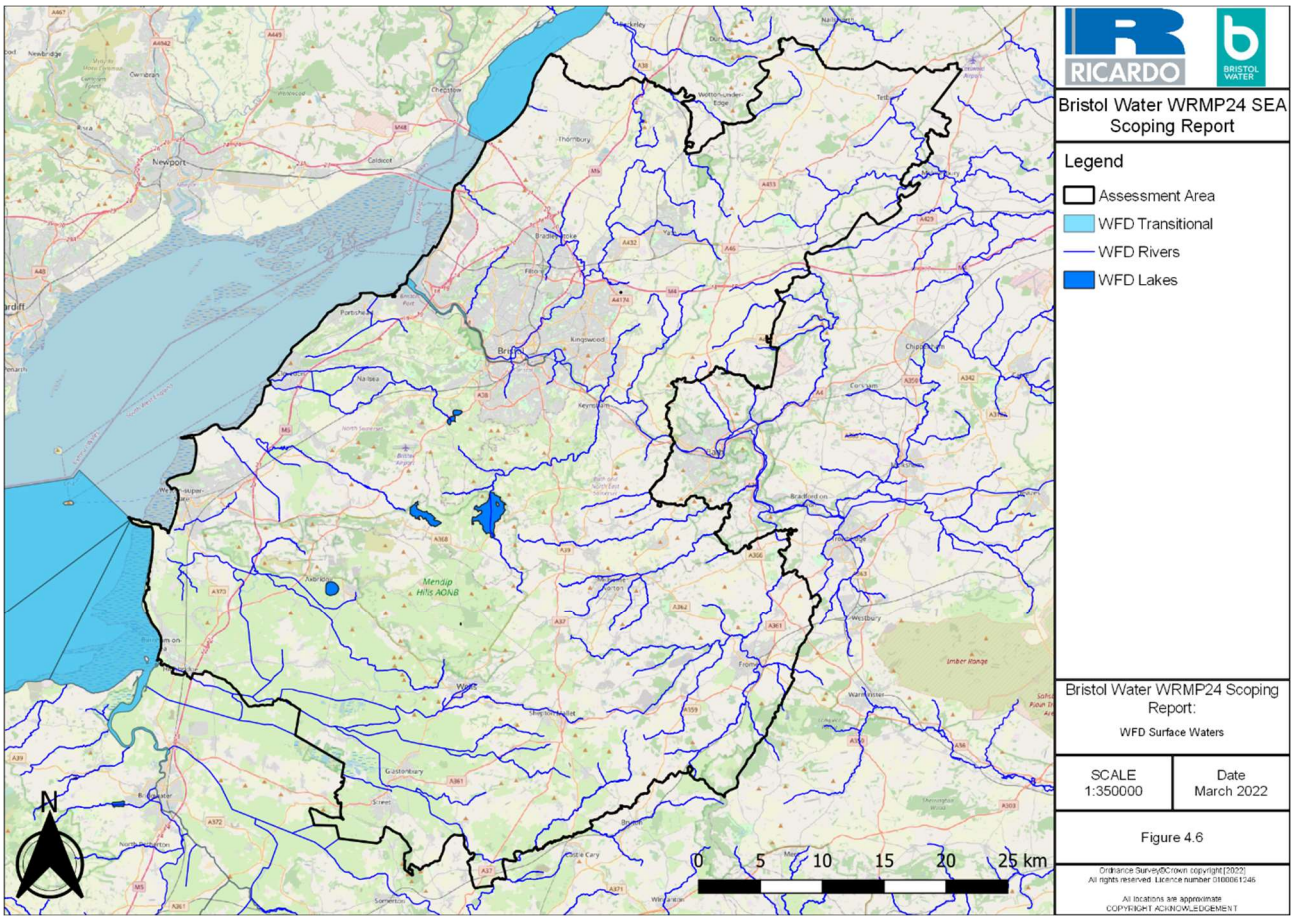


Figure 4-6: WFD Surface Waters

4.5.1.2 Surface Waters: Lakes and Reservoirs

There are three surface water impounding reservoirs (Cheddar, Blagdon and Chew Valley) collecting water from the Mendip Hills. Chew Valley Reservoir is the largest. There are also other smaller raw water reservoirs within the supply system.

4.5.1.3 Groundwater

Bristol Water operates 16 small groundwater sources such as springs, wells and boreholes which are used conjunctively and account for around 15% of the water available. The groundwater bodies are shown in Figure 4-7.

Under the WFD, there are two separate classifications for groundwater bodies, chemical status and quantitative status. A groundwater body will be classified as having poor quantitative status in the following circumstances: where low groundwater levels are responsible for an adverse impact on rivers and wetlands normally reliant on groundwater, where abstraction of groundwater has led to saline intrusion, and where it is possible that the amount of groundwater abstracted will not be replaced each year by rainfall. For a groundwater body to be at good status overall, both chemical status and quantitative status must be good. In addition to assessing status, there is also a requirement to identify and report where the quality of groundwater is deteriorating as a result of pollution and which may lead to a future deterioration in status.

Source Protection Zones (SPZs) provide additional protection to safeguard drinking water quality. This is achieved through constraining the proximity of an activity that may impact upon drinking water abstraction. They are defined around large and public potable groundwater abstraction sites and take account of the groundwater travel time to an abstraction.

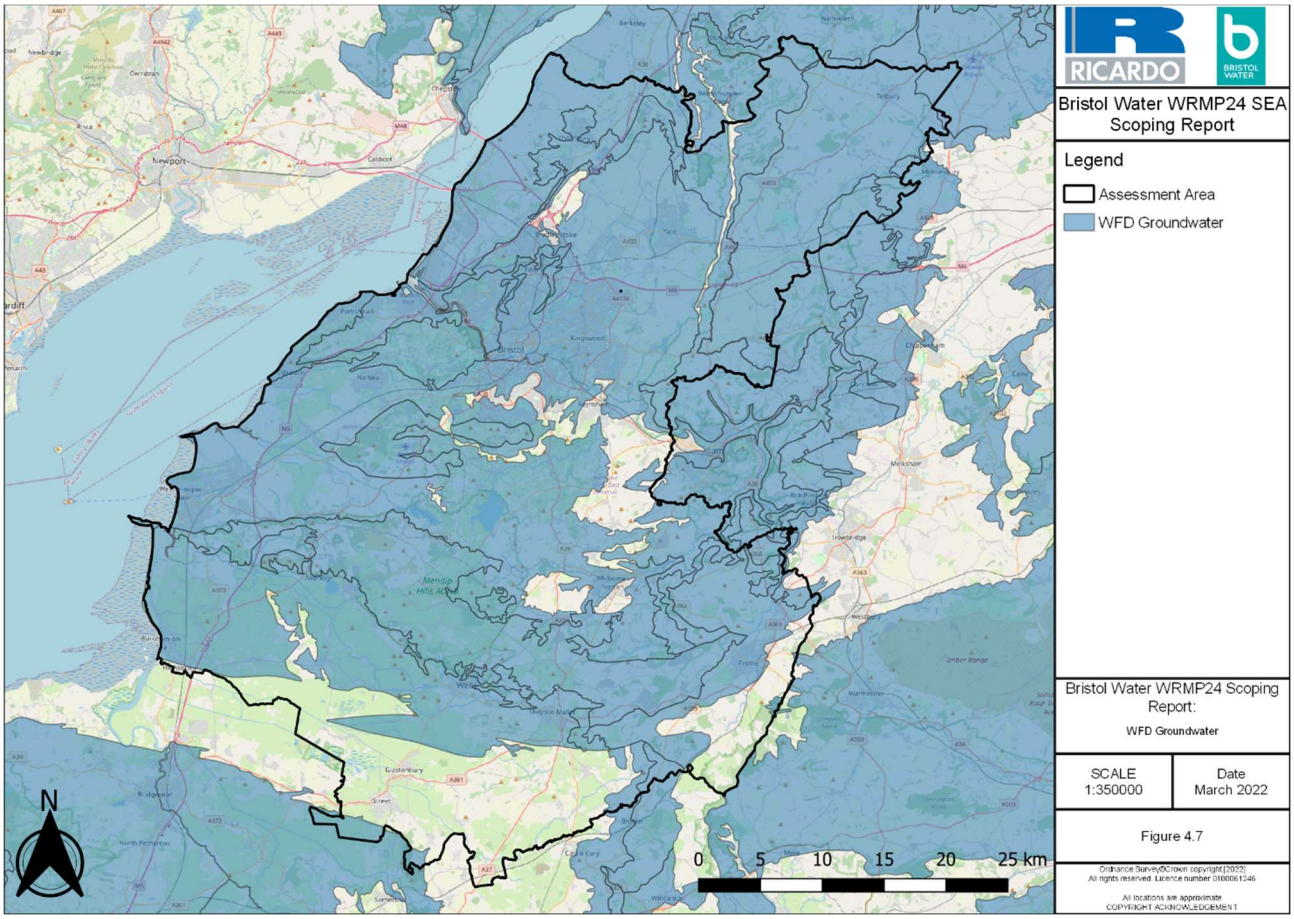


Figure 4-7: WFD Groundwater

4.5.1.4 Estuaries

There are four WFD estuarine waterbodies associated with the assessment area: Bristol Avon, Severn Upper, Severn Middle and Severn Lower, with a combined area of over 50,000ha. They are all considered to have an ecological status of 'moderate' and a chemical status of 'fail'.

4.5.1.5 Water dependent designated sites

There are a number of designated sites, designated both at a national and international level, within the Bristol Water Area, that are dependent on the fluvial environment to maintain the standard of their qualifying features. These include (but may not be limited to);

- Blagdon Lake SSSI
- Cheddar Reservoir SSSI
- The Severn Estuary Ramsar, SAC, SPA and SSSI;
- Bridgwater Bay SSSI
- Chew Valley Lake SPA and SSSI
- Avon Gorge Woodlands SAC
- Somerset Levels and Moors Ramsar and SPA.

4.5.1.6 Key Pressures

The key pressures in the catchment, particularly affecting ecological and biological status are:

- Discharges from sewage treatment works releasing ammonia, phosphates, and other pollutants into the water environment. The major discharges in the catchment are from sewage treatment works and these can lead to signs of nutrient enrichment at times of low flows, for example the River Axe and North Somerset Streams[38];
- Intermittent discharges from sewage system overflows (pollution incidents);
- Diffuse runoff from agricultural land into watercourses (increasing nitrates and to a lesser extent pesticides);
- Impact of historical release of nitrates into groundwater (nitrates continue to accumulate in water many years after the sources of nitrates are removed); and
- Surface water abstraction (public water supply and other abstractions impacting on low flows in the catchment).

4.5.1.7 Aquifer Productivity

The hydrogeological map of aquifer productivity in the Bristol Water study area is shown in Figure 4-8. A highly productive aquifer is distinguished from those that are only of importance or have no significant groundwater. Aquifer potential is identified using three divisions of geological formations[39];

- those in which intergranular flow in the saturated zone is dominant
- those in which flow is controlled by fissures or discontinuities
- less permeable formations including aquifers concealed at depth beneath covering layers.

[38] Environment Agency (2015). River Basin Management Plan Severn River Basin District.

[39] British Geological Survey (2020) Hydrogeology 625K digital hydrogeological map of the UK. Available at: Hydrogeology 625K digital hydrogeological map of the UK - British Geological Survey (bgs.ac.uk)

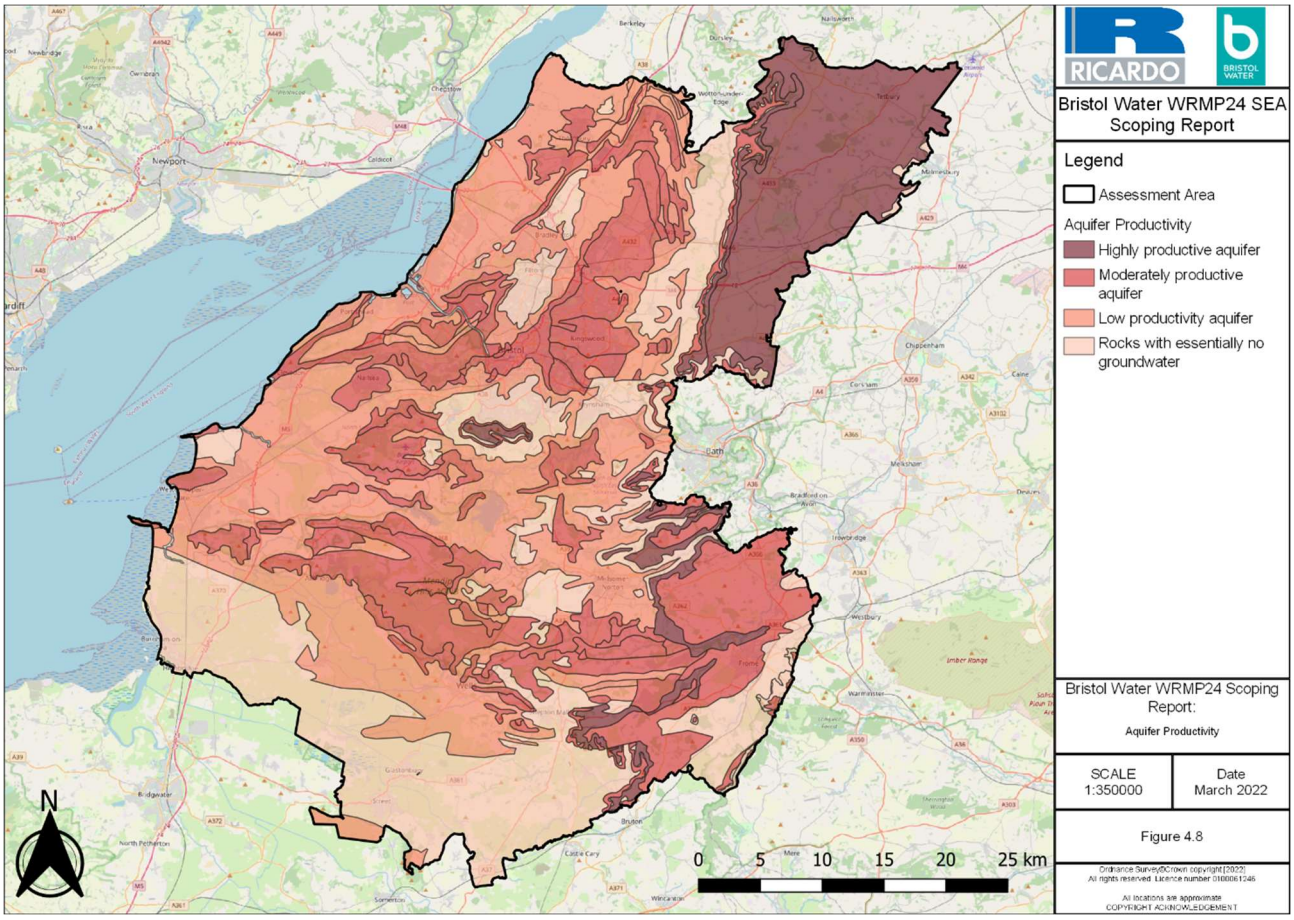


Figure 4-8: Aquifer Productivity

4.5.1.8 Water Framework Directive Classification

Since 2000, the health of waterbodies has been classified using a status based approach according to quality elements defined within Annex V of the WFD.

Surface water status is awarded on a 5 point scale (High, Good, Moderate, Poor, Bad), and overall scores are split into scores for ecological status and chemical status. For a waterbody to be in overall 'good' status, both ecological and chemical status must be at least 'good' (i.e. the lowest score out of ecological and chemical status also constitutes the waterbody's overall score). Ecological status classification considers the condition of biological quality elements (e.g. aquatic invertebrates, plants and fish), hydromorphological quality elements (the morphology of the habitat available). Chemical status considers the general chemical and physico-chemical quality elements (concentrations of supporting physico-chemical elements; and concentrations of specific pollutants).

The Bristol Water SEA area falls within two management catchments, Avon Bristol & Somerset North Streams and Somerset South and West. Table 4-5 shows the ecological and chemical status of waterbodies in these management catchments.

The WFD ecological classification for river catchments in the Bristol Water study area are shown in Figure 4-9.

Table 4-5: Ecological and Chemical status of waterbodies within the respective management catchment

Ecological Status or Potential						
Management Catchment	**Bad**	**Poor**	**Moderate**	**Good**	**High**	**Total**
Avon Bristol and Somerset North Streams	0 (0%)	22 (20%)	73 (68%)	13 (12%)	0 (0%)	108
Somerset South and West	1 (1%)	19 (17%)	85 (76%)	7 (6%)	0 (0%)	112

Chemical Status or Potential		
Management Catchment	**Bad**	**Good**
Avon Bristol and Somerset North Streams	108 (100%)	0 (0%)
Somerset South and West	112 (100%)	0 (0%)

4.5.1.9 Flood Risk

Flooding can arise from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources. The Environment Agency's Flood Risk Maps available on its website show areas at risk of flooding, including people, economic activity and the environment[40].

Flooding impacts on people, the economy and the environment. Areas at risk include Burnham-on-Sea, Weston-Super-Mare and Bristol (Severn)[41]. Approximately 156,000 people (14% of the study area's population) live along the coast[42] and flood risk is mitigated by flood defences where urban areas are present (i.e. Burnham-on-Sea, Clevedon, Portishead and Weston-Super-Mare). The Flood Risk areas in the Bristol Water study area are shown in Figure 4-10.

[40] Flood Risk Maps for Rivers and Sea in England - December 2019 (arcgis.com)

[41] Bristol (Severn) Flood Risk Area comprises the Royal Edward Docks, land surrounding the River Trym, Hazel Brook, the River Frome, the River Malago, Bristol Floating Dock, Siston Brook, Brislington Brook, Longmoor Brook, Pigeonhouse Stream and Warmley Brook.

[42] The Centre for Towns Data Tool: https://www.centrefortowns.org/datatool

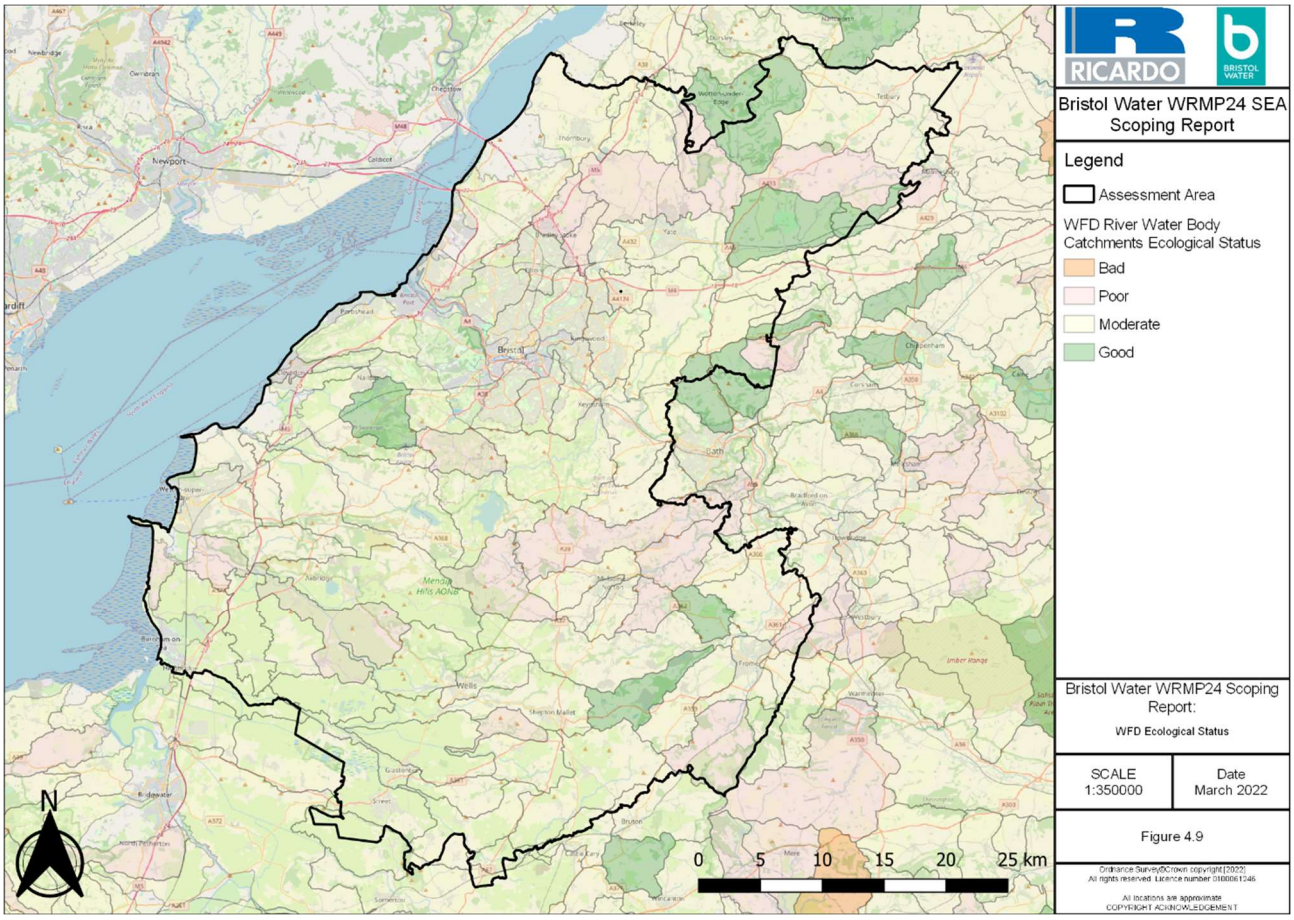


Figure 4-9: WFD River Water Body Catchments Ecological Status

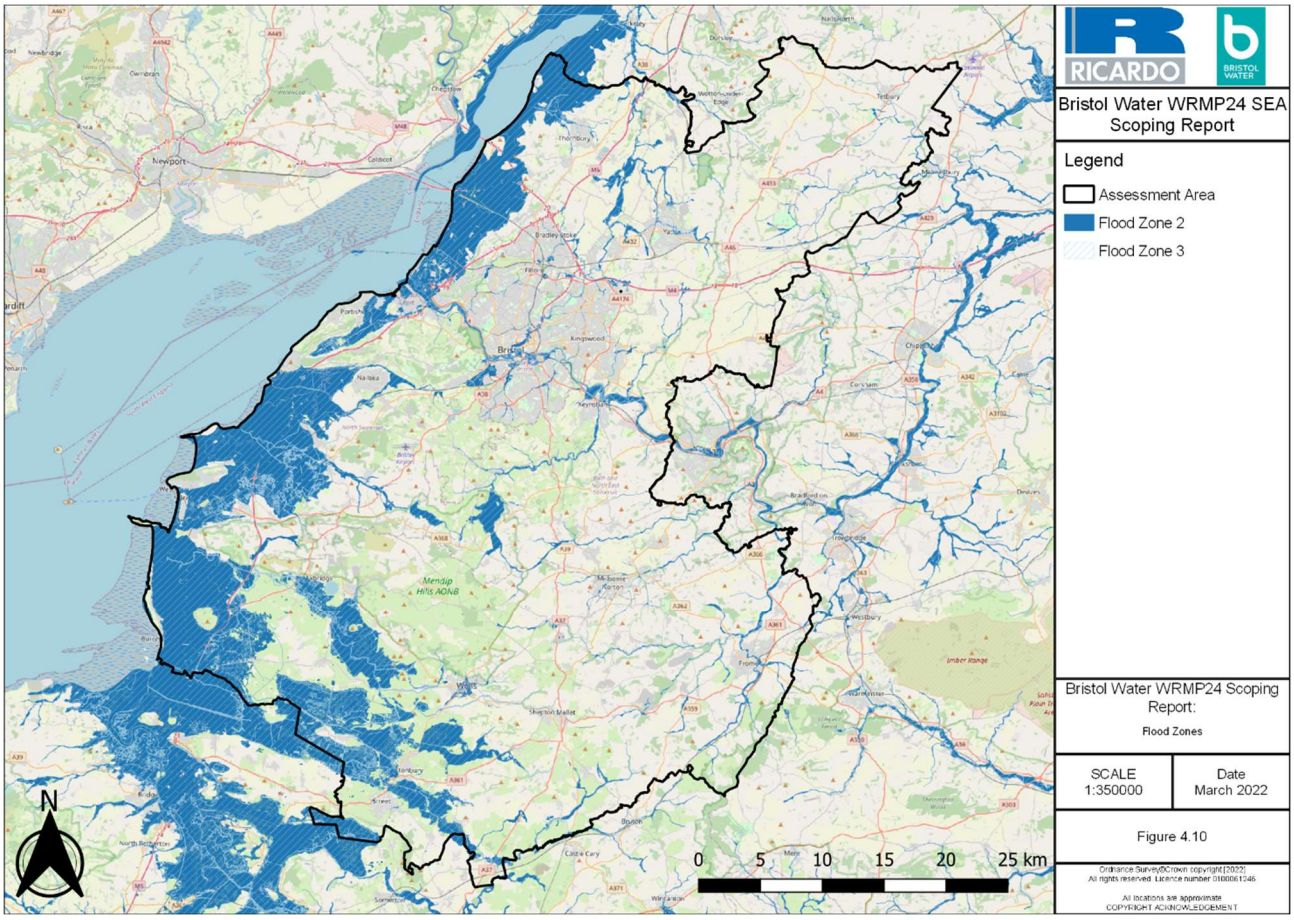


Figure 4-10: Flood Zones

4.5.2 Future Baseline

The national framework for water resources[43] highlights that if no action is taken between 2025 and 2050, around 3,435 million extra litres of water per day will be needed to address future pressures in England. Five regional groups have been set up each tasked with pulling together a regional plan to build resilience to a range of uncertainties and future scenarios. These include water companies and other water users. The south west region's (termed as the west country in the national framework) increased consumption, driven by population growth, is the largest driver of future water need by 2050. Increasing public water supply resilience to extreme droughts is also a significant component of additional water need, with increased protection for the environment also driving a notable component of the future water need. The West Country Water Resources Group (comprising Bristol Water, South West Water and Wessex Water) has a priority to make the region more efficient by achieving the ambitious reductions in customer water use and leakage, and to explore the potential to transfer water to other regions – particularly the neighbouring south east.

