

# **NORTHUMBRIAN WATER WRMP24 STRATEGIC ENVIRONMENTAL ASSESSMENT**

## **Scoping Report**

Mott MacDonald | June 2022

## FOREWORD

Northumbrian Water has commissioned Mott MacDonald to undertake a Strategic Environmental Assessment for our draft Water Resource Management Plan 2024 (WRMP24).

Our WRMP24 sets out how we intend to maintain the balance between supply and demand for water between 2025 and 2080. Our WRMP24 needs to ensure a secure and sustainable supply of water, focus on efficiently delivering the outcomes that our customers want, while reflecting the value that society places on the environment.

The Strategic Environmental Assessment (SEA) of our WRMP24 will meet the requirements of the SEA Directive and the Environmental Assessment of Plans and Programmes Regulations 2004 to assess the effect of our plan on the environment. It will also inform our decision-making process and help us to put forward a best value plan.

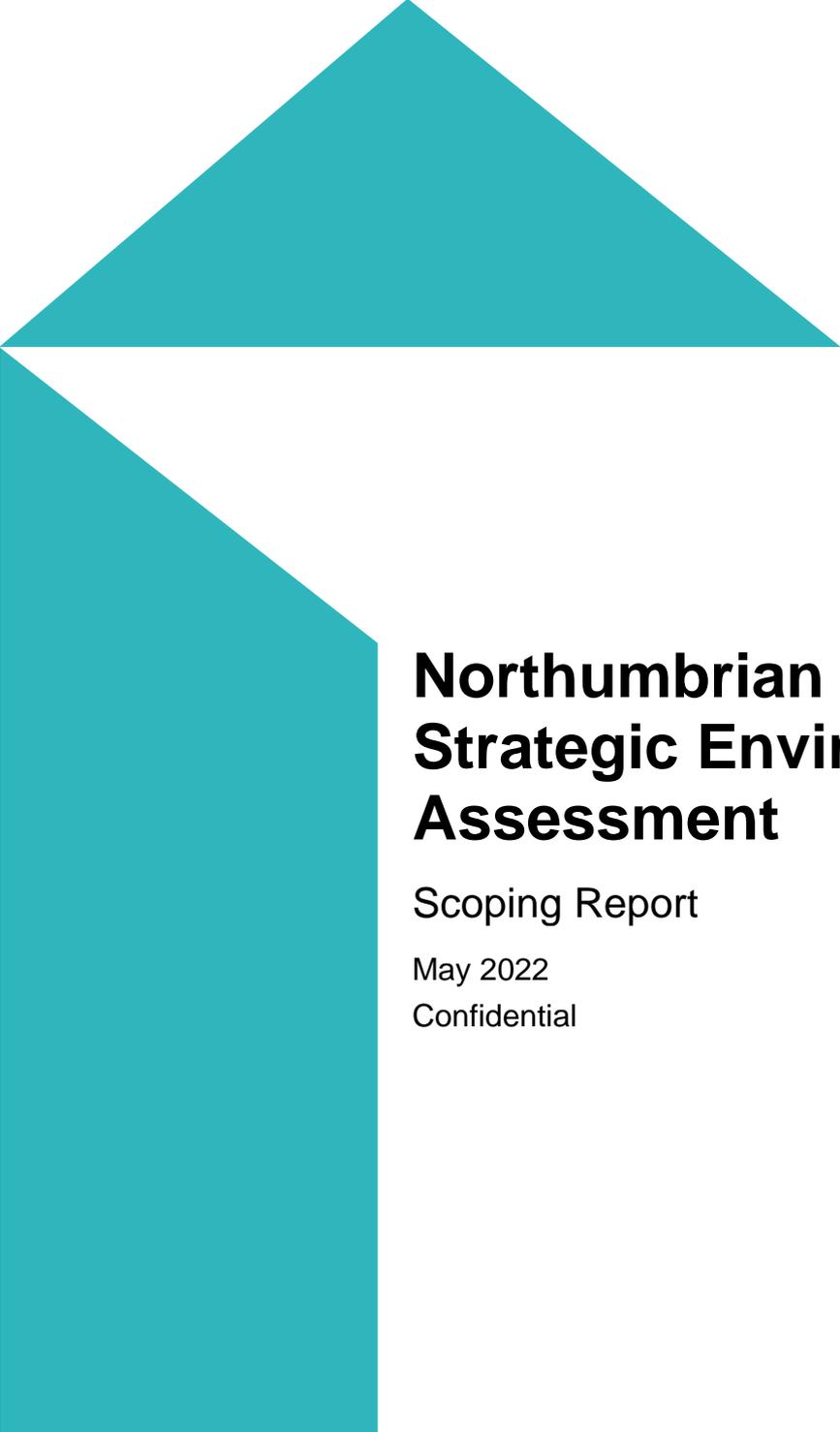
This SEA Scoping Report is the first stage of the SEA process and presents information on the context and scope of our SEA.

We have issued this SEA Scoping Report for consultation to the Environment Agency, Natural England, Historic England and made it available via our [website](#) to other stakeholder organisations and individuals, for a five-week consultation period from Friday 10 June 2022. Once the consultation period has finished, all consultation responses will be carefully reviewed and tabulated, and considered as far as possible. The SEA assessment will be reported in the Environmental Report, which will include all the other environmental assessments we are undertaking and will be published alongside our Draft WRMP24 later this year.

As part of this consultation on our SEA Scoping Report we would welcome your views on the following key questions:

- Do you have any comments on the baseline information presented or any additional baseline information you think would be useful?
- Do you have any comments on the key issues and opportunities identified?
- Do you have any comments on the proposed SEA objectives and assessment questions/sub-themes?
- Do you have any comments on the overall approach and environmental assessment methodology?

Please send your views by email to [waterresources@nwl.co.uk](mailto:waterresources@nwl.co.uk) – the deadline is 5.00pm on Friday 15 July 2022.



# **Northumbrian Water WRMP24 Strategic Environmental Assessment**

Scoping Report

May 2022

Confidential



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Scoping Report

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# Issue and Revision Record

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# Executive summary

## Introduction

Water companies have a statutory obligation to produce a Water Resources Management Plan (WRMP), which sets out how a company intends to maintain the balance between supply and demand for water over a minimum 25-year period. In the development of a WRMP, companies must follow the Water Resource Planning Guidelines<sup>1</sup> ('Guidelines'). WRMPs should ensure a secure and sustainable supply of water, focus on efficiently delivering the outcomes that customers want, while reflecting the value that society places on the environment.

## The SEA Process

An SEA is required for the Northumbrian Water WRMP 2024 known (hereafter in this document as NW WRMP24) under the European Union Directive 2001/42/EC, more commonly known as the SEA Directive and the Environmental Assessment of Plans and Programmes Regulations 2004 (the 'SEA Regulations'), retained after withdrawal from the European Union, which requires an assessment of the effects of certain plans and programmes on the environment.

The SEA also works to inform the decision-making process through the identification and assessment of significant and cumulative effects a plan or programme may have on the environment. The SEA process is conducted at a strategic level and enables consultation on the potential effects of a plan with a wide range of stakeholders.

This SEA Scoping Report is the first stage of the SEA process and presents information on the context and scope of the SEA. Specifically, the scoping stage aims to:

- Review relevant international, European, national, and local policies, plans and programmes and their implications for WRMP24.
- Establish the baseline environmental and socio-economic information and key sustainability issues and opportunities for the NW WRMP24 area.
- Set the context and objectives of the SEA.
- Decide on the scope for the SEA, ensuring that it covers all the likely significant environment effects of the NW WRMP.
- Provide an opportunity to engage and collaborate with the Consultation Bodies<sup>2</sup>.

The SEA Scoping Report will be issued for consultation to the Environment Agency, Natural England, Historic England, and Ofwat for 5-week consultation period. Once the consultation period has finished, all consultation responses will be carefully reviewed and tabulated, and taken into account as far as possible. Details of how the results of the consultation have been taken into account, alongside the results of the SEA assessment, will be reported in the Environmental Report (to be published alongside NWL Draft WRMP24).

The SEA will be integrated with other environmental assessments, including Habitats Regulations Assessment (HRA), Water Framework Directive (WFD) Assessment, Natural Capital Assessment and Biodiversity Net Gain Assessment. The HRA and WFD assessments will also be included as separate reports appended to the SEA.

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<sup>1</sup> EA, NRW, Defra and Ofwat, 2021, "Water resources planning guideline". Available at: <https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline>

<sup>2</sup> The Consultation Bodies are: Natural England, Historic England, and the Environment Agency.

The NW WRMP24 SEA and environmental assessments will be undertaken in the context of the regional planning currently being carried out. Northumbrian Water sits within Water Resources North (WReN). The proposed approach to the SEA aligns with the regional methodologies and provides efficiencies through use of information gathered for regional environmental assessments as a basis for further assessment work as part of the NW WRMP24 development. Links to the relevant regional methodology documents are provided in Section 6 of this Scoping Report.

A key stage in the SEA process is the development of the SEA Framework which includes SEA objectives and indicators. The SEA objectives and indicators will be used during the assessment stage to appraise the WRMP24 options and preferred programme to determine their potential environmental effects. The WRMP24 SEA objectives support the Northumbrian Water Limited outcomes for customers and the environment, the Defra Guiding Principles for water resource planning, and the Defra 'Creating a great place for living: Together we are building a green and healthy future'.

The summary of proposed SEA objectives for the NW WRMP24 are:

- To protect and enhance biodiversity, ecological functions, capacity and habitat connectivity, including protecting designated sites and their qualifying features, priority species and priority habitats.
- To provide opportunities for habitat creation or restoration and deliver a net benefit / gain for biodiversity (BNG).
- To avoid introducing or spreading and, where feasible, manage invasive non-native species (INNS).
- To protect, conserve and enhance natural capital and the ecosystem services from natural capital to increase resilience to climate change.
- To meet WFD objectives relating to biodiversity.
- To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing.
- To secure resilient, high quality, sustainable and affordable water supplies over the long term for the health and wellbeing of the community.
- To increase access and connect customers to the natural environment, provide education or information resources for the public.
- To maintain and enhance the water environment for other users including recreation, tourism and navigation.
- To reduce or manage flood risk, taking climate change into account.
- To enhance or maintain the quality of surface and groundwater waterbodies.
- To enhance or maintain surface water flows and quantity and groundwater resources.
- To meet WFD objectives and support the achievement of environmental objectives set out in River Basin Management Plans.
- To increase water efficiency and increase resilience of water supplies and natural systems to droughts.
- To protect geological and geomorphological features, and the functionality and quality of soils, including the protection of high-grade agricultural land.
- To reduce and minimise air emissions during construction and operation.
- To minimise or reduce embodied and operational carbon and greenhouse gas emissions.
- To introduce climate mitigation where required and improve the climate resilience of assets and natural systems to the threats of climate change.

- To conserve, protect and enhance the historic environment and heritage assets, and their settings, including archaeologically important sites.
- To conserve, protect and enhance landscape and townscape character and visual amenity.
- To reduce, and make more efficient, the consumption of resources, and minimise the generation of waste.
- Avoid negative effects on built assets and infrastructure.

### Next Steps

The next stage of the SEA process involves assessing the options and preferred plan ('draft WRMP24') using the SEA Framework. The results of the assessment will be recorded in an Environmental Report. The Environmental Report will then be issued for formal public consultation and updated as necessary. Monitoring will be carried out by Northumbrian Water Limited following adoption of the Northumbrian Water WRMP24 (NW WRMP24).

### Drought Planning

If a separate SEA is required for the Northumbrian Water Limited Drought Plan 2021 then the relevant aspects of this report will provide a suitable scope for the assessment of the Drought Plan and consultation.

# 1 Introduction

1.1.1 Water companies have a statutory obligation to produce a Water Resources Management Plan (WRMP), which sets out how a company intends to maintain the balance between supply and demand for water over a minimum 25-year period. In the development of a WRMP, companies must follow the Water Resource Planning Guidelines<sup>3</sup> ('Guidelines'). WRMPs should ensure a secure and sustainable supply of water, focus on efficiently delivering the outcomes that customers want, while reflecting the value that society places on the environment.

1.1.2 The Guidelines state that in developing a WRMP in England and Wales, water companies should screen for a Strategic Environmental Assessment (SEA) and carry out a full SEA if required.

1.1.3 According to the SEA Regulations Part 2 (5) SEA Regulations:

*'the responsible authority shall carry out, or secure the carrying out of, an environmental assessment, in accordance with Part 3 of these Regulations, during the preparation of that plan or programme and before its adoption or submission to the legislative procedure.'*

1.1.4 And Schedule 2 (6) confirms that the list of topics to be considered includes

*'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, on issues such as—*

*(a) biodiversity;*

*(b) population;*

*(c) human health;*

*(d) fauna;*

*(e) flora;*

*(f) soil;*

*(g) water;*

*(h) air;*

*(i) climatic factors;*

*(j) material assets;*

*(k) cultural heritage, including architectural and archaeological heritage;*

*(l) landscape; and*

*(m) the inter-relationship between the issues referred to in sub-paragraphs (a) to (l).*

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<sup>3</sup> EA, NRW, Defra and Ofwat, 2021, "Water resources planning guideline". Available at: <https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline>

## 1.2 Water Resource Planning Guidelines

- 1.2.1 The Guidelines set out the framework and requirements for developing a WRMP with the objective ‘to efficiently deliver resilient, sustainable water resources for your customers and the environment, both now and in the long term’<sup>4</sup>.
- 1.2.2 The Guidelines highlight the following key environmental considerations:
- Reflect the government’s 25-year Environment Plan including:
    - Setting out ambitions for environmental sustainability and resilience
    - Supporting nature recovery
    - Using natural capital in decision-making
    - Using a catchment approach
    - Delivering net gain for the environment
  - Impact of climate change with regard to river flows and groundwater recharge, and any future supply options
  - Issue of spread of invasive non-native species (INNS) and proposed measures to mitigate that risk
  - Enhancing the natural resilience of catchments by effective catchment management planning, to increase the amount and/or quality of water available for abstraction without posing unacceptable pressures on the environment
  - Consider whether abstractions are truly sustainable, looking across a catchment as a whole
  - The requirement to demonstrate Biodiversity Net Gain (BNG) for options and the plan.
  - The stronger focus and detailed guidance on natural capital including the five minimum ecosystem services to be considered and natural capital metrics.
  - Improved guidance on approaches to integrate environmental outputs into options decision-making and programme appraisal.
- 1.2.3 The draft supplementary guidance note ‘Environment and society in decision-making’<sup>5</sup> provides additional detail on how to integrate environmental and social considerations into decision-making in the WRMP process through SEA, biodiversity net gain assessment and natural capital assessment.
- 1.2.4 The Guidelines state there is a need to comply with environmental legislation, SEA and Habitats Regulations Assessments. This SEA Scoping Report is the first stage of the SEA process for WRMP24. The Scoping Report is produced early in the WRMP process, as it sets the context, approach and framework for assessing the WRMP options and subsequent preferred and alternatives plans. The results of the SEA and other environmental assessments aids decision-making on mitigation requirements, options development, and selection of preferred options for the WRMP, with the aim of developing a WRMP that meets legislative environmental requirements and provides environmental net gain.

## 1.3 WRMP Environmental Assessment and the Regional Planning Process

- 1.3.1 Regional water resource plans taking a long-term view of water planning to 2100 are currently being prepared for each region. The NW WRMP24 SEA will be undertaken in the context of the regional planning currently being carried out. Northumbrian Water falls within Water Resources North (WReN). The proposed approach to the SEA aligns with the regional methodologies and

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<sup>4</sup> EA, NRW, Defra and Ofwat, 2021, “Water resources planning guideline, section 1.1.1

<sup>5</sup> Environment Agency, 2021, Water resources planning guideline supplementary guidance – Environment and society in decision-making (England). External guidance: 18643.

provides efficiencies through use of regional environmental assessments as a basis for further assessment work as part of the NW WRMP24 development.

- 1.3.2 Environmental assessments including SEA are being undertaken for the regional plans and also for WRMP24. However, rather than having two separate processes that duplicate effort, the regional planning assessments will provide much of the assessment work for the WRMP24 (as explained below and in Figure 1.1).
- 1.3.3 This report is the SEA Scoping Report prepared specifically for the NW WRMP24 to meet legislative requirements and provide the local level details for WRMP24 including the local level plans and programmes review, baseline information and key issues and opportunities specific to Northumbrian Water. The SEA framework including objectives and assessment criteria has been largely taken from the WReN SEA methodology to ensure consistency and allow the SEA results from the regional plan to be used for the WRMP24.
- 1.3.4 SEA option assessments carried out for the regional plan will be used for the WRMP24 SEA assessment. The regional SEA results will be reviewed and where relevant local information will be included in the assessments as part of WRMP24. The regional SEA results may also flag where mitigation is needed, and this will help inform further options development by Northumbrian Water Limited for the WRMP24. Any new options not included in the regional plans will need full assessment using the defined SEA framework as part of the WRMP24.
- 1.3.5 The regional plans will undergo in-combination effects assessment. This is expected to take place in 2022 for WReN. To meet legislative requirements, an in-combination effects assessment, specific to NW WRMP, will also take place. NW WRMP24 in-combination effects assessment will consider transfers which are outside the Northumbrian Water area or in close proximity to the plan boundary with potential pathways affecting receptors outside the plan area. Further details on the proposed environmental assessment approach including the SEA method is presented in Section 6 of this SEA Scoping Report.

### Water Resources North Regional Plan

- 1.3.6 WReN has completed work to create the information and data required to input to the regional reconciliation process at August 2021 input and through autumn 2021. This has included working across water companies at a regional level to develop and apply new methodologies, taking into account new data, guidance and policy. However, the information and data presented in the January 2022 emerging plan does not represent a final view of the Regional Plan or for company WRMPs, and over the coming months it will be updated. This will include a refinement of technical input data (notably regarding the impact of stochastics and climate change on our forward supply forecasts), working with other stakeholders to better understand environmental needs and how they may impact on abstraction, and carrying out further work with representatives of other sectors in our region.
- 1.3.7 In addition, feedback from customers and stakeholders on the emerging plan through informal consultation and again on the updated Regional Plan and draft WRMPs from August 2022, may also result in changes to the plans. All of this means that much of the information presented in this submission is subject to change. Particular areas where material changes are anticipated are likely to include:
- 1.3.8 **Supply forecasts (DO)**, which will be subject to further refinement particularly around how stochastic data is used and how it is scaled for climate change impacts.
- 1.3.9 **Outage** and process losses are based on WRMP19 values and will be updated.
- 1.3.10 **Demand forecasts**, and in particular the scale, pace and certainty of demand reduction policies including leakage and PCC reductions, the potential need for adaptive planning to handle

uncertainty, and an ongoing refinement of understanding of possible post-Covid demand patterns. Demand management options for WRMP24 have not been finalised in particular metering and water efficiency, all water companies are working towards finalising these options. Further updates are also expected on Non household demand forecasts.

- 1.3.11 **Exports**, Water companies have been working with Retailers and Inset Appointees (NAV's) and further work is required to finalise these forecasts.
- 1.3.12 **Scale** and pace of achieving the 1 in 500-year drought resilience in the Yorkshire Grid.
- 1.3.13 **Sustainability reductions and environmental destination**, in particular with regard to the outputs from ongoing AMP7 WINEP investigations as well as further engagement with stakeholders at a catchment scale.
- 1.3.14 **Target headroom**, uncertainty and associated risk to be explored and refined with the new stochastic deployable output methods, the UKCP18 climate scenarios and uncertainty related to PCC and leakage reductions.
- 1.3.15 **Options** these require further assessment to finalise the costs and benefits, which will impact on the metrics and environmental assessment, and it is possible additional options may be developed.
- 1.3.16 **Carbon** the Government has recently published revised guidance on carbon costing, and cost models will be updated to reflect this. These updates impact on optimisation runs and they will need to be re-run for the formal submission.
- 1.3.17 Option appraisal outputs are indicative based on the data available at the time of writing this report. The work to date reflects the process used to produce a final planning scenario and pathways, but all optimisation runs will be re-run once the option costs and benefit data is finalised.
- 1.3.18 If there is a change to any of the supply-demand balance components this will impact on the baseline and sensitivity testing scenarios and will need to be incorporated into the option appraisal and decision making. The current outputs are still to be finalised, but it should also be noted that the supply-demand needs may also result in a material change to the emerging plan.
- 1.3.19 Water companies may include additional metrics in their WRMPs e.g., Yorkshire Water is considering a resilience metric. This may alter the options put forward in the final solution but will not have a material impact on the regional planning process outcomes.

**Figure 1.1: Stages of the Regional Plan development**

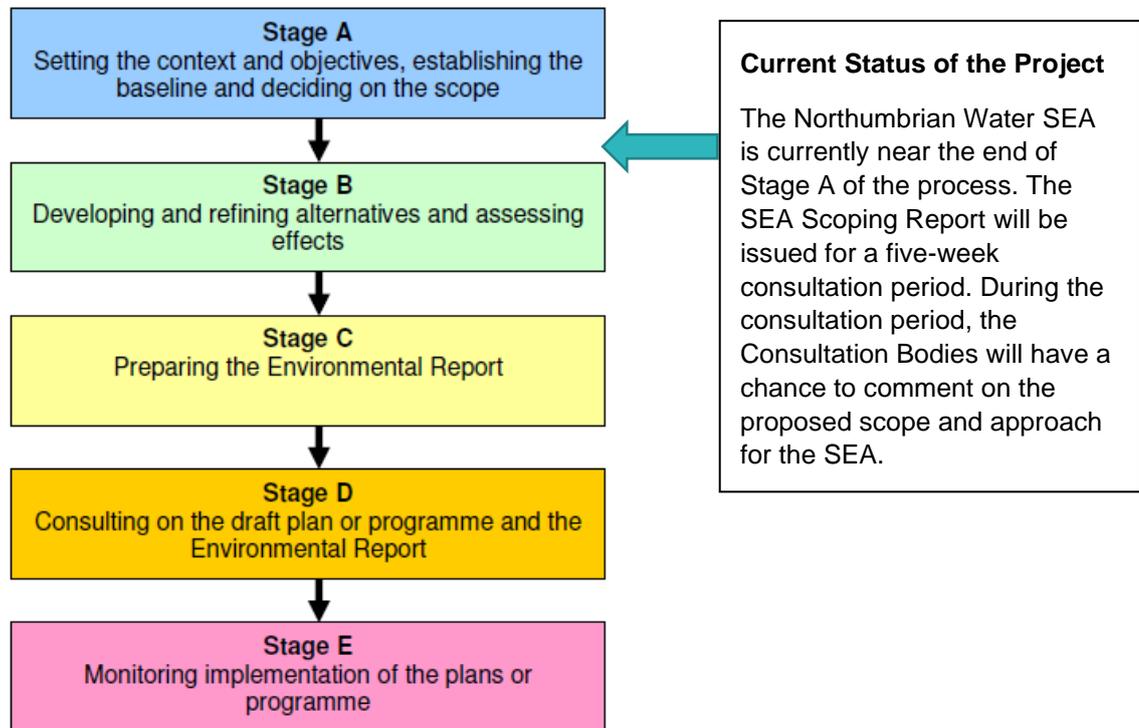


## 1.4 The SEA Process

- 1.4.1 A SEA is required for the NW WRMP24 under the European Union Directive 2001/42/EC, more commonly known as the SEA Directive. The Directive was transposed into United Kingdom (UK) law via the Environmental Assessment of Plans and Programmes Regulations 2004 ('SEA Regulations') and retained following withdrawal from the European Union. This requires an assessment of the effects of certain plans and programmes on the environment. Part 2 (5) (2) of the SEA Regulations states that SEA is required for plans and programmes which are prepared for water management and sets the framework for development consents.
- 1.4.2 The SEA also works to inform the decision-making process through the identification and assessment of significant and cumulative effects a plan or programme may have on the environment. The SEA process is conducted at a strategic level and enables consultation on the potential effects of a plan with a wide range of stakeholders. Figure 1.2 shows the different stages in the SEA process. Appendix C presents the different tasks involved in each of the SEA stages.
- 1.4.3 The SEA process will follow current and emerging guidance on the application of SEA within water resource planning including incorporating best practice within the proposed approach. The current and emerging guidance documents include:
- Strategic Environmental Assessment: Core Objective Identification, 2020, All Company Working Group.
  - Strategic Environmental Assessment and Habitats Regulations Assessment - guidance for water resources management plans and drought plans, 2012, UK Water Industry Research.
  - Strategic Environmental Assessment and Habitats Regulations Assessment - guidance for water resources management plans and drought plans, Update ongoing, UK Water Industry Research.
  - Water Resource Planning Guidelines, 2021, Environment Agency, Ofwat, Natural Resources Wales.
  - Best practice topic guidance on SEA and biodiversity, climate and heritage from Natural England, the Environment Agency and Historic England.

- Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (UKWIR 2021).
- Environment Agency, 2021, Water resources planning guideline draft supplementary guidance – Environment and society in decision-making (England).

**Figure 1.2: SEA Process Steps**

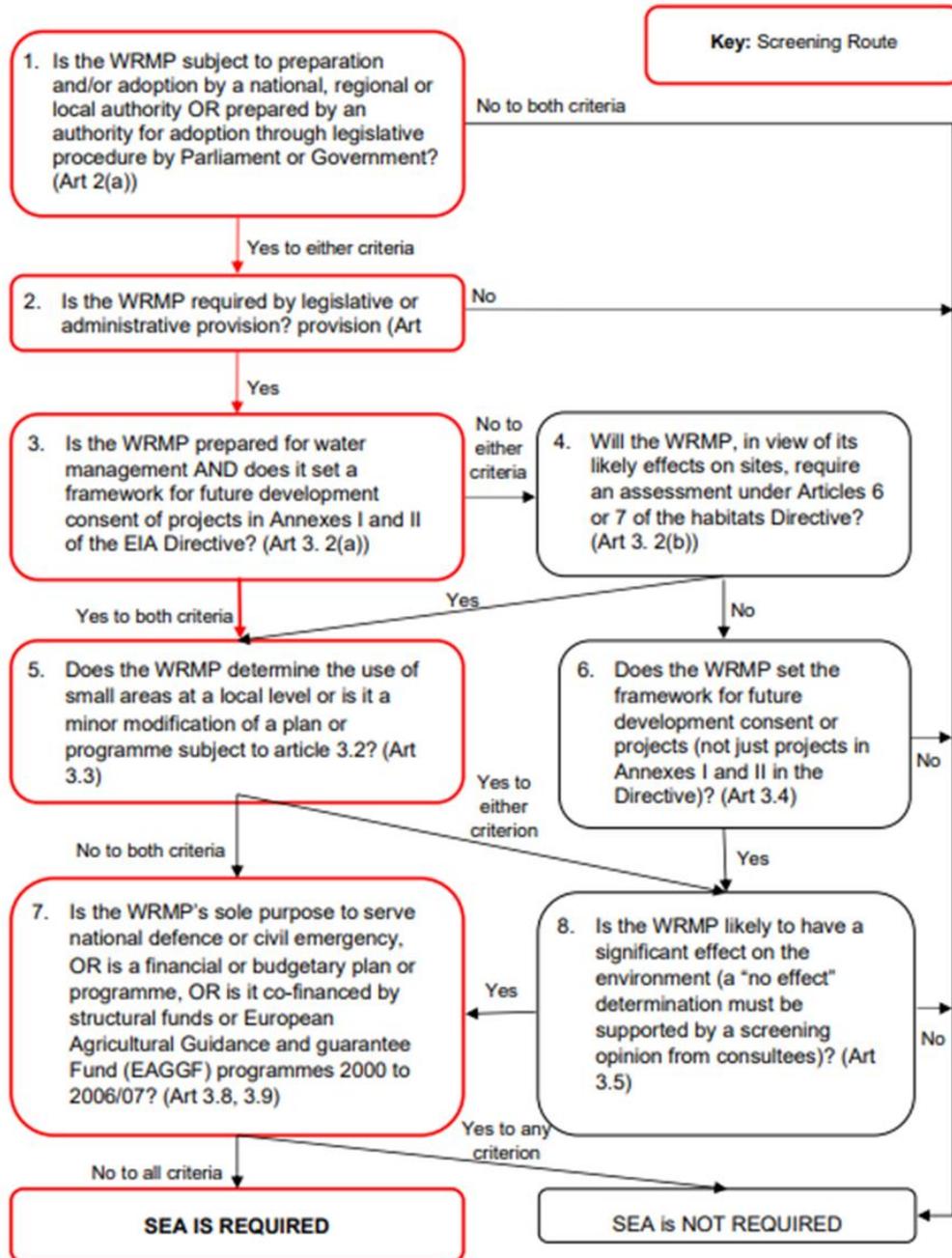


## 1.5 SEA Screening

- 1.5.1 Water companies, as responsible authorities, must determine if theirs fall within the scope of the SEA Directive.
- 1.5.2 Northumbrian Water Limited undertook a SEA screening exercise to determine whether a SEA of the WRMP is required. The decision tree in Chapter 3 of the UKWIR report entitled Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (UKWIR 2021) was used.
- 1.5.3 The results of the screening exercise are as follows:
- The NW WRMP24 will be prepared and adopted by Northumbrian Water Limited (NWL) who, under the SEA Directive, is considered an “authority”. Go to Box 2 see below.
  - The WRMP is required by legislative provision, being a statutory document under the Water Act 2003, amending the Water Industry Act 1991. Go to Box 3 see below.
  - The WRMP will be prepared for water management and also sets a framework for future development consent as it will contain options for new infrastructure for the sourcing, treatment, storage and transfer of water. Go to Box 5 see below.
  - The area of jurisdiction for the WRMP would be considered greater than ‘local level’ and the options to be included within the plan are not within the meaning of ‘small areas’. As WRMPs are required as new plans on a cyclical basis to provide for updated supply-demand forecasts over a long-term planning horizon, they are not considered to be ‘minor

modifications' to the previous plan (See box 7 in Figure 1.3 below). A WRMP meets none of the exemption criteria within Box 7. Therefore, SEA of the WRMP24 is required.

**Figure 1.3: SEA screening determination**



Source: UKWIR (2020) Environmental Assessment Guidance for WRMPs & Drought Plans

## 1.6 Purpose of the Scoping Stage and Report

1.6.1 The purpose of this Scoping Report is to set the context and scope for SEA, covering Stage A of the SEA process<sup>6</sup>. The Environmental Report, published alongside the draft WRMP24, will set out the results of the SEA assessment (covering Stages B to D). Stage E (Monitoring) will be carried out by Northumbrian Water as part of their annual monitoring.

1.6.2 Specifically, the scoping stage aims to:

- Review relevant International, European, National, and local policies, plans and programmes and their implications for the WRMP.
- Establish the baseline environmental and socio-economic information and key sustainability issues and opportunities for the NW WRMP24 area.
- Set the context and objectives of the SEA.
- Decide on the scope for the SEA, ensuring that it covers all the likely significant environment effects of the WRMP.
- Provide an opportunity to engage and collaborate with the Consultation Bodies<sup>7</sup>.

## 1.7 Limitations of the Scoping Report

1.7.1 Mott MacDonald has relied on published data and information provided by WReN Northumbrian Water Limited and from third party organisations in the production of this SEA Scoping Report. The baseline information collected in this SEA Scoping Report is the most up-to-date information currently available, however it is possible that conditions described in this report may change over time. This dataset will be reviewed and updated as appropriate throughout the SEA process as new information becomes available. The consultation process aims to address and minimise any gaps in information to ensure all potential environmental effects have been considered with regard to the WRMP24.

1.7.2 The Northumbrian Water WRMP24 covers a substantial geographical area. Therefore, the baseline is currently a high-level review of conditions within the region. Once options and their locations have been better defined and narrowed down in number and location, a review of the site baseline conditions will be undertaken and datasets will be included within a GIS system, which will be used to support the assessment of options.

## 1.8 Background and purpose

### The SEA Regulations requires:

*'an outline of the contents and main objectives of the plan or programme...'*

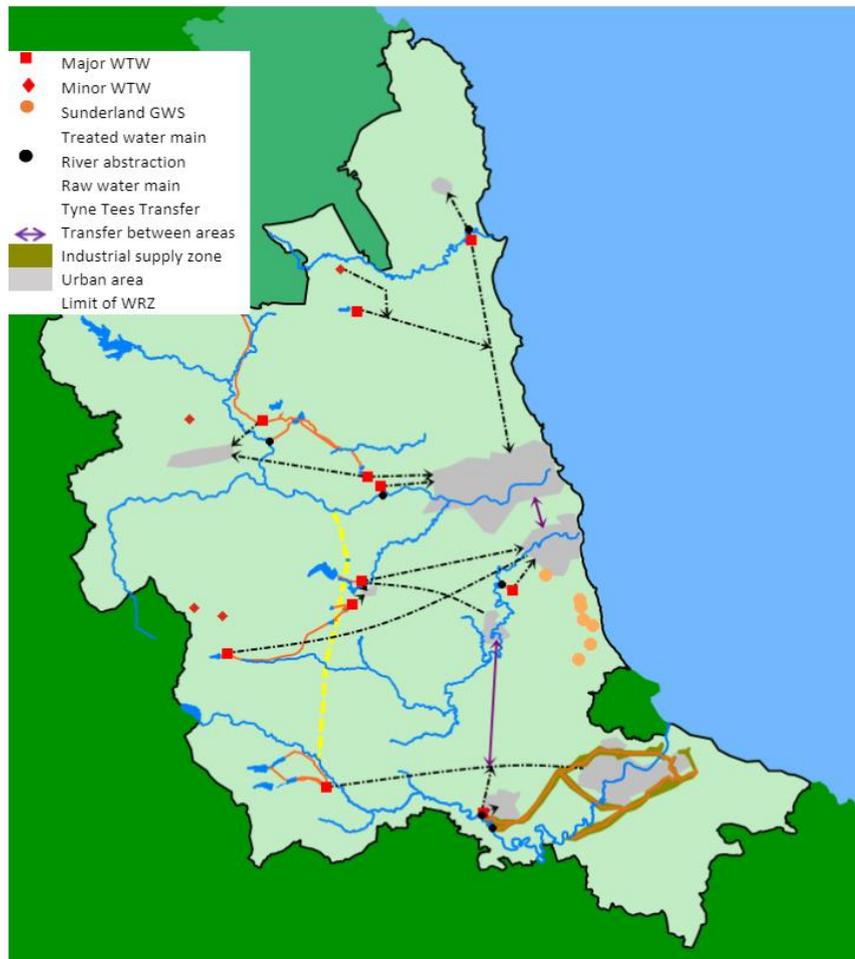
SEA Regulations Schedule 2 (1)

1.8.1 Water companies have a statutory obligation to produce a Water Resources Management Plan (WRMP), which sets out how a company intends to maintain the balance between supply and demand for water over a minimum 25-year period. New WRMPs are prepared every five years and Northumbrian Water is due to publish a draft of the WRMP in October 2022 and the final WRMP in September 2023. The new WRMP24 is the subject of this SEA.

<sup>6</sup> DCLG, September 2005, A 'Practical Guide to the Strategic Environmental Assessment Directive', Pages 26 - 29

<sup>7</sup> The Consultation Bodies are: Natural England, Historic England, and the Environment Agency.

**Figure 1.4: Northumbrian Water supply area and water transfer network**



Source: Northumbrian Water 2022

**Figure 1.5: Northumbrian Water borehole locations**



1.8.2

Source: Northumbrian Water 2022

## 1.9 Relationship to Water Resources North regional plan

1.9.1 As described in Section 1.3, the NW WRMP24 will be undertaken in the context of the WReN regional planning currently being carried out.

1.9.2 The main objectives, as presented in the WReN Emerging Plan for consultation<sup>8</sup>, are to:

- Ensure there is enough water for a growing population and to support economic growth.
- Improve the environment by leaving more water in the region's rivers, streams and underground sources.
- Increase the region's resilience to severe drought and other extreme shocks and stresses.
- Address the impacts of climate change on demand for water and how much is available.

1.9.3 WReN vision is to provide an integrated long-term strategy, prepared through multi-sector collaboration and planning, that takes account of the needs of all of those in the WReN region with an interest in the management and use of water. The ambition is that water companies in the region will collaborate with others and agree a long-term water resource strategy which will then be used to guide the development of the draft 2024 WRMPs. WReN's overall aim is to deliver a reliable, sustainable and affordable system of water supply to meet multi-sector requirements (including the environment) across the North of England for the next 50 years and beyond towards the end of the century. Where this plan impacts on public water supply which is the drinking water that is supplied by the water companies in the WReN region – it will be

<sup>8</sup> WReN Emerging Plan for consultation: Available at: <https://www.waterresourcesnorth.org/our-region/emerging-plan-for-consultation/>

reflected in the water companies' statutory draft Water Resource Management Plans (WRMPs) which will be submitted to Defra in October 2022 and consulted on shortly afterwards.

- 1.9.4 The WReN regional plan<sup>9</sup> suggests the WReN regional plan environmental assessments, including the SEA, can be used as a framework for the WReN member water companies such as Northumbrian Water when undertaking their WRMP24 statutory environmental assessments.

## 1.10 NWL WRMP24 option types

- 1.10.1 The WRMP24 will include both supply and demand side options, as well as catchment management options, which falls outside the typical supply or demand categorisations. Descriptions of the potential option types considered for the WRMP are provided in the following sections.

### Potential supply options

- 1.10.2 The broad supply option types being considered include:

- **Aquifer storage and recovery** - aquifer storage options involve abstracting water from a river or reservoir, treating and injecting it underground to be stored in natural aquifers.
- **Desalination** – desalination options involve pumping sea water or brackish water (from an estuary) for treatment and release into supply. The water will be blended before putting into supply, with the brine to be piped out to sea for disposal (in the case of sea desalination) or to a sewer (in the case of brackish water desalination).
- **Distribution capacity expansion** - Intra-zonal network enhancements (increased pipeline capacity or booster pumping capacity) to enable water to be transferred from new sources to demand centres within the water resource zone.
- **Drought intervention** – drought intervention options include drought order; drought permit; recommission abandoned sources; and temporary transfer.
- **Groundwater sources** - Usually a borehole which abstracts water from an aquifer which then goes to a treatment works.
- **Increase water treatment works (WTW) capacity and efficiency** - Increase deployable output by removing constraints on dissolved oxygen within the treatment works or reducing process losses.
- **Effluent reuse** – effluent is treated and discharged into rivers or piped into supply.
- **Reservoirs** – reservoir options include dam raising (increasing the capacity of existing reservoirs), or creation of new reservoirs. It is likely that most of these will be banded reservoirs (i.e., not within a valley) with piped transfers in and out of supply.
- **Redevelopment of existing resources with increased yields** - Increase the potential yield of an existing water resource asset in order to increase deployable output.
- **Transfers** – transfers include asset transfers, and bulk transfers within/into region, either of raw or treated water.
- **Trading** – involves an agreement with another water company to trade water where there is a surplus.

### Potential demand management options

- 1.10.3 The broad demand option types being considered include:

- **Metering consumption reduction** – involves reducing water consumption by installing meters in currently unmeasured properties. It can include compulsory metering for

household and non-household uses, smart metering, and other metering such as optant metering.