Originally, the WFD set a target of aiming to achieve at least 'good status' in all waterbodies by 2015. However, provided that certain conditions are satisfied, it was acknowledged that in some cases the achievement of good status may be delayed until 2021 or 2027. The primary objective in the short-term is to ensure no deterioration in status between status classes: the 2015 water body classification is the baseline from which deterioration between classes is assessed; no deterioration between status classes is permitted unless certain and specific conditions apply.

The UK Climate Change Risk Assessment (CCRA3) 2021 Evidence Report[44] draws together and interprets the evidence gathered CCRA regarding current and future threats and opportunities for the UK posed by the impacts of climate change up until 2100. Findings of all CCRA assessments include:

[43] Environment Agency (2020) Meeting our future water needs: a national framework for water resources. March 2020
[44] Defra (2016) The UK Climate Change Risk Assessment 2017 Evidence Report

- Changing climatic conditions and extreme events, including temperature change, water scarcity, wildfire, flooding, wind, and altered hydrology (including water scarcity, flooding and saline intrusion)
- Increasing pressure on the UK's water resources due to changes in hydrological conditions and regulatory requirements to maintain good ecological status
- Increases in water demand for irrigation of crops
- A reduction in public water supplies due to increasing periods of water scarcity
- Lower summer river flows across the UK due to warming and drying conditions
- An increase in precipitation in winter months due to a combination of greater depths and more frequent heavy rainfall events – suggesting larger volumes of runoff with potential negative impacts on flood risk and sewer overflows in urban environments
- Flash-flooding associated releases from combined sewer overflows (CSO) could in turn increase associated illnesses at the coast due to the varying occurrence of microbial pathogens in the marine environment.

4.5.3 Key Issues

- The need to further improve the quality of the region's river, estuarine and coastal waters taking into account WFD objectives and designated sites objectives (i.e. assessment against Common Standards Monitoring Guidance, where relevant).
- The need to maintain the quantity and quality of groundwater resources taking into account WFD objectives.
- The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change on surface waters and groundwaters.
- The need to ensure sustainable abstraction to protect the water environment and meet society's needs for a resilient water supply.
- The need to ensure that people understand the value of water.

4.6 SOIL, GEOLOGY AND LAND-USE

4.6.1 Baseline

4.6.1.1 Geology

The Bristol Water supply area is geologically diverse and includes a number of Principal Aquifers such as the chalk aquifer. Geological sites may be sensitive to changes in water levels and quality, pollution, and land use.

The Severn and Avon Vales to the west and north of Bristol is a low-lying, undulating flood plain of the Rivers Severn and the Warwickshire Avon and therefore contains alluvial soils. Much of the land adjacent to the rivers floods regularly in winter and there are relict wetland sites and features such as old pollards, wet pastures, ditches and tall hedges. Woodlands tend to be fairly small and are scattered throughout the area[45].

The area is underlain by Triassic and Jurassic soft rocks, mostly consisting of Mercia Mudstones and Liassic Clays, which form heavy loam or clay soils. Several outliers of Cotswold Jurassic Limestone occur at Bredon Hill and near Gloucester.

The Bristol, Avon Valleys and Ridges toward the north and east of the Bristol Water supply area are underlain by Carboniferous and Jurassic Limestone with mudstones, clays and alluvium in the valleys. Land use is varied and includes the urban area of Bristol, the River Avon gorge and alternating ridges and broad valleys with some steep wooded slopes and open rolling farmland.

The Mendip Hills to the south are underlain by Carboniferous limestone and support species-rich grasslands and woodlands on thin soils. The Mendips are predominantly pastoral with much of the plateau traditionally

[45] Natural England (2014) National Character Area Profiles (south west England). Available at: https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles#ncas-in-south-west-england (Accessed 7th February 2022).

being grazed by dairy cattle with beef or sheep on the escarpments. There has been significant horticultural use made of the lower slopes of the southern escarpment, particularly growing strawberries.

The Somerset Levels and Moors are located to the south of the Bristol Water supply area and are underlain by Triassic rocks, the most common of which is Mercia mudstone. It is the largest area of lowland wet grassland and associated wetland habitat remaining in Britain. The majority of the area is only a few metres above mean sea level and drains via a large network of ditches, rhynes and rivers. The area is mainly used for summer cattle grazing, often in conjunction with hay or silage production, although withy (willow) growing is also an important traditional activity.

Geological Conservation Review (GCR) Sites is the register of known nationally and internationally important Earth science (geological and geomorphological) sites in Great Britain[46]. The GCR underpins designation of Earth science features in SSSIs. There are 91 GCRs within the Bristol Water supply area (Figure 4-11).

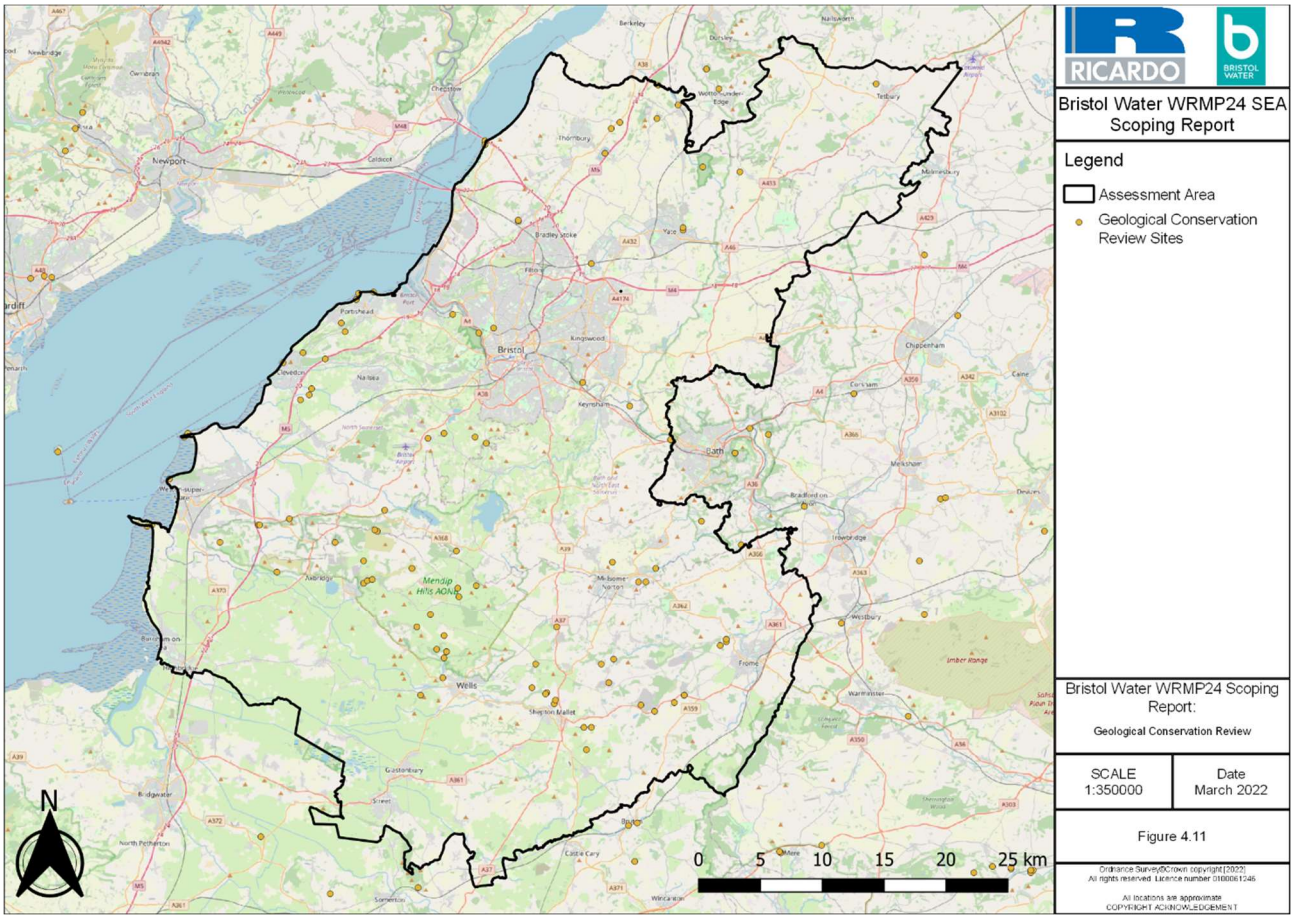


Figure 4-11: Geological Conservation Review Sites

4.6.1.2 Land Use

MHCLG data states that for both the South West and the UK, land that is not developed constitutes 93.2% and 91.5% respectively of total land area. The single largest land use in the South West is agriculture, constituting 68.5% of total land (this is considered to be land that is not developed). Within developed land, the single largest use is Transport & Utilities, which constitutes 3.8% of total land use[47].

Water equates to 4.9% of the total area of land within the West of England sub-region compared to 2.6% nationally and 2.0% regionally, with the Bristol City Council area having the largest proportion of land area within this land use typology (7.3%) and Bath & North East Somerset the lowest (1.9%).

Previously developed land (PDL) is defined as land that is or was occupied by a permanent structure (excluding agricultural or forestry buildings, landfills and parks) and associated fixed surface infrastructure. The proportion

[46] Geological Conservation Review. Available at: http://jncc.defra.gov.uk/page-2947 (Accessed 7th February 2022).
[47] Live tables on land use - GOV.UK (www.gov.uk)

of new development built on PDL in the West of England varies across the four local authorities that comprise the sub-region. For example, between 2013 and 2016, 86% of new developments were constructed on PDL in the Bristol City Council area compared to 60% nationally, which in part reflects the urban nature of the area and limited opportunities for greenfield development. In contrast, only 37 to 42% of new dwellings in North Somerset, Bath & North East Somerset and South Gloucestershire were constructed on PDL over the same period[48].

In 2012, the South West had a total of 2,360 ha of vacant or derelict PDL that was unused or may be available for redevelopment, which was one of the lowest compared to other English regions (Table 4-6). Of this, about 23% had some form of planning permission or was allocated for development in a local plan. Two thirds (1,800 ha) of PDL in the South West region was considered to be suitable for housing, with capacity for 29,910 homes[49].

Table 4-6 Previously Developed Land Available for Redevelopment (2012)

Region	All vacant and Derelict PDL (ha)	Total Area Suitable for Housing (ha)
South West	2,360	1,800
England	*45,120*	*22,681*

Adopted and emerging local plans of the local planning authorities that comprise the West of England seek to maximise development of brownfield sites in addition to greenfield land to meet housing and economic development needs.

4.6.1.3 Soils

The Agricultural Land Classification (ALC) was developed by Defra providing a means of assessing agricultural land suitability. The 'best and most versatile land' is generally defined as agricultural land that is Grades 1, 2 and 3a, with Grade 1 being the best (see Table 4-7).

In the Bristol Water supply area, there are vast areas of Grade 1 quality agricultural land located in the area between Bristol and Radstock, and around Nailsea. Poorer quality land can be found in the Mendips and to the southeast of the Bristol Water supply area. Generally, land in the Bristol Water supply area is classified as 'Good/Moderate' (Grade 3). Whilst the proportion of land classified as 'Poor' (Grade 4) or 'Very Poor' (Grade 5) is less relative to England, the percentage within Grade 1 ('Excellent') or Grade 2 ('Very Good') is also less. Figure 4-12shows the ALC of the Bristol Water supply area.

[48] Department for Communities and Local Government (2016) Land Use Change Statistics. Available at: https://www.gov.uk/government/statistical-data-sets/live-tables-on-land-use-change-statistics (Accessed 7th February 2022).
[49] University of the West of England, for the Campaign to Protect Rural England (2014) From Wasted Space to Living Spaces: The Availability of Brownfield Land for Housing Development in England.

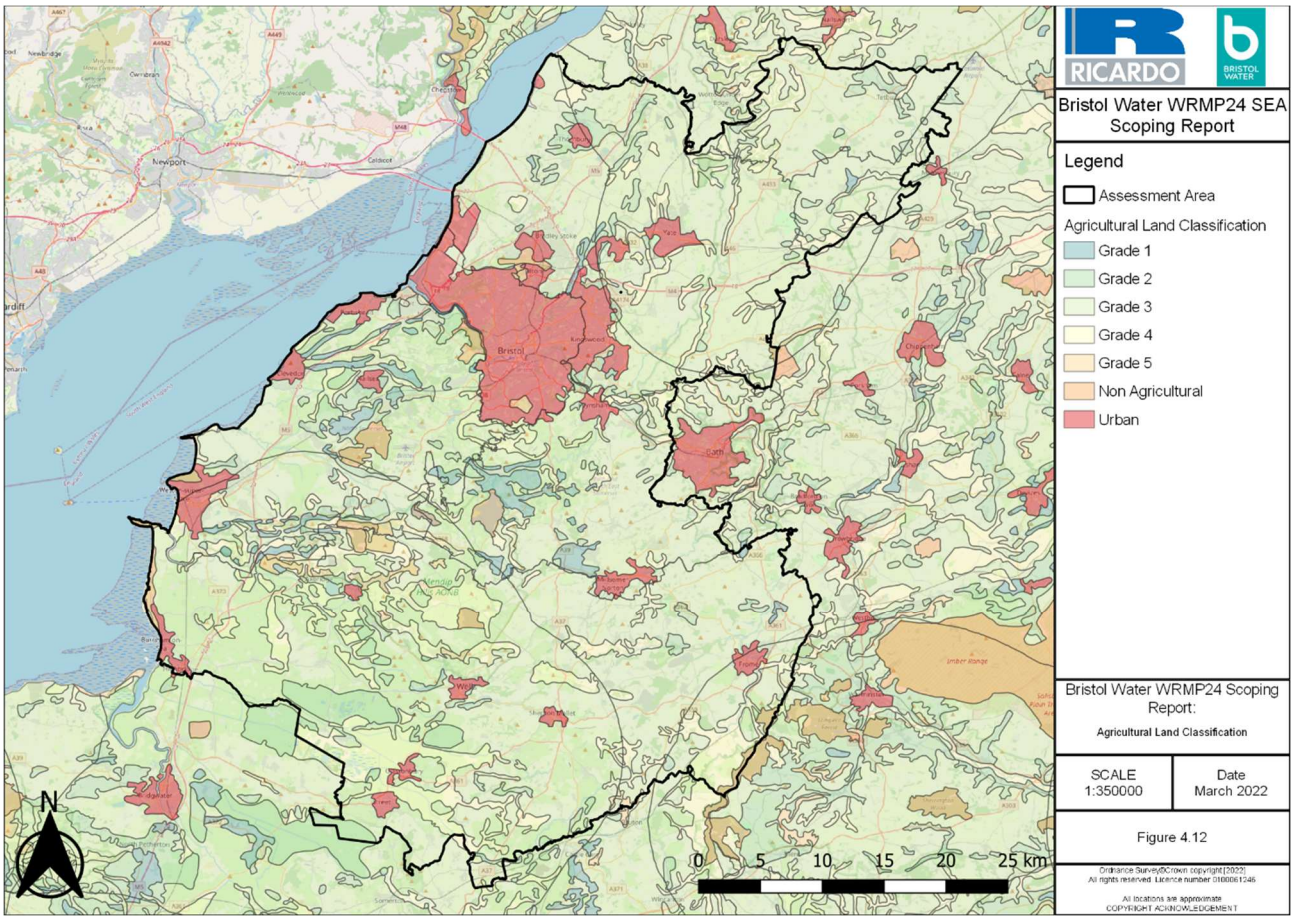


Figure 4-12: Agricultural Land Classifications

Table 4-7 Agricultural Land Quality for Bristol Water Supply Area and England (percentage land cover)

Agricultural Land Classification	Bristol Water Supply Area (%)	England (%)
Grade 1 - Excellent	1.7	2.7
Grade 2 – Very Good	7.6	14.2
Grade 3 – Good / Moderate	69.9	48.2
Grade 4 - Poor	13.7	14.1
Grade 5 - Very Poor	0.35	8.4
Non-Agricultural	2.66	5
Urban	4.17	7.3

4.6.2 Future Baseline

One of the core planning principles of the National Policy Planning Framework (NPPF) is to encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value[50]. The NPPF also places great importance with respect to Green Belt policy, the aim of which is to prevent urban sprawl by keeping land permanently open[50]. Green Belt serves five purposes: to check the unrestricted sprawl of large built-up areas; to prevent neighbouring towns merging into one another; to assist in safeguarding the countryside from encroachment; to preserve the setting and special character of historic towns; and to assist in urban regeneration, by encouraging the recycling of derelict and

[50] National Planning Policy Framework (publishing.service.gov.uk)

other urban land. Although the NPPF promotes a presumption in favour of sustainable development, this does not apply where proposed developments may affect European or other designated sites covered by specific policies.

The 25 Year Environment Plan (2018) runs alongside the Industrial Strategy (2017) and outlines the government's approach to safeguarding the environment and sustainable management of the economy. It introduces reforms to incentivised land management following Brexit. The plan details the Environmental Land Management scheme (ELMs); the evolution of the Common Agricultural Policy (CAP) following exit from the EU. The ELMs includes 3 new schemes designed to support the rural economy and the government's commitment to net zero emissions by 2050. The first of these schemes, the Sustainable Farming Incentive, will pay farmers to manage their land in an environmentally sustainable way. The scheme designates standards based on a feature e.g., hedgerows or grassland, and contains a series of actions required to meet the criteria. The scheme is currently being piloted but is due to launch in 2022. The Local Nature Recovery Scheme is intended to encourage collaboration between farmers and will pay for actions that support nature recovery which meet local environmental priorities. The Local Nature Recovery Scheme is due to launch in 2024. Finally, the Landscape Recovery scheme support long-term projects to recover landscape and ecosystems. Examples of projects include the restoration of peatland and salt marshes, large-scale tree planting and the re-wilding of landscapes where appropriate. Again, this scheme is due to come online in 2024.

4.6.3 Key Issues

The key sustainability issues arising from the baseline assessment for soil, geology and land use are:

- The need to protect geological features of importance and maintain and enhance soil function and health.
- The need to manage the land more holistically at the catchment level, benefitting landowners, other stakeholders, the environment and sustainability of natural resources (including water resources).
- The need to make use of previously developed land (brownfield land) and to reduce the prevalence of derelict land in the region.
- The need to minimise development on Green Belt land.

4.7 AIR AND CLIMATE

4.7.1 Baseline

4.7.1.1 Local Air Quality

WRMP options may involve the operation of abstraction and treatment facilities at a greater level of intensity and / or in locations where such operations do not normally take place, with the potential for negative effects, although generally only in the short term.

The local air quality baseline situation can be best described through reference to the local authorities that have declared Air Quality Management Areas (AQMA). A local authority declares an AQMA when UK National air quality objectives are unlikely to be met. The local authorities in the area which have declared an AQMA within their boundaries are illustrated in Figure 4-13. The majority of the AQMAs have been declared because of emissions from road transport. There are 5 AQMAs in total within the study area, alongside 2 *Air Quality Management Area Order (2018)* designations listed below;

- Bristol AQMA
- Keynsham AQMA
- Kingswood – Warmley AQMA
- Saltford AQMA
- Staple Hill AQMA
- Farrington Gurney Air Quality Management Area Order 2018
- Temple Cloud Air Quality Management Area Order 2018.

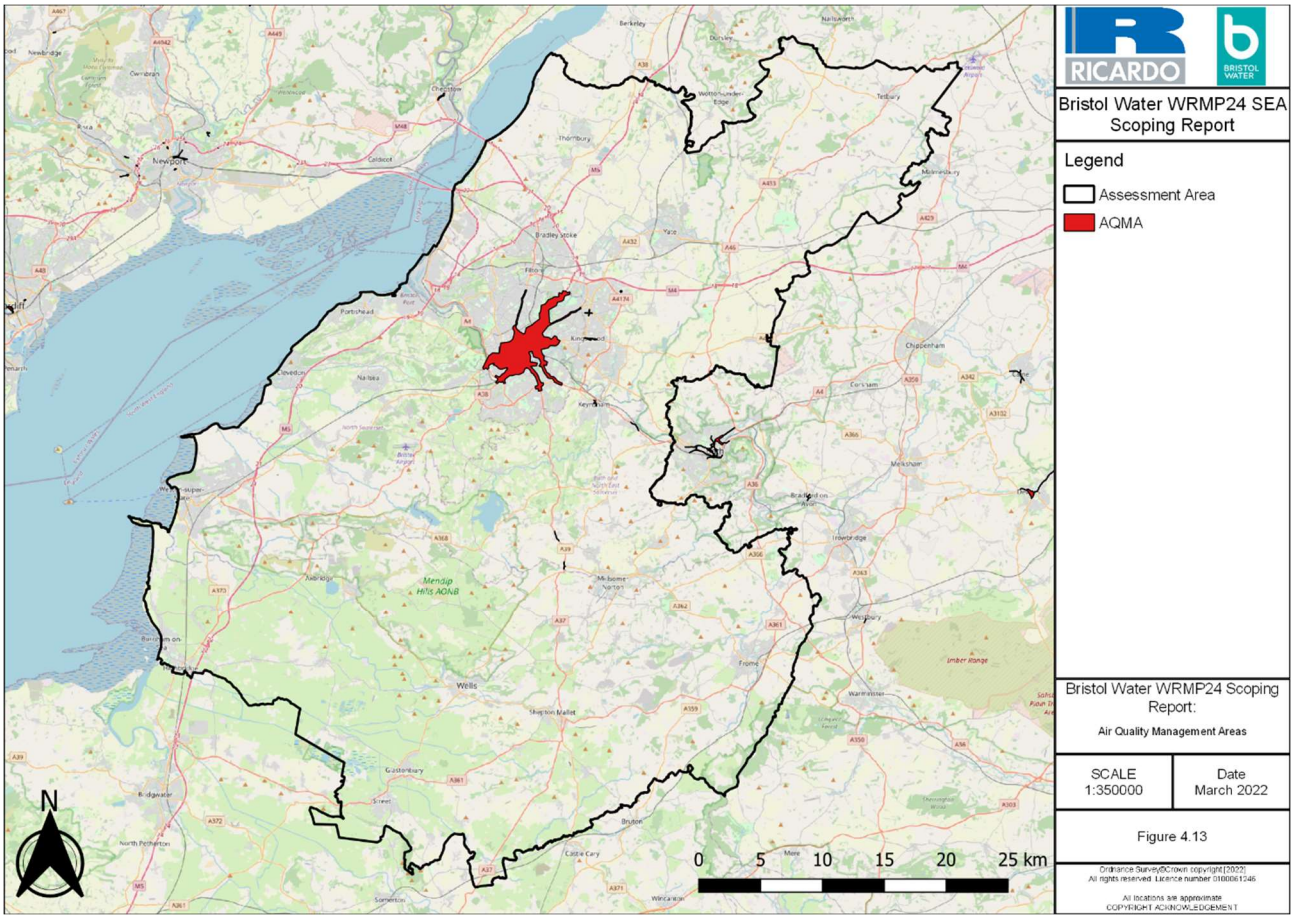


Figure 4-13: Air Quality Management Areas

The most recent Clean Air Strategy contains a set of objectives focused on the reduction of traffic emission impacts[51]. In April 2015, the Supreme Court ruled that the UK Government must redraft the national nitrogen dioxide (NO_2) air quality action plan, as well as 16 regional action plans, including Greater London, with the aim of ensuring that these areas reach compliance with legal NO_2 limits as soon as possible. In response, the Government published an updated plan in 2017 along with individual zone plans for the 37 zones identified as having air quality issues with NO_2, including the South West[52]. It is expected that the South West region will be compliant by 2022.