- **Other consumption reduction** – involves reducing household and non-household consumption in ways other than metering.
  - It can include tariffs/fees (introduction of special fees, changes to existing measured tariffs, introduction of special tariffs for specific users)
  - Water recycling (rainwater harvesting / grey water reuse for new or existing household and non-household).
  - It can also include water efficiency measures such as water use audit and inspection, awareness campaigns, sponsoring water efficiency enabling activities by others, home visits to reduce plumbing losses, and the promotion of water saving devices.
- **Loss reduction** – involves reducing distribution system leakage, including service reservoir losses and trunk main leakage, as well as reducing customer supply pipe leakage. Leakage reduction options include capital investments to both the company-side and customer-side assets and operational improvements and policy changes. Examples include pressure management, mains renewal, increasing efficiency of active leakage control, etc. Customer supply pipe leakage reduction typically includes increased customer engagement/education or incentives to repair their supply pipes between the distribution main and the property.

#### Catchment management options

1.10.4 Catchment management options may also be considered. As catchment management is not solely considered as 'supply' or 'demand' option, but is more a combination of these, it is presented separately from the supply option types and demand option types above.

1.10.5 Catchment management options include:

- Flow augmentation and licencing
- Integrated catchment management
- Knowledge exchange, education, and agricultural activity
- Natural water retention measures (including natural flood management and wetland creation)
- Nutrient and sediment reduction
- Pesticide reduction
- River restoration
- Sustainable Urban Drainage Systems (SuDS)
- Terrestrial habitat creation/management.

## 2 Relationships with other Policies, Plans and Programmes

The SEA Regulations requires:

*'an outline of the contents and main objectives of the plan or programme, and of its relationship with other relevant plans and programmes'*

*'the environmental protection objectives, established at international, 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'*

SEA Regulations Schedule 2 (1) and (5)

### 2.1 Policies, Plans and Programmes Review

- 2.1.1 A review of the policies, plans, and programmes relevant to the WRMP24 was undertaken as part of the SEA Scoping process. The aim was to determine how the emerging WRMP may be affected by these external factors. Furthermore, the WRMP must aim to support current relevant policies, plans, programmes, and environmental protection legislation at international, national, and local levels. The WRMP must aim to support, and where possible, strengthen the objectives of other local plans and strategies within the Northumbrian Water supply region.
- 2.1.2 A review of these documents is required to identify potential inconsistencies or constraints, and consistencies between these documents and the draft WRMP to inform the development of the SEA Framework. **Table 2.1** lists current relevant policies, plans, and programmes which were considered during the SEA scoping stage. Appendix A presents the policies, plans, and programmes review in full.

### 2.2 Identification of Key Themes and Messages

- 2.2.1 The main themes, messages and objectives from the policies, plans and programmes review that are considered relevant to the WRMP are presented below. These are as follows:
- Conserve flora and fauna and their habitats, including designated and non-designated sites.
  - Conservation and wise use of wetlands and their resources.
  - Support environmental and biodiversity net gain.
  - Integrate ecosystem service and natural capital principles.
  - Halt overall biodiversity loss and support the protection, recovery and enhancement of biodiversity.
  - Contribute to nature recovery and nature recovery networks and strategies
  - Creation of green infrastructure.<sup>10</sup>
  - Protection of landscape character and quality.
  - Improve water quality so all waters achieve 'good status' or 'no deterioration' as set out in the Water Framework Directive.
  - Prevent or limit inputs of pollutants into groundwater.
  - Monitor and provide information to consumers on drinking water quality.
  - Promote efficient use of water.
  - Reduce and manage the risks of flooding through sustainable design.

<sup>10</sup> The UK Government's 25-year Environment Plan includes a sub-objective for the provision of more and better-quality green infrastructure including urban trees. Available at: <https://www.gov.uk/government/publications/25-year-environment-plan>

- Reduce greenhouse gas emissions to support the transition to the UK Government’s 2050 net zero target.
- Adapt to the impacts of climate change including drought, flooding and peak water demand conditions.
- Increase resource efficiency and reduce natural resource use and waste.
- Create a green economy and promote sustainable growth.
- Promote sustainable and healthy communities.<sup>11</sup>
- Promote social inclusion and community participation.
- Protect cultural heritage assets including archaeology and built heritage.
- Protect best quality soils and agricultural land.
- Improve the health and resilience of Chalk Catchments.
- Improve soil health.
- Support the Lawton recommendation<sup>12</sup> for statutory undertakers planning the management of water resources to:
  - Make space for water and wildlife along rivers and around wetlands
  - Restore natural processes in river catchments, including in ways that support climate change adaptation and mitigation
  - Accelerate the programme to reduce nutrient overload, particularly from diffuse pollution
- Support the UK Government’s 25 Year Plan to Improve the Environment<sup>13</sup>:
  - Using and managing land sustainably – including embedding an “environmental net gain” principle into development (as supported by the Environment Act 2021)
  - Recovering nature and enhancing the beauty of landscapes
  - Connecting people to the environment to improve health and wellbeing
  - Increase resource efficiency and reducing pollution
  - Securing clean, healthy and productive and biologically diverse seas and oceans
  - Protecting and improving the global environment

2.2.2

The themes, messages and objectives identified from the policies, plans, and programmes review will provide an input into the process of identifying key issues and opportunities and developing the SEA Framework.

**Table 2.1: Relevant international, national, and regional policies, plans and programmes**

Policies, Plans, and Programmes	
International	
● Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)	● Kyoto Protocol to the UN Framework Convention on Climate Change (1997)
● Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983)	● Commitments arising from the World Summit on Sustainable Development, Johannesburg (2002)

<sup>11</sup> The UK Government definition of sustainable communities as outlined in the document ‘Sustainable Communities: Homes for All’ (ODPM, January 2005, page 74) is: “Sustainable communities are places where people want to live and work, now and in the future. They meet the diverse needs of existing and future residents, are sensitive to their environment, and contribute to a high quality of life. They are safe and inclusive, well planned, built and run, and offer equality of opportunity and good services for all”.

<sup>12</sup> Lawton, 2010, Making Space for Nature, Recommendation 4, Page 73

<sup>13</sup> UK Government (2018). A Green Future: Our 25 Year Plan to Improve the Environment. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/693158/25-year-environment-plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf)

## Policies, Plans, and Programmes

- Convention on Biological Diversity (1992)
- Ramsar Convention - The Convention on Wetlands of International Importance (1971)
- UN Framework Convention on Climate Change (1992)
- Paris Agreement (2015)
- Charter for the Protection and Management of Archaeological Heritage (1990)
- The World Heritage Convention (1972)
- Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) (1998)

### European

- Ambient Air Quality Directive (2008/50/EC)
- Thematic Strategy on Air Pollution (2005)
- Establishing measures for the recovery of the stock of European eel 2007 (1100/2007)
- Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011)
- Fresh Water Fish Directive (2006/44/EC)
- Directive on the Conservation of Wild Birds (79/409/EEC) (as amended)
- Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (92/43/EEC)
- Directive on Animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals (2006/88/EC)
- Limiting Global Climate Change to 2 degrees Celsius - The way ahead for 2020 and beyond (2007)
- A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (2018)
- Promotion of the use of energy and renewable sources Directive (2009/28/EC)
- Energy Act 2013
- Mainstreaming sustainable development into EU policies: 2009 Review of the European Union Strategy for Sustainable Development
- European Commission Environmental Liability Directive (2004/35/EC)
- Directive on the assessment of the effects of certain plans and programmes on the environment (2001/42/EC)
- 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)
- The European Landscape Convention (2006)
- The Environmental Noise Directive (2002/49/EC)
- European Soils Charter (2003)
- Thematic Strategy for Soil Protection (2006)
- The Nitrates Directive (91/676/EEC)
- The Water Framework Directive (WFD) (2000/60/EC)
- Urban Wastewater Treatment Directive (91/271/EEC)
- Drinking Water Directive (1998/83/EC)
- Directive on Bathing Water (76/160/EEC); and Directive 2006/7/EC repealing Directive 76/160/EEC (from 2014)
- Groundwater Directive (2006/118/EC)
- Marine Strategy Framework Directive (2008/56/EEC)
- Directive on the Assessment and Management of Flood Risks (2007/60/EC)
- Blueprint to Safeguard Europe's Water Resources (2012)

### National

- The Eels (England & Wales) Regulations 2009 (as amended)
- Salmon and Freshwater Fisheries Act 1975
- UK Post-2010 Biodiversity Framework, JNCC and Defra (2012)
- Making Space for Nature - A review of England's Wildlife Sites and Ecological Network (2010)
- Biodiversity 2020: A strategy for England's wildlife and ecosystem services, Defra (2011)
- The Conservation of Habitats and Species Regulations (2010) (as amended)
- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations (2019)
- Climate Change and the Historic Environment, English Heritage (2008)
- Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment, Historic Environment (2016)
- The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning 3, Historic Environment (2017)
- Ancient Woodland and Veteran Trees: Protecting them from development, Forestry Commission and Natural England (2014)
- Our Waste, Our Resources: A Strategy for England, HM Government (2018)
- Safeguarding our Soils - A strategy for England, Defra (2009)

## Policies, Plans, and Programmes

- 
- Delivering a healthy natural environment. Ecosystem approach action plan, Defra (2010)
  - The Invasive Alien Species (Enforcement and Permitting) Order 2019
  - The Great Britain Invasive Non-Native Species Strategy, Defra (2015)
  - A narrative for conserving freshwater and wetland habitats in England, Natural England (2016)
  - Conservation 21 - Natural England's Conservation Strategy for the 21st Century, Natural England (2016)
  - State of Natural Capital Annual Report 2020, Natural Capital Committee (2020)
  - Standing Advice on Protected Species, Natural England (2016)
  - Climate Change Act 2008
  - UK Climate Change Risk Assessment, Defra (2017)
  - The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting, Defra (2018)
  - National Planning Policy Framework (NPPF) (2019)
  - A Green Future: Our 25 Year Plan to Improve the Environment, UK Government (2018)
  - The draft Environment Bill 2020
  - Securing the Future – Delivering the UK Sustainable Development Strategy (2005)
  - The Natural Choice: Securing the Value of Nature, Defra (2011)
  - Marine and Coastal Access Act (2009)
  - The Wildlife and Countryside Act 1981 (as amended)
  - Environment Protection Act 1990
  - Countryside and Rights of Way (CROW) Act
  - The Natural Environment and Communities Act 2006 (NERC Act)
  - Creating a better place: Our ambition to 2020, Environment Agency (2018)
  - UK National Ecosystem Assessment Follow-on (2014)
  - National Infrastructure Delivery Plan 2016–2021, Infrastructure and Projects Authority (HM Government) (2016)
  - Fixing the foundations: Creating a more prosperous nation, HM Government (2015)
  - Environment Act 1995
  - The Environmental Damage (Prevention and Remediation) (England) Regulations 2015
  - Environmental Assessment of Plans and Programmes Regulations 2004
  - Creating a great place for living: together we are building a green and healthy future (2018)
  - Planning (Listed Buildings and Conservation Areas) Act 1990
  - Water Resources Act 1991
  - Water Industry Act 1991
  - Water Act 2003 (as amended)
  - Preparing for a drier future: England's water infrastructure needs, National Infrastructure Commission (2018)
  - Draft National Policy Statement for Water Resources Infrastructure, Defra (2018)
  - Water for Life White Paper, Defra (2011)
  - The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (as amended)
  - Protect groundwater and prevent groundwater pollution, Environment Agency (2017)
  - Groundwater protection technical guidance, Environment Agency (2017)
  - The Environment Agency's approach to groundwater protection, Environment Agency (2018)
  - The Groundwater (England and Wales) Regulations 2009
  - Flood and Water Management Act 2010
  - 
  - National Flood and Coastal Erosion Risk Management Strategy for England, Environment Agency (2020)
  - 
  - The Flood and Coastal Erosion Risk Management Policy Statement, Defra (2020)
  - Flood risk assessments: climate change allowances, Environment Agency (2016)
  - The Water Resources Management Plan Regulations 2007
  - Water Resources Planning Framework (2015-2065), Water UK (2016)
  - Water Supply (Water Quality) Regulations 2016 (as amended)
  - National Policy Statement for Wastewater (2012)
  - Climate change approaches in water resources planning – Overview of new methods, Environment Agency (2013)
  - Drought response: our framework for England, Environment Agency (2017)
  - Future Water: The Government's water strategy for England, Defra (2008)
  - Water Resources Planning Guideline, Environment Agency (2016)
  - The Urban Waste Water Treatment (England and Wales) Regulations 1994
  - The Nitrate Pollution Prevention Regulations 2015
  - Managing Water Abstraction, Environment Agency (2016)
  - Marine Plans – South East Inshore, South Inshore, South Offshore (Marine Management Organisation)
  - UK Marine Policy Statement (2011)
-

## Policies, Plans, and Programmes

- The Ancient Monuments and Archaeological Areas Act 1979

### Regional and Local

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>● Site Improvement Plans for Natura 2000 Sites, Natural England</li> <li>● Local Development Plans (Various)</li> <li>● Public Rights of Way Improvement Plans (ROWIPs)</li> <li>● Local level Green Infrastructure Plans and Strategies</li> <li>● National Natural Capital Atlas: Mapping Indicators, Natural England (2020)</li> <li>● AONB Management Plans</li> <li>● National Character Area (NCA) Profiles, Natural England</li> <li>● Northumbria River Basin Management Plan (2015)</li> </ul> | <ul style="list-style-type: none"> <li>● Catchment Flood Management Plans (2009): Northumbria River Basin District</li> <li>● Catchment Abstraction Management Strategies (CAMS) (2016)</li> <li>● Meeting our Future Water Needs: a National Framework for Water Resources, Environment Agency (2020)</li> <li>● Long-term water resources environmental destination, Environment Agency (2020)</li> <li>● Water Resources Planning Guideline, Various (2021)</li> <li>● Forward programme 2021-22, RAPID (2021)</li> </ul> |
|--|--|

### Northumbrian Water

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>● Environment Strategy (2021)</li> <li>● Biodiversity Strategy (2021)</li> <li>● Pollution Incident Reduction Plan (2020)</li> <li>● Draft Drought Plan 2022 (2021)</li> <li>● PR19 Business Plan (2020)</li> <li>● Safety, Health and Environment (SHE) Statement (2020)</li> </ul> | <ul style="list-style-type: none"> <li>● Emission Possible Plan to achieve net zero by 2027 (2021)</li> <li>● Leakage Target (2020)</li> <li>● Water Environment Improvements / Blue spaces Scheme (2021)</li> </ul> |
|---|--|

## 3 Environmental Baseline

The SEA Regulations requires consideration of:

*‘the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme’*

*‘the environmental characteristics of areas likely to be significantly affected’*

SEA Regulations Schedule 2 (2) and (3)

### 3.1 Introduction

3.1.1 Current baseline information for the environment and socio-economics was reviewed for the NW WRMP24 area. The baseline was collected from published sources as referenced in the text and is summarised in the sections below. The baseline information forms an evidence base against which environmental issues or opportunities resulting from the WRMP24 can be predicted and assessed. The baseline information is presented under the SEA Regulations topics:

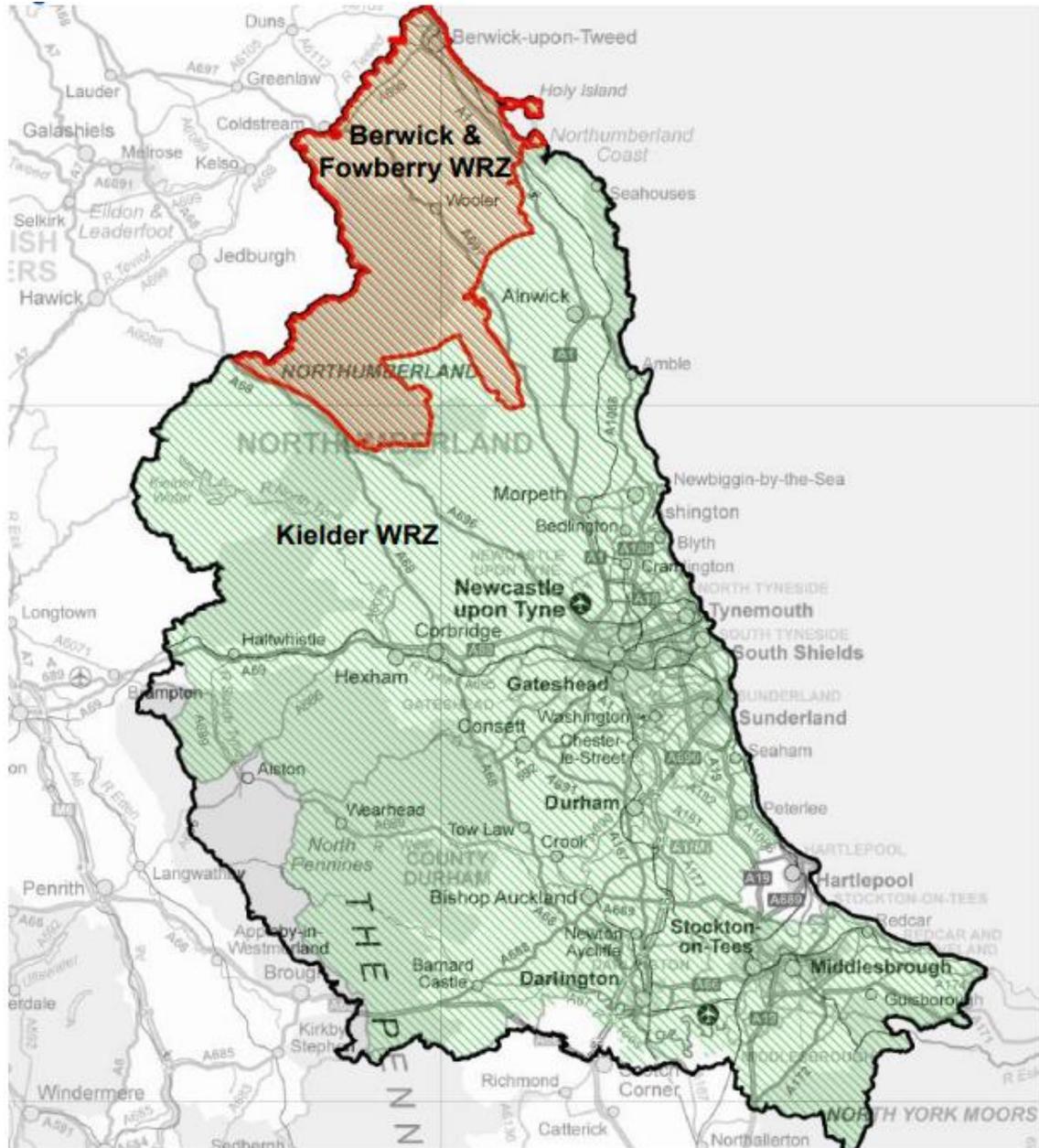
- Biodiversity, flora, and fauna
- Water
- Soil
- Air
- Climatic factors
- Population and human health
- Historic environment
- Landscape
- Material assets

3.1.2 It should be noted the NW WRMP24 covers a substantial geographical area and the development of options is currently being finalised. Therefore, the baseline is currently a high-level review of conditions within the WReN region where appropriate (Fig 3.1) and therefore extending to the Northumbrian region rather than on specific options. For example, there are potential effects both from the transfer of water outside the supply area or from options close to the plan boundary with potential pathways affecting receptors outside the supply area. The baseline GIS developed to facilitate undertaking the assessments and reporting will include a buffer so that additional receptors (such as designated sites) and potential pathways are captured and can be included in the assessments. Appendix B5 maps surface water catchments that could potentially be affected and that fall either partially, or wholly outside the WReN region and the Northumbrian Water supply area. These include the:

- Northumberland Rivers
- Tyne
- Wear
- Tees
- Once options and their locations are better defined and narrowed down in number and location a review of the specific site baseline conditions will be undertaken and the

environmental datasets will be included in a GIS database to support the assessment of the options.

**Figure 3.1: Northumbrian Water Region**



Source: Northumbrian Water, Water Resource Management Plan, 2019

## 3.2 Biodiversity, Flora and Fauna

### Designated Sites

- 3.2.1 The Northumbrian water region contains numerous Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR), Marine Protected Areas (MPA) and Marine Conservation Zones (MCZ). The number and type of terrestrial ecological sites across the Northumbrian water region is presented in **Table 3.1** and in Appendices B.1 to B.3.

Should plan options be proposed that have the potential to impact Marine Sites or freshwater dependent terrestrial ecosystems the baseline will be extended will be assessed within the SEA.

**Table 3.1: Ecological sites in the NW WRZ**

Designated Site	Total Number	
	Berwick-Fowberry	Kielder
SAC	4	19
SPA	3	8
Ramsar	3	5
SSSI	8	251
NNR	1	15
LNR	-	126
MPA	-	-
MCZ	1	3

3.2.2

Under the Natural Environment and Rural Communities (NERC) Act 2006, Northumbrian Water has a duty to have regard to the conservation of biodiversity in exercising its function. The duties relate to habitats and species of principal importance, some which may be designed Local Wildlife Sites (LWS).

Priority habitats make up 23% of the Northumbrian water region equating to a total of 210,380ha. Deciduous woodland accounts for the highest percentage of priority habitat in the region. The split of priority habitats by type across the region is shown in **Table 3.2**.

**Table 3.2: Priority habitats in the NW WRZ (Berwick – Fowberry)**

Priority Habitat Type	Berwick – Fowberry Hectares (ha)
Coastal and floodplain grazing marsh	136.52
Coastal saltmarsh	34.85
Coastal sand dunes	152.55
Fragmented Heath	1.51
Deciduous woodland	830.13
Good quality semi-improved grassland	150.5
Lowland calcareous grassland	0.79
Lowland dry acid grassland	29.17
Lowland fens	24.34
Lowland heathland	38.73
Lowland meadows	16.34
Maritime cliff and slope	24.82
Mudflats	15.12
No main habitat but additional habitats present	186.4

Priority Habitat Type	Berwick – Fowberry Hectares (ha)
Saline lagoons	0.06
Traditional orchard	3.14

**Table 3.3: Priority habitats in the NW WRZ (Kielder)**

Priority Habitat Type	Kielder (ha)
<i>Blanket bog</i>	64947.79
<i>Calaminarian grassland</i>	57.99
<i>Coastal and floodplain grazing marsh</i>	1054.97
<i>Coastal saltmarsh</i>	158.40
<i>Coastal sand dunes</i>	1052.68
<i>Deciduous woodland</i>	24950.31
<i>Fragmented heath</i>	2674.49
<i>Good quality semi-improved grassland</i>	5593.63
<i>Grass moorland</i>	21154.14
<i>Lowland calcareous grassland</i>	470.71
<i>Lowland dry acid grassland</i>	235.09
<i>Lowland fens</i>	564.81
<i>Lowland heathland</i>	2205.97
<i>Lowland meadows</i>	471.16
<i>Lowland raised bog</i>	247.69
<i>Maritime cliff and slope</i>	396.69
<i>Mudflats</i>	87.53
<i>No main habitat but additional habitats present</i>	10917.50
<i>Purple moor grass and rush pastures</i>	230.14
<i>Reedbeds</i>	26.13
<i>Saline lagoons</i>	19.43
<i>Traditional orchard</i>	40.93
<i>Upland calcareous grassland</i>	303.73
<i>Upland flushes, fens and swamps</i>	389.62
<i>Upland hay meadow</i>	871.06
<i>Upland heathland</i>	69612.81

3.2.3 There are approximately 2,000 invasive non-native species (INNS) in the UK, and approximately 10-15% of them cause significant social, environmental, or economic impacts, costing the UK an estimated £1.7 Billion a year.

3.2.4 Species of particular concern for Northumbrian Water highlighted in their biodiversity programme include<sup>14</sup>:

<sup>14</sup>

- North American Signal crayfish (*Pacifastacus leniusculus*)
- Japanese Knotweed (*Fallopia japonica*)
- Himalayan Balsam (*Impatiens glandulifera*)
- Giant Hogweed (*Heracleum mantegazzianum*)

### 3.3 Water

- 3.3.1 The Northumbrian Water supply region is a relatively wet area in the UK, with the average annual rainfall exceeding 1500mm and is classed as an area with no serious water stress<sup>15</sup>. However, the anticipated population and economic growth alongside the projected changes in climate will likely continue to place additional stress on water availability and the natural environment within the Northumbrian Water supply region. The Northumbrian Water supply region also has a number of nationally and internationally important wetlands and other water-dependent habitats. Therefore, the management of water resources is particularly important.
- 3.3.2 The main rivers in the Northumbrian Water supply region are shown in Appendix B4. There is one main river basin district (RBD) within the Northumbrian Water supply region; Northumbria. All of the NW supply area falls within the Northumbria river basin district.
- 3.3.3 The Northumbria RBD covers an area of 9,000km<sup>2</sup> and extends from the Scottish border in the north to Stockton-upon-Tees in the south and includes parts of Cumbria in the west and extends to the North Sea in the east.<sup>16</sup> Fig 3.1. The Northumbrian water supply area intersects 7 of the management catchments in the Northumbria RBD.
- 3.3.4 The number of water bodies in the Northumbrian Water supply region within Northumbria RBD is presented in **Table 3.3**.

**Table 3.4: Number of water bodies in the Northumbrian Water supply region**

Water body categories	Total
Rivers and surface water	315
Lake	45
Coastal	7
Estuarine	7
Groundwater	10
<b>Total</b>	<b>384</b>

- 3.3.5 The WFD indicator of the health of the water environment is whether a water body is at good status or potential. This is an assessment of a range of quality elements relating to the biology and chemical quality of surface waters and quantitative and chemical quality of groundwater. To achieve good ecological status or potential, good chemical status or good groundwater status every single element assessed must be at good status or better. If one element is marginally below its threshold for good status, then the whole water body's status is classed as less than

<sup>15</sup> Environment Agency (2021). Water Stressed Areas – Final Classification 2021. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/998237/Water\\_stressed\\_areas\\_\\_\\_final\\_classification\\_2021.odt](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/998237/Water_stressed_areas___final_classification_2021.odt)

<sup>16</sup> Defra and Environment Agency (2021). "Northumbria River Basin District". Available at Northumbria River Basin District | Catchment Data Explorer

good. **Tables 3.4 and 3.5** summarise the current status of surface and groundwater water bodies in the Northumbrian Water supply region within the main RBD<sup>17</sup>.

**Table 3.5: 2015 classification for surface water bodies in the Northumbrian Water supply region**

River basin district	Quantitative status				Chemical Status		
	Bad	Poor	Moderate	Good	High	Fail	Good
Northumbria RBD	13	62	199	98	2	29	345

**Table 3.6:** WFD quantitative and chemical 2015 classification for groundwater water bodies in the Northumbrian Water supply region.

River basin district	Quantitative status		Chemical status	
	Poor	Good	Poor	Good
Northumbria RBD	1	9	7	3

3.3.6 The RBMP for the Northumbria RBD highlights significant water management issues which prevent the sustainable management of water within the entirety of the river basin, as presented in **Table 3.6**. Within the Northumbria RBD, change to the natural flow and level of water, pollution from rural areas, pollution from abandoned mines, pollution from wastewater and pollution from towns, cities, and transport, as well as physical modifications, affect the highest proportions of water bodies.

3.3.7 **Table 3.7: Water management issues**

Water Management Issue	Northumbria RBD
Physical modifications	38%
Pollution from wastewater	13%
Pollution from rural areas	10%
Pollution from abandoned mines	9%
Pollution from towns, cities, and transport	4%
Change to the natural flow and level of water	2%
Non-native invasive species	<1%

### Flood risk

3.3.8 Within the Northumbrian water region, the risk of flooding comes from a variety of sources which include coastal waters, surface water, groundwater, storms, and reservoirs. The projected changes in climate presented in Section 3.7. Climatic factors are likely to increase the frequency of extreme weather events, which combined with projected increases in coastal erosion rates and a rise in sea level will further impact flood risk across the region, with nearly 46% of the surface waters in the Northumbria RBD predicted to deteriorate by 2027.

3.3.9 The Northumbria RBD has over 2.78 million residents, with over 6,000 residents who are at high risk of flooding from rivers and the sea and over 13,000 also at risk from surface water flooding.

<sup>17</sup> It should be noted that 'coastal' waterbodies outlined in Table 4.3 within the Northumbrian Water supply region are not included within Tables 4.4 and 4.5, as WFD classifications for these water bodies were not available considering they are not part of a river water body catchment,

There are no significant flood risk areas identified in the Northumbria RBD during the Preliminary Flood Risk Assessment process.

### 3.4 Covid-19 Impacts on Water Demand

3.4.1 The research and data that has been collated for this report all indicate that demand and PCC have been impacted by the effect of the Covid-19 pandemic. Namely that household demand has increased, and non-household demand has decreased, with overall total demand increasing. It is encouraging that figures from multiple sources are similar and by combining all the data that have investigated the effect of Covid-19 alone on demand (excluding weather) the impact can be summarised as:

- Total Demand: A 2-5% increase of total demand (excluding weather) with times of peak demands increasing by 20-40% (this includes weather).
- PCC: A 3-15% increase in average PCC (excluding weather); with times of peak demand increasing by around 20-40% (this includes weather).
- Non household demand: A decrease of 25-50%.
- Using more water at home: This ranges between a 15-55% increases in water use in the home as perceived by customers. This tallies up to what was actually seen from the demand data.
- Working from home: Pre-Covid 5-15% of customers were working from home and during 2020 this has increased to 20-45%.

3.4.2 The impact of the Covid-19 pandemic will continue to affect PCC and Demand in the next few years and could potentially cause permanent changes to demand and PCC henceforward. From modelled data the PCC increase is estimated to reduce to between 2-3% by 2025 compared to an estimated 4-5% for 2021/22. These estimates give an idea of how consumption will vary for the remainder of the AMP regarding the effect of Covid-19.

3.4.3 Northumbrian Water's long-term goal is to reach a PCC of 118 litres per person per day by 2040. Pre-covid, we reported a NWG PCC for 2019/20 of 148.86. Current reported NWG PCC (2020/21) is 165.66 as shown in **Table 3.7**.

3.4.4 **Table 3.8 Average PCC Kielder and Berwick pre-Covid**

Average PPC	2019/2020	2020/2021
Kielder	144.19	162.47
Berwick	13%	151.67

3.4.5 The WReN region is a hub for agriculture with cereal and livestock grazing being the predominant type of farming. Agricultural land is classified on a scale of 1 to 5 where 1 is the highest quality and 5 is the lowest. The agricultural land classification of the region is predominately Grade 3 followed by Grade 5, with pockets of urban and non-agricultural land as shown in **Appendix B4**

3.4.6 The North East of England has a significant number of landfill sites. Currently, there are approximately 96 authorised landfill sites across the Northumbrian Water region.

### 3.5 Air

3.5.1 Air quality in the Northumbrian water region is varied and there are certain areas with higher concentrations of air pollutants likely to be associated with urbanisation, transport, or business activities. Air Quality Management Areas (AQMAs) are declared where the national air quality

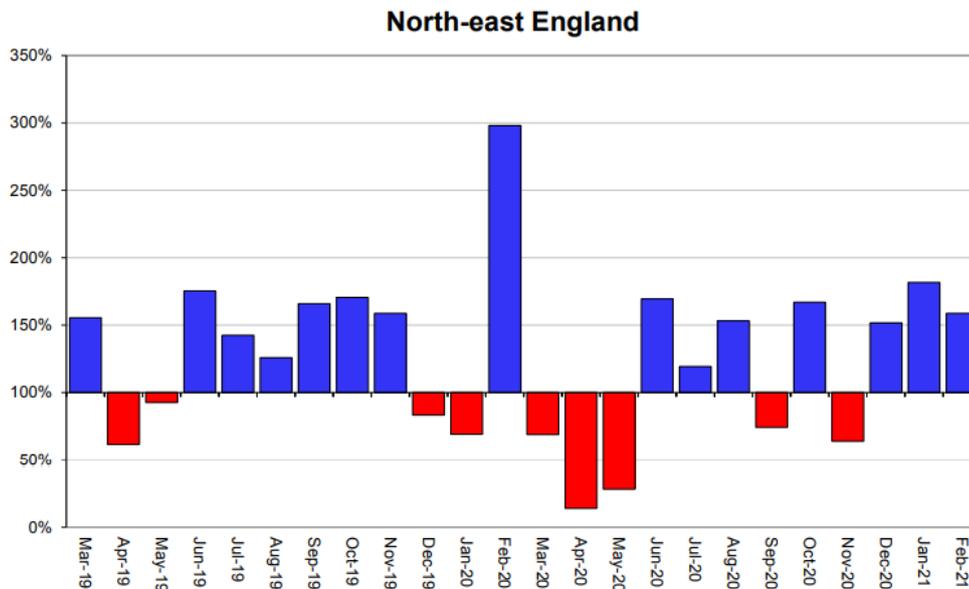
objectives are not being met<sup>18</sup>. A high proportion of the local authorities which fall within the Northumbrian Water supply region contain at least one AQMA and are predominately designated for Nitrogen dioxide (NO<sub>2</sub>) and Particulate Matter (PM<sub>10</sub>)<sup>19</sup>. There is a total of 7 AQMAs in the Northumbrian supply area.

### 3.6 Climatic Factors

#### 3.6.1

Current observations indicate that the UK is continuing to warm. In 2021, temperature records were set, including a high of 28.6°C and a new winter record of -23.0°C<sup>20</sup>. The decade between 2010 and 2020 has been on average 0.3°C warmer than the 1981-2010 average and 0.9°C warmer than 1961-1990. Annual precipitation has increased across the UK in the last few decades with 2020 seeing 116% more rainfall than the 1981-2010 average. **Figure 3.2** below provides rainfall information for the North East region from March 2019 to February 2021 (the red bars indicative of below average rainfall and the blue bars indicative of above average rainfall). February 2020 stood out to be an extensively wet winter month, setting an annual record.

**Figure 3.9: North East region Monthly Rainfall Chart (2019-2021)<sup>21</sup>**



#### 3.6.2

The Met Office UK Climate Projections (UKCP) were updated for the first time since 2009 in December 2018 (UKCP18)<sup>22</sup>. The UKCP18 are largely the same as the previous projections where all areas of the UK are projected to be warmer, particularly during summer months. Rainfall is projected to vary seasonally and at a regional scale, however the UK is projected to have wetter winters and drier summers. The projected changes in temperature and precipitation for the north east of England by the 2050s (2040-2069), under the RCP8.5 scenario (high emissions scenario) are detailed in **Table 3.8**. The 1981-2010 baseline period and the central

<sup>18</sup> Defra National Air Quality Objectives. Available at: [https://uk-air.defra.gov.uk/assets/documents/National\\_air\\_quality\\_objectives.pdf](https://uk-air.defra.gov.uk/assets/documents/National_air_quality_objectives.pdf)

<sup>19</sup> Defra List of Local Authorities with AQMAs. Available at: <https://uk-air.defra.gov.uk/aqma/list>

<sup>20</sup> RMetS (2021). State of the UK Climate. Available at: [State of the UK Climate - Met Office](https://www.metoffice.gov.uk/state-of-the-uk-climate)

<sup>21</sup> Water Situation Report: Available as: <https://www.gov.uk/government/collections/water-situation-reports-for-england>

<sup>22</sup> Met Office UKCP18. Available at: <https://ukclimateprojections-ui.metoffice.gov.uk/>

estimate, representing ‘as likely as not’ probability of change (50th percentile), was used for the following projections.

**Table 3.8: Climate projections by the 2050s under the RCP8.5 scenario**

Climatic Factor	Climate Projections
Temperature	Annual mean temperatures are projected to increase by 3.5°C. Summer temperatures are projected to see the largest increase by 2.8°C and winter temperatures by 1°C. Mean maximum summer temperatures are projected to increase by 3°C.
Precipitation	Annual mean precipitation is projected to decrease by 10%. Seasonal variability is projected with a 20% decrease in precipitation during summer months and an increase of 20% during winter months.

Source: Met Office UKCP18 using the central probability estimate for a RCP8.5 scenario

### Greenhouse gas emissions

3.6.3 Based on information from the local authorities which fall within the WReN region, the total carbon dioxide (CO<sub>2</sub>) emissions for 2019 across all sectors is estimated at 14,750.2 kilo tonnes (ktCO<sub>2</sub>).

3.6.4 The industry sector contributed the highest proportion of emissions to the total in 2019 at 38.8% followed by the transport and domestic sector at 30.7% and 26.6% respectively. The LULUCF sector is estimated to be responsible for the removal of 1,189.5ktCO<sub>2</sub> equating to an 8.1% reduction in the total CO<sub>2</sub> emissions<sup>23</sup>

## 3.7 Population and Human Health

3.7.1 It should be noted that data is presented differently by each Authority.

### Northumberland

3.7.2 The total population as determined by Northumberland County Council local authority is 319,030 (2017). The Office of National Statistics population projections (2016 based) predict that by 2033 the total population will increase by another 18,970 people to a total of 338,000, an increase of 8.3% from 2017 estimates as shown in **Table 3.9**. Over the next 25 years an increase of 3,680 new homes occupied each year is predicted.

**Table 3.9: Population projections all ages 2017 – 2034 Northumberland**

Total population (all ages)	2017	2034
Numbers	319,030	338,00

Source: ONS Data

3.7.3 It is estimated that 16.3% of the population are aged 0-15 years (Children & Young People), 59.7% of the population are aged 16-64 (working age group) and 23.9% are aged 65 and over. Compared to the average for England, the Working Age group is 1.23% lower than the national average, whilst the 65+ age group is 5.42% higher.

<sup>23</sup> DECC (2021) Local Authority Carbon Dioxide Emissions Estimates 2019: Statistical Release

3.7.4 The general Northumberland populational health in comparison to the populational health of the North East of England, and of England as a whole, is presented in **Table 3.10** below.

**Table 3.10: General Health (2011) Northumberland**

Name	Northumberland	England
	%	%
Very bad health	2	1.2
Bad health	4.3	4.2
Fair health	15	13.1
Good health	38.3	34.2
Very good health	39.7	47.2

Source: Northumberland County Council

### North East England

3.7.5 Settlements within the North East region of England are diverse and range from large population centres such as Newcastle, Sunderland and Durham to small rural hamlets and seaside towns.

3.7.6 The distribution of age amongst the population in the region is similar to the UK average where 17.6% are aged 15 and under, 62.3% are between 16 and 64, and 20.1% are over 65. The average age is 41.6 years old, and the region has a total population of 2.4M residents.

3.7.7 Ethnicity in the region is predominately White British. There are much smaller proportions of Black, Asian, and Mixed ethnicities in the urban areas of the region compared to rural areas.

3.7.8 Life expectancy at birth for both males and females in North East England is lower than the England average at around 77.9 years old and 81.6 years old respectively. Alongside the various indicators included within the Public Health Profiles, the region is generally worse than the national average. Where the region is performing worse than the national average is against the following indicators:

- Killed and seriously injured casualties on England's roads
- Suicide rate
- Hip fractures in people aged 65 and over
- Estimated diabetes diagnosis rate
- Smoking prevalence in adults (18+)
- Percentage of physically active adults,
- Smoking prevalence in adults in routine and manual occupations (18-64)
- Excess winter deaths.

## 3.8 Economy

3.8.1 North East England contributes around 6.7% of the total UK economy. Gross Domestic Product (GDP) per head is £24,068 which is lower than the national UK average of £32,857. The production industry dominates the employment sector across the North East region, which is in line with the rest of the UK. For the three months ending September 2021 the unemployment rate was 5.9% which is slightly higher than the UK average of 5.6%.

3.8.2 In 2019, there were 2.6 million trips to North East England, which makes up around 5% of total trips to England. The total expenditure in Eastern England was £759 million.