Air quality compliance data in 2019 for the South West and Bristol urban area zones is summarised below[53]:

- The limit value for hourly mean nitrogen dioxide (NO_2) was met but the limit value for annual mean NO_2 was exceeded (along with eleven other UK zones).
- The target values for ozone based on the maximum daily eight-hour mean, based on the AOT4040 statistic were met.
- The long-term objective for ozone, set for the protection of human health (maximum daily eight hour mean) was exceeded (along with all other UK zones);
- The limit value for annual and daily mean concentration of PM_{10} particulate matter was met compared to 2015 when it was not met.
- The target value for annual mean concentration of $PM_{2.5}$ particulate matter, the Stage 1 limit value (which came into force on 1 January 2015), and the Stage 2 limit value (which must be met by 2020) were met.

[51] Defra (2019) Clean Air Strategy 2019. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/cleanair-strategy-2019.pdf

[52] AQplans_UK0030.pdf (defra.gov.uk) (accessed 9 February 2022)

[53] DEFRA (2020) Annual Report 2020. Available at: Annual Report 2020 Issue 1 Online Viewer - Defra, UK

- The limit values for nickel, benzo[a]pyrene, sulphur dioxide, carbon monoxide, lead and benzene were met.

In recent years, several key air pollutants have shown major decreases in atmospheric concentrations across the UK, while others have remained constant[54]:

- Atmospheric concentrations of SO_2 have continued to decrease, in line with long-term trends across the UK. These reductions are a result of decreasing dependence on coal for energy and reductions in the sulphur content of fuels.
- Overall emissions of NO_x have decreased over the last 20 years, falling 57% between 2009 and 2019. Emissions from road transport also decreased by 31% between 2009 and 2019 as a result of tighter emissions standards for petrol and diesel cars. The monitored atmospheric concentrations did not show such a notable decrease, potentially due to continued high levels of NO_x emissions from older vehicles.
- Atmospheric concentrations of particulate matter ($PM_{2.5}$ and PM_{10}) decreases in emissions have been partially offset by increases in emissions from residential burning with $PM_{2.5}$ emissions increasing by 28% between 2009 and 2019.
- Carbon monoxide (CO) concentrations were reduced as a result of reductions in emissions from road transport, iron and steel production and the domestic sector.
- Levels of ozone have remained relatively constant since the mid-1990s, with a possible increase observed within significant annual variation as a consequence of primary NO emission reductions. The distribution of ozone across the UK shows highest concentrations over upland and rural locations with annual average concentrations of >60µg m^{-3} over rural areas in the UK including the South West[55].

4.7.1.2 Greenhouse Gases and Climate Change

Greenhouse gases including carbon dioxide (CO_2) emitted from human actions are a major contributor to climate change. The South West emitted approximately 7.5% of the UK's greenhouse gas emissions in 2019[56]. The amount of CO_2 emitted in the South West of England sub-region between 2015 and 2019 is shown in Table 4-8 and highlights that emissions have reduced since 2015 by 11% to 25.8 $MtCO_2$ in 2019, principally because of declines in emissions from the industry and commercial and domestic sectors. Domestic and transport sectors remained the largest source of CO_2 emissions in the region.

Table 4-8 End User Estimates of Carbon Emissions, South West England 2015-2019[57]

End User	2015	2016	2017	2018	2019
Industry ($MtCO_2$)	5.2	4.9	4.7	4.6	4.4
Commercial ($MtCO_2$)	3.3	2.8	2.6	2.6	2.3
Public sector ($MtCO_2$)	1.2	1.0	0.9	0.9	0.8
Domestic ($MtCO_2$)	8.8	8.3	7.8	7.8	7.6
Transport ($MtCO_2$)	11.2	11.6	11.7	11.5	11.4
LULUCF Net Emissions	0.6	0.7	0.8	0.8	0.8
Total	**29.1**	**27.9**	**26.9**	**26.6**	**25.8**
Per capita emissions (t)	*5.9*	*5.6*	*5.4*	*5.3*	*5.2*

[54] DEFRA (2021) Emissions of air pollutants in the UK – Summary. Available at: Emissions of air pollutants in the UK - Summary - GOV.UK (www.gov.uk)

[55] Air Quality Expert Group (2021) Ozone in the UK – recent trends and future projections. Available at: 2112200932_Ozone_in_the_UK_Recent_Trends_and_Future_Projections.pdf (defra.gov.uk)

[56] BEIS (2021) UK Local authority carbon dioxide emissions estimates 2019. Available at: UK local authority carbon dioxide emissions estimates 2019 (publishing.service.gov.uk)

[57] BEIS (2021) UK Local authority and regional carbon dioxide emissions national statistics: 2005 to 2019. Available at: UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019 - GOV.UK (www.gov.uk)

On a local authority (LA) basis within South West England, every LA experienced a reduction in per capita emissions between 2014 and 2019[58]. The average percentage decrease across the south west LAs was 17.5% across the six years. Exeter had the highest percentage decrease in emissions with 27.1%.

The predominant greenhouse gas of interest is carbon dioxide (CO_2). Bristol Water is a large user of energy due to the energy needed to treat and pump water. Mid-year 2021/22, 8.81kgCO_2e per customer were produced by Bristol Water, this rate of consumption is down from 19kgCO_{2e} in 2019/2020. Bristol Water's emissions figure per megalitre of water supplied was 375kg/CO_2e/Ml in 2016; this has been reduced to 277kgCO_2e/Ml by 2021[59]. In the last 6 years, carbon emissions from Bristol Water have fallen 53%.

Forecasts for future climate change are likely to influence processes within the hydrological cycle such as runoff and evapotranspiration. The impact of climate change on the water environment and water-related infrastructure is summarised in Table 4-9.

Table 4-9 Potential impact of climate change on the water environment and water-related infrastructure

Sector	*Impact*
Water Resources (i). Water Supply	*Reduction in yields, either in total or at certain times of the year.* *Increased evaporation losses from surface water stores* *Increased sediment and pollution runoff into watercourses.* *Increased risk of algal blooms and pollution in reservoirs.* *Increase in demands in summer months leading to increase in average and peak requirements.* *Increased pressure on treatment and distribution system.*
(ii). Water demand	*Increased requirements for agriculture.*
Flood Management	*Increased riverine storm occurrence and flood risk.* *Improvements and higher specifications required for flood defences, urban drainage and rainwater disposal.*
Water Quality Management	*Lowered water quality in lowland rivers, with implications for instream ecosystems and water abstractions.* *Altered potential for polluting incidents.* *Increased potential for combined sewer overflows due to an increase in extreme storm occurrences.*
Navigation	*Lower summer flows leading to reduced navigation opportunities in rivers and canals.*
Aquatic ecosystems	*Altered habitat potential, with species at their environmental margins most affected.*
Water-based recreation	*Impacts through changes in river flows and water quality.*

4.7.1.3 Adaptation to Climate Change

The UK Climate Change Risk Assessment (CCRA3) 2021 Evidence Report, which is required to conduct its assessment every five years,[60] draws together and interprets evidence gathered by CCRA regarding current and future threats and opportunities for the UK posed by the impacts of climate change up until 2100. Overall, the findings of the CCRA3 have identified eight priority areas for Government and other organisations to address within the next five years:

- Risks to the viability and diversity of terrestrial and freshwater habitats and species from multiple hazards

[58] BEIS (2021) UK Local authority and regional carbon dioxide emissions national statistics: 2005 to 2019. Available at: UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019 - GOV.UK (www.gov.uk)

[59] Bristol Water (2021) Annual Performance Report 2020/2021. Available at: BW_APR-2021_Web(Linked).pdf (hubspotusercontent30.net)

[60] Defra (2021) The UK Climate Change Risk Assessment 2021 Evidence Report. Available at: https://www.theccc.org.uk/wp-content/uploads/2021/07/Independent-Assessment-of-UK-Climate-Risk-Advice-to-Govt-for-CCRA3-CCC.pdf

- Risks to soil health from increased flooding and drought
- Risks to natural carbon stores and sequestration from multiple hazards leading to increased emissions
- Risks to crops, livestock and commercial trees from multiple hazards
- Risks to supply of food, goods and vital services due to climate-related collapse of supply chains and distribution networks
- Risks to people and the economy from climate-related failure of the power system
- Risks to human health, well-being and productivity from increased exposure to heat in homes and other buildings
- Multiple risks to the UK from climate change impacts overseas.

The UK Climate Change Act 2008 set legally binding targets for the UK to reduce greenhouse gas emissions by at least 80% by 2050, and CO_2 emissions by at least 26% by 2020, both set against a 1990 baseline. Under the requirements of the Act, the Government has set five year carbon budgets to set out a trajectory for emissions reductions to 2050. Budgets have been set covering the periods 2008-12, 2013-17, 2018-22, 2023-27 and 2028-32, equivalent to 22%, 28%, 34%, 50% and 57% reductions in carbon emissions compared to 1990 levels respectively. The National Adaptation Programme (NAP) is currently in its second period [2018-2023] which sets out the actions that government and others will take to adapt to climate change challenges in England. The NAP addresses climate risks which could affect the natural environment, critical infrastructure, communities and businesses and consequently explains associated actions and future responses on risks such as flooding and coastal change, risks to health from high temperatures, and risk of public water supply shortages[61].

4.7.2 Future Baseline

Government and international targets will require significant cuts in greenhouse gas emissions by 2027. The UK met the first and second carbon budgets with headrooms of 36 and 384 $MtCO_2e$ respectively and is currently projected to meet the third carbon budget with a headroom of around 26 $MtCO_2e$ (until 2022)[62]. Objectives are being achieved for many air pollutants (lead, benzene, 1,3-butadiene and carbon monoxide (CO)). However, measurements show that long-term reducing trends for NO_2[63] and PM_{10}[64] are flattening or even reversing at a number of locations, despite current policy measures.

Future climate change is projected (UKCP18) to cause a change in the seasonality of extremes through an extension of the convective season from summer to autumn, with increases in heavy rainfall intensity in the autumn. Although an overall summer drying trend is to be expected in the future, data from the Met Office's UK Climate Projections (UKCP18 [Local 2.2km] projections) suggest increases in heavy summer rainfall event intensity[65]. The UKCP18 also estimates that summers in central England are likely to be between 1.1°C to 5.8°C warmer,57% drier and 9% wetter[66].

Emissions of PM_{10} and $PM_{2.5}$ have been relatively stable since 2009. The Government's aim is to reduce emissions of $PM_{2.5}$ against the 2005 baseline by 30% by 2020, and 46% by 2030, emissions of NO2 against the 2005 baseline by 55% by 2020 and 73% by 2020 and to reduce emissions of sulphur dioxide against the 2005 baseline by 59% by 2020, increasing to 88% by 2030[67].

[61] DEFRA (2018) The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting. Available at: national-adaptation-programme-2018.pdf (publishing.service.gov.uk)

[62] DECC (2020) Updated energy and emissions projections 2019. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/931323/updated-energy-and-emissions-projections-2019.pdf

[63] Nitrogen dioxide

[64] Particulates with a diameter of 10µm or less

[65] Met Office (2021) UK Climate Projections: Headline Findings

[66] Defra, BEIS, the Met Office and the Environment Agency (2018) – UKCP18 Climate Change Over Land: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-infographicheadline-findings-land.pdf

[67] Defra (2019), Clean Air Strategy 2019

4.7.3 Key Issues

The key sustainability issues relevant to the WRMP and the SEA, arising from the analysis of the air quality and climate baseline are:

- the need to minimise emissions of pollutant gases and particulates and enhance air quality;
- the need to reduce the need to travel and promote sustainable modes of transport;
- the need to reduce greenhouse gas emissions arising from implementation of the WRMP;
- the need to take into account, and where possible adapt to, the potential effects of climate change;
- the need to increase environmental resilience to the effects of climate change.

4.8 CULTURAL HERITAGE

4.8.1 Baseline

Implementation of WRMP options could affect historic landscape character and historic structures associated with the water environment and the historical context of their setting. Archaeological remains are sensitive to changes in water quality, water levels (for example waterlogged deposits), pollution and land-use practices.

Heritage designations for the assessment area are shown in Figure 4-14.

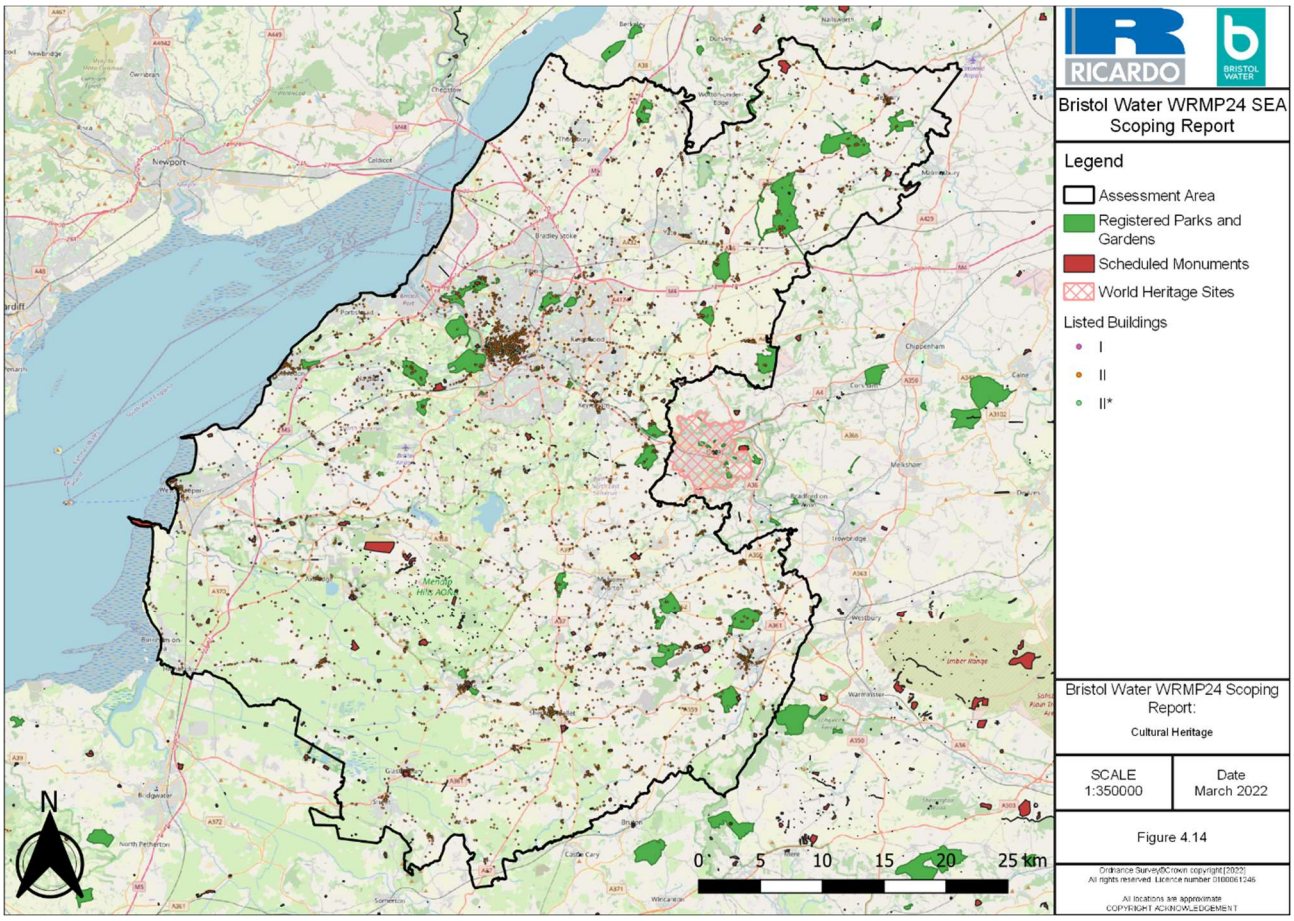


Figure 4-14: Cultural Heritage Sites

Nationally important archaeological sites are statutorily protected as Scheduled Monuments (SMs)[68]. There are currently around 20,000 entries in the Schedule for the UK[69]. As of 2021, within the southwest of England, there were 4 World Heritage Sites, 6,994 SMs, about 90,000 listed buildings and over 300 Registered Parks

[68] Nationally important archaeological sites designated under the Ancient Monuments and Archaeological Areas Act, 1979, www.culture.gov.uk/historic_environment/scheduled_ancient_monuments/

[69] English Heritage (2021) Heritage Indicators. Available at: Heritage Indicators 2021 (historicengland.org.uk)

and Gardens. There are approximately 10,331 listed buildings and 470 SMs located within the assessment area.

Historic England collects data on buildings at risk. There were 4,985 designated assets on the Heritage at Risk (HAR) register in 2021. 233 entries have been removed from the Register in 2021, with 130 being added[70]. Heritage assets such as SMs can be at risk from water abstraction or dewatering (previously 1.71% nationally). However, other assets, such as those composed of organic material and preserved in waterlogged or anaerobic conditions, are proportionately more at risk (e.g. palaeoenvironmental deposits). Of the 6,994 SMs in the South West, 50 (0.7%) are on the at Risk Register. 5.6% of the Registered Parks and Gardens in the South West are identified as at risk (17 out of 305)[71]. These HAR sites are showing in Figure 4-15.

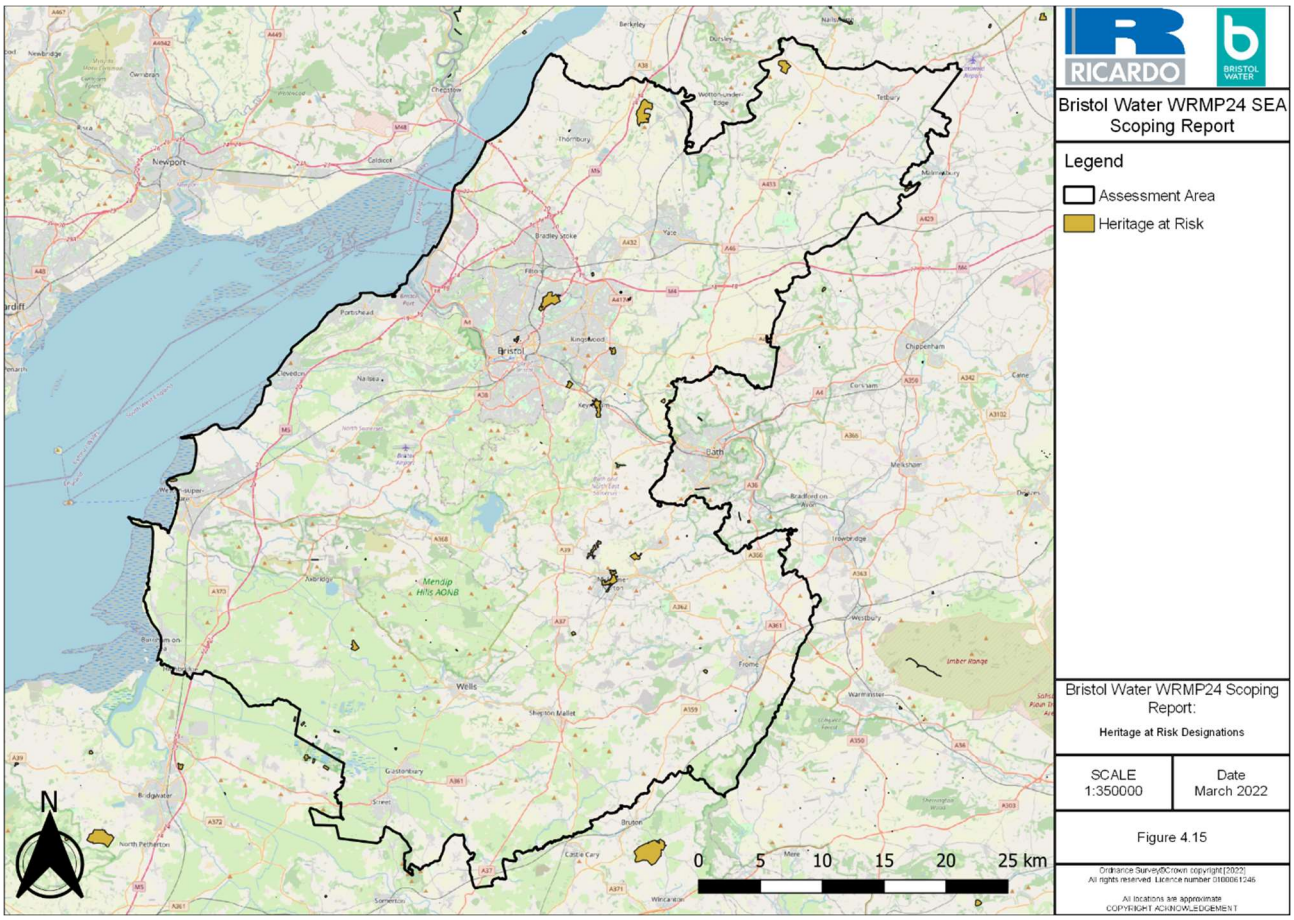


Figure 4-15: Heritage at Risk

Conservation Areas are usually designated by the local planning authority. They are designated for their special architectural and historic interest. Conservation Areas can include historic town and city centres, fishing and mining villages, 18th and 19th century suburbs, model housing estates, country houses set in historic parks and / or historic transport links and their environment. There are over 8,000 conservation areas in England. Individual LAs provide details on specific conservation areas. Conservation Areas are shown in Figure 4-16.

[70] Historic England (2021) Heritage at Risk: Latest Findings: https://historicengland.org.uk/advice/heritage-at-risk/findings/

[71] Historic England (2021): Heritage At Risk: The South West Register 2021

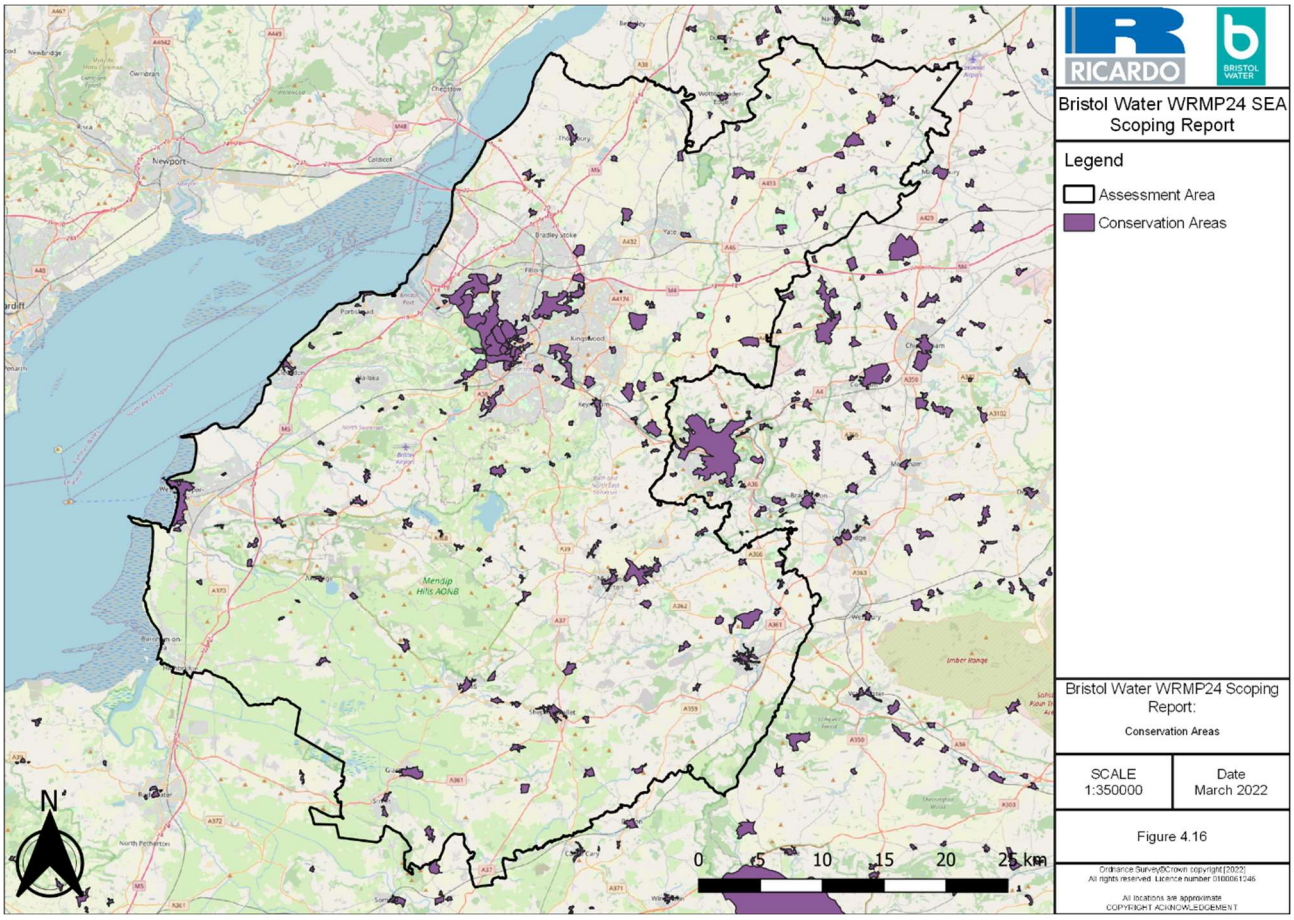


Figure 4-16: Conservation Areas

In relation to unknown assets, waterlogged conditions preserve waterlogged archaeology such as wooden artefacts and structures such as trackways. Remains may be located in water logged areas which are rain-fed or groundwater fed. If the latter, then clearly abstraction levels can be a critical factor in maintaining conditions in which preservation of the remains is viable. In addition, there are waterlogged deposits that are specifically associated with chalk; springs and their associated wetlands can contain important archaeological information, especially palaeo-environmental evidence. Such water-dependent heritage assets will be considered when assessing potential WRMP options.