### 3.9 Regional deprivation

3.9.1 The Index of Multiple Deprivation (IMD) 2019 is the official measure of relative deprivation for small areas (or neighbourhoods) in England. The IMD ranks every small area (Lower Super Output Area) in England from 1 (most deprived) to 32,844 (least deprived). For larger areas we can look at the proportion of LSOAs within the area that lie within each decile. Decile 1 represents the most deprived 10% of LSOAs in England while decile 10 shows the least deprived 10% of LSOAs. According to the Northumberland County Council, 8% of the county population live in areas within the 10% most deprived decile of the IMD 2019.

### 3.10 Historic Environment

3.10.1 The Northumbrian water region is rich in heritage, with listed buildings, scheduled monuments, registered parks and gardens and registered battlefields. The total number of each of these assets within the Northumbrian Water Supply region is presented in **Table 3.11**. Scheduled monuments, registered parks and gardens, and registered battlefield are shown in Appendix B.7.

The WReN region is rich in heritage with listed buildings, scheduled monuments, conservation areas, registered parks and gardens, and registered battlefields.

**Table 3.11: Heritage assets within the WReN region**

Asset	Description	Berwick-Fowberry		Kielder
Listed Buildings	The statutory responsibility for listed buildings control lies with the individual Local Authorities. The Department for Digital, Culture, Media and Sport is responsible for compiling the statutory list of buildings of special architectural or historic interest and each building or structure of interest is classified under one of three Grades; I, II* and II depending on their significance (Grade I assessed as highest significance).	Grade I	28	305
		Grade II*	38	695
		Grade II	645	10240
Registered Parks and Gardens	Historic England maintains a register of historic parks and gardens of special interest in England, these parks and gardens are as equally important as buildings and settlements and form part of an area's cultural heritage. However, unlike listed buildings and conservation areas, historical parks and gardens are not afforded legal protection within the UK. The registration of these historic parks and gardens is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the landscapes' special character.	Grade I	-	4
		Grade II*	1	10
		Grade II	-	40
Scheduled Monuments	Scheduled monuments are protected under the Ancient Monuments and Archaeological Areas Act 1979. The monuments are scheduled and recorded through Historic England, based on national importance and covering a diverse range of archaeological sites. Scheduled monuments are often in a ruinous or semi-ruinous condition or take on the form of earthworks. More complete structures of national significance are usually protected as listed buildings.		73	1447
Conservation Areas	Conservation areas are designated by local planning authorities under their powers. The areas are protected to preserve special areas of historical and architectural importance and can range from small villages, town centres and residential areas. Each conservation area		6	257

Asset	Description	Berwick-Fowberry	Kielder
	will have its own conservation area appraisal, which sets out how it should be protected.		
Registered Battlefields	Historic England holds a Register of Historic Battlefields. Its purpose is to offer battlefields protection through the planning system, and to promote a better understanding of their significance and public enjoyment.	3	5

It is likely that most of the Local Authorities in the WReN region will hold a Historic Environment Record (HER), which is a database of archaeological sites, listed buildings and other historic buildings, and finds of historic objects. There are hundreds of entries on the HERs from churches and houses to roman coin finds and medieval finds. There is also potential for unidentified heritage assets and archaeological remains to be present within the region.

### 3.11 Landscape

The landscape across the Northumbrian Water region is diverse; it is low and flat near the North Sea coast and increasingly mountainous toward the northwest. The region also has a striking stretch of coastline, including sandy beaches, sand dunes, rugged cliffs and isolated islands, and picturesque seaside villages.

National Character Areas (NCAs) divide England’s landscape into 159 distinct areas and are defined by a unique combination of aspects such as landscape, biodiversity, geodiversity and economic activity<sup>24</sup>. There are 17 NCAs within the Northumbrian Water WRZ.

Areas of Outstanding Natural Beauty (AONB) are protected to conserve and enhance their natural beauty and distinctiveness<sup>25</sup>. There are two AONB within the Northumbrian Water WRZ which are detailed in **Table 3.12** and are mapped in Appendix B6.

**Table 3.12: AONB within the Northumbrian Water Region**

AONB	Description
Northumberland Coast	Covering 40 miles (64 km) of coastline from Berwick-Upon-Tweed to the River Coquet estuary in the Northeast of England, includes sandy beaches, sand dunes, rugged cliffs and isolated islands. It includes two National Nature Reserves.
North Pennines	The North Pennines is the northernmost section of the Pennine range of hills, the AONB is also a UNESCO Global Geopark. The landscape of the North Pennines AONB is made up of heather moors, deep dales, upland rivers, hay meadows and stone-built villages. 36% of the AONB designated as Sites of Special Scientific Interest.

<sup>24</sup> Natural England (2014). NCAs. Available at: <https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making>

<sup>25</sup> Natural England (AONBs): designation and management. Available at: <https://www.gov.uk/guidance/areas-of-outstanding-natural-beauty-aonbs-designation-and-management>

### Tranquillity

- 3.11.1 Tranquillity is recognised as a natural resource and one which is beneficial to health and wellbeing, however infrastructure and development is putting more pressure on this special quality. The Campaign for Rural England (CPRE) has developed a tranquillity map for England to show the range of undisturbed or disturbed tranquillity areas across the country. There are areas of high tranquillity (undisturbed areas) distributed throughout Northern England, as well as pockets of urban areas.

### 3.12 Material assets

- 3.12.1 The Northumbrian Water supply region has an extensive transport network which connects people, places and services both within the region and beyond to support the regional and national economy.
- 3.12.2 In the wider WReN region the A1(M) runs north-south through the region whilst a number of key A roads (A1, A58, A69, A696, and the A19) cross the region, mostly travelling outwards from Newcastle upon Tyne. These main trunk routes are maintained by Highways England. A variety of other major roads run through the region, maintained by county council.

### Resource Use and Waste

- 3.12.3 In 2020/21 the total amount of local authority managed waste was 25.9 million tonnes. North East England managed 1.3 million tonnes of waste in 2020/21, with 33.8% of this collected waste sent for recycling, 56.4% sent to incineration, 7.9% sent to landfill and the remaining 2.0% fell within the 'other' category. The recycling rate for North East England was the second lowest in England, with only London (29.9%) performing worse.

### 3.13 Natural Capital

- 3.13.1 The Northumbrian Water WRZ contains a diverse range of Natural Capital stocks that provide a range of ecosystem services at the national, regional and local levels. The landscape is a mixture of coastal area, lowlands and small hills that contain all eight broad habitat types included within the United Kingdom's National Ecosystem Assessment (UK NEA). The UK NEA reports, first published in 2011 with follow-on reports published in 2014, set out the direct relationships between healthy, functioning ecosystems and human well-being and economic prosperity. The findings, which included extensive research from hundreds of natural scientists, economists, social scientists and other stakeholders, explained that many of the UK's ecosystems are in a state of decline, and that it is critically important for decision-making processes to recognise the benefits that society receives from those ecosystems. Anthropogenic pressures, such as agricultural intensification and population growth, threaten the functioning of those ecosystems, with the report citing a significant decline in the UK's semi-natural grasslands in the last 60 years due to agriculture, as well as a similar decline in coastal margin habitats due to development and coastal squeeze. It is an imperative for the WReN assessment process to recognise the current state and benefits derived from its ecosystems. It is also important to recognise that the Northumbrian water region contains several key abiotic stocks including fertile soils and coastal shelves, which also directly benefit society.
- 3.13.2 The land cover percentages for Natural Capital stocks within the Northumbrian Water region have been estimated using open source data and are provided below. Estimates for coastal and marine land cover were not available, however these habitats will be included in the Natural Capital baseline for the options assessments and wider IEA process.

### Soils and geology

- 3.13.3 Information on soils stocks within the Northumbrian water WRZ is provided in Appendix B4, Section 3.5 and **Table 4.1**. The region contains nationally important stocks of soils.

### Freshwater

- 3.13.4 Freshwater natural capital stocks cover approximately% of the Northumbria Water WRZ. This encompasses all waterbodies and wetlands such as rivers, ponds, fens, marshes and bogs. Within the WRZ artificial freshwater habitats, such as canals and reservoirs are also an important natural capital stock. These natural capital stocks are vital to support the region's biodiversity and provide other ecosystem services such as water supply, climate regulation and cultural services

### Farmland

- 3.13.5 Farmland natural capital stocks cover approximately 47% of the Northumbrian water region, agriculture with cereal and livestock grazing being the most predominant type of farming. Examples of types of Farmland stocks include Arable and rotational leys, Horticulture, Improved grassland, Orchards and top fruit and Permanent pasture. In addition to the primary production of agricultural products, farmland provides many other services such as supporting biodiversity and providing cultural and heritage services.

### Grasslands

- 3.13.6 Grassland natural capital stocks cover approximately 11% of the Northumbrian Water region and include predominately semi natural grasslands. These habitats provide key services supporting biodiversity, sequestering carbon and mitigating climate change and livestock production. In addition, this stock is associated with recreation and physical benefits.

### Urban

- 3.13.7 Urban natural capital stocks cover approximately 4% of the Northumbrian Water region and include greenspace, blue space and mosaic habitats within urban areas. These natural capital stocks provide a wide range of ecosystem services supporting a diverse array of plants and animals and can be particularly important for pollination services. Amenity greenspaces (parks, outdoor sports facilities) are vital for community cohesion, and the mental and physical health of urban residents.

### Woodland

- 3.13.8 Woodland natural capital stocks cover approximately 9% of the Northumbrian Water region and consist of several sub habitat types including Broadleaved, mixed and yew woodland, Coniferous woodland, Individual trees/veteran trees and Woodland priority habitats. The quality of woodland stocks vary within the region as the majority is under management however several high-quality stocks include ancient woodland. These stocks provide services such as carbon sequestration, air purification and flood prevention.

### Coastal and marine

- 3.13.9 Coastal and marine habitats cover a small proportion of the land cover within the Northumbrian Water region however include several key habitats and natural capital stocks such as:

- Beach
- Salt marsh
- Sand dunes
- Intertidal rock

- Intertidal sediment
- Reefs
- Sea grass beds
- Shallow subtidal sediment.

3.13.10 These stocks support a range of services including reaction, cultural service, hazard prevention and climate regulation.

#### Future baseline

- The SEA Regulations requires that "the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the Plan or Programme" is identified. Prediction of future trends is difficult because they depend on a wide range of global, national and regional factors and decision making. Key trends have been identified and from an initial review it is likely that the following trends of aspects influencing change will continue:
- Climatic factors - the climate is expected to continue to change with annual average temperatures projected to increase, particularly in summer. Winters are projected to be wetter and summers drier. Carbon and other GHG emissions will continue to be emitted, however regulations and legislation will likely continue to promote the reduction in emissions through commitments to net zero. The water industry in the UK is aiming to become net zero by 2030.
- Material assets - regeneration and future investment and demand are likely to increase the number and quality of material assets such as housing, transport infrastructure, waste facilities, and community facilities.

### 3.14 Key issues for the WReN Regional Plan:

- Biodiversity, flora and fauna – There is a need to protect or enhance the region's biodiversity, particularly protected sites designated for nature conservation and to avoid activities likely to cause irreversible damage to natural heritage. There is the need to develop opportunities to improve connectivity between fragmented habitats and to control the spread of Invasive Non- Native Species (INNS). There should be more engagement of people in biodiversity issues so that they personally value biodiversity including through recognising the value of ecosystem services.
- Population and human health - water resources play an important role in supporting the health and recreational needs of local communities. It is necessary to ensure all communities have a clean, safe and attractive environment in which people can take pride. Also to ensure secure, safe, reliable, sustainable and affordable supplies of water are provided. It is recognised that access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and wellbeing of communities.
- Soil – Protect and enhance the quality of soils. Encourage the development of brownfield sites and promote mixed use development.
- Water - Encourage more efficient use of water and promote awareness of water sustainability. Develop a resilient and flexible water management approach to cope with a changing climate, population, and economic conditions. Water quality is likely to continue to be maintained and improved through legislation such as the WFD. There is potential for an increased need for wastewater treatments in combination due to WFD water quality standards and population increase. Given the energy intensity of wastewater treatment, the water industry CO<sub>2</sub> emissions may increase and further contribute to climate change. There is a need to reduce flood risk to people both residential and non-residential properties,

community facilities and key transport links, as well as designated nature conservation sites and heritage.

### 3.15 Wider issues

3.15.1 Air quality and Climate – There is a critical need to reduce greenhouse gas emissions and to put UK on the path to net zero 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 and improve overall air quality.
- Minimise energy consumption and support the use of sustainable/renewable energy and improve resilience to climate change.
- Build in adaption to climate change to future planning and consider the level of urgency of associated risks of climate change impacts.

3.15.2 Historic environment - Historic England recently reported that heritage assets at risk are decreasing. There is a need to conserve or enhance sites and the settings of archaeological importance and cultural heritage interest, particularly those which are sensitive to the water environment.

## 4 Key Environmental Issues and Opportunities

### The SEA Regulations require:

Consideration of ‘any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of particular environmental importance, such as areas designated pursuant to Council Directive 79/409/EEC on the conservation of wild birds (a) and the Habitats Directive’

### SEA Regulations Schedule 2 (4)

#### 4.1 Scoping: Issues and Opportunities

4.1.1 A key stage in the scoping process is to decide what topics are relevant for the NWL WRMP SEA and what topics (if any) should be scoped out. It is considered that all the SEA Regulations topics are relevant to the WRMP and therefore they have all been scoped in. **Table 4.1** provides an overview of these topics and relevant key issues and opportunities associated with each SEA Regulations topic.

4.1.2 Topics were scoped in based on the baseline situation and the potential for the NWL WRMP24 to impact them. This was assessed by reviewing baseline conditions and current environmental issues for the Northumbrian Water WRZ and assessing the likelihood of a potential impact.

**Table 4.1: Key Issues and Opportunities**

SEA Topic	Implications	Opportunities
Biodiversity, Flora and Fauna	<p>The NW WRZ is rich in habitats and species diversity, and includes national and internationally designated sites including SSSIs, NNRs, SPAs, SACs and Ramsar sites.</p> <p>Development of new water infrastructure can directly or indirectly affect designated and non-designated sites, habitats and species through loss of land, disturbance and damage.</p> <p>There is potential for the options within the NWL WRMP24 to result in surface and/or groundwater pollution which could have an impact on wildlife.</p> <p>Wetland and marsh habitat rely on water, the NWL WRMP24 should ensure that it does not affect these areas through over abstraction and should look for opportunities to reduce abstraction pressure where cost effective and possible.</p>	<p>The NWLWRMP should ensure that there are no negative impacts on biodiversity and should look to enhance biodiversity and achieve biodiversity net gain where possible. There are opportunities to include options which result in improvements to the natural environment and biodiversity net gain through habitat creation or enhancement, support Nature Recovery Networks and Strategies, connectivity of ecological networks to increase species resilience and introduction of vegetation to slow run-off and reduce flood risk, amongst others.</p> <ul style="list-style-type: none"> <li>• Protect, conserve and enhance biodiversity</li> <li>• Slow/halt biodiversity losses/declines</li> <li>• Protect sensitive chalk stream habitats</li> <li>• Integrate biodiversity into new infrastructure</li> </ul>
Soil	<p>Agriculture has a dominant role in the landscape of the NW WRZ. Agriculture land of Grade 2 and 3 are the most common across the region.</p> <p>The options within the NWL WRMP24 have the potential to result in a loss of</p>	<p>Soil is an important natural resource and as such the NWL WRMP should consider the impact of options on the soil stocks and avoid options which have significant negative effects. The options within the NWL WRMP should avoid impacts on</p>

SEA Topic	Implications	Opportunities
	<p>agricultural land or through a reduction in water availability for agricultural processes. There is also potential for soil contamination through the construction phase.</p>	<p>agricultural land of Grade 1 and 2 if possible, and mitigation should be included where impacts are unavoidable. There are opportunities for the options to positively affect agriculture, for example options to increase raw water storage and supply:</p> <ul style="list-style-type: none"> <li>● Promote regenerative agricultural practices</li> <li>● Prioritise the implementation of catchment management solutions to help manage soils, increase soil health and reduce impacts of waterbodies</li> <li>● Ensure measures are taken to prevent soil erosion</li> <li>● Reduce nutrient loads within surface water and groundwater bodies</li> </ul>
Water	<p>Phosphate and physical modifications are the most common pressures affecting the achievement of 'Good' status. The significant water management issues which are most common in affecting the achievement of 'Good' are pollution from wastewater, physical modifications and pollution from town, cities or rural areas. There is potential for the options within the NWLWRMP24 to have a negative impact on water quality.</p> <p>Areas of the region are at high risk of flooding from both surface water and rivers and the sea. There is potential that the options within the WRMP could be affected by or contribute to an increased risk of flooding.</p>	<p>The NWL WRMP should avoid options which have a negative impact on water quality or ecology. Options which reduce pressures on the water environment should be explored. WFD will be considered during the optioneering process to contribute to the selection of options which could lead to WFD improvements or avoid WFD deterioration.</p> <p>The NWL WRMP has the opportunity to improve the environment by leaving more water in the region's rivers, streams and underground sources.</p> <p>The options within the NWL WRMP should avoid areas at high risk of flooding and, where appropriate, implement measures to reduce flood risk:</p> <ul style="list-style-type: none"> <li>● Ensure the protection, improvement and sustainable use of waterbodies</li> <li>● Avoid, control or reduce water pollution</li> <li>● Leave more water in the natural environment</li> <li>● Reduce or mitigate flood risk</li> </ul>
Air	<p>Air quality in the region is varied. Generally, it is good, however there are some areas designated as AQMAs. Air pollution sources include transport and industry.</p> <p>The options within the NWL WRMP24 have the potential to impact air quality. This could include the generation of air pollutants from treatment plants and there is also likely to be effects from the construction phase.</p>	<p>There is potential for the NWL WRMP to mitigate any increases in air pollutants as a result of the options and improve air quality in the region.</p> <ul style="list-style-type: none"> <li>● Improve air quality</li> </ul>
Climatic Factors	<p>The NW WRZ is projected to have hotter and drier summers, and wetter and warmer winters, as well as short duration "extreme weather events" such as thunderstorms and heatwaves. There is potential that this could affect water availability through increases in periods of drought.</p> <p>There is also potential for options within the NWL WRMP24 to result in carbon emissions during the construction and operation phase which will further contribute to climate change.</p>	<p>The NW WRZ has the opportunity to consider the impact of climate change within the option selection process. Measures to increase the resilience of the option to a changing climate could also be considered. The options should also consider the impact on climate change through the optioneering and design processes.</p> <p>The NWL WRMP has the opportunity to address the impacts of climate change on demand for water and how much is available, and to increase the region's</p>

SEA Topic	Implications	Opportunities
Landscape	<p>The NW WRZ landscape is diverse and there are important landscapes within the region, including AONBs.</p> <p>There is potential for the options within the NWL WRMP24 to have an impact on the landscape. This could include temporary construction effects and permanent effects associated with infrastructure which could affect visual amenity or the character of the area.</p>	<p>resilience to severe drought and other extreme events and stresses:</p> <ul style="list-style-type: none"> <li>● Increase resilience to climate change, including the resilience of resource, infrastructure and the environment</li> <li>● Reduce contribution to climate change</li> <li>● Ensure zero net emissions</li> <li>● Promote nature-based solutions and restore habitats to offset and sequester carbon within NW WRZ, while also achieving biodiversity net gains</li> </ul> <p>Consideration of the impacts of the landscape should be considered as part of the option development. There is potential for the NWLWRMP to enhance the landscape. This may involve selecting certain materials or colours for the option or through planting or habitat creation:</p> <ul style="list-style-type: none"> <li>● Ensure the protection of landscape character</li> <li>● Enhance landscapes by working with stakeholders through habitat creation, implementation of catchment-based solutions and safeguarding existing habitats.</li> </ul>
Historic Environment	<p>The NW WRZ is rich in heritage and contains many listed buildings, scheduled monuments, and registered parks and gardens, amongst others.</p> <p>The options within the NWL WRMP24 have the potential to directly or indirect impact the historic environment through effecting the asset's fabric or setting.</p>	<p>The options within the NWL WRMP should consider the historic environment and minimise adverse effects:</p> <ul style="list-style-type: none"> <li>● Protect archaeology</li> <li>● Careful consideration to the siting of options to reduce effects on historic assets and their setting</li> <li>● Encourage public awareness through promoting heritage sites</li> </ul>
Population and Human Health	<p>Population is expected to grow which will likely place additional pressure on the water environment within the region. Economic growth and climate change will also add to this pressure. Health within the region is generally good.</p> <p>The options within the NWL WRMP24 have the potential to result in temporary disturbance effects during the construction phase. There is also potential for impacts on the water or natural environment which could have impacts on recreation and wellbeing.</p>	<p>There is an opportunity for the NWL WRMP to engage with the local community. The NWL WRMP could also look to maximise opportunities for recreation through enhancing access and the condition of the water environment, greenspaces or areas of the natural environment. Thus, improving the inclusivity of and connection to the local natural environment.</p> <p>The NWL WRMP also has the opportunity to ensure a resilient and reliable water supply for customers now and in the future, ensuring there is enough water for a growing population and to support economic growth.</p> <p>Ensure an economically sustainable water supply for customers. This may see the economic value of water increase and require a greater value to be assigned to water through increased charges and/ or seasonal water rates:</p> <ul style="list-style-type: none"> <li>● Prevent disturbance effects for the local community</li> <li>● Enhance the natural environment for recreation purposes</li> </ul>

SEA Topic	Implications	Opportunities
Material Assets	<p>The NW WRZ contains important transport links which could be affected during construction works. There is also significant water and wastewater treatment infrastructure across the region. The region produces and manages a significant amount of waste and there are over 100 authorised landfill sites.</p> <p>The NWL WRMP24 has the potential to increase the use of resources within the region and result in the generation of waste.</p>	<ul style="list-style-type: none"> <li>● Improve access to the natural environment for all members of the community</li> <li>● Provide a resilient and reliable water supply for customers</li> </ul> <p>The NWL WRMP has the opportunity to consider the use of resources within the option development and reduce the use of energy, materials and prevent waste generation:</p> <ul style="list-style-type: none"> <li>● Reduce resource use</li> <li>● Minimise waste generation</li> <li>● Avoid impacts on the transport network</li> <li>● Achieve required leakage reduction targets</li> <li>● Reduce unplanned outages</li> </ul>

Notes: All topics have been scoped in

## 4.2 Option Types: Issues and Opportunities

4.2.1 Appendix D presents key issues and opportunities identified for each of the different water resource supply and demand option types (as described in section 1.10) proposed for WRMP24 (Appendices D.1 to D.16).

# 5 SEA Framework

## 5.1 SEA Objectives

5.1.1 A key part of the SEA Scoping process is the development of the SEA Framework. The SEA Framework forms the basis for predicting and assessing the effects arising from the implementation of the NWL WRMP24 and will be used to assess the WRMP options and the preferred programme. An overarching set of SEA objectives and assessment questions to guide the assessment have been developed for the WReN regional plans. Northumbrian Water will maintain similar SEA objectives for WRMP24 as outlined in the WReN regional plan. The reason for this is that the great majority of NWL WRMP24 options are located within the WReN region and following a consistent approach will enable the results of the regional plan options-level SEA results to be easily used as part of the NWL WRMP24 process. The results of the HRA and WFD assessments will feed into the SEA objectives on biodiversity and water.

5.1.2 The compatibility of the WRMP24 SEA objectives with the WRE regional plan SEA objectives is shown in **Table 5.1** below.

**Table 5.1: NWL WRMP24 SEA and WReN regional SEA objectives compatibility**

SEA Topics	NWL WRMP24 Objectives	WReN SEA Objectives (Draft)
<b>Biodiversity, Flora and Fauna</b>	To protect and enhance biodiversity, ecological functions, capacity and habitat connectivity, including protecting designated sites and their qualifying features, priority species and priority habitats.	To protect and enhance biodiversity, ecological functions, capacity, and habitat connectivity within the WReN region.
	To provide opportunities for habitat creation or restoration and deliver a net benefit / gain for biodiversity (BNG).	To provide opportunities for habitat creation or restoration and a net benefit/gain for biodiversity.
	To avoid introducing or spreading and, where feasible, manage invasive non-native species (INNS).	To avoid introducing or spreading INNS.
	To protect, conserve and enhance natural capital and the ecosystem services from natural capital to increase resilience to climate change.	To protect, conserve and enhance natural capital and the ecosystem services from natural capital that contribute to the economy.
	To meet WFD objectives relating to biodiversity.	
<b>Soils</b>	To protect geological and geomorphological features, and the functionality and quality of soils, including the protection of high-grade agricultural land.	To protect and enhance geology, geomorphology, and the quality and the quantity of soils.
<b>Water</b>	To reduce or manage flood risk, taking climate change into account.	To reduce or manage flood risk, taking climate change into account.
	To enhance or maintain the quality of surface and groundwater waterbodies.	To maintain or improve the quality of rivers, lakes, groundwater, estuarine and coastal waterbodies.

SEA Topics	NWL WRMP24 Objectives	WReN SEA Objectives (Draft)
	To enhance or maintain surface water flows and quantity and groundwater resources.	To avoid adverse impact on surface and groundwater levels and flows, and ensure sustainable management of abstractions.
	To meet WFD objectives and support the achievement of environmental objectives set out in River Basin Management Plans.	
	To increase water efficiency and increase resilience of water supplies and natural systems to droughts.	To increase awareness of water sustainability and efficient use of water.
<b>Air</b>	To reduce and minimise air emissions during construction and operation.	To maintain and improve air quality.
<b>Climate</b>	To minimise or reduce embodied and operational carbon and greenhouse gas emissions.	To minimise greenhouse gas emissions.
	To introduce climate mitigation where required and improve the climate resilience of assets and natural systems to the threats of climate change.	To adapt and improve resilience to the threats of climate change.
<b>Landscape &amp; Visual amenity</b>	To conserve, protect and enhance landscape and townscape character and visual amenity.	To protect and enhance designated and undesignated landscape, townscape and the countryside.
<b>Historic Environment</b>	To conserve, protect and enhance the historic environment and heritage assets, and their settings, including archaeologically important sites.	To conserve/protect and enhance historic environment and heritage assets, and their setting, including archaeologically important sites.
<b>Population and Human Health</b>	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing.	
	To secure resilient, high quality, sustainable and affordable water supplies over the long term for the health and wellbeing of the community.	To protect and improve health and well-being and promote sustainable socio-economic development through provision of access to a resilient, high quality, sustainable and affordable supply of water over the long term.
	To increase access and connect customers to the natural environment, provide education or information resources for the public.	
	To maintain and enhance the water environment for other users including recreation, tourism and navigation.	To protect and enhance the water environment for other users including recreation tourism and navigation.
<b>Material assets</b>	To reduce, and make more efficient, the consumption of resources, and minimise the generation of waste.	To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, including leakage from the water supply system, encourage its re-use and eliminate waste sent to landfill.
	Avoid negative effects on built assets and infrastructure	

## 5.2 Assessment Criteria

**Table 5.2** presents the proposed assessment criteria that will form the assessment framework for the options and WRMP24 assessment.

**Table 5.2: SEA assessment criteria for NW WRMP24**

SEA Topic	Proposed SEA Objectives	Assessment Questions/Sub-Themes
Biodiversity, flora and fauna	To protect and enhance biodiversity, ecological functions, capacity and habitat connectivity, including protecting designated sites and their qualifying features, priority species and priority habitats.	<ul style="list-style-type: none"> <li>● Is the option likely to affect the conservation status of any SPA, SACs, Ramsar sites, SSSI or locally designated sites?</li> <li>● Will the option provide opportunities to enhance and provide climate change resilience of water dependent Natura 2000 sites/ features?</li> <li>● Will the option protect and enhance aquatic habitats and species, including freshwater fisheries and chalk rivers?</li> <li>● Will the option affect the marine environment, habitats and species (including Marine Conservation Areas (MCZ) and Marine Protection Areas (MPA))?</li> <li>● Is the option likely to affect ancient woodland, Section 41 of the NERC act habitats and species of principal importance for the purpose of conserving biodiversity?</li> <li>● Will the option affect any habitats that support legally protected species or species of conservation concern?</li> <li>● Is there potential for contribution to achieving 'favourable' conservation status or for creation of new priority habitats?</li> <li>● Is the option likely to have an impact on a current or future Nature Recovery Network?</li> <li>● Are there any opportunities for habitat creation or restoration?</li> <li>● Will the option contribute to the loss or gain in habitat connectivity?</li> <li>● Is there a possibility for INNS to be spread/ introduced or for algal blooms to occur?</li> <li>● Is there an opportunity to improve biodiversity value through removal of INNS?</li> </ul>
	To provide opportunities for habitat creation or restoration and deliver a net benefit / gain for biodiversity (BNG).	
	To avoid introducing or spreading and, where feasible, manage invasive non-native species (INNS).	
	To protect, conserve and enhance natural capital and the ecosystem services from natural capital to increase resilience to climate change.	
	To meet WFD objectives relating to biodiversity.	
Soil	To protect geological and geomorphological features, and the functionality and quality of soils, including the protection of high-grade agricultural land.	<ul style="list-style-type: none"> <li>● Will the option affect high grade agricultural land?</li> <li>● Will the option promote the efficient use of land?</li> <li>● Will the option prevent soil erosion and retain soil stocks as a natural resource?</li> <li>● Will the option promote soil health?</li> <li>● Will the option involve use of brownfield or greenfield land?</li> <li>● Will the option prevent mineral sterilisation?</li> </ul>

SEA Topic	Proposed SEA Objectives	Assessment Questions/Sub-Themes
		<ul style="list-style-type: none"> <li>Will the option affect soil contamination or involve remediation?</li> <li>Is the option likely to affect geodiversity, including SSSIs of geological importance?</li> <li>Will the option prevent nutrient loading in water bodies?</li> </ul>
Water	To reduce or manage flood risk, taking climate change into account.	<ul style="list-style-type: none"> <li>Is the option vulnerable to flood risk?</li> <li>Will the option contribute to or reduce the risk of flooding?</li> <li>Will the option mitigate flood risk? (i.e., attenuation of flows through NFM, catchment storage etc.) (Flooding include fluvial, marine, surface and groundwater)</li> </ul>
	To enhance or maintain the quality of surface and groundwater waterbodies.	<ul style="list-style-type: none"> <li>Will the option affect surface water quality or quantity?</li> <li>Will the option affect ground water quality or quantity?</li> <li>Is the option likely to contribute to or conflict with the achievement of WFD objectives?</li> </ul>
	To enhance or maintain surface water flows and quantity and groundwater resources.	<ul style="list-style-type: none"> <li>Will the option affect bathing waters?</li> <li>Will the option affect shellfish water protected areas?</li> <li>Will the option affect chalk rivers and streams?</li> <li>Will the option affect raw water quality?</li> <li>Will the option reduce the flashy nature of surface waters?</li> <li>Will the option slow the flow in upper catchments and reduce soil losses to river systems?</li> <li>Will the option comply with flow targets?</li> </ul>
	To meet WFD objectives and support the achievement of environmental objectives set out in River Basin Management Plans.	<ul style="list-style-type: none"> <li>Does the option provide a reliable and sustainable water supply which meets changing demand?</li> <li>Will the option protect and enhance the environmental resilience of the water environment to climate change, flood risk and drought?</li> </ul>
	To increase water efficiency and increase resilience of water supplies and natural systems to droughts.	<ul style="list-style-type: none"> <li>Does the option reduce the presence of containments in waterbodies, and make more water available to the environment?</li> </ul>
Air	To reduce and minimise air emissions during construction and operation.	<ul style="list-style-type: none"> <li>Is the option in an air quality management area (AQMA)?</li> <li>Will the option affect local air quality?</li> </ul>
Climatic Factors	To minimise or reduce embodied and operational carbon and greenhouse gas emissions.	<ul style="list-style-type: none"> <li>Will the option affect carbon or other greenhouse gas (GHG) emissions?</li> <li>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?</li> <li>Will the option affect carbon sequestration?</li> </ul>

SEA Topic	Proposed SEA Objectives	Assessment Questions/Sub-Themes
	To introduce climate mitigation where required and improve the climate resilience of assets and natural systems to the threats of climate change.	<ul style="list-style-type: none"> <li>● Is the option vulnerable to climate change effects?</li> <li>● Does the option include climate resilience measures?</li> <li>● Will the option create catchment resilience to drought?</li> </ul>
Landscape & Visual Amenity	To conserve, protect and enhance landscape and townscape character and visual amenity.	<ul style="list-style-type: none"> <li>● Will the option have an effect on the character of the landscape, townscape or seascape, including tranquillity and views?</li> <li>● Will the option improve access to the countryside?</li> <li>● Will the option create or improve green infrastructure which contributes to access to the landscape?</li> <li>● Will the option protect and enhance designated landscapes and features?</li> </ul>
Historic Environment	To conserve, protect and enhance the historic environment and heritage assets, and their settings, including archaeologically important sites.	<ul style="list-style-type: none"> <li>● Will the option affect designated or non-designated historic assets, sites and features?</li> <li>● Will the option affect the setting and/or significance of a historic asset?</li> <li>● Will the option affect archaeology (including unknown archaeology)?</li> <li>● Will the option affect heritage assets at risk?</li> <li>● Will the option affect conservation areas or historic landscape/townscape areas?</li> <li>● Will the option alter the hydrological conditions of water-dependent heritage assets, including organic remains?</li> </ul>
Population and Human Health	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing.	<ul style="list-style-type: none"> <li>● Does the option promote water efficiency and encourage a reduction in water consumption?</li> <li>● Will the option secure resilient water supplies for the health and wellbeing of customers?</li> <li>● Will the option allow for economic development?</li> <li>● Will the option allow for economic diversity?</li> <li>● Will the option have an effect on active lifestyles, such as impacts on active travel through disruption to pedestrian and cycle routes?</li> <li>● Will the option affect Public Rights of Way?</li> <li>● Will the option affect road or rail infrastructure?</li> <li>● Will the option minimise disturbance from noise, light, visual, and transport?</li> <li>● Will the local communities have been actively engaged to foster an inclusive environment and participate in decision making?</li> </ul>
	To secure resilient, high quality, sustainable and affordable water supplies over the long term for the health and wellbeing of the community.	
	To increase access and connect customers to the natural environment, provide education or information resources for the public.	

SEA Topic	Proposed SEA Objectives	Assessment Questions/Sub-Themes
	To maintain and enhance the water environment for other users including recreation, tourism and navigation.	<ul style="list-style-type: none"> <li>● Will the option maintain or enhance tourism?</li> <li>● Does the option improve access to the natural environment for recreation, including those living within deprived areas?</li> <li>● Will the option have an effect on freshwater fisheries for recreational purposes?</li> <li>● Will the option have an effect on marine fisheries for recreational purposes?</li> </ul>
Material Assets	To reduce, and make more efficient, the consumption of resources, and minimise the generation of waste.	<ul style="list-style-type: none"> <li>● Will the option reuse existing infrastructure?</li> <li>● Will the option minimise the use of resources?</li> <li>● Will the option reduce the production of waste?</li> </ul>
	Avoid negative effects on built assets and infrastructure.	<ul style="list-style-type: none"> <li>● Will the option affect built assets and infrastructure, including transport infrastructure?</li> </ul>

## 6 Proposed Approach to the SEA

### 6.1 Overview of Environmental Assessment Approach

6.1.1 The proposed approach to the environmental assessments to support the NW WRMP24 development will follow the WRPG and supplementary guidance. The following environmental assessments will be undertaken:

- Strategic Environmental Assessment
- Habitats Regulations Assessment
- Water Framework Directive Assessment
- Invasive Non-Native Species Risk Assessment
- Natural Capital Assessment
- Biodiversity Net Gain Assessment

6.1.2 The proposed methodology outlined in the sections below is aligned to the regional planning approach for environmental assessment. The WReN regional plan options assessments will form the basis of the NW WRMP24 assessments. Environmental assessments will be updated based on additional local datasets and updated options information (where available).

6.1.3 To determine the environmental effects of the options and alternatives programmes for WRMP24, the following tasks are proposed:

- Options level environmental assessments:
  - Review and update assessment undertaken as part of WReN for NW WRMP24 with additional local level data and updated options information (if available). WReN assessments will also be translated into the NW WRMP24 SEA objectives for consistency.
  - Assessment of new options – network enhancement options and options under 10MI/d (for WReN) will not have been previously assessed as part of the regional planning.
- Programme level environmental assessment of the draft NW WRM24 (best value plan) and the alternative programmes (e.g., least cost plan) including cumulative and in-combination effects.

### 6.2 Options Level Environmental Assessments

6.2.1 As discussed in section 6.1, the options level environmental assessments will involve reviewing and updating assessments undertaken as part of the regional planning, and assessing new options using a consistent methodology. The proposed approach is summarised below.

6.2.2 An ESRI ArcGIS tool has been developed to store most of the environmental data required as part of the assessment process. To ensure consistency the data layers used for the regional planning are included in the GIS tool. Additional local datasets will also be included where available (e.g., local wildlife sites, housing allocations, mineral and waste allocations).

### 6.3 SEA

6.3.1 Each SEA objective has a set of defined datasets and a defined effect assessment and evaluation system using a qualitative scale of minor, moderate, major positive and minor, moderate, major negative, and neutral. The effects of each option will be assessed using this scale and the evaluation set out through a narrative justification. The proposed datasets and

definitions of scale of effect are presented in Appendix E and are consistent with the regional planning approach.

- 6.3.2 The regional plan option level SEAs will be reviewed and updated where required with additional local information or re-assessment where options have been further developed or changed. The mitigation and enhancement measures identified during regional assessments will be further developed with the options development team.
- 6.3.3 Options requiring new assessments or re-assessments (as discussed above) will utilise the GIS tool to identify key constraints and opportunities for each option. Professional judgement will then be applied to assess the impacts of the option, evaluate the effects and justify findings using the assessment criteria presented in Appendix E. The assessment will be split into construction effects and operational effects as these may be quite different and would not provide an accurate picture if they were combined. An option may have both positive and negative effects under a SEA objective, and rather than trading these effects to cancel each other out, both positive and negative effects will be reported to show that an option may have mixed effects.

## 6.4 HRA

- 6.4.1 The HRA is a statutory requirement in its own right, but also feeds into the SEA objective on biodiversity. The stages of HRA include the Test of Likely Significance (ToLS), Appropriate Assessment (AA) (if required from the ToLS), and consideration of alternatives (if the AA finds that effects on site integrity cannot be adequately mitigated).
- 6.4.2 The regional plan option level HRA ToLS will be reviewed and re-assessed if options have changed or further options information is available. Likewise, HRA AA will be reviewed and updated if required. The HRA process will be applied to any new options following the regulatory requirements and approach set out in the WRE<sup>26</sup> HRA method statements.

## 6.5 WFD

- 6.5.1 The WFD assessment is a statutory requirement in its own right, but also feeds into the SEA objective on water quality. The regional plan option level WFD assessments followed the ACWG WFD Assessment Guidelines which includes a Level 1 Basic Screening for Impact and a Level 2 Detailed Screening for Impact. The regional plan Level 1 and Level 2 WFD assessments will be reviewed and updated if required. The WFD process will be applied to any new options in line with the ACWG guidelines and WRE WFD method statement<sup>27</sup>.