4.8.2 Future Baseline

The NPPF was introduced in 2012 (updated 2019) and aimed to make the planning system less complex and more accessible, changing the emphasis on planning towards a presumption in favour of development. However, the NPPF states that *"Local Planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal […]. They should take this into account when considering the impact of a proposal on a heritage asset, to avoid or minimise any conflict between the heritage asset's conservation and any aspect of the proposal."*[72].

Climate change could have variable impacts on heritage assets in the future. Some types of assets and landscapes have already experienced and survived significant climatic changes in the past and may demonstrate considerable resilience in the face of future climate change. For example, global warming is likely to encourage fungal and plant growth and insect infestation which could impact historic building materials with temperate fluctuations also potentially increasing structural problems[73]. However, many more historic assets are potentially at risk from the direct impacts of future climate change[74].

[72] MHCLG (2021) National Planning Policy Framework.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

[73] Historic England (2021) What Are the Effects of Climate Change on the Historic Environment? Available at: What Are the Effects of Climate Change on the Historic Environment? | Historic England

[74] English Heritage (2010) Climate Change and the Historic Environment

4.8.3 Key Issues

- The need to conserve or enhance sites of archaeological importance and cultural heritage interest, and their setting, particularly those which are sensitive to the water environment.
- The need to protect water-dependent heritage sites during drought conditions.

4.9 LANDSCAPE AND VISUAL AMENITY

4.9.1 Baseline

Landscape character[75] can be defined as a 'distinct and recognisable pattern of elements, or characteristics in the landscape that make one landscape different from another, rather than better or worse'. Some landscapes are special because they have a particular amenity value, such as those designated as Areas of Outstanding Natural Beauty (AONB). Others may have an intrinsic value as good examples or be the only remaining examples of a particular landscape type. Some landscapes are more sensitive to development whereas others have a greater capacity to accommodate development. Assessments of landscape character and landscape sensitivity enable decisions to be made about the most suitable location of development to minimise impacts on landscapes.

Implementation of WRMP options has the potential to influence landscape and visual amenity, for example through effects arising from construction of new infrastructure, raising of reservoir levels or the abstraction of water affecting existing water levels in rivers.

AONBs and National Character Areas (NCAs) are shown on Figure 4-17.

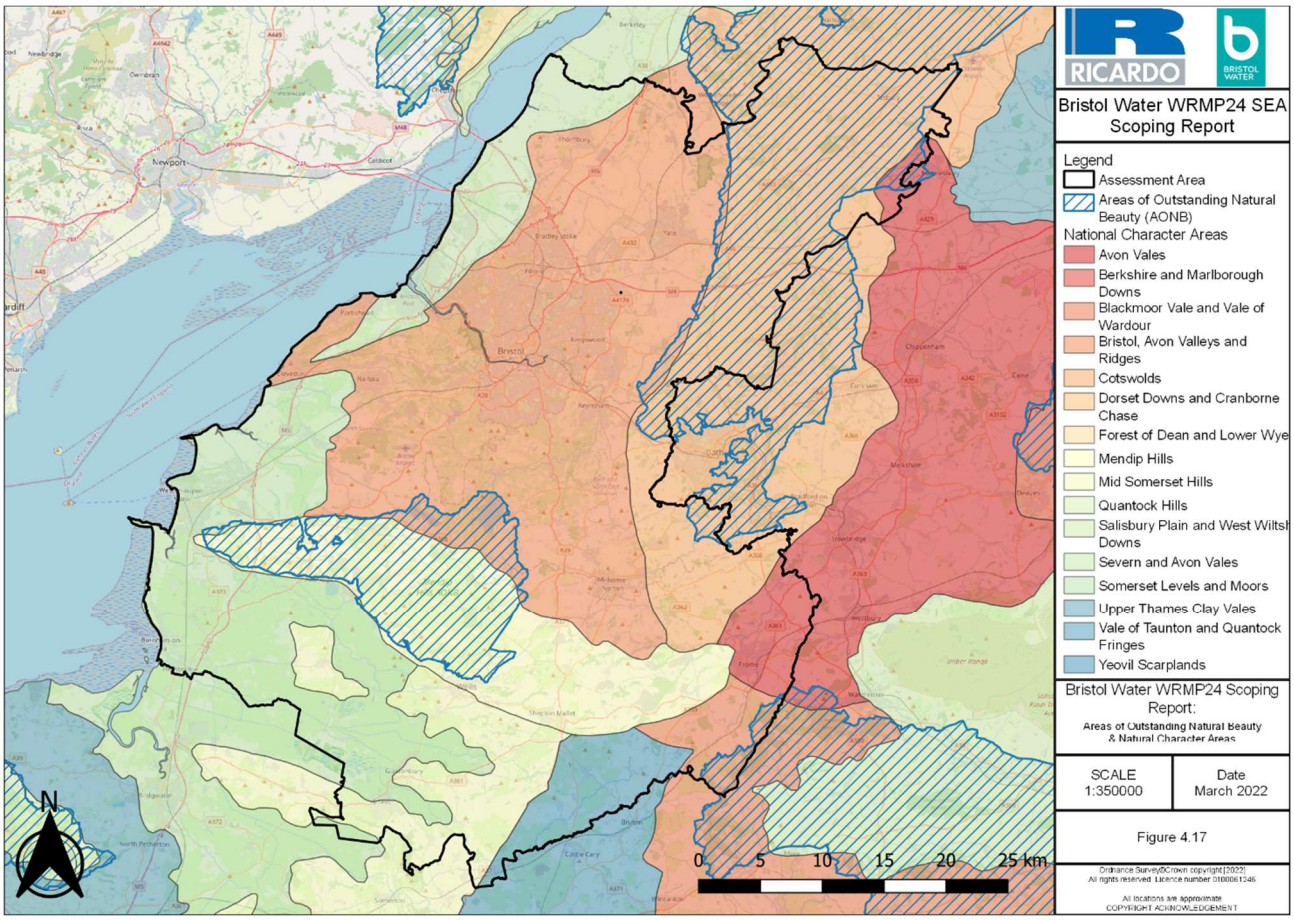


Figure 4-17: AONBs and NCAs

[75] Natural England (2014) An approach to Landscape Character Assessment. landscape-character-assessment.pdf (publishing.service.gov.uk)

4.9.1.1 Nationally Designated Sites

AONBs are defined as 'precious landscapes whose distinctive character and natural beauty are so outstanding that it is in the nation's interest to safeguard them'[76]. They are designated under the National Parks and Access to the Countryside Act, 1949, strengthened by the Countryside and Rights of Way Act, 2000. The primary purpose of the AONB is 'to conserve and enhance the natural beauty of the landscape.' There are 3 AONBs wholly or partially within the study area (Cotswolds AONB; Mendip Hills AONB; and Cranborne Chase and West Wiltshire Downs AONB).

4.9.1.2 Green Belt

The main characteristics of Green Belt are its openness and permanence. The main aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open. The Green Belt therefore aims to check the unrestricted sprawl of large built-up areas; prevent neighbouring towns merging into one another; assist in safeguarding the countryside from encroachment; preserve the setting and special character of historic towns; and assist in urban regeneration while encouraging the recycling of derelict and other urban land.

Large areas of the Bristol Water Supply Area are covered by the Bristol and Bath Green Belt, which surrounds both of these cities. The Bristol and Bath Green Belt stretches from Clevedon in the west to Trowbridge in the east, from Blagdon in the south to Thornbury in the North.

4.9.1.3 Natural England National Character Areas and Heritage Coasts

Natural England National Character Areas also take account of landscape (also referred to in the Biodiversity, Flora and Fauna topic; Section 4.2). These Landscape Character Areas (LCAs) are shown geographically in Figure 4-17 with key features summarised below in Table 4-10[77]. There are no Heritage Coast areas in Bristol Water's SEA assessment area.

Table 4-10 Landscape Character Areas: Landscape Characteristics

Area	Characteristics
Severn and Avon Vales	• Diverse range of flat and gently undulating landscapes, united by broad river valley character; • Riverside landscapes with little woodland, often very open. Variety of land uses from small pasture fields and commons in the west to intensive agriculture in the east; • Distinct and contrasting vales: Evesham, Berkeley, Gloucester, Leadon, Avon; • Many ancient market towns and large villages along the rivers; • Nucleated villages with timber frame and brick buildings; • Prominent views of hills - such as the Cotswolds, Bredon and the Malverns - at the edges of the character area.
Bristol, Avon Valleys and Ridges	• A landscape of very mixed landform, geology and settlement pattern, strongly influenced by the Avon Valley, Bristol at its centre and by its industrial history; • Low-lying, shallow valleys which contrast with limestone ridges and scarps; • Frequent large villages, small towns and major conurbations but also undisturbed rural areas; • Wooded scarps - with ancient woodland - and high, open, downland ridges; • Legacy of coal industry evident in tips, settlement patterns and reclaimed areas; • Waterside mills and other features of former rural industries; • Frequent parks, mansions and manor houses.
Mendip Hills	• A chain of prominent limestone hills extending inland from the coast and rising up sharply from surrounding lowlands; • An open, largely treeless, limestone plateau with karst features, cave systems, dry stone walls and sparse settlement; • Dramatic gorges, cliffs and escarpment slopes around the plateau;

[76] [ARCHIVED CONTENT] Landscape and scenery - Areas of Outstanding Natural Beauty in England : Enjoy England (nationalarchives.gov.uk)

[77] Natural England (2014). National Character Areas: South West, available at: https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles#ncas-in-south-west-england

	• A sharp contrast between the open plateau and steep escarpment slopes of the karst landscape and the more complex, gentler landforms in the east; • Many industrial archaeological sites reflecting the lead, coal and cloth industries; • Perpendicular church towers; • Country houses in the east with wooded parks; • Buildings in local stone with pantile roofs: stones include grey limestone, reddish dolomitic limestone and grey or honey-coloured oolitic limestone; • Outstanding prehistoric ritual landscape
Somerset Levels and Moors/ Mid Somerset Hills	• Flat, open landscape of wet pasture, arable and wetland divided up by wet ditches or 'rhynes'; • Absence of dispersed farmsteads or any buildings on levels and moors. Nucleated settlements on ridges/islands; • Surrounded, and divided up, by low hills, ridges and islands which form distinctive skylines; • Peat working and nature reserves contrasting with the rectilinear planned landscape of the Moors; • Dramatic and prominent hills such as Brent Knoll, the Isle of Avalon and Barrow Mump, rising above the Levels and Moors; • Sparse tree cover on Levels and Moors contrasting with woodland, hedges and orchards of surrounding hills; • Sparsely populated Moors but settlements common on hills, ridges and islands; • Historic landscape strongly evident in features ranging from prehistoric trackways and lake villages to post-medieval enclosures and peat working; • International nature-conservation significance for wetland, waders and waterfowl; • Narrow dune belt fringing Bridgwater Bay; • Raised rivers and levees, with main roads and causeways flanked by houses. Flooding in winter over large areas.
Cotswolds	• Defined by its underlying geology: a dramatic scarp rising above adjacent lowlands with steep combes, scarp foot villages and beech woodlands; • Rolling, open, high wold plateaux moulded by physical and human influences, with arable and large blocks of woodland, divided up by small, narrow valleys; • Incised landscapes with deep wide valleys; • Flat, open dip slope landscape with extensive arable farmland; • Prominent outliers within the lowlands; • Honey-coloured Cotswold stone in walls, houses and churches; • Attractive stone villages with a unity of design and materials.

4.9.1.4 Tranquillity Areas

'Tranquillity' can be defined as the quality of calm that is experienced by people in places full of the sights and sounds of nature. The Campaign for Rural England (CPRE) developed tranquillity mapping for England to identify areas that are either disturbed or undisturbed by urban areas (towns and cities), traffic (road, rail and airports), power stations, pylons, power lines and open-cast mines[78]. Effects on tranquil areas will be considered when assessing the WMRP options.

4.9.2 Future Baseline

The intrinsic planning policy in the updated 2019 NPPF is to enable and facilitate growth whilst aiming to protect the character of areas. The 2019 NPPF re-iterates that more weight should be given to conserving landscape and scenic beauty in National Parks and AONBs which have the highest status of protection in relation to landscape and scenic beauty. The NPPF identifies that planning permission should be refused for

[78] CPRE tranquillity mapping for England: http://www.cpre.org.uk/what-we-do/countryside/tranquil-places

major developments in these designated areas except in exceptional circumstances and where it can be demonstrated that they are in the public interest.

It states that planning policies and decisions should contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes while recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services. The policy is clear that appropriate housing development is required and planning policies should identify opportunities for villages to grow and thrive.

With the pressures for housing in parts of the assessment area, there are likely to be some threats to visual amenity more broadly beyond designated landscape areas (including within Green Belt). Climate change and land use change (e.g. due to agricultural reform associated with the UK's exit from the EU and Common Agricultural Policy) may also, in the longer term, lead to changes to landscape character.

4.9.3 Key Issues Relevant to the WRMP

- The need to protect and improve the natural beauty of the area's AONBs and other areas of natural beauty.
- The need to protect and improve the character of landscapes and townscapes.
- It is envisaged that landscape and designated sites will be maintained and enhanced for the enjoyment of the public.

4.10 INTER-RELATIONSHIPS

It is noted that there are inter-relationships between SEA topics. Inter-relationships that result in changes to individual effects are considered through the assessment of synergistic effects.

5. DRAFT SEA OBJECTIVES AND PROPOSED ASSESSMENT FRAMEWORK

5.1 OVERVIEW

This section outlines the assessments that will be carried out as part of the SEA to identify the environmental and social effects of the potential options to be considered for the Bristol Water WRMP.

The environmental and social assessment of the WRMP options will be 'objectives led'. Establishing assessment objectives is a recognised way of considering the environmental and social effects of a plan and comparing the effects of possible alternatives. SEA objectives are often derived from environmental and social objectives that are already established in UK law, international, national or local policy, or other plans and programmes. The other source of information is environmental conditions or issues that arise from review of baseline information.

An assessment framework of objectives has been developed, based on:

- The key policy messages and environmental and social protection objectives identified in the review of policies and plans (See Section 3 and Appendix A). It is important that the assessment takes these objectives into account as this will help to highlight any area where the WRMP will help or hinder the achievement of the objectives of other plans (either at a local, national or international scale).
- The current state of the environment in the assessment area and the key environmental issues identified (see Section 0).

In October 2020, the group of water companies involved in developing Strategic Regional Water Resource Options (SROs) in the RAPID gateway process (known as the All Company Working Group - ACWG), published guidance[79] for environmental assessment methods for SROs which is aligned to the WRPG to increase the consistency of environmental assessment. This is supplemented with the ACWG Strategic Environmental Assessment: Core Objective Identification report (October 2020) which identifies appropriate

79 Mott MacDonald Limited (2020). All Companies Working Group WRMP environmental assessment guidance and applicability with SROs. Published October 2020

SEA objectives following a review of water company approaches to SEA. The SEA objectives and indicator questions in this scoping report have been developed taking into account the ACWG SEA objectives.

Draft SEA objectives are set out in Table 5-1 alongside the key messages identified from the review of policies, plans and programmes and the key issues from the review of baseline information. The following sections describe how Bristol Water will use these SEA objectives in the assessment of the environmental and social effects of the potential WRMP options. By assessing each option against the objectives, it is more apparent where measures might have an adverse or beneficial effect, and where measures could be developed to reduce potential adverse impacts, whilst enhancing beneficial ones.

Within the Biodiversity, Flora and Fauna topic, and the Water topic, objectives have been included that will integrate the findings of the HRA, BNG, NCA and WFD assessments in the SEA.

The WRMP options may have effects outside of the Bristol Water geographical region (see Section 4.1.2). Where this is the case the effects of the option in its entirety will be considered in the appraisal against the SEA objectives and documented in the Environmental Report.

As well as the overall SEA objectives, a number of key questions have been developed for each SEA topic. These key questions will prompt the assessment and ensure it considers all the relevant aspects. The assessment of each WRMP option will require the following information:

- Details of each option;
- Construction (where applicable) and operational / implementation details;
- Benefits to Bristol Water's deployable output;
- Key elements of the baseline environment, such as location of designated sites, priority habitats and species, landscape areas or heritage assets etc.

Table 5-1 SEA Objectives and Assessment Approach

SEA Topic	Key Messages and Objectives	Baseline – key issues	SEA objective	Key questions
Biodiversity, flora and fauna	Conservation and enhancement of the natural environment and of biodiversity, particularly internationally and nationally designated sites and priority habitats and species (NERC act Section 42 for England), whilst taking into account future climate change. Promote a catchment-wide approach to water use to ensure better protection of biodiversity. To achieve favourable condition for priority habitats and species in particular designated sites. Avoidance of activities likely to cause irreversible damage to natural heritage. Support well-functioning ecosystems, respect environmental limits and capacities, and maintain / enhance coherent ecological networks, including provision for fish passage and connectivity for migratory / mobile species. Strengthen the connections between people and nature and realise the value of biodiversity. Protection, conservation and enhancement of natural capital. Ecosystem services from natural capital contribute to the economy and therefore should be protected and, where possible, enhanced.	The need to protect or enhance the region's biodiversity, particularly protected sites designated for nature conservation. The need to avoid activities likely to cause irreversible damage to natural heritage. The need to take opportunities to improve and not reduce connectivity between fragmented habitats. The need to control the spread of Invasive Non-Native Species (INNS). The need to recognise the importance of allowing wildlife to adapt to climate change. The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the ecosystem services. The need to deliver an increase in the Bristol Water biodiversity index.	1.1 To protect and enhance sites that are designated, both nationally and internationally, for their nature conservation value.	Will the option protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated sites such as SACs, SPAs, Ramsar sites and SSSIs?) Will it affect HRA compliance?
			1.2 To avoid a reduction in natural capital assets, and to provide opportunities for biodiversity net gain, where possible.	Will the option provide opportunities for new habitat creation or restoration and link existing habitats as part of the development progress? Will the option contribute to improvements to Bristol Water's Biodiversity Index? Does it protect, conserve and enhance biodiversity, natural capital and the ecosystem services the natural capital provides? Will it maintain and enhance the green infrastructure network and the biodiversity it supports?
			1.3 To protect priority habitats and species	Will the option protect and enhance non-designated sites and local biodiversity? Will it affect WFD compliance e.g. good ecological potential / status?

SEA Topic	Key Messages and Objectives	Baseline – key issues	SEA objective	Key questions
	Avoidance of activities likely to cause the spread of Invasive Non-Native Species (INNS). A need to protect the green infrastructure network.			Will the option protect, and enhance where appropriate, coastal and marine habitats and species? Will the option affect a priority habitat on the priority habitat inventory?
			1.4 To avoid further spread of invasive, non-native species	Is there an opportunity to improve biodiversity value through removal of INNS? Will the option prevent the spread / introduction of invasive non-native species?
Soil, geology and land use	Protect and enhance and diversity of geology (including geological SSSIs) and soils, including geomorphology and geomorphological processes which can be lost or damaged by insensitive development. Ensure that soils will be protected and managed to optimise the varied functions that soils perform for society (e.g. supporting agriculture and forestry, protecting cultural heritage, supporting biodiversity, as a platform for construction), in keeping with the principles of sustainable development. Promote catchment-wide approach to land management by relevant stakeholders, in order to benefit natural resources, reduce pollution and develop resilience to climate change.	The need to protect geological features of importance and maintain and enhance soil function and health. The need to manage the land more holistically at the catchment level, benefitting landowners, other stakeholders, the environment and sustainability of natural resources (including water resources). The need to make use of previously developed land (brownfield land) and to reduce the prevalence of derelict land in the region. The need to minimise development on Green Belt land.	2.1 To ensure the appropriate and efficient use of land and protect and enhance local geomorphology, soil quality and geodiversity.	Will it promote the efficient use of land? Will the option utilise previously developed land? Will the option protect and enhance protected sites designated for their geological interest and wider geodiversity? Will the option maintain the quality of Best and Most Versatile Agricultural Land? Will the option minimise conflict with existing land use patterns?

SEA Topic	Key Messages and Objectives	Baseline – key issues	SEA objective	Key questions
	Promote mixed use developments, and encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions. Encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value.			Will the option minimise land contamination?
Water	Promote sustainable water resource management, including a reduction in water consumption. Maintain and improve water quality and water resources (surface waters, groundwater and bathing water). Meet protected area targets related to water quality and flow in the Water Framework Directive. Expand the scope of water quality protection measures to all waters, surface waters and groundwater. Improve the quality of the water environment and the ecology which it supports, and continue to provide high levels of drinking water quality. Ensure appropriate management of abstractions and protect flow and level variability across the full range of regimes from low to high conditions. Prevent deterioration of water quality status.	The need to further improve the quality of the region's river, estuarine and coastal waters taking into account WFD objectives and designated sites objectives (i.e. assessment against Common Standards Monitoring Guidance, where relevant). The need to maintain the quantity and quality of groundwater resources taking into account WFD objectives. The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change on surface waters and groundwaters. The need to ensure sustainable abstraction to protect the water environment and meet society's needs for a resilient water supply.	3.1 To protect the quality of surface water and groundwaters	Will the option protect and improve surface, estuarine and coastal water quality? Will the option protect and improve groundwater quality?
			3.2 To protect flows and resource levels of surface waters and groundwaters	Will the option reduce the demand for water resources? Will the option result in changes to groundwater levels? Will the option result in changes to river flows?
			3.3 To reduce or manage flood risk whilst accounting for climate change	Will the option have the potential to cause or exacerbate flooding in the catchment area now or in the future? Will the option have the potential to help alleviate flooding in the catchment area now or in the future?

SEA Topic	Key Messages and Objectives	Baseline – key issues	SEA objective	Key questions
	Balance the abstraction of water for supply with the other functions and services the water environment performs or provides. Steer new development to areas with the lowest probability of flooding and manage any residual flood risk, taking account of the impacts of climate change. Promote measures to enable and sustain long term improvement in water efficiency. Promote a catchment based approach to the management and work with local stakeholders to deliver catchment based solutions to water quantity and quality. Develop a resilient and flexible water management approach to cope with changing climate, population and economic conditions. Reduce flood risk to people, residential and non-residential properties, community facilities and key transport links, as well as designated nature conservation sites and heritage assets and landscapes of value. Reduce risk of flooding by changing operation of reservoirs.	The need to ensure that people understand the value of water.		Will the option be at risk of flooding now or in the future?
			3.4 To meet WFD objectives	Will the option prevent the deterioration of Water Framework Directive (WFD) waterbody status (or potential)? Will the option ensure a new activity or new physical modification does not prevent the future achievement of good status for a water body?
Air Quality	Reduce the effects of air pollution on ecosystems. Improve overall air quality. Achieve and sustain compliance with and contribute towards national	The need to minimise emissions of pollutant gases and particulates and enhance air quality;	4.1 To protect and enhance air quality	Will it reduce or minimise air pollutant emissions?

SEA Topic	Key Messages and Objectives	Baseline – key issues	SEA objective	Key questions
	objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas.	The need to reduce the need to travel and promote sustainable modes of transport.		Will it increase emissions to air in areas sensitive to emissions (i.e. in proximity to an AQMA or sensitive habitat?)
Climate Change	Reduce greenhouse gas emissions. Targets include: reduce the UK's greenhouse gas emissions by at least 80% (relative to 1990 levels) by 2050. Minimise energy consumption, support the use of sustainable / renewable energy and improve resilience to climate change. Build in adaptation to climate change to future planning and consider the level of urgency of associated risks of climate change impacts accordingly. Need for adaptive measures to respond to likely climate change impacts on water supply and demand.	The need to reduce the need to travel and promote sustainable modes of transport; The need to reduce greenhouse gas emissions arising from implementation of the WRMP; The need to take into account, and where possible adapt to, the potential effects of climate change; The need to increase environmental resilience to the effects of climate change.	5.1 To minimise greenhouse gas emissions and embodied carbon	Will the option reduce or minimise greenhouse gas emissions? Is there potential for the option to incorporate climate mitigation measures to reduce its carbon footprint, such as lower embodied carbon or incorporating renewable energy? Will the option have new infrastructure that is energy efficient or make use of renewable energy sources?
			5.2 To adapt and improve resilience to the threats of climate change	Is the option infrastructure vulnerable to climate change? Will the option reduce vulnerability to the effects of climate change by appropriate adaptation? Will the option increase environmental resilience to the effects of climate change?
Human Health and Socio-economics	Water resources play an important role in supporting the health and recreational needs of local communities and businesses.	The need to ensure water supplies remain affordable especially for deprived or vulnerable communities. The need to ensure continued improvements in levels of health	6.1 To promote a sustainable economy and maintain and enhance the economic and social well-being of local communities	Will the option ensure the continuity of a safe and secure drinking water supply? Will the option ensure sufficient infrastructure is in place for predicted population increases?

SEA Topic	Key Messages and Objectives	Baseline – key issues	SEA objective	Key questions
	To ensure all communities have a clean, safe and attractive environment in which people can take pride. To ensure safe, reliable, dependable, sustainable and affordable supplies of water are provided for all communities. Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and wellbeing of communities. Promotion of healthy communities and protection from risks to health and wellbeing. Promotion of sustainable economy supported by access to essential utility and infrastructure services.	across the region, particularly in urban areas and deprived areas. The need to ensure public awareness of drought conditions and importance of maintaining resilient, reliable public water supplies without the need for emergency drought measures. The need to ensure water quantity and quality is maintained for other users including tourists, recreational users and other users such as farmers. The need to ensure a balance between different aspects of the built and natural environment that will help to provide opportunities for local residents and tourists, including opportunities for access to recreation resources and the natural and historic environment. The need to accommodate an increasing population. The need to contribute towards maintaining sustainable growth in the region. Sites of nature conservation importance, heritage assets, water resources, important landscapes and public rights of way contribute to recreation and tourism opportunities and subsequently health and well-being and the economy.		Will the option help to meet the employment needs of local people? Will the option ensure that an affordable supply of water is maintained and vulnerable customers protected? Will the option contribute to sustaining and growing the local and regional economy? Will the option avoid disruption through effects on the transport network? Will the option be resilient to future changes in resources (both financial and human)?
			6.2 To maintain and enhance tourism and recreation	Will the option affect opportunities for recreation and physical activity? Will the option affect public rights of way or national cycle routes? Will the option ensure sufficient infrastructure is in place to sustain a seasonal influx of tourists? Will the option improve access to local services and facilities (e.g. sport and recreation)?

SEA Topic	Key Messages and Objectives	Baseline – key issues	SEA objective	Key questions
			6.3 To protect and enhance human health and wellbeing	Will the option maintain surface water and bathing water quality within statutory standards? Will it be located in an area considered to be more health deprived than others in the region? Will the option adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise, light or traffic levels)?
Material assets	Promote sustainable production and consumption whilst seeking to reduce the amount of waste generated by using materials, energy and water more efficiently. Consider issues of water demand, water supply and water quality in the natural environment and ensure a sustainable use of water resources. Contribute to a resource efficient, green and competitive low carbon economy. Maintain a reliable public water supply and ensure there is enough water for human uses, whilst seeking to maintain a healthy water environment. Minimise the production of waste, ensure waste management is in line with the waste hierarchy, and eliminate waste sent to landfill. Promote the sustainable management of natural resources.	The need to minimise the consumption of resources, including water and energy. The need to reduce the total amount of waste produced in the region, from all sources, and to reduce the proportion of this waste sent to landfill. The need to continue to reduce leakage from the water supply system. Daily consumption of water is higher than the national average in the area and consequently there is a continued need to encourage more efficient water use. The need to support regional and national commitments to decarbonisation.	7.1 To promote the efficient use of resources and minimise waste	Will the option seek to minimise the demand for raw materials? Will it make use of existing infrastructure? Will the option promote the re-use and recycling of waste materials and reduce the proportion of waste sent to landfill? Will the option encourage the use of sustainable design and materials? Will the option reduce or minimise energy use?

SEA Topic	Key Messages and Objectives	Baseline – key issues	SEA objective	Key questions
Cultural heritage	Built development in the vicinity of historic buildings and Scheduled Monuments could have implications for the setting and/or built fabric and cause damage to any archaeological deposits present on the site. Ensure active management of the Region's environmental and cultural assets. Ensure effects resulting from changes to water level (surface or sub-surface) on all historical and cultural assets are avoided. Consider effects on important wetland areas with potential for paleo-environmental deposit. Promote the conservation and enhancement of the historic environment, including the promotion of heritage and landscape as central to the culture of the region and conserve and enhance distinctive characteristics of landscape and settlement. Conserve and enhance the historic environment, heritage assets and their settings.	The need to conserve or enhance sites of archaeological importance and cultural heritage interest, and their setting, particularly those which are sensitive to the water environment. The need to protect water-dependent heritage sites during drought conditions.	8.1 To conserve and enhance historic assets and other cultural heritage and their settings, including archaeologically important sites	Will the option conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings? Will the option avoid or minimise damage to archaeologically important sites? Will the option affect the setting and / or significance of a historic asset? Will the option affect public access to, or enjoyment of, features of cultural heritage? Will it avoid damage to important wetland areas with potential for paleo-environmental deposits?
Landscape and visual amenity	Protection and enhancement of landscape (including designated landscapes, landscape character, distinctiveness and the countryside). Abstraction and low river flows could negatively affect landscape and visual amenity.	The need to protect and improve the natural beauty of the area's AONBs and other areas of natural beauty. The need to protect and improve the character of landscapes and townscapes. It is envisaged that landscape and designated sites will be maintained	9.1 To conserve and enhance landscape and townscape character and visual amenity	Will the option avoid adverse effects on, and enhance where possible, protected / designated landscapes (including woodlands) such as National Parks or AONBs? Will the option protect and enhance landscape character, townscape and seascape?

SEA Topic	Key Messages and Objectives	Baseline – key issues	SEA objective	Key questions
	Enhance the value of the countryside by protecting the natural environment for this and future generations. Improve access to valued areas of landscape character in sustainable ways to enhance its enjoyment and value by visitors and stakeholders.	and enhanced for the enjoyment of the public.		Will the option affect access to existing landscape features? Will the option minimise adverse visual impacts?

5.2 PROPOSED FRAMEWORK FOR ASSESSMENT

5.2.1 Primary Assessment

An appraisal framework (an extract of which is provided in Table 5-2) is proposed to assess each of the potential WRMP options against the SEA objectives. The appraisal framework will be applied to test the performance of options against the SEA objectives as set out in Table 5-1. This approach will enable the environmental performance of these options to be used to inform decision-making and the selection of options for inclusion in Bristol Water's WRMP.

The first and second columns of Table 5-2 set out the SEA topics and objectives. The third and fourth columns provide the assessment results in terms of positive and negative effects during the construction phase and the fifth and sixth columns provide the results during the operational phase.

The assessment will assume the implementation of standard best practice in implementing the measures and any defined mitigation measures (which will be set out) so that the significance of effects relates to the residual effects after mitigation in line with the ODPM Practical Guide and UKWIR SEA national guidance. The mitigation measures for any identified adverse effects will be identified within the appraisal framework.

In line with best practice the negative and positive effects are assessed separately for each objective and not aggregated or "netted off" in any way. This approach has been adopted to maintain transparency of negative and positive effects, particularly when using the SEA to support net gain considerations.

The seventh column provides commentary and evaluation of the effects of the option on the SEA objectives for each topic, with reference to the key questions (outlined in Table 5-1). This commentary will be split into construction and operational aspects and will outline the key details that underpin the assessment against that SEA objective, providing transparency as to how the significance of effects has been assessed.

The SEA appraisal framework will be used to capture the assessment for each option (one table completed per option), alternative programmes and the WRMP as a whole.

Table 5-2 Example extract of a SEA appraisal framework to be completed for each potential WRMP option

SEA topic	SEA objective	Construction Effects		Operational Effects		Effect Description (including mitigation)
Biodiversity, flora and fauna	1.1 To protect and enhance sites that are designated, both nationally and internationally, for their nature conservation value.	*0*	-	+	-	**Construction effects:** **Operational effects:**

5.2.1.1 Determining significance of residual effects

Varying levels of uncertainty are inherent within the assessment process. The assessment will minimise uncertainty through the application of expert judgement. The level of uncertainty of the option assessment for each SEA objective will be reported in the appraisal framework. Where there is significant uncertainty which precludes an effects assessment category being assigned for a particular option and SEA objective, an "uncertain" residual effects assessment label will be applied to that specific SEA objective.

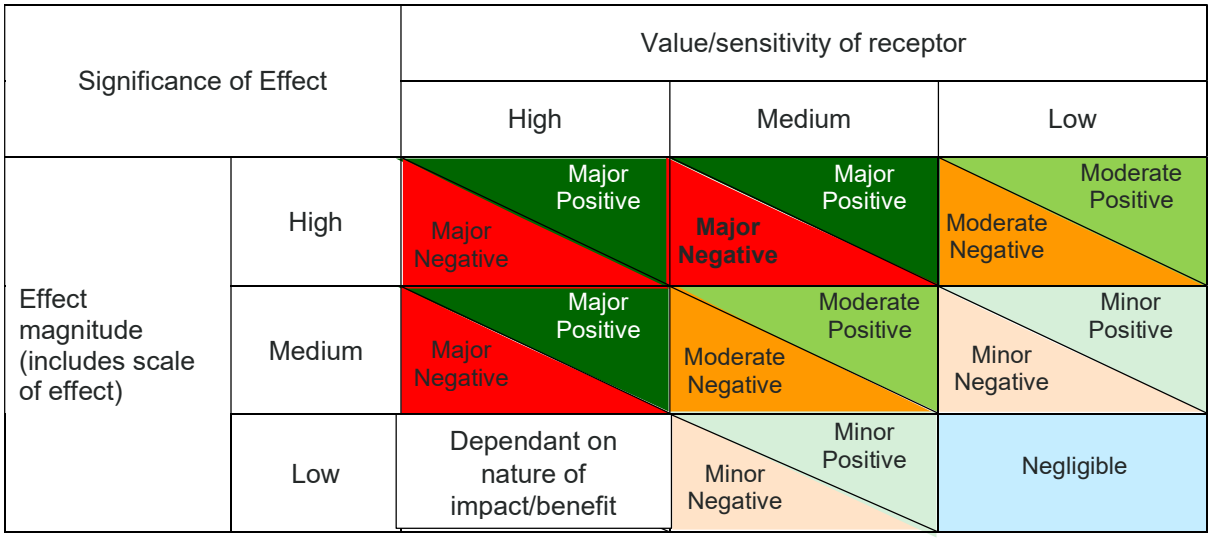
The assessment of options will be carried out applying the SEA significance ratings shown in Table 5-3. The assessment conclusions will take into account the magnitude of the effect and the sensitivity of the environmental receptors associated with the relevant SEA objective (guided by the significance matrix presented in Figure 5-1 and general significance definitions presented beneath it). However, it is important to note that other factors identified in the SEA Regulations Schedule 1, such as duration (short, medium and long-term) and permanence of effect will also be considered. As part of the determination of significance ratings consideration will also be given to cumulative effects. The term 'cumulative effects' being a collective term to include secondary, cumulative and synergistic effects. With respect to duration, short-term impacts will be defined as those that last for up to six months, medium term impacts are those that extend for six months to two years whilst long term impacts are assessed as those that continue for greater than two years.

Table 5-3: Significance ratings

Effect	Description
+++	Major Positive
++	Moderate Positive
+	Minor Positive
0	Neutral
-	Minor Negative
--	Moderate Negative
---	Major Negative
?	Uncertain

The effects assessment will take account of any proposed mitigation measures that have been incorporated into the option conceptual design and costs, i.e. it is the residual effects after the application of mitigation that will be assessed.

Figure 5-1: Significance matrix used to assess effects of each WRMP option on each SEA objective



General Significance Definitions:

Major - effects represent key factors in the decision-making process. They are generally associated with sites and features of international, national or regional importance. If adverse, such resources/features are generally those which cannot be replaced or relocated.

Moderate - effects are likely to be important considerations at a regional or district scale. If adverse, they are likely to be of potential concern.

Minor - effects are not likely to be decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.

Negligible - effects which are not perceptible, being within normal bounds of variation or the margin of forecasting error.

For the '**high' effect magnitude** (top row), a major effect significance is assigned for both high and medium value receptors to reflect the magnitude of the effect.

For the **'low' effect magnitude and 'high' value receptor** (bottom left box), the significance of effect could be minor, moderate or major dependent on the precise nature of the impact or benefit.

The resulting significance of effects will be considered in the prioritisation of options and programmes of options. Where major adverse residual effects are predicted, should the option/programme be included in the WRMP, measures envisaged to prevent, reduce and as fully as possible offset these effects on the environment (as a result of implementing the WRMP) will be outlined in the Environmental Report as appropriate. These will be in addition to any mitigation that has already been included in the conceptual design and costs of each alternative option. Mitigation may include additional provisions within the WRMP itself and/or measures to be applied during the WRMP implementation stage. It may also include proposals for changing other plans and programmes to address significant cumulative residual effects. Bristol Water will consider how any remaining significant residual effects identified are to be monitored to identify any unforeseen adverse effects and to enable appropriate remedial action to be taken.

The assessment will involve quantitative analysis of environmental and social effects as appropriate, informed by the availability of accepted assessment methods and associated data requirements. It should also be noted that the Options Appraisal undertaken by Bristol Water will involve monetised costs associated with the environmental and social aspects where it is possible to derive costs, and carbon values. During the production of the SEA this will be taken into account to ensure that there is no double counting of environmental, social and carbon costs within the qualitative and quantitative assessment of the monetised costs.

The analysis methods will use a detailed suite of environmental and social datasets that are available at a consistent quality across the geographical footprint of all the options under consideration. The HRA and WFD assessments will also inform the assessments at each key stage, with any adverse implications for Habitats Directive or WFD compliance flagged at the option assessment stage to inform decision-making at the programme appraisal and WRMP assessment.

Additionally, assessment will be carried out and specifically reported within the SEA Environmental Report as to the effects on any SSSI. This effects assessment will take account of the conservation objectives established for the relevant SSSI in consultation with Natural England. This is in line with the WRPG which states that companies must "ensure compliance with other legally binding environmental objectives (e.g. those for non-National Site Network SSSIs)". Effects on other designated sites set out in the WRPG will also be specifically reported in the SEA: National Nature Reserves; Local Nature Reserves; Marine Conservation Zones; Scheduled Monuments; World Heritage Sites; National Parks; European Landscape Convention; and Areas of Outstanding Natural Beauty.

5.2.1.2 Summarising the effects assessment

Completed appraisal framework tables for each option, for each alternative programme and for the overall WRMP will be presented in full in an appendix to the Environmental Report. A summary of the assessment will be presented within the main text of the Environmental Report as a colour-coded visual evaluation (VE) matrix. An example of the proposed VE matrix is given in Table 5-4. For each option and each SEA topic, the VE matrix summarises the likely significance of effects (which will be discussed in full in the completed appraisal framework tables).

Table 5-4: Example of a Visual Evaluation Matrix

WRMP Options	SEA Objectives – negative effects								SEA Objectives – positive effects							
	1.1	1.2	1.3	1.4	2.1	3.1	3.2	3.3	1.1	1.2	1.3	1.4	2.1	3.1	3.2	3.3
Option 1																
Option 2																

Note: only a portion of the objectives are shown for illustration purpose

The completed appraisal framework table for each option, programme or the WRMP will also be accompanied in the appendix to the Environmental Report by a summary comprising an overview of the adverse and beneficial effects as presented in Table 5-5.

In assessing each option, programme or WRMP, the effects (beneficial or adverse) of any interactions between SEA topics will be identified, assessed and reported.

Table 5-5: Example SEA appraisal framework summary

[WRMP option details]	
Summary commentary of scheme negative effects	[Summary]
SEA objectives negative effects summary	
Summary commentary of scheme positive effects	[Summary]
SEA objectives beneficial effects summary	

5.2.2 Secondary, Cumulative and Synergistic Environmental Effects

Schedule 2(6) of the SEA Regulations requires the assessment of "The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects…." These can be defined as follows:

- Secondary or indirect effects are effects that are not a direct result of the plan, (e.g. an abstraction that changes local groundwater levels and thus affects the ecology of a nearby wetland).
- Cumulative effects arise, for instance, where several nearby groundwater sources each have insignificant effects but together have a measurable effect on river flows; or where several individual effects of a water resource zone programme (e.g. traffic disruption) have a combined effect.
- Synergistic effects interact to produce a total effect greater than the sum of the individual effects. Synergistic effects often happen as habitats, resources or human communities get close to capacity. For instance, a wildlife habitat can become progressively fragmented with limited effects on a particular species until the last fragmentation makes the areas too small to support the species at all.

The term 'cumulative effects' is being adopted as the collective term to include secondary, cumulative and synergistic effects (as suggested by the ODPM Practical Guide). The SEA of the WRMP will include cumulative

effects assessment at each of the assessment levels as described in the following sections (option-level, programme-level and overall WRMP). It should be noted that some options may be mutually exclusive (i.e. only one of these options can be developed) and this will also be identified in the SEA as part of the option-level assessment. For the programme level and WRMP level assessment, cumulative effects will include consideration of other plans, programmes and projects in the context of spatial and/or temporal proximity.

A matrix such as the example provided in 2 will be used to help consider interactions between options or programmes. In assessing these effects, consideration will be given to other factors which may affect the receiving environment in the short, medium and long term.

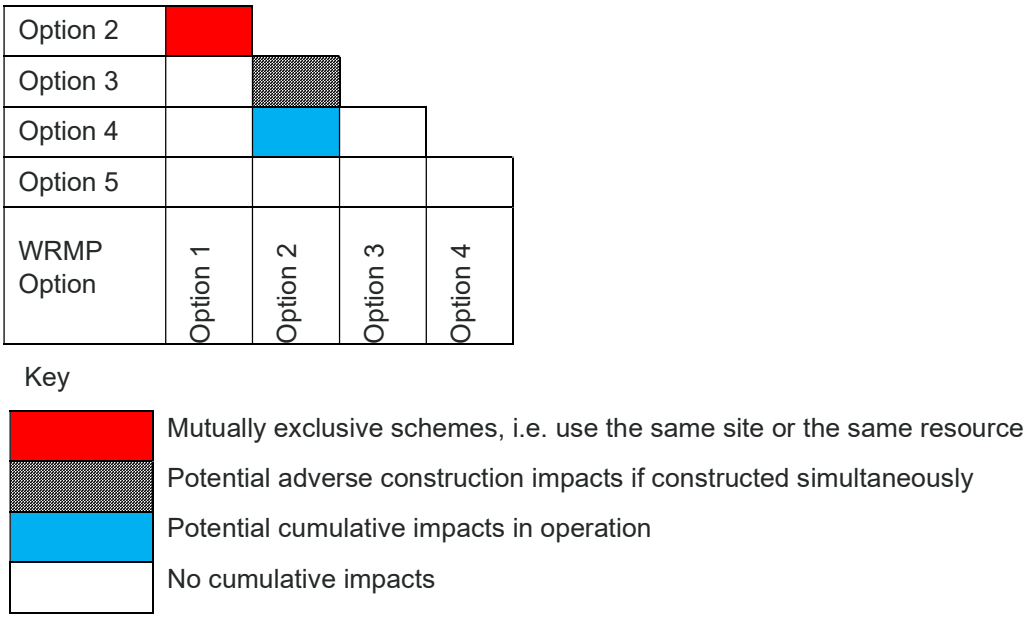


Figure 5-2: Cumulative Effects Assessment Matrix

5.2.2.1 Programme and WRMP level cumulative effects assessment

To meet the requirements of the SEA Regulations, the cumulative effects between options in the preferred programme will be assessed, as will those of the WRMP with other relevant plans, programmes or projects.

Cumulative effects with non-water resources related plans, programmes and projects will be considered where relevant, including existing completed projects, approved but uncompleted projects, ongoing activities, plans or projects for which an application has been made and which are under consideration by consenting authorities and plans and projects which are reasonably foreseeable (i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects). Sources of information include the following:

- Land use and development plans to identify major development proposals (those which are likely to generate large scale construction or operational effects e.g. growth points, strategic centres;
- Transport and other infrastructure plans (e.g. flood risk management plans, energy, and other utilities).
- Local Plans

The following cumulative assessments are proposed in the SEA:

- An assessment of cumulative effects of options that could potentially be implemented at the same time. Mutually exclusive options (e.g. those that draw upon the same resource or use the same site) will also be identified.
- Assessment of cumulative effects of the Bristol Water WRMP with the Bristol Water Drought Plan, the WCWRG Regional Plan, other water company Drought Plans and WRMPs, Environment Agency Drought Plans and other relevant water management plans. The potential for a neighbouring company implementing options under its WRMP simultaneously will be considered. Neighbouring water

companies will be included as consultees to the WRMP and associated SEA Environmental Report in order to identify any trans-boundary issues.

- Assessment of potential cumulative effects of the Bristol Water WRMP with any other identified relevant programmes, plans and strategic projects that may be in place / implemented during the period of the WRMP.

5.2.3 Consideration of reasonable alternatives

A wide range of reasonable alternative options are being considered for the WRMP through the SEA comprising different supply-side and demand-side options. In determining the preferred programme of options, Bristol Water will use the findings of the option-level SEA to inform the programme appraisal modelling which will identify a short-list of alternative programmes. These alternatives will be assessed through the programme-level SEA to inform decisions on the preferred programme.

6. INTEGRATING WRMP ASSOCIATED ENVIRONMENTAL ASSESSMENTS

Ricardo Energy and Environment has also been commissioned by Bristol Water to undertake the other environmental assessments associated with the WRMP; Natural Capital Assessment (NCA), Habitats Regulations Assessment (HRA), Water Framework Directive Assessment (WFD), and Invasive Non-Native Species Assessment (INNS). As identified by relevant guidance these assessments will be integrated within the SEA. Figure 6-1 (adapted from the UKWIR SEA guidance) illustrates how the SEA and other environmental assessment processes are aligned with the WRMP development process. A summary of each environmental assessment and their integration to the SEA are provided in the sections below.

6.1 NATURAL CAPITAL ACCOUNTING AND BIODIVERSITY NET GAIN

NCA and BNG assessments are required by regulators to provide a comprehensive understanding of the benefits and costs to the natural environment of plan proposals. The approach that will be applied to these assessments[80] draws on the WRPG[81] and UKWIR[82] guidance. It also draws on the principles of the Natural Capital Register and Account Tool (EA, 2021)[83] and the approach outlined in Defra's Enabling a Natural Capital Approach (ENCA) (Defra, 2020)[84].

Although there is currently no legislative requirement for NCA, the WRPG states that water companies should use NCA in their decision-making which can be used to include an assessment of ecosystem resilience. The EA have published separate supplementary guidance on Environment and Society in Decision-making[85,86] which provides more detail about the expectation for NCA, and how NCA can support decision-making. The purpose of this is to allow water companies and Regional Groups to "make decisions that do not devalue, and look to enhance the value of the natural world for society benefit" (WRPG Supplementary Guidance[85]) together with supporting water companies to promote plans that have the potential to deliver wider environmental and social benefits.

The BNG assessment will demonstrate that options and plans will look to maximise biodiversity gain and facilitate the incorporation of BNG into supply option design. This will underpin delivery of wider environmental net gain through provision of improved habitat quality and quantity.