## 6.6 INNS

- 6.6.1 The tasks in the INNS assessment include: i) identify species present, ii) identify relevant pathways, iii) identify specific source pathway receptors, iv) assessment of risks. It will follow the approach set out in the WRE INNS method statement<sup>28</sup> aligning with the EA's most recently published methodology for risk assessment of SROs.

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<sup>26</sup> WRE Regional Plan Integrated Environmental Assessment Scoping Report (2021) – Appendix F: HRA Method Statement. Available at: [https://wre.org.uk/wp-content/uploads/2021/01/WRE\\_IEAScopingReport\\_Final\\_6Jan21.pdf.pagespeed.ce.slkMX\\_wnbo.pdf](https://wre.org.uk/wp-content/uploads/2021/01/WRE_IEAScopingReport_Final_6Jan21.pdf.pagespeed.ce.slkMX_wnbo.pdf)

<sup>27</sup> WRE Regional Plan Integrated Environmental Assessment Scoping Report (2021) – Appendix G: WFD Assessment Method Statement. Available at: [https://wre.org.uk/wp-content/uploads/2021/01/WRE\\_IEAScopingReport\\_Final\\_6Jan21.pdf.pagespeed.ce.slkMX\\_wnbo.pdf](https://wre.org.uk/wp-content/uploads/2021/01/WRE_IEAScopingReport_Final_6Jan21.pdf.pagespeed.ce.slkMX_wnbo.pdf)

<sup>28</sup> WRE Regional Plan Integrated Environmental Assessment Scoping Report (2021) – Appendix H: INNS Method Statement. Available at: [https://wre.org.uk/wp-content/uploads/2021/01/WRE\\_IEAScopingReport\\_Final\\_6Jan21.pdf.pagespeed.ce.slkMX\\_wnbo.pdf](https://wre.org.uk/wp-content/uploads/2021/01/WRE_IEAScopingReport_Final_6Jan21.pdf.pagespeed.ce.slkMX_wnbo.pdf)

6.6.2 The results of the INNS assessment will feed back into the SEA process under the biodiversity objective. For those assets or raw water transfer scenarios determined as high risk for the potential spread of INNS, a mitigation options appraisal will be conducted. This will involve reviewing known mitigation technologies and determining their effectiveness with regard to species type, transmission pathway and feasibility.

## 6.7 Natural capital assessment

6.7.1 The Natural Capital Assessment (NCA) undertaken for the regional planning involved defining and developing the natural capital baseline using open source data as described in NECR285<sup>29</sup> to generate a Natural Capital account of the stocks within the region. A NCA was undertaken for each feasible option that included assessments across the option footprint and zone of influence. The impact of each option on the Natural Capital stocks and indicators of condition was reported for each option quantitatively. This impact was reported for construction and post construction to give an estimation of the impact of the option's whole lifecycle. The results of the stock assessment were reported in total losses and gains within each option's zone of influence. The WRE NCA's assessments aligned with Defra's Enabling a Natural capital Approach (ENCA) this guidance was updated in 2021. This approach will be undertaken for the NW WRMP24.

6.7.2 The results of the change in natural capital stocks informed the assessment against the six ecosystem services listed below. During the initial phase of the NCA, all of the six ecosystem services listed were reviewed and scoped in or out due to the geographical or socio-economic context of the option and its zone of influence. Five of the ecosystem services were monetised, however, water purification was assessed quantitatively. The ecosystem services used to assess the impact on natural capital included:

- Carbon sequestration (Climate regulation)
- Natural Hazard management
- Water purification \* Quantitative
- Water Regulation
- Biodiversity and Habitats \* assessed separately through Biodiversity net gain
- Air pollutant removal
- Recreation & amenity value
- Food production

6.7.3 The NCA undertaken for NW WRMP24 options at the regional level will be reviewed and updated if required and any new options defined in 6.1.3 will follow the approach set out above. Options that do not require land use change will be scoped out of NCA.

## 6.8 Biodiversity Net Gain assessment

6.8.1 Biodiversity net gain or net loss must be considered at both the option and programme level. Each option should look to secure biodiversity net gain if required and any mitigation should be included in the option cost. The Water resources planning guideline supplementary guidance states that if there would be a significant additional cost for an option to get significant extra benefit, this could be included as a separate option for consideration. Options that do not require land use change will be scoped out of BNG assessment

6.8.2 As part of the regional planning a biodiversity baseline was developed from spatial data sets of habitats inventories and assessed broadly in line with the DEFRA BNG metric 3.0 which was used to calculate BNG change through land use of each option, this was determined by the option boundary. The Natural Capital account was used to identify the biodiversity value of the

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<sup>29</sup> Natural England (2020) National Natural Capital Atlas: Mapping Indicators

footprint of each option prior to construction. The post construction land use was used to calculate the post construction biodiversity score.

## 6.9 Programme level environmental assessments

- 6.9.1 A range of potential programmes will be developed for the NW WRMP24 with the aim of selecting a Best Value Plan. The alternative programmes as well as the draft WRMP24 (Best Value Plan) will undergo environmental assessment to identify any cumulative and/or in-combination effects. If significant negative effects are identified, additional mitigation measures will be investigated or alternatives options.
- 6.9.2 Through the natural capital and biodiversity net gain assessments the plan-wide implications and opportunities will be investigated to develop a plan that delivers environmental net gain.

## 6.10 Effects outside the Northumbrian boundary

- 6.10.1 There is potential for effects outside the Northumbrian Water region, for example, from transfer of water outside the area or from options close to the plan boundary with potential pathways affecting receptors outside the plan area. It is likely that SROs will cross boundaries. The baseline GIS database will include a buffer around the plan area so that additional receptors (such as designated sites) are captured and can be included in the assessments.

## 6.11 Influencing the development of the WRMP24

- 6.11.1 As presented in the method sections above, the SEA and other environmental assessments will be an ongoing and iterative process throughout the NW WRMP24 development. However, there are some key decision-points for influencing the plan:
- Regional plan assessments – environmental assessments undertaken for the regional plans will flag the environmental effects of Northumbrian Water options as well as potential mitigation and enhancement opportunities that can be further developed by Northumbrian Water.
  - NW WRMP24 options assessments and options design - The option assessments will assess the positive and negative environmental effects of each option and will identify possible mitigation and enhancement measures that will be fed back to the options design teams. Options with major or moderate negative effects will need appropriate mitigation in order for them to be taken forward. Opportunities to maximise benefits will also be considered with the design teams.
  - NW WRMP24 programme development and appraisal – the results of the environmental assessments will feed into the selection of programme options for and Northumbrian Water decision-making. Once the NW WRMP24 alternative programmes are identified individual options within them will be reviewed and the cumulative effects assessed. If major or moderate negative cumulative effects are identified additional mitigation will be needed or alternative options or programmes will need to be considered. Opportunities to maximise programme-wide benefits will also be considered.

# 7 Consultation and Next Steps

## 7.1 SEA scoping consultation

- 7.1.1 The SEA Scoping Report will be issued for a 5-week consultation to the three statutory bodies: The Environment Agency, Natural England and Historic England, as well as being made available to wider stakeholders.
- 7.1.2 The NW process and SEA objectives have been consulted upon over the last year. Therefore, at this stage Northumbrian Water would welcome your views on the SEA Scoping Report on the following key questions:
1. Do you have any comments on the baseline information presented or any additional baseline information you think would be useful?
  2. Do you have any comments on the key issues and opportunities identified?
  3. Do you have any comments on the proposed SEA objectives and assessment questions/sub-themes?
  4. Do you have any comments on the overall approach and environmental assessment methodology?
- 7.1.3 Following the Scoping Report consultation period, all consultation responses will be carefully reviewed and tabulated, and considered as far as possible. Details of how the scoping stage consultation has been considered, alongside the results of the SEA assessment, will be presented in the Environmental Report.

## 7.2 Next steps

- 7.2.1 Following the Scoping consultation, SEA Stage B (the assessment stage – see **Figure 1.2** and Appendix C will be undertaken. The options within the NW WRMP24 and the cumulative effects will be assessed against the SEA objectives. The findings will be presented in the NW WRMP24 Environmental Report. The proposed structure and content for the Environmental Report is presented in **Table 7.1**

**Table 7.1: Environmental Report – proposed structure and content**

Structure of the Environmental Report	Information to include
Non-technical summary	<ul style="list-style-type: none"> <li>• Summary of the SEA process</li> <li>• Summary of the likely significant effects of the NW WRMP24</li> <li>• Statement on the difference the process has made to date</li> <li>• How to comment on the report</li> </ul>
Methodology used	<ul style="list-style-type: none"> <li>• Approach adopted in the SEA</li> <li>• Who was consulted and when</li> <li>• Difficulties encountered in compiling information or carrying out the assessment</li> </ul>
Background	<ul style="list-style-type: none"> <li>• Purpose of the SEA</li> <li>• Objectives and context of the NW WRMP24</li> </ul>

Structure of the Environmental Report	Information to include
SEA Objectives, Baseline and Context	Summary of the scoping stage: <ul style="list-style-type: none"> <li>• Plans and programmes review and implications for the NW WRMP24 and SEA</li> <li>• Description of the baseline characteristics and the predicted future baseline</li> <li>• Environmental issues and opportunities</li> <li>• Limitations of the data, assumptions made</li> <li>• SEA Framework</li> </ul>
NW WRMP24 Options Assessment	<ul style="list-style-type: none"> <li>• Description of options</li> <li>• Assessment of environmental effects</li> <li>• Proposed mitigation measures and enhancement opportunities</li> <li>• As there is a potential for effects outside the Northumbrian Water supply region, the baseline GIS database will include a 20km buffer around the regional plan area so that additional receptors (such as designated sites) are captured and can be included in the assessment. Any options that fall outside that area will also be assessed (Appendix B5)</li> </ul>
NW WRMP24 Cumulative Assessment	<ul style="list-style-type: none"> <li>• Assessment of cumulative effects</li> <li>• Uncertainties and risks</li> </ul>
Implementation	<ul style="list-style-type: none"> <li>• Links to other tiers of plans and programmes and the project level</li> <li>• Proposals for monitoring</li> </ul>

7.2.2 The SEA Environmental Report will be issued for public consultation alongside the draft NW WRMP24 in 2022. Comments received on the SEA will be recorded in a log and addressed in the final SEA Environmental Report. Any significant alterations to the NW WRMP24 as a result of the consultation will be assessed in terms of their environmental implications and influence on the revision of the WRMP. The final SEA Environmental Report will be amended as necessary to reflect any changes.

7.2.3 Following adoption of the NW WRMP24, a Post-Adoption statement will be produced which outlines how the SEA process has influenced the development of WRMP, how consultation comments were taken into consideration and how the WRMP will be monitored. This summary will provide enough information to make it clear how the NW WRMP24 was influenced (if at all) as a result of the SEA process and consultation.

7.2.4 Stage E ‘Monitoring implementation of the plan’ of the SEA process will be carried out by Northumbrian Water. It is likely that monitoring of the NW WRMP24 will be incorporated with the annual monitoring process. Monitoring proposals will be developed as part of the SEA process and presented in the SEA Environmental Report.

## A. Review of Relevant Policies, Plans and Programmes

Policy, Plan or Programme	Topic	Key objectives, guidance and references
<b>International</b>		
Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)	Biodiversity	The aims are to conserve wild flora and fauna and their natural habitats and to promote European cooperation. Particular importance is placed on the need to protect endangered natural habitats and endangered vulnerable species, including migratory species.
Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983)	Biodiversity	The Convention aims to conserve terrestrial, aquatic and avian migratory species throughout their range.
Convention on Biological Diversity (1992)	Biodiversity	The Biodiversity Convention has three main aims which are to conserve biological diversity; to ensure the sustainable use of the components of biological diversity; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.
Ramsar Convention - The Convention on Wetlands of International Importance (1971)	Biodiversity	Provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The aim is 'the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world'. The Convention uses a broad definition of the types of wetlands covered, including lakes and rivers, swamps and marshes, wet grasslands and peatlands, oases, estuaries, deltas and tidal flats, near-shore marine areas, mangroves and coral reefs, and human-made sites such as fishponds, rice paddies, reservoirs, and salt pans.
UN Framework Convention on Climate Change (1992)	Climatic Factors	The stated objective is to achieve stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities.
Kyoto Protocol to the UN Framework Convention on Climate Change (1997)	Climatic Factors	The Kyoto Protocol was adopted in 1997 and ratified in 2005. It commits its parties to limit climate change by setting internationally binding targets for emission reductions. Covering the six main GHGs, it required the UK to reduce emissions by 12.5% in the first commitment period (2008-2012). This was successfully achieved, and a second commitment period has been agreed whereby European Union (EU) countries will aim to achieve a joint 20% reduction compared to 1990 levels.
Commitments arising from the World Summit on Sustainable Development, Johannesburg (2002)	Climatic Factors	Adopted at the World Summit on Sustainable Development in 2002 and built upon earlier declarations made at previous conferences and summits. It commits nations to take a collective responsibility to build a human, equitable and caring global society cognisant of the need for human dignity for all. The Declaration also reinforces the three pillars of sustainable development: environmental, economic and social development at the local, national, regional and global level.
Paris Agreement (2015)	Climatic Factors	The Paris Agreement came out of the COP21 and aims to limit global temperature rises to 1.5°C to 2°C above pre-industrial levels. It brings together 196 parties from across the world into a common cause and requires all parties to put forward nationally determined contributions to strengthen efforts in the years ahead. It also aims to strengthen the ability of countries to deal with the impacts of climate change.
Charter for the Protection and Management of Archaeological Heritage (1990)	Historic Environment	The charter lays down principles relating to the different aspects of archaeological heritage management. These include the responsibilities of public authorities and legislators, principles relating to the professional performance of the processes of inventories, survey, excavation, documentation, research, maintenance, conservation, preservation, reconstruction, information, presentation, public access and use of the heritage, and the qualification of professionals involved in the protection of the archaeological heritage. The Charter states that policies for the protection of archaeological heritage should constitute an integral component of policies relating to land use, development, and planning as well as of cultural, environmental and educational policies.
The World Heritage Convention (1972)	Historic Environment	The Convention defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List. It also sets out the duties of states in identifying potential sites and their role in preserving them.
Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) (1998)	Population and Human Health	The Aarhus Convention was created to give empowerment to citizens and civil society organisations in relation to environmental matters and is founded on the principles of participative democracy. It provides for access to environmental information; public participation in environmental decision making; and access to justice.
<b>European<sup>30</sup></b>		
Ambient Air Quality Directive (2008/50/EC)	Air	It establishes ambitious, cost-effective targets for improving human health and environmental quality up to 2020. The EU objective on air quality is 'to achieve levels of air quality that do not result in unacceptable impacts on, and risks to, human health and the environment'.
Thematic Strategy on Air Pollution (2005)	Air	The Strategy recognises the impact of air pollution on human health and the environment. It establishes interim objectives for air pollution in the EU and proposes appropriate measures for achieving them.
Establishing measures for the recovery of the stock of European eel 2007 (1100/2007)	Biodiversity	Advice from the International Council for the Exploration of the Sea (ICES) in 2006 indicated that the stock of the European eel ( <i>Anguilla anguilla</i> ) is outside safe biological limits across European waters. The population has declined significantly, reducing to 5% of the original 1980s stock levels. In response to this advice, the European Union adopted Council Regulation (EC) No 1100/2007, which requires Member States to undertake a series of measures aimed at the recovery of eel stock. The goal is to achieve 40% escapement of adult eels, relative to that in absence of anthropogenic factors, to sea to spawn. The EU Regulation was transposed into UK law under The Eels (England and Wales) Regulations 2009.  Eleven Eel Management Plans have been prepared, one for each River Basin identified in England and Wales. The plans outline the current situation and how we intend to achieve the targets required by the European Regulation. Such measures include a reduction in fishing pressure, improving access and habitat quality, and reducing the impacts of entrainment. The measures that will require the installation of passes at obstructions and screens at abstraction and discharge points that prevent the migration of eels.

<sup>30</sup> It is acknowledged that the UK has left the European Union. However, European law and policy has formed the basis for UK environmental laws and contributed to the direction of UK policy in these areas for many years. As such, they are considered to remain a useful contextual frame as part of the policies, plans and programmes review.

Policy, Plan or Programme	Topic	Key objectives, guidance and references
Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011)	Biodiversity	<p>Strategy to halt the loss of biodiversity and ecosystem services in the EU by 2020. There are six main targets and 20 actions to help Europe reach its goal. The six targets cover:</p> <ul style="list-style-type: none"> <li>Full implementation of EU nature legislation to protect biodiversity</li> <li>Better protection for ecosystems, and more use of green infrastructure</li> <li>More sustainable agriculture and forestry</li> <li>Better management of fish stocks</li> <li>Tighter controls on invasive alien species</li> <li>A bigger EU contribution to averting global biodiversity loss</li> </ul> <p>The strategy is in line with two commitments made by EU leaders in March 2010. The first is the 2020 headline target: 'Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss'; the second is the 2050 vision: 'By 2050, European Union biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human wellbeing and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided'.</p>
Fresh Water Fish Directive (2006/44/EC)	Biodiversity	The Directive concerns the quality of fresh waters and shall apply to those waters designated by the Member States as needing protection or improvement in order to support fish life. This directive shall not apply to waters in natural or artificial fishponds used for intensive fish-farming.
Directive on the Conservation of Wild Birds (79/409/EEC) (as amended)	Biodiversity	<p>Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (this is the codified version of Directive 79/409/EEC as amended). This Directive ensures far-reaching protection for all of Europe's wild birds, identifying 194 species and sub-species among them as particularly threatened and in need of special conservation measures. There are a number of components to this scheme:</p> <ul style="list-style-type: none"> <li>Member States are required to designate SPAs for 194 particularly threatened species and all migratory bird species. SPAs are scientifically identified areas critical for the survival of the targeted species, such as wetlands. They are part of the Natura 2000 ecological network set up under the Habitats Directive 92/43/EEC.</li> <li>A second component bans activities that directly threaten birds, such as the deliberate killing or capture of birds, the destruction of their nests and taking of their eggs, and associated activities such as trading in live or dead birds (with a few exceptions).</li> <li>A third component establishes rules that limit the number of bird species that can be hunted (82 species and subspecies) and the periods during which they can be hunted. It also defines hunting methods which are permitted (e.g., non-selective hunting is banned).</li> </ul>
Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (92/43/EEC)	Biodiversity	The main aim of the Habitats Directive is to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements. While the Directive makes a contribution to the general objective of sustainable development; it ensures the conservation of a wide range of rare, threatened or endemic species, including around 450 animals and 500 plants. Some 200 rare and characteristic habitat types are also targeted for conservation in their own right. The Directive provides for a ban on the downgrading of breeding and resting places for certain strictly protected animal species. Exceptions to the strict protection rules can be granted under very specific conditions. The Habitats Directive also establishes the EU wide Natura 2000 ecological network of protected areas. For these areas it provides a high level of safeguards against potentially damaging developments. Together with the Birds Directive, the Habitats Directive forms the backbone of EU nature protection legislation.
Directive on Animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals (2006/88/EC)	Biodiversity	The Directive sets out rules on animal health concerning aquaculture animals and related products which apply to the marketing, importation and transit of such products. It also establishes measures aimed at the prevention and control of diseases in aquaculture animals as well as making further provisions regarding the authorisation to aquaculture production businesses and processing establishments.
Limiting Global Climate Change to 2 degrees Celsius - The way ahead for 2020 and beyond (2007)	Climatic Factors	<p>This a set of binding legislation to ensure the EU meets its climate and energy targets for the year 2020. The targets are:</p> <ul style="list-style-type: none"> <li>20% reduction in GHGs</li> <li>20% of EU energy from renewables</li> <li>20% improvement in energy efficiency</li> </ul>
A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (2018)	Climatic Factors	The long-term strategy sets out Europe's commitment to lead in global climate action and to present a vision that can lead to achieving net-zero greenhouse gas emissions by 2050 through a socially-fair transition in a cost-efficient manner. It looks into the portfolio of options available for Member States, business and citizens, as well as into how these can contribute to the modernisation of our economy and improve the quality of life of Europeans, protect the environment, and provide for jobs and growth.
Promotion of the use of energy and renewable sources Directive (2009/28/EC)	Climatic Factors	The Directive sets ambitious targets that the EU will reach a 20% share of energy from renewable sources by 2020 and a 10% share of renewable energy specifically in the transport sector. It also sets out to improve the legal framework for promoting renewable energy.
Energy Act 2013	Climatic Factors	The Act makes provides a framework for delivering secure, affordable and low carbon energy. It includes provisions for decarbonisation and the duties in relation to it.
Mainstreaming sustainable development into EU policies: 2009 Review of the European Union Strategy for Sustainable Development	Cross-cutting	<p>The Renewed EU Sustainable Development Strategy (2006) deals in an integrated way with economic, environmental and social issues and lists the following seven key challenges:</p> <ol style="list-style-type: none"> <li>1. Climate change and clean energy;</li> <li>2. Sustainable transport;</li> <li>3. Sustainable consumption and production;</li> <li>4. Conservation and management of natural resources;</li> <li>5. Public health;</li> <li>6. Social inclusion, demography and migration; and</li> <li>7. Global poverty</li> </ol>
European Commission Environmental Liability Directive (2004/35/EC)	Cross-cutting	The Directives relates to the prevention and remedying of environmental damage (ELD) and establishes a framework based on the polluter pays principle to prevent and remedy environmental damage. The Directive defines "environmental damage" as damage to protected species and natural habitats, damage to water and damage to soil.
Directive on the assessment of the effects of certain plans and	Cross-cutting	The Directive, known as the SEA Directive, sets out the requirement for the assessment of certain plans and programmes on the environment. An SEA is mandatory for plans/programmes which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste/ 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. SEA is also required where plans/programmes have been determined to require an assessment under the Habitats Directive.