The purpose of NCA assessment is to evaluate the benefits and disbenefits to society that arise from changes to natural capital assets. It can work alongside the SEA and BNG which is concerned with habitat improvement for the purposes of ecosystem resilience rather than for the associated benefits to society. Therefore NCA,

[80] Ricardo (2022) Biodiversity Net Gain and Natural Capital Method Statement – Report for Bristol Water

[81] Ofwat, NRW & EA (2021), Water Resources Planning Guideline – v9 for Publishing February 2021

[82] Andrews R, Ashmole R, Fredenham E, Mant JM, Pitcher C, Sanders J, Twigg W, Wade TI and Westbrook M (2021) Environmental Assessments for Water Resources Planning. UK Water Industry Research Ltd Report 21/WR/02/15.

[83] EA (2021) The Environment Agency Natural Capital Register and Account Tool, Version 1. Technical Report. Published January 2021.

[84] Defra (2020) Enabling a Natural Capital Approach Guidance, updated August 2021

[85] EA (2021) WRPG 2024 supplementary guidance – Environment and society in decision-making. Published 24/03/2021

[86] NRW (2020) WRPG 2024 supplementary guidance – Environment and Society in decision-making (Wales). Draft for consultation published September 2020.

SEA and BNG can be seen as complementary and the outputs of all three should be considered in decision-making.

Natural capital and BNG are incorporated within the SEA framework through the inclusion of a dedicated objective associated with the 'biodiversity, flora and fauna' topic: 'To avoid a reduction in natural capital assets, and to provide opportunities for biodiversity net gain, where possible'. The inclusion of this specific objective in the assessment framework not only allows integration but will also facilitate avoidance of double counting in the decision-making process. A stand-alone NCA and BNG report will be prepared at the same time as the draft WRMP.

Figure 6-1 SEA, NCA, HRA, and WFD assessment aligned with the WRMP Process (adapted from the UKWIR Guidance)

6.2 HABITATS REGULATION ASSESSMENT

As a competent authority, Bristol Water must ensure that its WRMP meets the requirements of the Habitats and Species Regulations 2017 (Habitats Regulations) prior to implementation. If the WRMP (i.e. one or more options within it) may cause a likely significant effect on one or more European sites[87], either alone or in-combination with other options, plans or projects, the WRMP must be subject to Appropriate Assessment. In accordance with the Habitats Regulations, Bristol Water is undertaking a HRA of its WRMP in parallel to the SEA.

The process has four potential stages:

1. Screening stage: identifies likely impacts, alone or in-combination with other projects or plans, and considers whether these impacts are likely to be significant. Screening will initially be carried out at the option level to assess whether any options will result in likely significant effects on a European site. Screening will also be carried out at the programme level and for the WRMP as a whole.

2. Appropriate Assessment stage: if screening identifies the potential for likely significant effects, an Appropriate Assessment of the impacts of an option, programme or the whole WRMP (either alone or in combination with other plans and projects) will be required such that a conclusion can be made as to whether there will be impacts on site integrity, taking into account potential alternative solutions and mitigation measures.

3. Assessment of alternative solutions: where alternative solutions are identified and consideration of their impacts are given in comparison to those in the WRMP.

4. Assessment where no alternatives exist and adverse impacts remain, which provides an assessment of imperative reasons of overriding public interest and compensatory measures required.

Stages 3 and 4 are only invoked if an option were to be included in the preferred programme that may cause likely significant effects on a European site.

Subject to the findings of the HRA screening process, and the selection of options for the WRMP, Appropriate Assessment of the WRMP may need to be undertaken and mitigation or alternatives developed. The scope and approach for Appropriate Assessment, if required, will be determined in consultation with Natural England.

The findings from the HRA will inform the SEA at each stage of the assessment process, in particular the SEA topics of ‘biodiversity, flora and fauna’ and ‘water’.

It should be noted that, as recommended by relevant guidance as shown in Figure 6-1, the WRMP is being undertaken in parallel with preparation of the SEA and HRA, and the results of these two assessments will feed into the revision of the WRMP in an iterative process.

6.3 WATER FRAMEWORK DIRECTIVE ASSESSMENT

In line with the WRPG, water companies must also consider the impact of options, programmes and plans on relevant waterbodies as defined under the WFD. In particular, companies must ensure that its proposed activities do not result in any deterioration between status classes of any water body (as assessed through a series of objective measures, including biological, chemical and morphological condition) or prevent the achievement of “Good Ecological Status”.

A WFD screening will be coordinated with the SEA process, and detailed WFD assessment would be required to support planning applications should the potential for non-compliance with WFD objectives be identified by the screening exercise.

For each scheme, the WFD assessment will evaluate:

- Potential effects on the status of WFD elements, i.e. fish, macroinvertebrates, macrophytes and phytobenthos (diatoms).
- Compliance with WFD objectives, i.e.:
    - No deterioration between status classes.

[87] European sites are taken to include Special Areas of Conservation (SACs), candidate SACs, Special Protection Areas (SPAs), potential SPAs, Ramsar and proposed Ramsar sites, and sites identified as compensatory habitat for any of the aforementioned designations

- No impediments to good Ecological Status / Potential (GES/GEP).
- No compromises to waterbody objectives.
- No effects on other waterbodies.
- Assists attainment of waterbody objectives.
- Assists attainment of protected area objectives.

These findings will be integrated into assessments of relevant SEA topics, in particular biodiversity, flora and fauna, and water resources.

6.4 INVASIVE NON-NATIVE SPECIES RISK ASSESSMENT

Section 5.14 of the WRPG[88] states that water companies must review whether current abstraction operations and future solutions will risk spreading INNS or create pathways which increase the risk of spreading INNS. The approach[89] that will be undertaken in reviewing the INNS risk associated with the unconstrained list of options, constrained list of options and preferred programme will provide information that will support the SEA, option selection and inform the type and extent of mitigation measures that may be required. The INNS assessment is incorporated within the SEA framework through the inclusion of a dedicated objective associated with the 'biodiversity, flora and fauna' topic: 'To avoid further spread of invasive, non-native species'. A stand-alone INNS assessment report will be prepared at the same time as the draft WRMP.

7. USE OF SEA IN WRMP OPTION AND PROGRAMME APPRAISAL

7.1 OPTION APPRAISAL

Option appraisal is an overarching term for the specification and assessment of options under consideration for the WRMP. It includes the process of refinement of the unconstrained options list to the constrained list considering a wide range of factors such as promotability to customers, yield, lead time, environmental effects, and technical feasibility. More detailed assessment is then carried out of the constrained list options against the SEA objectives, taking into account the range of assessments which are now sheltered under the SEA 'umbrella'. Once the constrained list options have been subjected to SEA, the assessment outcomes are used to support programme appraisal.

7.2 PROGRAMME APPRAISAL

The aim of the WRMP is to find the 'best value' programme of supply and/or demand options to restore and maintain a supply-demand balance. The selection process is facilitated through programme appraisal modelling tools, which are designed to produce an optimised programme taking account of specified metrics that include (but are not limited to) whole life cost, carbon, drought resilience and environmental considerations via the SEA, NCA and BNG assessment.

The WRMP will continue to follow a 'twin track' approach to addressing the supply-demand deficit, with demand management and leakage reduction measures continuing to be implemented to further reduce water consumption per person/per property within Bristol Water's supply area.

8. NEXT STEPS: CONSULTATION

8.1 CONSULTATION ON THE SCOPING REPORT

The Scoping Report documents the proposed scope and approach for the SEA of Bristol Water's WRMP and represents Stage A of the SEA (see Section 1.5). It is issued as a consultation document to seek agreement on the scope and approach. Following consultation, the scope and / or approach may be modified to take

[88] Ofwat (2021). Water resources planning guideline Draft update November 2021

[89] Ricardo (2022) Invasive Non-Native Species (INNS) Method Statement – Report for Bristol Water

account of consultees' responses. Consultation responses, and any subsequent amendments made as a consequence of the responses, will be document in an appendix to the SEA Environmental Report.

Five weeks are being provided for consultees to provide comments on the scope of the SEA as described within this report, in line with SEA Regulation 12(6).

Following completion of the assessment, the draft SEA Environmental Report, HRA Screening Report (and Appropriate Assessment(s) if required) WFD Compliance Report and reports concerning NCA, BNG and INNS, will be issued alongside the draft WRMP for consultation to statutory consultees, stakeholders and the wider public in October 2022.

8.2 STAGE B: DEVELOPING AND REFINING ALTERNATIVES AND ASSESSING EFFECTS

Stage B of the SEA process comprises the SEA assessment and the development of reasonable alternative options. In determining the preferred programme, Bristol Water will use the findings of the SEA and accompanying environmental assessments as an integral part of the best value planning approach and modelling. The option-level SEA results will inform the programme appraisal which will involve the use of an optimisation model to select the Best Value plan for customers and environment to address the deficit. Bristol Water will then assess the preferred solution against the SEA (and other non-monetary factors) to provide an additional review stage of the impacts of individual options in the preferred plan and to determine if it is necessary to introduce mitigation measures or consider alternative solutions. Bristol Water may also decide to constrain out some options during the programme appraisal stage if the impacts are highly adverse and cannot be mitigated. This may result in several iterations of running the model and Bristol Water will assess each run against the SEA. If there is significant uncertainty in the baseline supply demand balance, Bristol Water may need to identify solutions to alternative scenarios and assess these against the SEA.

8.3 STAGE C: PREPARATION OF ENVIRONMENTAL REPORT

8.3.1 Structure and Content

The findings of the SEA will be documented in an Environmental Report (this comprises Stage C of the SEA process). Assessments will be fully documented in the Environmental Report, to be published for consultation alongside the WRMP. The Environmental Report will also identify provisional monitoring and mitigation measures according to the significant effects identified.

A draft structure for the report is proposed in Table 8-1. The proposed structure of the report is derived from the requirements specified by the SEA Regulations[90] and set out in the ODPM Practical Guide[91]. A non-technical summary of the information will be provided under the headings listed in Schedule 2 of the SEA regulations.

Table 8-1 Draft Structure of the Environmental Report

Non-Technical Summary
1 Introduction
1.1 Strategic Environmental Assessment
1.2 Purpose of the Environmental Report
1.3 Requirement for SEA of Bristol Water's Water Resources Management Plan
1.4 SEA and Water Resources Management Planning
1.5 Habitats Regulations Assessment
1.6 Water Framework Directive Assessment
1.7 Consultation
1.8 Structure of the Environmental Report

[90] SEA Regulations, Part 3, Regulations 2 and 3 and Schedule 2.

[91] Office of the Deputy Prime Minister (2005) A Practical Guide to the Strategic Environmental Assessment Directive

8.3.2 Stage D: Consulting on the Draft WRMP and the Environmental Report

Bristol Water will formally invite the statutory consultation bodies, stakeholders and the public to comment on the draft WRMP and the SEA Environmental Report during the statutory public consultation period. This is likely to be in November 2022. This consultation comprises Stage D of the SEA. Comments made will be taken into account in determining the final WRMP, acknowledging that environmental and social considerations are not the only determining factors in formulating the WRMP.

Any significant changes made to the WRMP at that stage in the process, including changes based on consultation responses and the SEA, will be assessed to identify their likely significant effects. The findings of the assessment will then be taken into account in developing the final WRMP.

8.3.3 SEA Statement

Once the revised WRMP is published and adopted. Bristol Water will publish an SEA Post Adoption Statement, describing how the SEA and the responses to consultation have been taken into account during the preparation of the WRMP. This statement will describe how environmental considerations have been integrated into the WRMP, and explain any changes made or alternatives rejected. Information will also be provided on the environmental monitoring to be carried out during implementation of the WRMP to track the environmental effects of the WRMP and to trigger appropriate responses where effects are identified.

8.4 QUALITY ASSURANCE

The Practical Guide contains a Quality Assurance checklist to help ensure that the requirements of the SEA Directive are met. The checklist is reproduced in Appendix B, indicating where this Scoping Report meets the requirements, and which requirements will be addressed in the Environmental Report.

APPENDICES

Appendix A – Review of Policies, Plans and Programmes

The findings of the review of policy, plans and programmes are set out below. The purpose of the review and a summary of the key findings are set out in Section 3 of this Report. This table sets out the purpose and objectives of the policy, plans and programmes, their potential relationship with Bristol Water's Water Resource Management Plan and the potential implications for the objectives of the SEA.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
International	
Ramsar Convention (1971) *The Convention on Wetlands of International Importance*	
The Convention on Wetlands (Ramsar, Iran, 1971) (the "Ramsar Convention") is an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the "wise use", or sustainable use, of all of the wetlands in their territories. Ramsar sites within Bristol Water's SEA Assessment area include the Severn Estuary and the Somerset Levels.	The impacts of the Water Resource Management Plan options on important wetland habitats must be considered as part of the SEA.
The World Heritage Convention (UNESCO) 1972 – a global instrument for the protection of cultural and natural heritage.	
A global instrument for the protection of cultural and natural heritage. Signatories commit themselves to refraining from 'any deliberate measures which might damage, directly or indirectly, the cultural and natural heritage' of their World Heritage Sites. The city of Bath is the closest UNESCO designated site.	The Water Resource Management Plan and SEA should take account of the need to protect scheduled monuments and archaeological areas.
The Bern Convention (1979) *The Convention on the Conservation of European Wildlife and Natural Habitats*	
International convention which aims to ensure conservation of wild flora and fauna species and their habitats. Special attention is given to endangered and vulnerable species, including endangered and vulnerable migratory species specified in appendices. Enforced in European legislation through the Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC).	The implementation of the Water Resource Management Plan may influence biodiversity in the south west of England and as such the SEA should seek to maintain or enhance the quality of habitats and biodiversity.
The Bonn Convention (1983) *The Convention on the Conservation of Migratory Species of Wild Animals*	
Aims to conserve terrestrial, marine and avian migratory species by protecting endangered, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger such species. Enforced in European legislation through the Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC).	The implementation of the Water resource management Plan may influence biodiversity in the south west of England and as such the SEA should seek to maintain or enhance the quality of habitats and biodiversity.
Granada Convention (1985) *Convention for the Protection of the Architectural Heritage of Europe*	
To reinforce and promote policies for the conservation and enhancement of Europe's heritage.	The SEA should take into account the need to conserve heritage.
The European Convention on the Protection of Archaeological Heritage (Valetta Convention) (1992)	
This Convention sets out a revised body of new basic legal standards for Europe to the previous Granada Convention, to be met by national policies for the protection of archaeological assets as sources of scientific and documentary evidence. It makes the conservation and enhancement of the archaeological heritage one of the goals of urban and regional planning policies.	The SEA should take into account the need to conserve heritage.
European Commission (1991), *Urban Waste Water Treatment Directive (1991/271/EC)*	
The Directive's objective is to protect the environment from the adverse effects of urban waste water discharges and discharges from certain industrial sectors and concerns the collection, treatment and discharge of domestic waste water, mixture of waste water and waste water from certain industrial sectors.	The SEA should seek to maintain, protect and improve water quality across the region.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
European Commission (1991) The Nitrates Directive (91/676/EEC)	
The Nitrates Directive is designed to reduce water pollution caused by nitrate from agriculture. The directive requires Defra and the Welsh Assembly Government to identify surface or groundwaters that are, or could be, high in nitrate from agricultural sources. Once a water body is identified as being high in nitrate all land draining to that water is designated a Nitrate Vulnerable Zone. Within these zones, farmers must observe an action programme of measures which include restricting the timing and application of fertilisers and manure and keeping accurate records.	The Water resource management Plan should be consistent with the aim to reduce water pollution caused by nitrate from agriculture. The SEA assessment framework should include water quality.
Valletta Convention (1992) *Convention on the Protection of Archaeological Heritage of Europe (revised)*	
The Valletta Convention is one of a series of Conventions for the protection of the cultural heritage produced by the Council of Europe over the last fifty years.	The SEA should take into account the need to conserve heritage.
European Commission (1992) *Habitats Directive (1992/43/EC)*	
The aim of the Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance.	The impacts of the Water resource management Plan options on internationally designated sites and species must be considered as part of the SEA.
United Nations (1992), *Convention on Biological Diversity (CBD)*	
The main objectives are: • Conservation of biological diversity • Sustainable use of its components • Fair and equitable sharing of benefits arising from genetic resources	The commitment to conserving biological diversity must be considered in any Water resource management Plan options and the SEA should seek to promote the protection and enhancement of biodiversity.
United Nations Economic Commission for Europe (1998) *Aarhus Convention - Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*	
The Aarhus Convention grants the public rights regarding access to information, public participation and access to justice, in governmental decision-making processes on matters concerning the local, national and transboundary environment. It focuses on interactions between the public and public authorities. The Aarhus Convention has been ratified by the European Community, which has begun applying Aarhus-type principles in its legislation, notably the Water Framework Directive (Directive 2000/60/EC).	The Convention is designed to improve the way ordinary people engage with government and decision-makers on environmental matters. It helps to ensure that environmental information is easy to get hold of and easy to understand. The SEA should seek to provide easily understood information to the public on the environmental implications of the Water resource management Plan and its constituent options.
European Commission (1998), *Drinking Water Directive (1998/83/EC)*	
The objective of the Drinking Water Directive is to protect the health of the consumers in the European Union and to make sure the water is clean and of good quality. To make sure drinking water everywhere in the EU is healthy, clean and tasty, the Drinking Water Directive sets standards for the most common substances (so-called parameters) that can be found in drinking water. A total of 48 microbiological and chemical parameters must be monitored and tested regularly.	The SEA should seek to ensure that objectives address water quality in the region, particularly drinking water quality.
European Commission (2000), *The Water Framework Directive (2000/60/EC)*	
This Directive establishes a framework for the protection of inland surface waters, transitional waters, coastal water	The SEA should seek to promote the protection and enhancement of all water resources.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
and groundwater. It also encourages the sustainable use of water resources. Key objectives are general protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water.	
Council of Europe (2000) *European Landscape Convention (Florence Convention)*	
The European Landscape Convention is an international convention focusing specifically on landscape. The UK Government signed the European Landscape Convention in 2006 and it became binding from March 2007.	The SEA should take landscape quality into account and include water quality in the assessment framework.
European Commission (2012) A Blueprint to safeguard Europe's Water Resources	
This document outlines actions that concentrate on better implementation of current water legislation, integration of water policy objectives into other policies, and filling the gaps in particular with regard to water quantity and efficiency. This has a long-term aim to ensure sufficient availability of good quality water for sustainable and equitable use.	The implementation of the WRMP should seek to facilitate the ongoing reliable availability of good quality water.
United Nations (2002), *Commitments arising from the World Summit on Sustainable Development, Johannesburg*	
The World Summit on Sustainable Development proposed broad-scale principles which should underpin sustainable development and growth. It included objectives such as: • Greater resource efficiency • Work on waste and producer responsibility • New technology development • Push on energy efficiency • Integrated water management plans needed Minimise significant adverse effects on human health and the environment from chemicals by 2020.	These commitments are the highest level definitions of sustainable development. The Water resource management Plan should be influenced strongly by all of these themes and should seek to take its aims into account. The SEA should seek to promote the achievement of the sustainable development objectives outlined in this plan.
Council of Europe (2003) *European Soils Charter*	
Sets out common principles for protecting soils across the EU and will help.	The SEA should seek to ensure that the quality of the regions land, including soils, is protected or enhanced.
European Commission (2006) *Thematic Strategy for Soil Protection*	
The Thematic Strategy for Soil Protection consists of a Communication from the Commission to the other European Institutions, a proposal for a framework Directive (a European law), and an Impact Assessment.	The SEA assessment framework should include soils.
European Commission (2007), *Floods Directive (2007/60/EC)*	
The Directive's aim is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive shall be carried out in coordination with the Water Framework Directive, notably by flood risk management plans and river basin management plans being coordinated, and through coordination of the public participation procedures in the preparation of these plans.	The SEA should seek to ensure that flood risk in the region is not adversely affected by the implementation of the Water resource management Plan.
European Commission (2006) Fresh Water Fish Directive (2006/44/EC)	
The Directive seeks to protect those fresh water bodies identified by Member States as waters suitable for sustaining fish populations. For those waters, it sets physical and chemical water quality objectives for salmonid waters and cyprinid waters.	The SEA should seek to promote the protection of river and lake water quality in order to maintain and develop suitable environments that will sustain water fish populations.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
The Directive is designed to protect and improve the quality of rivers and lakes to encourage healthy fish populations.	
European Commission (2008) *Ambient Air Quality Directive (2008/50/EC)*	
The Directive sets legally binding limits for concentrations in outdoor air of major air pollutants that impact public health such as particulate matter (PM10 and PM2.5) and nitrogen dioxide (NO2). There are also indirect effects as these pollutants can combine in the atmosphere and contribute to greenhouse gases which can be transported great distances by weather systems.	The implementation of the Water resource management Plan may have some influence on air quality, either directly or indirectly, through construction or operational activities. The SEA should take account of the need to ensure that the region's air quality is maintained or enhanced, and that emissions of air pollutants are kept to a minimum. Seek to help meet regional air quality targets.
European Commission (2009), *Birds Directive (2009/147/EC)*	
The Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. It sets broad objectives for a wide range of activities, although the precise legal mechanisms for their achievement are at the discretion of each Member State (in the UK delivery is via several different statutes).	The SEA should seek to protect and conserve important bird habitats.
European Commission (2009), *Promotion of the use of energy from renewable sources Directive (2009/28/EC)*	
This promotes the use of energy from renewable sources.	The SEA should take account of the need to seek to promote the use of renewable energy.
European Commission (2020), *The EU Biodiversity Strategy for 2030*	
The strategy aims to halt the loss of biodiversity and ecosystem services in the EU and help stop global biodiversity loss by 2020. It reflects the commitments taken by the EU in 2010, within the international Convention on Biological Diversity.	The implementation of the Water resource management Plan may influence biodiversity in the Bristol Water area and as such the SEA should take account of the need to maintain or enhance the quality of habitats and biodiversity.
The Paris Agreement (2016), Cancun Agreement (2011) and Kyoto Agreement (1997)	
These agreements represent key steps forward in capturing plans to reduce greenhouse gas emissions and to help developing nations protect themselves from climate impacts and build their own sustainable futures. It includes a shared vision to control the global rise in temperature.	The SEA should consider the need for water companies to seek to promote a reduction in greenhouse gas emissions in carrying out its service activities.
European Commission, Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive)	
This Directive ensures that individual Parties integrate environmental assessment into their plans and programmes at the earliest stages, whereby an SEA becomes mandatory for plans / programmes which are: • Prepared for agriculture, forestry, fisheries, energy, industry transport, waster / water management, telecommunications, tourism, town & country planning or land use and which **set the framework** for future development consent of projects listed in the EIA Directive; Or • Have been determined to require an assessment under the Habitats Directive. For any plans / programmes not included in the above, the Member States must carry out a screening procedure to determine whether the plans / programmes are likely to have significant environmental effects.	This directive provides the regulatory basis for an SEA being carried out as part of the WRMP.
European Commission (1999) *Landfill of Waste Directive (99/31/EC)*	
The Directive aims at reducing the amount of waste landfilled; promoting recycling and recovery; establishing high standards of landfill practice across the EU and preventing the shipping of waste from one Country to another.	The Water resource management Pan should take the effects on waste to landfill into account. The SEA assessment should consider the effects on water, soil, air, human health and waste.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
The objective of the Directive is to prevent or reduce as far as possible negative effects on the environment (in particular on surface water, groundwater, soil, air and human health) from the landfilling of waste, by introducing stringent technical requirements for waste and landfills.	
National	
Salmon and Freshwater Fisheries Act, 1975	
The Act lays down the present basic legal framework within which salmon and freshwater fisheries in England are regulated. Proposals have been made to extend the legislation to apply to more fish species e.g. coarse fish, eel and lamprey species. These proposals are currently under review. The Act covers legislation on fishing methods and related offences, obstructions to fish passage, salmon and freshwater fisheries administration and law enforcement. Proposed extensions to the legislation (under review) include the provision of fish passes and screening of water abstraction and discharge points for coarse fish, eel and lamprey species.	The Act Provides statutory requirements for maintaining fish passage. The SEA will cover fish passage as an element of at least one sustainability objective. The SEA should seek to address any potential issues or effects on existing measures to address fish passage.
The Environmental Assessment of Plans and Programmes Regulations 2004 (the SEA Regulations)	
This represents the transposition of the Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive).	This regulation provides the UK regulatory basis for an SEA being carried out as part of the WRMP.
Water Resource Management Plan Regulations 2007	
These regulations prescribe how water undertakers in England and Wales are to prepare and publish water resources management plans in accordance with Section 37 of the Water Industry Act. This prescribes the method of publication of a draft water resources management plan, and how water undertakers are to deal with representations received in relation to a draft water resources management plan.	This is the UK regulatory basis against which all water undertakers must be compliant in the production of their individual WRMPs.
Wildlife and Countryside Act (as amended) (1981)	
The Act is the principle mechanism for providing legislative protection of wildlife in Great Britain. Species listed in Schedule 5 of the Act are protected from disturbance, injury, intentional destruction or sale. Other provisions outlaw certain methods of taking or killing listed species. This Act is brought up to date regularly to ensure the most endangered animals are on the schedule. The Act also improved protection for the most important wildlife habitats.	Some aspects of the Water resource management Plan may have effects on habitats and species. The SEA should seek to maintain or enhance the quality of habitats and biodiversity and take regard of protected species and habitats.
Planning (Listed Buildings and Conservation Areas) Act 1990	
This Act addresses listed buildings including the prevention of deterioration and damage and preservation and enhancement of conservation areas.	The Water resource management Plan and SEA should take account of the need to protect listed buildings and conservation areas.
Water Resources Act, 1991 (Amendment) Regulations 2009 SI3104	
Amends Water Resources Act 1991 by extending the use of Water Protection Zones and Works Notices, in particular to deal with harm to aquatic ecosystems caused by the physical characteristics of a water course or lake, such as quantity, structure and substrate of river/lake bed.	The SEA should include objectives that cover hydromorphological aspects and seek to ensure that hydromorphological features within the plan are maintained or enhanced.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
Aligns the Water Resources Act with the hydromorphological requirements of the WFD.	
Water Industry Act 1991 was amended by the commencement of Section 36 of the Flood and Water Management Act 2010	
This makes provision for general duties of water undertakers including those associated with water resources management plans and sets out supply duties.	The Water resource management Plan must take into account this legislation.
The Countryside and Rights of Way (CROW) Act, 2000	
The Act provides for increased public access to the countryside and strengthens protection for wildlife. The main provisions of the Act are as follows: • Extends the public's ability to enjoy the countryside whilst also providing safeguards for landowners and occupiers • Creates new statutory right of access to open country and registered common Land Use Consultants • Modernises Right of Way system • Gives greater protection to SSSIs • Provides better management arrangements for AONBs Strengthens wildlife enforcement legislation.	The SEA should include objectives that take into account public access, protection of SSSIs and the management of relevant landscape designations.
Department for Culture, Media and Sport (2001) *The Historic Environment – A Force for the Future*	
This strategy outlines the Government's policy regarding the historic environment. The strategy has key aims and objectives that demonstrate the contribution the historic environment makes to the country's economic and social well-being.	The implementation of the Water resource management Plan may have an influence on the heritage of the region, in particular if options affect surface water levels. The SEA should seek to ensure any adverse effects on heritage assets are minimised or avoided.
The Energy Act 2013	
This provides the legislative framework for delivering secure, affordable and low carbon energy. It includes provision for decarbonisation.	The implementation of the WRMP may have an influence upon the Bristol Water area's total energy use. The SEA should seek to promote energy efficiency, as well as seeking to reduce the effects of climate change through greenhouse gas emissions. The SEA should also promote the use of renewable energy, where relevant.
Environment Act 1995	
The Environment Act set up the EA to manage resources and protect the environment in England and Wales	The SEA should seek to promote the protection and enhancement of all water resources without having negative effects on other aspects of the environment.
The Water Act (2003) (as amended)	
The Water Act 2003 is in three Parts, relating to water resources, regulation of the water industry and other provisions. The four broad aims of the Act are: • The sustainable use of water resources • Strengthening the voice of consumers • A measured increase in competition • The promotion of water conservation.	The implementation of the Water resource management Plan may have an effect through its role in maintaining supplies of water. The SEA should seek to promote sustainable use of water resources.
The Water Environment (Water Framework Directive) Regulations (England and Wales) 2017	
These Regulations implement the Water Framework Directive and set out a range of statutory actions to	The Water resource management Plan should seek to maintain, protect and improve ecological status across the region and prevent any deterioration of WFD status.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
secure and maintain Good Ecological Status or Potential for all water bodies designated under WFD.	The SEA will be informed by the parallel WFD compliance assessment of the Water resource management Plan.
Defra (2004) Rural Strategy	
The strategy sets out rural and countryside policy and draws upon from lessons learnt following the rural white paper. Objectives include supporting economic and social regeneration across rural England and enhance the value of the countryside and protect the natural environment for this and future generations.	The implementation of certain Water resource management Plan options may have an effect upon rural communities and the countryside. The SEA should also seek to ensure that the quality of the region's landscapes, natural resources and biodiversity are maintained or enhanced.
Defra (2004) The First Soil Action Plan for England	
This plan is a comprehensive statement on the state of the UK's soils and how Government and other partners were working together to improve them. It aims to ensure that England's soils will be protected and managed to optimise the varied functions that soils perform for society (e.g. supporting agriculture and forestry, protecting cultural heritage, supporting biodiversity, as a platform for construction), in keeping with the principles of sustainable development.	The SEA should seek to ensure that the quality of the region's land, including soils, is protected or enhanced.
Defra (2005) Securing the Future: Delivering UK Sustainable Development Strategy	
The strategy for sustainable development aims to enable all people to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations. The strategy places a focus on protecting natural resources and enhancing the environment.	The SEA must seek to ensure that objectives relating to sustainable development, sustainable resource use and protecting the natural environment, are considered when assessing the potential impacts of the Water resource management Plan.
Defra (2005) Making space for water: taking forward a new government strategy for flood and coastal erosion risk management in England	
The strategy outlines how to manage the risks from flooding and coastal erosion in the UK. The strategy aims to reduce the threat of flooding to people and their property, and to deliver the greatest environmental, social and economic benefit, consistent with the Government's sustainable development principles.	The SEA should seek to ensure that flood risk in the region is not adversely affected by the implementation of the Water resource management Plan.
Natural Environment and Rural Communities Act (2006)	
This Act makes provision about bodies concerned with the natural environment and rural communities in connection with wildlife, sites of special scientific interest, National Parks and the Broads. The Natural Environment and Rural Communities Act is designed to help achieve a rich and diverse natural environment and thriving rural communities.	The SEA should seek to maintain or enhance the quality of habitats and biodiversity. The impacts of the Water resource management Plan on any designated features, as highlighted in the Natural Environment and Rural Communities Act, should be addressed.
Environment Agency (2007) Soil: A Precious Resource	
The soil strategy identifies the Environment Agency's priorities, sets out their role and says what action is to be taken to protect, manage and restore soil. Damaged soil structure can lead to flooding, water pollution and can affect the landscape and archaeological features. The strategy also outlines the part managing soils can play in mitigating climate change.	The Water resource management Plan should ensure the sustainable management of soil resources. SEA objectives should reflect and consider relevant priorities from the Soil: A Precious Resource publication.
Department for Business, Energy and Industrial Strategy (2020) Energy White Paper	
The Energy White Paper provides puts in place a strategy for the wider energy system that: Transforms energy, building a cleaner and greener future. Supports a green recovery, supporting thousands of green jobs across the country in new green industries and	The implementation of the Water resource management Plan may have an influence upon Bristol Water's total energy use. The SEA should seek to promote energy efficiency, as well as seeking to reduce the effects of climate change through greenhouse gas emissions.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
leveraging new green export opportunities. Creates a fair deal for consumers, protecting the fuel poor. It includes the goal that by 2050, emissions from industry will need to fall by around 90 per cent from today's levels.	The SEA should also promote the use of renewable energy, where relevant.
Defra (2007), Conserving Biodiversity in a Changing Climate: Guidance on Building Capacity to Adapt	
The guiding principles described in this document summarise current thinking on how to reduce the impacts of climate change on biodiversity and how to adapt existing plans and projects in the light of climate change. The guidance is intended to inform implementation of the UK Biodiversity Action Plan, taking account of climate change is relevant to the fulfilment of many international agreements and obligations affecting the UK.	The SEA must consider the impacts on biodiversity whilst also taking into account the potential for future climate change.
Defra (2011) Future Water: The Government's water strategy for England	
This strategy is the high level Government document which outlines how the Government wants the water sector to look by 2030, considering issues of water demand, water supply, water quality in the natural environment, surface water drainage, river and coastal flooding, greenhouse gas emissions and charging. It states that "by 2030 at the latest, we have: Improved the quality of our water environment and the ecology which it supports, and continued to provide high levels of drinking water quality from our taps Sustainably managed risks from flooding and coastal erosion, with greater understanding and more effective management of surface water Ensured a sustainable use of water resources, and implemented fair, affordable and cost-reflective charges.	The SEA should seek to ensure that the themes included in the strategy objectives are also reflected in the SEA objectives, particularly around water quality in the region, the quality of aquatic ecology, drinking water quality, resource use, energy use and greenhouse gas emissions, and adaptation to climate change.
The Climate Change Act 2008 & The Climate Change Act 2008 (2050 Target Amendment) Order 26 June 2019	
This act sets carbon targets for 2050. Originally the target was for net carbon account for 2050 at least 80% lower than 1990 baseline, however, this was revised in 2019 to be at least 100% lower in line with the net zero ambition. The 2019 amendment changed the UK carbon emissions reduction target from an 80% to a 100% reduction.	This target needs to be taken into account by the SEA. The new target from 2019 needs to be taken into account by the SEA objective for energy use and greenhouse gas emissions, and adaptation to climate change.
Defra (2008) England Biodiversity Strategy –climate change adaptation principles	
Government strategy presenting five principles that are fundamental to conserving biodiversity during climate change. The precautionary principle underlies all the principles.	The SEA must consider the impacts on biodiversity whilst also taking into account the potential for future climate change.
The Eels Regulations 2009	
Implement European Council Regulations 1100/2007 establishing measures for the recovery of the stock of European eel. The Regulations will help implement delivery Eel Management Plans. They address eel records and re-stocking, close season and reduction of fishing effort, passage of eels and entrainment. The key objective is to ensure that at least 40% of the potential production of silver eels returns to the sea to spawn. This will be achieved by reducing exploitation of all life-stages of the eel and restoration of their habitats.	The SEA should seek to maintain the quality of habitats and biodiversity and take regard of protected species identified. This should include migratory fish species and their migratory passage.
Defra (2009) Safeguarding our soils – A Strategy for England	

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
The new Soil Strategy for England – Safeguarding our Soils – outlines the Government's approach to safeguarding our soils for the long term. It provides a clear vision to guide future policy development across a range of areas and sets out the practical steps that we need to take to prevent further degradation of our soils, enhance, restore and ensure their resilience, and improve our understanding of the threats to soil and best practice in responding to them. The Governments vision is that: By 2030, all England's soils will be managed sustainably, and degradation threats tackled successfully. This will improve the quality of England's soils and safeguard their ability to provide essential services for future generations.	The SEA should seek to ensure that the quality of the regions soils and their management is protected or enhanced.
Environment Agency (2009), *Water Resources Strategy for England and Wales*	
Launched on 30 March 2009, covering the actions that the Environment Agency believes need to be taken to ensure that there is enough water for people and wildlife in the face of future pressures. These include: • climate change • population growth • diffuse pollution • water for wildlife and wetlands	The SEA should seek to ensure that strategy objectives are also reflected in the SEA objectives, particularly around water resource use and availability in the region.
Defra (2010) Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network	
This independent review of England's wildlife sites and the connections between them sets objectives and recommendations to help achieve a healthy natural environment that will allow our plants and animals to thrive.	The SEA should seek to maintain or enhance the quality of habitats and biodiversity.
Environment Agency (2010), *Water Resources Action Plan for England and Wales*	
The strategy has four main aims: • Adaptation to and mitigation of climate change; • A better water environment; • Sustainable planning and management of water resources; • People valuing water and the water environment.	The SEA should seek to ensure that strategy objectives are also reflected in the SEA objectives particularly regarding the sustainable management of water resources and protecting the environment.
Flood and Water Management Act (2010) as amended	
The Flood and Water Management Act 2010 aims to provide better, more comprehensive management of flood risk for people, homes and businesses. It aims improve efficiency in the water industry, improve the affordability of water bills for certain groups and individuals, and help ensure continuity of water supplies to the consumer.	The SEA should seek to ensure that flood risk in the region is not adversely affected by the implementation of the Water resource management Plan and that water supplies across the region are maintained.
Historic England (2021) Heritage at Risk	
Heritage at risk is a national programme that aims to identify the endangered sites (historic buildings and places with increased risks of neglect and decay) and then help secure them for the future. Regional Heritage at Risk Registers were most recently published in 2019.	The SEA should seek to protect and enhance and landscape.
Defra (2011) UK National Ecosystem Assessment Defra (2014) UK National Ecosystems Assessment Follow on, Synthesis of Key Findings	

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
Ecosystems services from natural capital contribute to the economic performance of the nation. Information and tools to enable decision makers to understand the wider value of ecosystems and their associated services.	For the purposes of the readership integrating an ecosystems services approach into the SEA is not being undertaken. However, it is realised that through the 'Objective-led' approach, many of the services relevant to the Water resource management Plan can be considered through the objectives and key questions for example: • Provisioning Services: Freshwater • Provisioning Services: Biodiversity • Regulating Services: Water Regulation • Cultural services: Recreation and ecotourism • Cultural services: Cultural heritage values • Cultural services: Aesthetic The SEA should ensure the Water resource management Plan effects the related provisioning services in the least damaging way through informing the Water resource management Plan formulation and selection of Water resource management Plan options during times of Water resource management. In the event of further guidance being issued on incorporating ESA into SEA, the anticipated approach is sufficiently flexible that it should be able to accommodate this (subject to timing).
Defra (2011) Water for Life – Water White Paper	
This sets out market reform in the water sector.	The Water resource management Plan should take into account the contents of this paper.
Defra (2011) The Natural Choice: securing the value of nature, The Natural Environment White Paper	
Addresses the Government's approach to valuing economic and social benefits of a healthy natural environment while continuing to recognise nature's intrinsic value. It describes the vision of the Government for this to be the first generation to leave the natural environment of England in a better state than it inherited, requiring placing the value of nature at the heart of decision-making – in Government, local communities and businesses. Approaches to mainstream the value of nature across society include: • facilitating greater local action to protect and improve nature; • creating a green economy, in which economic growth and the health of our natural resources sustain each other, and markets, business and Government better reflect the value of nature; • strengthening the connections between people and nature to the benefit of both; and showing leadership in the European Union and internationally, to protect and enhance natural assets globally	The Water resource management Plan supports the provisioning service of freshwater through ensuring security of supply during times of water resource management. The media campaigns that form part of the Demand side Water resource management Plan options may contribute towards increasing the awareness of the population to the value the provisioning services of water. Other related ecosystem services may include: • Provisioning Services: Biodiversity • Regulating Services: Water Regulation • Cultural services: Recreation and ecotourism • Cultural services: Cultural heritage values • Cultural services: Aesthetic The SEA should ensure the Water resource management Plan effects the related provisioning services in the least damaging way through informing the Water resource management Plan formulation and selection of Water resource management Plan options during times of Drought.
Defra (2011) Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services	
The objective for the next decade is: 'to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people.' Four action areas are: • A more integrated large-scale approach to conservation on land and at sea	The SEA must consider impacts on biodiversity. The implementation of the Water resource management Plan may influence biodiversity in the area and as such the SEA should seek to maintain or enhance the quality of habitats and biodiversity and take regards of priority species.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
• Putting people at the heart of biodiversity policy • Reducing environmental pressures • Improving our knowledge.	
Defra (2011) Government Review of Waste Policy in England 2011	
The review is guided by the "waste hierarchy", EU obligations and targets on waste management, carbon impacts, environmental objectives and the costs and benefits of different policy options. The Governments vision include a move beyond the current throwaway society to a "zero waste economy" in which material resources are re-used, recycled or recovered wherever possible, and only disposed of as the option of very last resort.	The Water resource management Plan may involve options that involve the generation of waste (e.g. either through construction requirements or operation of supply side options). The SEA should seek to enhance recycling and minimise the amount of waste going to landfill.
Department of Energy and Climate Change (2011) National Policy Statements for Energy Infrastructure	
The energy National Policy Statements (NPSs) set out national policy against which proposals for major energy projects will be assessed and decided on by the Infrastructure Planning Commission. The purpose of the NPSs is to develop a clear, long-term policy framework which facilitates investment in the necessary new infrastructure (by the private sector) and in energy efficiency. It highlights that the construction, operation and decommissioning of infrastructure can lead to increased demand for water, involve discharges to water and cause adverse ecological effects resulting from physical modifications to the water environment.	The SEA should consider the cumulative effects of the Water resource management Plan and any major energy proposals which may affect the availability of water in the Bristol Water supply area.
Environment Agency (2011) National Flood and Coastal Risk Management Strategy for England	
This strategy provides the overarching framework for future action by all risk management authorities to tackle flooding and coastal erosion in England, building on existing approaches. Risk should be managed in a co-ordinated way within catchments and along the coast and balance the needs of communities, the economy and the environment. This strategy will form the framework within which communities have a greater role in local risk management decisions and sets out the Environment Agency's strategic overview role in flood and coastal erosion risk management (FCERM).	The SEA should consider how the Water resource management Plan may affect flood and coastal risk across the region.
Natural England (2011) *UK Geodiversity Action Plan*	
The UKGAP sets out of framework for geodiversity action across the UK. It provides a shared context and direction for the protection and enhancement of geodiversity through a common aim, themes, objectives and targets which link national, regional and local activities. The UKGAP consists of six broad themes: 1. Furthering our understanding of geodiversity 2. Influencing planning policy, legislation and development design 3. Gathering and maintaining information on our geodiversity 4. Conserving and managing our geodiversity 5. Inspiring people to value and care for our geodiversity 6. Sustaining resources for our geodiversity	The Water resource management Plan should have regard to the aims and objectives of the UKGAP. The SEA framework should consider effects of options on geodiversity and outline enhancement and mitigation opportunities where these are identified.
Defra (2012) The UK Evidence Report	
Five themes are identified that form the priorities for adaptation in the UK.	The SEA should take into account the need for climate change adaptation.
Defra (2012) National Policy Statement for Waste Water	

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
National Policy Statement (NPS) sets out Government policy for the provision of major waste water infrastructure. It will be used by the Infrastructure Planning Commission (IPC) to guide its decision making on development consent applications for waste water developments that fall within the definition of Nationally Significant Infrastructure Project (NSIP) as defined in the Planning Act 2008.	The SEA should seek to ensure the Water resource management Plan considers any unforeseen NSIP proposals that come forward prior to adoption which may affect water resources in the Bristol Water area.
Environment Agency (2013), *Managing Water Abstraction*	
This sets out how the EA manages water resources in England.	The SEA should consider the range of impacts that changes to abstractions could have on the environment, including water bodies, biodiversity, and water users.
Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment	
Guidance for addressing the historic environment in Strategic Environmental Assessment or river bas. It identifies the recommended list of plans, programmes and policies for review, approach to baseline review, potential sustainability issues.	The SEA should consider the potential effects of the Water resource management Plan on the historic environment, particularly designated assets and their settings, and to important wetland areas with potential for palaeo-environmental deposits. Historic characterisation can supplement information about designations. Sustainability issues, objectives and indicators identified in this document should be taken into account in the SEA.
Defra and Welsh Government (2014) River Basin Planning Guidance	
Aims to give guidance on practical implementation of the Water Framework Directive (WFD). The river basin planning process involves setting environmental objectives for all groundwater and surface waters (including estuaries and coastal waters) within the river basin district, and devising programmes of measures to meet those objectives.	The Water resource management Plan should take into account the contents of this statutory guidance
Defra (2015) The Great Britain Invasive Non-native Species Strategy	
The Strategy is intended to provide a strategic framework, updated from the 2008 framework, within which the actions of government departments, their related bodies and key stakeholders can be better co-ordinated. Its overall aim is to minimise the risks posed, and reduce the negative impacts caused, by invasive non-native species in Great Britain.	The implementation of the Water resource management Plan may influence biodiversity in the south east and as such the SEA should seek to maintain or enhance the quality of habitats and biodiversity.
Historic England (2015) Historic Environment Good Practice Advice in Planning Note 3	
This provides guidance on managing change within settings of heritage assets. This includes archaeological remains, historic buildings, sites, areas and landscapes.	The SEA should take into account effects on settings of heritage assets.
Environment Agency (2017) Drought response: our framework for England	
This framework describes how drought affects England and how the EA works closely with the government, water companies and others to manage the effects of drought on people, business and the environment. Specifically, the framework sets out: • How drought affects different parts of England • Who is involved in managing drought and how they work together • How the agency and others take action to manage drought	The supply of water resources in the region may be affected by future drought, therefore this framework is linked closely with the Water resource management Plan. The Water resource management Plan and SEA need to take account of the guidance provided by the Environment Agency.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
• How we monitor and measure the impacts of drought to advise senior management and government on the prospects and possible action How we report on drought and communicate with others	
Defra, Environment Agency, Natural England, Forestry Commission England (2016) Creating a great place for living	
Sets out a number of objectives linked to creating a great place for living. The objectives are related to the following topics: • Environment – a cleaner, healthier environment, benefiting people and the economy; • Food and farming – a world-leading food and farming industry; • Rural – a thriving rural economy, contributing to national prosperity and wellbeing; • Protection – a nation better protected against floods, animal and plant diseases and other hazards, with strong response and recovery capabilities; • Excellent Delivery – Excellent delivery, on time and to budget with outstanding value for money; An outstanding organisation – an organisation striving to be the best, focused on outcomes and constantly challenging itself.	The SEA must take into account impacts of the water resource management options (construction and operation) on the environment, as well as the population and human health and land use (which will impact on the food and farming and rural objectives).
HM Government (2016) National Infrastructure Delivery Plan 2016-2021	
This plan updates and replaces the previous National Infrastructure Plan and takes a targeted approach to infrastructure investment and delivery across different sectors over five years. These are all critical to support economic growth through the expansion of private sector businesses across all regions and industries, to enable competitiveness and to improve the quality of life of everyone in the UK. The plan recognises the pressure on future water and waste services from population growth and climate change.	The Water resource management Plan could result in the production of additional waste. The SEA should seek to reduce the production of waste and ensure it is treated in line with the widely adopted 'waste hierarchy' and not sent to landfill. The Water resource management Plan can contribute to the providing resilient water services.
HM Treasury Infrastructure UK (2014) National Infrastructure Plan	
The Plan focusses on economic infrastructure: the networks and systems in energy, transport, digital communication, flood protection, water and waste management. These are all critical to support economic growth through the expansion of private sector businesses across all regions and industries, to enable competitiveness and to improve the quality of life of everyone in the UK. The objectives for the water sector are 'to secure a fair deal for customers while enabling water companies to continue to attract low-cost investment needed to provide the high quality, resilient water services customers want.'	The SEA objectives should take into account the objectives for the water sector presented in this plan.
Historic England (2016) Climate Change and the Historic Environment	
Sets out the current thinking on the implications of climate change for the historic environment. It is intended both for the heritage sector and also for those involved in the wider scientific and technical aspects of climate change; in the development of strategies and plans relating to the impact of climate change; or in projects relating to risk assessment, adaptation and mitigation.	The SEA should seek to assess the implications of the Water resource management Plan in combination with climate change and the potential impacts on heritage and the historic environment.
Conservation of Habitats and Species Regulations (as amended) 2017	

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
These regulations consolidate all the various amendments made to the Conservation (Natural Habitats) Regulations 1994 in England. The regulations provide for the designation and protection of 'European sites', the protection of 'European species', and the adaptation of planning and other controls for the protection of European Sites. They are the principal means by which the Habitats Directive is transposed in England as such its main objective is to promote the maintenance of biodiversity.	The Water resource management Plan must fully comply with the Regulations. The impacts of the Water resource management Plan options on biodiversity and protected species and sites must be considered as part of the SEA.
HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment	
This plan sets out government action to help the natural world regain and retain good health. It aims to deliver cleaner air and water in cities and rural landscapes, protect threatened species and provide richer wildlife habitats – using a natural capital approach to better-inform policy. By adopting the plan, the government aims to achieve clean air; clean and plentiful water; thriving plants and wildlife; a reduced risk of harm from environmental hazards such as flooding and drought; using resources from nature more sustainably and efficiently; and enhanced beauty, heritage and engagement with the natural environment. In addition, the plan will set out to manage pressures on the environment through; mitigating and adapting to climate change, minimising waste, managing exposure to chemicals and enhancing biosecurity. The six key areas for action are: • Using and managing land sustainably, which includes embedding an 'environmental net gain' principle for development (including housing and infrastructure) • Recovering nature and enhancing the beauty of landscapes • Connecting people with the environment to improve health and wellbeing • Increasing resource efficiency, and reducing pollution and waste • Securing clean, productive and biologically diverse seas and oceans Protecting and improving the global environment	The Water resource management Plan may influence the environmental benefits and pressures identified in the Environment Plan, such as: • Clean air • Clean and plentiful water • Thriving plants and wildlife • Reducing risks of harm from environmental hazards • Using resources from nature more sustainably and efficiently • Enhancing beauty, heritage and engagement with the natural environment • mitigating and adapting to climate change • minimising waste • managing exposure to chemicals • enhancing biosecurity The SEA should ensure that the impacts of any water resource management options on the 25-year goals set out in the Environment Plan are fully considered, whilst taking into account environmental net gain and natural capital approach, which the government have identified as principle themes.
Ministry of Housing, Communities and Local Government (2019) National Planning Policy Framework	
The NPPF sets out the Government's planning policies for England. The revision to the NPPF published in February 2019 broadly continues the guidance set out in the 2012 NPPF, with more emphases on housing, design, efficient use of land and continued reference to an objective of achieving net gains. It constitutes guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications. At the heart of the NPPF is a presumption in favour of sustainable development. However, the 'presumption in favour of sustainable development' is not applicable where any adverse impacts would significantly outweigh the benefits, when assessed against all policies in the NPPF or where	Any permanent construction activities in the Water resource management Plan should take account of the key components of the NPPF to ensure sustainable development and seek to promote biodiversity net gain.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
specific policies indicate development should be restricted. This includes proposed developments that affect European designated sites, Green Belt or AONB land. It presents guidance under broad themes which include: Promoting healthy and safe communities; Meeting the challenge of climate change, flooding and coastal change; Conserving and enhancing the natural environment; and Conserving and enhancing the historic environment.	
Department for Energy and Climate Change (2020) Energy White Paper: Powering our Net Zero Future	
The white paper outlines a series of policies and commitments made by the government as part of the transition to net zero carbon emissions. The strategies are threefold: Prioritisation of renewable sources energy generation and invest in low-carbon technologies Supporting a green recovery from COVID-19 through investment in green industries Creating a fair deal for consumers through facilitating competition, enhanced regulation and strategies to improve the energy performance of homes.	The implementation of the WRMP may have an influence upon the Bristol Water area's total energy use. The SEA should seek to promote energy efficiency, as well as seeking to reduce the effects of climate change through greenhouse gas emissions. The SEA should also promote the use of renewable energy, where relevant.
Environment Agency (2020) Meeting our future water needs: a national framework for water resources	
The organisations responsible for England's water supplies have understood the long term needs of sectors that depend on a secure supply of water – public water supply, agriculture, power generation, industry and the environment. These needs will be met through the development of regional water resources plans. Agreed what the regional plans should deliver and how, so they drive a step-change in water resources planning. The national framework identifies strategic water needs for England and its regions across all sectors up to and beyond 2050. Sets out a strategic direction for the work being carried out by regional water resources groups by exploring the range of approaches available to meet the likely pressures	The Water resource management Plan should consider the water resource framework and what it states should be included in a plan.
Environment Agency (various dates) Abstraction Licensing Strategies	
Sets out how much water is available for abstraction within each key river catchment, taking into account the needs of the environment and existing abstractors.	The Water resource management Plan should consider relevant catchment strategies and any environmental protection measures of relevance to the Water resource management Plan options.
Defra (2020) Enabling a Natural Capital Approach (ENCA)	
ENCA resources are a mixture of data, guidance and tools that enable individuals/ organisations to understand natural capital and know how to take it into account. The aims of ENCA are to: • Build capacity among users to assess and value the natural environment by providing comprehensive information and resources • Reduce search costs for analysts and decision makers • Provide a platform to update tools and guidance as knowledge develops • Identify new evidence and areas for development The guidance is a comprehensive document providing information and resources for Natural Capital, covering the natural capital framework, economic valuation of the	The SEA will help to inform future development by TWUL and therefore should consider the effect of the water resource management options on opportunities for natural capital.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
environment, how project or policy appraisal can incorporate natural capital, natural capital accounting principles and methods, benefits and challenges and applying natural capital at a local level.	
Environment Agency (undated) Hydroecology: Integration for modern regulation	
This paper describes clear way forward in terms of hydroecology and a strategic direction to its development and application.	The Water resource management Plan and SEA should ensure relevant ecological considerations are integral to water resource evaluation and management decisions across the range of temporal and spatial scales.
The Environmental Damage (Prevention and Remediation) (England) Regulations 2015	
These regulations amend the 2009 regulations and provide additional protection to habitats and species identified on Annexes 1 and 2 of the EC Habitats Directive (92/43/EEC), SSSIs and, in some cases, classified waterbodies from environmental damage where an operator has intended to cause damage or been negligent to the potential for damage. Applies to the most serious categories of environmental damage, including; Contamination of land that results in a significant risk of adverse effects on human health. Adverse effects on surface water or groundwater consistent with a deterioration in the water's status. Adverse effects on the integrity of an SSSI or on the conservation status of species and habitats protected by EU legislation outside SSSIs.	The SEA should seek to ensure that the guidance is considered when assessing the WRMP.
Environment Agency (undated), *WFD River Basin Characterisation Project: Technical Assessment Method - River abstraction and flow regulation*	
This paper describes the method used to assess the likelihood of river water bodies achieving the relevant WFD objectives as a result of artificial influences on low river flows.	Implementation of the Water resource management Plan may impact river water quality. The SEA should seek to promote the protection and enhancement of biodiversity and river water quality across the region.
Defra (2007) The Air Quality Strategy for England, Scotland and Wales	
This strategy identifies air quality objectives and policy options to further improve air quality in the UK from into the long term. The options are intended to provide important benefits to quality of life and help protect the environment as well as the direct benefits to public health.	The implementation of the Water resource management Plan may have some influence on air quality, either directly or indirectly through construction or operation activities. The SEA should seek to ensure that the region's air quality is maintained or enhanced, and that emissions of air pollutants are kept to a minimum.
Department of Energy and Climate Change (2011) Planning our electric future: a White Paper for secure, affordable and low carbon electricity	
This white paper outlines a package of reforms so that by 2030 there will be a flexible, smart and responsive electricity system, powered by a range of low carbon sources of electricity. This includes engaging with consumers on energy use. Decarbonisation is important in meeting the 2050 targets.	The implementation of the Water resource management Plan may have an influence upon Bristol Water's total energy use. The SEA should seek to promote energy efficiency, as well as seeking to reduce the effects of climate change through greenhouse gas emissions. The SEA should also promote the use of renewable energy, where relevant.
Regional and Local	
Bristol Water (2019) Business Plan 2020-2025: Bristol Water For All)	
The business plan sets out proposals from Bristol Water for customers, stakeholders and for Ofwat. It includes proposals for price controls for 2020-25, set in a longer-term context for the future of water services for all the communities Bristol Water serves. The plan outcomes were developed with customers' priorities in mind:	The Water resource management Plan should seek to support he Business Plan and the SEA framework should consider and echo the priorities set out in the Business Plan.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
Outcome 1: Excellent Customer Experiences Outcome 2: Local Community and Environmental Resilience (which includes initiatives to deliver on the promise of building biodiversity and protecting the environment such as the performance commitment regarding Bristol Water's biodiversity index and compliance with the Water Industry National Environment Programme (WINEP). Outcome 3: Safe and Reliable Supply of Water Outcome 4: Corporate and Financial Resilience	
Bristol Water (2019) Final Water Resources Management Plan 2019	
The Water Resources Management Plan 2019 (WRMP19) presents Bristol Water's approach to the management of water resources for the benefit of customers, the wider community and the environment in the period 2020 to 2045. The WRMP19 is closely linked with the findings of the process to develop the existing Bristol Water Drought Plan (2018).	The Water resource management Plan will take into account the objectives of Bristol Waters WRMP.
Natural England Site Improvement Plans (2014-15): South West (SIPs)	
SIPs have been developed as part of the Improvement plan for England's Natura 2000 sites. These plans outline the current and predicted issues affecting the sites and the measures required to improve their condition. These are live documents intended to reflect changes in the evidence base. Objectives of site improvement plans include: • Control of Invasive species • Management of public access and land use • Monitoring and action against diseases that affect trees. Monitoring of species distribution and identifying any necessary action.	The SEA should seek to maintain or enhance the quality of habitats and biodiversity. The impacts of the Water resource management Plan on Natura 2000 sites should be addressed.
Environment Agency and Defra, (2015) River Basin Management Plan for Severn and South West River Basin Districts	
River basin management plans provide a framework for protecting and enhancing the benefits provided by the water environment. Water and land resources are closely linked and so the plans also inform decisions on land-use planning. Environmental objectives include the following: • Prevention of deterioration to the status of surface waters and groundwater. • To achieve objectives and standards for protected areas. • To aim to achieve good status for all water bodies or, for heavily modified water bodies • and artificial water bodies, good ecological potential and good surface water chemical status. • Reversal of any significant and sustained upward trends in pollutant concentrations in Groundwater. • The cessation of discharges, emissions and loses of priority hazardous substances into surface waters. • To progressively reduce the pollution of groundwater and prevent or limit the entry of Pollutants.	The Water resource management Plan will need to ensure that it is consistent with the principles of the River Basin Management Plan and that it does not adversely affect the issues identified as significant water management issues.
Bristol Avon Catchment Partnership (2016) Catchment Plan	
The Bristol Avon Catchment Management Plan is the product of consultation with a range of stakeholders. The	The Water resource management Plan operation may have the potential to affect several of the Catchment

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
Bristol Avon Catchment Partnership have formulated a strategy to deliver a healthy river with high quality environment for both people and wildlife. It is also intended as a route to achieve Water Framework Directive Objectives. It summarises key issues in the catchment and outlines a shared vision for how assets can be maintained and enhanced. The Partnership Actions are as follows: • To improve public understanding about the value and services provided by the catchment. • To improve water and flood risk management. • Improve land management and sustainable agriculture. • To improve wastewater management. • To improve river management. • To Improve recreation management. To Increase and better coordinate investment opportunities.	Management Plans objectives. The SEA will include objectives that take into account the objectives of the Plan where relevant
Local Plans and Core Strategy for impacted local authorities – Bristol, North Somerset, South Gloucestershire and Bath and North East Somerset	
Local plan forms part of each local authority's statutory Development Plan. In their local plans each local authority identifies the main social, physical and economic characteristics and issues present. The plans then outline strategic objectives for future developments and a delivery strategy to accompany these. Strategic Objectives include: • Ensuring a sustainable future and developing green capital. • Enabling ambitious and sustainable economic growth. • Appropriate housing provision and a high-quality built environment. • Fostering a pattern of development that improves health and wellbeing. • Effective waste management and minimisation of waste in new development. Adapting to climate change and promotion of renewable energy.	Options in the Water resource management Plan have potential to cause social, economic and environmental effects. The SEA assessment framework should consider the effects of the Water resource management Plan on the achievement of the strategy's key priorities and the effects on water management, natural capital, landscape and biodiversity.
Bristol Health and Wellbeing Policy 2020-2025	
This strategy seeks to reduce the disparity in health outcomes between deprived and affluent areas of Bristol. It aims for citizens to thrive in a city that support mental and physical health and wellbeing.	The Water resource management Plan and SEA should take account of the aims of the strategy to promote health outcomes.
Historic England, Heritage at Risk Register: South West (2021)	
The Heritage at Risk register is produced annually and documents the buildings and structures, places of worship, archaeological sites, battlefields, wrecks, parks and gardens, and conservation areas known to be at risk in the region.	The WRMP should have special regard to heritage that is on the Heritage at Risk register for the South West.
Environment Agency (2009 and 2012) Catchment Flood Management Plans; Bristol Avon, Severn Tidal Tributaries, North and Mid Somerset	
Catchment flood management plans (CFMPs) explore all forms of inland flooding including fluvial groundwater, surface water and tidal flooding. In addition, CFMPs include: • Potential impacts of climate change • The effects of current land use and land management.	The Water resource management Plan links to this plan where it affects flood risk or land management, for example through changes in abstraction or water storage. The SEA should consider how the Water resource management Plan may affect flood risk across the region.

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
• Sustainable management of flood risk areas and the preservation of vital assets. CFMPs also help to establish effective management for future flood risk.	
Environment Agency (2016) South West and Severn River Basin Districts, Flood risk management plans 2015-2021	
Over the 6-year period of implementation the Flood Risk Management Plan has sought to: • Reduce flood risk to people, property, infrastructure and services. • Enable regeneration of existing communities and businesses. • Increase resilience of South West transport infrastructure. • Promote understanding of flood risk. • Align the priorities of different River Management Authorities. • Protect and work with natural river processes and restore watercourses to their natural state. • Promote environmental benefits and achieve WFD objectives through Flood Risk Management activities. • Improve understanding of the influence of land use changes and support land use managers to deliver beneficial practices.	The Water resource management Plan links to these plans where it affects flood risk or land management, for example through changes in abstraction or water storage. The SEA should consider how the Water resource management Plan may affect flood risk across the region.
The Cotswolds AONB Management Plan 2018-2023 & The Mendip Hills AONB 2019-2024	
Objectives include those associated with conserving and enhancing the condition of the AONBs.	The WRMP has the potential to affect several of the objectives for the Cotswolds and the Mendip Hills AONB. The SEA will include objectives that account for the objectives of the AONBs where relevant.
National Character Area (NCA) profiles for areas impacted by the Drought Plan	
NCA profiles are guidance documents intended to inform community decision making regarding each of the NCAs. They support the planning of conservation initiatives, inform the delivery of Nature Improvement Areas and encourage collaborative working through Local Nature Partnerships. Each profile contains Statements of Environmental Opportunity (SEOs) that offer guidance on critical issues within the area and promote sustainable growth. NCAs within the WRMP area are as follows: Avon Vales, Bristol Avon Valleys & Ridges, Cotswolds, Mendip Hills, Mid Somerset Hills, Severn & Avon Vales and Somerset Levels & Moors.	The Water resource management Plan may have an effect on NCAs. The SEA should include objectives that take into account the objectives of the NCAs where relevant (e.g. manage and enhance existing habitats).
Air Quality Annual Status Reports for Bristol City Council, South Gloucestershire District Council and North Somerset Council (2019)	
These reports provide an overview of air quality in each of the local authorities. They review the current standard of air quality in their areas and compare them to national statutory air quality objectives. The Annual Status Reports demonstrate the strategies employed by the council and any progress that has been made towards improving air quality.	The implementation of the Water resource management Plan may have some influence on air quality, either directly or indirectly, through construction or operational activities. The SEA should take account of the need to ensure that the region's air quality is maintained or enhanced, and that emissions of air pollutants are kept to a minimum. Seek to help meet regional air quality targets.
Bristol City Council Mayor's Climate Emergency Action Plan (2019), South Gloucestershire Council: Local Greenhouse Gas Report (2019/2020), North Somerset Climate Emergency Strategy 2019	
This plan outlines Bristol City Council's approach to management of the historic environment of the city. The objectives of the plan are to safeguard heritage for future	The implementation of the Water resource management Plan may have an influence on the heritage of the region, in particular if options affect surface water

Objectives identified in the Policy, Plan or Programme	Influences on the Water Resource MANAGEMENT Plan and the SEA objectives
generations, promote a sustainable urban environment and to ensure the effective use of limited council resources and community input.	levels. The SEA should seek to ensure any adverse effects on heritage assets are minimised or avoided.
Individual Conservation Area Appraisals	
Conservation Area Appraisals support the management of change in a way that conserves and enhances the character and appearance of historic areas. They interact with local and neighbourhood plans. Objectives include: • Identification of new conservation areas or extensions to existing assets. • Appraisal of conservation areas. • Designation of sites. • Managing proposals in conservation areas. Review of current conservation areas.	The Water resource management Plan and SEA should consider the need to protect conservation areas.
Bristol City Council: Our Inherited City: Heritage Statement Guidance: 2020	
This plan outlines Bristol City Council's approach to management of the historic environment of the city. The objectives of the plan are to safeguard heritage for future generations, promote a sustainable urban environment and to ensure the effective use of limited council resources and community input.	The implementation of the Water resource management Plan may have an influence on the heritage of the region, in particular if options affect surface water levels. The SEA should seek to ensure any adverse effects on heritage assets are minimised or avoided.
South Gloucestershire Local Plan: Policies, Sites and Policies Plan Adopted November 2017	
The objectives of the South Gloucestershire Local Plan: Policies, Sites and Places Plan include: • Responding to Climate Change and high-quality design. • Managing Future Development. • Tackling congestion and improving accessibility • Managing the Environment and Heritage. • Maintaining Economic Prosperity. • Providing Housing and Community Infrastructure.	The Water resource management Plan may influence local plan objectives. The SEA should include objectives that consider the objectives of the South Gloucestershire Plan where relevant.

Appendix B – Quality Assurance Checklist

ODPM Guidance[92] on SEA contains a Quality Assurance checklist to help ensure that the requirements of the SEA Directive are met. The checklist is reproduced below, indicating where this Scoping Report meets the requirements, and which requirements will be addressed in the Environmental Report.

Checklist Item	Comments
Objectives and Context	
The plan's or programme's purpose and objectives are made clear	The purpose of the WRMP is set out in Section 1.1 of this Scoping Report.
Environmental issues and constraints, including international and EC environmental protection objectives, are considered in developing objectives and targets	Objectives of other plans and programmes are set out in Section 3 and Appendix A.
SEA objectives, where used, are clearly set out and linked to indicators where appropriate	Draft objectives are set out in Section 5 of this Scoping Report.
Links with other plans, programmes and policies are identified and explained	Links are identified in in Section 3 and Appendix A.
Conflicts that exist between SEA objectives, between SEA and plan objectives and between SEA objectives and other plan objectives are identified and described	Any such compatibility conflicts would be identified as part of the cumulative assessment completed during the assessment of options and would be presented in the Environment Report.
Scoping	
Consultation Bodies are consulted in appropriate ways and at appropriate times on the content and scope of the Environmental Report	This Scoping Report is part of the consultation process required to meet the requirements of the SEA Directive and will be circulated to consultees. Further Consultation will be undertaken on the Environmental Report and Draft WRMP. The Consultation Process is described in Section 8.
The assessment focusses on specific issues	The proposed scope of the assessment reflects the geographic extent of Bristol Water's supply area and provides a comprehensive approach to assessment of potentially .
Technical, procedural and other difficulties encountered are discussed; assumptions and uncertainties are made explicit	Assumptions are discussed in Section 4.1.1 of this Scoping Report.
Reasons are given for eliminating issues from further consideration	The proposed objectives provide a comprehensive basis for assessment and at this stage, no issues have been eliminated.
Alternatives	
Realistic alternatives are considered for key issues, and the reasons for choosing them are documented	The appraisal framework, which will be revised following consultation, will be used to assess options, programmes and the plan. This will be set out in the Environmental Report.
Alternatives include 'do minimum' and / or 'business as usual' scenarios wherever relevant	Assessment of alternatives will be considered in the Environmental Report.
The environmental effects (both adverse and beneficial) of each alternative are identified and compared	Assessment of alternatives will be considered in the Environmental Report.
Inconsistencies between the alternatives and other relevant plans, programmes and policies are identified and explained	Assessment of alternatives will be considered in the Environmental Report.
Reasons are given for the selection or elimination of alternatives	Assessment of alternatives will be considered in the Environmental Report.

[92] Office of the Deputy Prime Minister (2005) A Practical Guide to the Strategic Environmental Assessment Directive

Baseline information	
Relevant aspects of the current state of the environment and their likely evolution without the plan or programme are described	The current state of the environment and predicted future baseline is set out in Section 4 of this Scoping Report for each SEA topic.
Environmental characteristics of areas likely to be significantly affected are described, including areas wider than the physical boundary of the plan area where it is likely to be affected by the plan	The environmental characteristics of Bristol Water's water supply area, and bordering regions where appropriate, are described in Sections 1.1, 2.2 and Section 4.
Difficulties such as deficiencies in information or methods are explained	Difficulties and limitations are set out in Section 4.1.1 of this Scoping Report.
Prediction and evaluation of likely significant environmental effects	
Effects identified include the types listed in the Directive (biodiversity, population, human health, fauna, flora, soil, water, air, climate factors, material assets, cultural heritage and landscape), as relevant; other likely environmental effects are also covered, as appropriate	Potential environmental effects will be set out in the Environmental Report.
Both positive and negative effects are considered, and the duration of effects (short, medium or long-term) is addressed	The nature and duration of potential effects will be set out in the Environmental Report, using an appraisal framework based on the one in Section 5 of this Scoping Report.
Likely secondary, cumulative and synergistic effects are identified where practicable	Potential secondary, cumulative and synergistic effects will be set out in the Environmental Report as described in Section 5..
Inter-relationships between effects are considered where practicable	Potential inter-relationship effects will be set out in the Environmental Report.
The prediction and evaluation of effects makes use of relevant accepted standards, regulations and thresholds	Relevant standards will be used where appropriate in undertaking the assessment in the Environmental Report.
Methods used to evaluate the effects are described	The Environmental Report will include information on the methods used for evaluation of potential effects.
Mitigation measures	
Measures envisaged to prevent, reduce and offset any significant adverse effects of implementing the plan or programme are indicated	Mitigation measures for potential negative effects will be incorporated into the assessment undertaken in preparing the Environmental Report.
Issues are to be taken into account in project delivery	Such mitigating measures, if required, will be highlighted against the options in the plan.
The Environmental Report	
Is clear and concise in its layout and presentation	The Environmental Report will be clear and concise.
Uses simple, clear language and avoids or explains technical terms	The Environmental Report will use simple, clear language, and explain technical terms, as appropriate.
Uses maps and other illustrations where appropriate	The Environmental Report will use maps and illustration where appropriate.
Explains the methodology used	The SEA methodology will be described in the Environmental Report.
Explains who was consulted and what methods of consultation were used	The consultation strategy, including organisations and dates of consultation will be included in the Environmental Report.
Identifies sources of information, including expert judgement and matters of opinion	Sources of information will be detailed in the Environmental Report.
Contains a non-technical summary covering the overall approach to the SEA, the objectives of the	The Environmental Report will include a Non-Technical Summary.

plan, the main options considered, and any changes to the plan resulting from the SEA	
Consultation	
The SEA is consulted on as an integral part of the plan-making process.	This Scoping Report is a part of the consultation process required to meet the requirements of the SEA Directive and will be circulated to consultees. Further consultation will be undertaken on the Environmental Report and draft WRMP. The Consultation process is described om Section 8.
Consultation Bodies and the public likely to be affected by, or having an interest in, the plan or programme are consulted in ways and at times which give them an early and effective opportunity within appropriate time frames to express their opinions on the draft plan and Environmental Report	This Scoping Report is a part of the consultation process required to meet the requirements of the SEA Directive and will be circulated to consultees. Further consultation will be undertaken on the Environmental Report and draft WRMP. The Consultation process is described om Section 8.
Decision-making and information on the decision	
The environmental report and the opinions of those consulted are taken into account in finalising and adopting the plan or programme	Responses from consultation on the draft Environmental Report will be incorporated in the development of the final Environmental Report. After finalisation of the WRMP, a statement will be published describing how the SEA and the responses to consultation have been taken into account during the preparation of the WRMP.
An explanation is given of how they have been taken into account	Responses from consultation on the draft Environmental Report will be incorporated in the development of the final Environmental Report. After finalisation of the WRMP, a statement will be published describing how the SEA and the responses to consultation have been taken into account during the preparation of the WRMP.
Reasons are given for choosing the plan or programme as adopted, in the light of other reasonable alternatives considered	This will be set out following consultation on the draft WRMP and Environmental Report.
Monitoring measures	
Measures proposed for monitoring are clear, practicable and linked to the indicators and objectives used in the SEA	The Environmental Report will include a section addressing proposals for monitoring.
Monitoring is used, where appropriate, during implementation of the plan or programme to make good deficiencies in baseline information in the SEA	The suggestions for monitoring will be made in the Environmental Report, with monitoring taking place following implementation of the WRMP, further to consultation with regulatory authorities including the Environment Agency and Natural England.
Monitoring enables unforeseen adverse effects to be identified at an early stage. (These effects may include prediction which prove to be incorrect)	The suggestions for monitoring will be made in the Environmental Report, with monitoring taking place following implementation of the WRMP, further to consultation with regulatory authorities including the Environment Agency and Natural England.
Proposals are made for action in response to significant adverse effects	Mitigation measures for adverse effects will be addressed in the Environmental Report.

T: +44 (0) 1235 75 3000
E: enquiry@ricardo.com
W: ee.ricardo.com