Policy, Plan or Programme	Topic	Key objectives, guidance and references
programmes on the environment (2001/42/EC)		
The Convention for the Protection of the Architectural Heritage of Europe (Granada Convention) (1985)	Historic Environment	The Convention sets out to reinforce and promote policies for the conservation and enhancement of Europe's heritage. It also affirms the need for European solidarity with regard to heritage conservation and is designed to foster practical co-operation among the Parties. It establishes the principles of "European co-ordination of conservation policies" including consultations regarding the thrust of the policies to be implemented.
The European Convention on the Protection of Archaeological Heritage (Valletta Convention) (1992)	Historic Environment	The Convention aims to protect the archaeological heritage as a source of the European collective memory and as an instrument for historical and scientific study.
The European Landscape Convention (2006)	Landscape	The Convention is also known as the Florence Convention and it aims to promote the protection, management and planning of European landscapes and organises European co-operation on landscape issues.
The Environmental Noise Directive (2002/49/EC)	Population and Human Health	The Directive is the EU's main instrument to identify noise pollution levels and covers the following three key action areas: the determination of exposure to environmental noise; ensuring that information on environmental noise and its effects is made available to the public; and preventing and reducing environmental noise where necessary and preserving environmental noise quality where it is good. It applies to noise to which humans are exposed, particularly in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise-sensitive buildings and areas. It does not apply to noise that is caused by the exposed person himself, noise from domestic activities, noise created by neighbours, noise at workplaces or noise inside means of transport or due to military activities in military areas.
European Soils Charter (2003)	Soil	The Charter sets out to protect soil as a complex natural resource which is fundamental to life. It recognises that: Soil is a precious asset Soil is a limited resource which is easily destroyed Land has a wide variety of uses and a proper planning policy is needed by Governments for urban development and civil engineering projects Farmers and foresters must preserve the soils quality Soil must be protected from erosion and pollution Further research and collaboration is required to ensure the wise use and conservation of soil
Thematic Strategy for Soil Protection (2006)	Soil	The Strategy aims to protect soil and promote its sustainable use. It is based on the following guiding principles: Preventing further soil degradation and preserving its functions Restoring degraded soils to a level of functionality consistent at least with current and intended use, thus also considering the cost implications of the restoration of soil
The Nitrates Directive (91/676/EEC)	Water	The Nitrates Directive aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices. This Directive forms integral part of the Water Framework Directive and is one of the key instruments in the protection of waters against agricultural pressures.
The Water Framework Directive (WFD) (2000/60/EC)	Water	The WFD has the following key aims: Expanding the scope of water protection to all waters, surface waters and groundwater Achieving 'good status' for all waters by a set deadline Water management based on river basins 'Combined approach' of emission limit values and quality standards Getting the prices right Getting the citizen involved more closely Streamlining legislation There are a number of objectives in respect of which the quality of water is protected. The key ones at European level are general protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water. Member States must aim to reach good chemical and ecological status in inland and coastal waters by 2015.
Urban Wastewater Treatment Directive (91/271/EEC)	Water	The objective of this Directive is to protect the environment from the adverse effects of urban wastewater discharges and discharges from certain industrial sectors. The Directive concerns the collection, treatment and discharge of such wastewater.
Drinking Water Directive (1998/83/EC)	Water	The Drinking Water Directive sets out the following objectives: Sets quality standards for drinking water quality at the tap (microbiological, chemical and organoleptic parameters) and the general obligation that drinking water must be wholesome and clean. Obliges Member States to regular monitoring of drinking water quality and to provide to consumers adequate and up-to-date information on their drinking water quality. Member States may exempt water supplies serving less than 50 persons or providing less than 10 m3 of drinking water per day as an average and water in food-processing undertakings where the quality of water cannot affect the wholesomeness of the foodstuff in its finished form.
Directive on Bathing Water (76/160/EEC); and Directive 2006/7/EC repealing Directive 76/160/EEC (from 2014)	Water	The overall objective of the Directive remains the protection of public health whilst bathing, but the revised Directive also offers an opportunity to improve management practices at bathing waters and to standardise the information provided to bathers across Europe and aims to set more stringent water quality standards and also puts a stronger emphasis on beach management and public information.
Groundwater Directive (2006/118/EC)	Water	This directive establishes a regime which sets underground water quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. The directive establishes quality criteria that takes account local characteristics and allows for further improvements to be made based on monitoring data and new scientific knowledge. The directive thus represents a proportionate and scientifically sound response to the requirements of the WFD as it relates to assessments on chemical status of groundwater and the identification and reversal of significant and sustained upward trends in pollutant concentrations. Member States will have to establish the standards at the most appropriate level and take into account local or regional conditions. The groundwater directive complements the WFD. It requires: Groundwater quality standards to be established by the end of 2008 Pollution trend studies to be carried out by using existing data and data which is mandatory by the WFD (referred to as 'baseline level' data obtained in 2007-2008) Pollution trends to be reversed so that environmental objectives are achieved by 2015 by using the measures set out in the WFD Measures to prevent or limit inputs of pollutants into groundwater to be operational so that WFD environmental objectives can be achieved by 2015

Policy, Plan or Programme	Topic	Key objectives, guidance and references
		Reviews of technical provisions of the directive to be carried out in 2013 and every six years thereafter Compliance with good chemical status criteria (based on EU standards of nitrates and pesticides and on threshold values established by Member States)
Marine Strategy Framework Directive (2008/56/EEC)	Water	The aim of the Marine Strategy Framework Directive is to protect more effectively the marine environment across Europe. It aims to achieve Good Environmental Status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The Directive enshrines in a legislative framework the ecosystem approach to the management of human activities having an impact on the marine environment, integrating the concepts of environmental protection and sustainable use.
Directive on the Assessment and Management of Flood Risks (2007/60/EC)	Water	Its aim is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive requires Member States to first carry out a preliminary assessment by 2011 to identify the river basins and associated coastal areas at risk of flooding. For such zones they would then need to draw up flood risk maps by 2013 and establish flood risk management plans focused on prevention, protection and preparedness by 2015. The Directive applies to inland waters as well as all coastal waters across the whole territory of the EU.
Blueprint to Safeguard Europe's Water Resources (2012)	Water	The Blueprint outlines actions in relation to improved implementation of current water legislation and the integration of water policy objectives into other policies, and also aims to fill the gaps in regard to water quantity and efficiency. The objective is to ensure that a sufficient quantity of good quality water is available for people's needs, the economy and the environment throughout the EU. It is closely linked to EU's 2020 Strategy and the 2011 Resource Efficiency Roadmap; however, the analysis spans up to 2050 and is therefore expected to drive EU water policy over the long term.
<b>National</b>		
The Eels (England & Wales) Regulations 2009 (as amended)	Biodiversity	Transposed from the European Directive (1100/2007) into UK law, the Regulations aim to establish measures for the recovery of the stock of European eel. The Regulations will help implement delivery Eel Management Plans.
Salmon and Freshwater Fisheries Act 1975	Biodiversity	The Act sets out the legal framework in which salmon and freshwater fisheries are regulated. It covers regulation on fishing methods and related offences, obstructions to fish passage, salmon and freshwater fisheries administration and law enforcement.
UK Post-2010 Biodiversity Framework, JNCC and Defra (2012)	Biodiversity	The purpose of the Framework is to set a broad enabling structure for action across the UK between now and 2020: To set out a shared vision and priorities for UK-scale activities, in a framework jointly owned by the four countries, and to which their own strategies will contribute. To identify priority work at a UK level which will be needed to help deliver the Aichi targets and the EU Biodiversity Strategy. To facilitate the aggregation and collation of information on activity and outcomes across all countries of the UK, where the four countries agree this will bring benefits compared to individual country work. To streamline governance arrangements for UK-scale activity.
Making Space for Nature - A review of England's Wildlife Sites and Ecological Network (2010)	Biodiversity	The report aims to answer the following questions: Do England's wildlife sites comprise a coherent and resilient ecological network? If not, what needs to be done? The report concludes that the approaches required to achieve a coherent and resilient ecological network are varied, and 24 wide-ranging recommendations are presented. Five themes unite them: We need to continue the recent progress in improving the management and condition of wildlife sites, particularly our SSSIs. We also make recommendations for how these should be designated and managed in ways that enhance their resilience to climate change. We need to properly plan ecological networks, including restoration areas. Restoration needs to take place throughout England. However, in some areas, both the scale of what can be delivered to enhance the network, and the ensuing There are a large number of surviving patches of important wildlife habitat scattered across England outside of SSSIs, for example in Local Wildlife Sites. We need to take steps to improve the protection and management of these remaining wildlife habitats. 'Protection' will usually be best achieved through incentive-based mechanisms, but at times may require designation. We need to become better at deriving multiple benefits from the ways we use and interact with our environment. There are many things that society has to do that may seem to have rather little to do with nature conservation, but could have, or even should have if we embrace more radical thinking; flood management by creating wetlands is an obvious example. We need to exploit these 'win-win' opportunities to the full. Being better at valuing a wider range of ecosystem services would help this process. We will not achieve a step-change in nature conservation in England without society accepting it to be necessary, desirable, and achievable. This will require strong leadership from government and significant improvements in collaboration between local authorities, local communities, statutory agencies, the voluntary and private sectors, farmers, landowners and other land-managers and individual citizens.
Biodiversity 2020: A strategy for England's wildlife and ecosystem services, Defra (2011)	Biodiversity	The Strategy builds on the Natural Environment White Paper and sets out how the UK is implementing the international and EU commitments. The mission for this strategy is as follows: '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'.
The Conservation of Habitats and Species Regulations (2010) (as amended)	Biodiversity	The Conservation of Habitats and Species Regulations 2010 apply in the terrestrial environment and in territorial waters out to 12 nautical miles. The EU Habitats and Wild Birds Directives are transposed in UK offshore waters by separate regulations. The new regulations do not make any substantive changes to existing policies and procedures other than the establishment of the Marine Management Organisation. The Marine Management Organisation takes on certain licensing functions from Natural England to ensure consistency with the approach in the Marine and Coastal Access Act 2009. The objective of the Habitats Directive is to protect biodiversity through the conservation of natural habitats and species of wild fauna and flora. The Directive lays down rules for the protection, management and exploitation of such habitats and species.
The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations (2019)	Biodiversity	This instrument provides changes to those parts of the 2017 conservation of habitats and species regulations which would no longer work when the UK leaves the EU.
Delivering a healthy natural environment. Ecosystem approach action plan, Defra (2010)	Biodiversity	Known as the "Ecosystems Approach Action Plan" (EAAP), it was first published in 2007 and was then updated in 2010. It sets out the concept and framework of ecosystem services and describes how this could be translated into "an ecosystems approach" to policy and decision making that could be applied at all levels of Government.
The Invasive Alien Species (Enforcement and Permitting) Order 2019	Biodiversity	The Order brings into force the EU Invasive Alien Species Regulation (1143/2014) on the prevention and management of invasive alien plant and animal species in England and Wales, including the relevant licenses, permits and rules for keeping invasive alien species.
The Great Britain Invasive Non-Native Species Strategy, Defra (2015)	Biodiversity	The Strategy builds on the first which was published in 2008 and sets out a series of aims and objectives to underpin action until 2020. It aims to address the issues of INNS in the UK to protect biodiversity, quality of life and economic interests.
A narrative for conserving freshwater and wetland habitats in England, Natural England (2016)	Biodiversity	Provides a narrative as to why the natural ecosystem system function is important for freshwater and wetland wildlife and recognises the ecosystem service benefits. It aims to provide a strategic framework for decision making for conserving these important habitats.

Policy, Plan or Programme	Topic	Key objectives, guidance and references
Conservation 21 - Natural England's Conservation Strategy for the 21st Century, Natural England (2016)	Biodiversity	The Strategy sets out how Natural England aim to contribute to the ambition set out the in Defra's strategy to 2020 and how they can work together with others to deliver this shared ambition. The Strategy is based on the following three principles: Creating resilient landscapes and seas Putting people at the heart of the environment Growing natural capital
State of Natural Capital Annual Report 2020, Natural Capital Committee (2020)	Biodiversity	The Nature Capital Committee's seventh annual report on the state of natural capital. The report recognises the importance that nature-based interventions will have on achieving net zero by 2050 targets. The report makes recommendations for the Government to take forward and outlines key points for inclusion within the Environment Bill.
Standing Advice on Protected Species, Natural England (2016)	Biodiversity	Provides guidance on reviewing planning applications which might have an affected on protected species.
Climate Change Act 2008	Climatic Factors	The Act sets out a legal framework to commit the Government to tackling climate change and climate change adaptation is also covered in the Act as it provides a legal framework for adaptation policy. The Act sets out a target of net zero by 2050 based on 1990 levels.
UK Climate Change Risk Assessment, Defra (2017)	Climatic Factors	Identifies the key climate change risks and opportunities for the UK which are as follows: Flooding and coastal change risks to communities, businesses and infrastructure Risks to health, well-being and productivity from high temperatures Risks of shortages in the public water supply for agriculture, energy generation and industry Risks to natural capital including terrestrial, coastal, marine and freshwater ecosystems, soils and biodiversity Risks to domestic and international food production and trade New and emerging pests and diseases and invasive non-native species affecting people, plants and animals
The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting, Defra (2018)	Climatic Factors	This is the second National Adaptation Programme (NAP) and sets out the Government's response to the second Climate Change Risk Assessment (CCRA). It also outlines the actions that will be taken to address the climate change issues identified in the CCRA across the following key sectors: Natural environment; Infrastructure; People and the built environment; Business and industry; and Local government.
National Planning Policy Framework (NPPF) (2019)	Cross-cutting	The updated NPPF sets out government's planning policies for England and how these are expected to be applied. Achieving sustainable development is at the heart of the NPPF whereby it has three overarching objectives in the social, economic and environmental spheres.
A Green Future: Our 25 Year Plan to Improve the Environment, UK Government (2018)	Cross-cutting	The 25 Year Plan sets out the Governments actions for improving the health of the natural environment. It includes six actions in order achieve clean air, plentiful and clean water, thriving plants and wildlife, reduced harm from environmental hazards, sustainable resource use and enhanced beauty, heritage and engagement with the natural environment: Using and managing land sustainably Recovering nature and enhancing the beauty of landscapes Connecting people with the environment to improve health and wellbeing Increasing resource efficiency, reducing pollution and waste Securing clean, productive and biologically diverse seas and oceans Protecting and improving the global environment
The draft Environment Bill 2020	Cross-cutting	The Bill was first introduced to parliament in October 2019 and then reintroduced in January 2020. The Bill is currently under review by a Public Bill Committee. The Environment Bill will support the 25 Year Environment Plan and brings about urgent and meaningful action to combat the environmental issues that the UK is facing. It sets out a requirement for biodiversity net gain which includes at least a 10% improvement in biodiversity value for new development. It also includes details on: Creating a new governance framework for the environment A new direction for resources and waste management Improving air quality Securing our water services Enhancing our green spaces Updating laws on chemicals (REACH)
Securing the Future – Delivering the UK Sustainable Development Strategy (2005)	Cross-cutting	The Strategy for sustainable development aims to '...enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations.' Guiding principles: Living within environmental limits Ensuring a strong, healthy, and just society Achieving a sustainable economy Promoting good governance Using sound science responsibly UK priorities for immediate action Sustainable consumption and production Climate change and energy Natural resource protection and environmental enhancement Sustainable communities
The Natural Choice: Securing the Value of Nature, Defra (2011)	Cross-cutting	The White Paper outlines the Government's vision for the natural environment for the next 50 years.
Marine and Coastal Access Act (2009)	Cross-cutting	The Act sets out to protect marine functions, activities and wildlife. It commits the UK to ambitions actions and sets out the provisions for Marine Conservation Zones (MCZs), a Marine Planning system, reform of inshore fishers, amongst others.

Policy, Plan or Programme	Topic	Key objectives, guidance and references
The Wildlife and Countryside Act 1981 (as amended)	Cross-cutting	The Wildlife and Countryside Act is the main Act which protects animals, plants and habitats in the UK. It implements the Bern Convention and the Birds Directive and contains details of European and national designated sites, protection for designated species.
Environment Protection Act 1990	Cross-cutting	The Act aims to set out provisions for the control of pollution to the environment (air, water and land) by regulating the management of waste and emissions. It places a duty of care on any business or person who produces waste to do so carefully and in line with requirements.
Countryside and Rights of Way (CROW) Act	Cross-cutting	The Act was introduced in 2000 with the intention to give greater freedom for people to explore open countryside and contains provisions to introduce a new statutory right of access for open-air recreation to mountain, moor, heath, down and registered common land. It also includes a power to extend the right to coastal land by order and enables landowners voluntarily to dedicate irrevocably any land to public access.
The Natural Environment and Communities Act 2006 (NERC Act)	Cross-cutting	The Natural Environment and Rural Communities Act is designed to help achieve a rich and diverse natural environment and thriving rural communities through modernised and simplified arrangements for delivering Government policy. It is about conserving and enhancing places and nature and helping people to enjoy them – taking a wider view, pursuing environmental management which encompasses access and recreation, and aiming where possible to achieve economic and social outcomes alongside conservation goals.
Creating a better place: Our ambition to 2020, Environment Agency (2018)	Cross-cutting	This aims to protect and improve natural resources in the UK and sits alongside Defra's 25 Year Environment Plan. It sets out the Environment Agency's vision, principles and purpose until 2020 as well as how they aim to deliver against the 25 Year Environment Plan.
UK National Ecosystem Assessment Follow-on (2014)	Cross-cutting	The 2011 UK National Ecosystem Assessment (UK NEA) which identified that the natural world and its ecosystems are important to our well-being and economic prosperity, however they are consistently undervalued. This follow on provides new information and tools to help decision makers integrate the value of ecosystems into decision making.
National Infrastructure Delivery Plan 2016–2021, Infrastructure and Projects Authority (HM Government) (2016)	Cross-cutting	Sets out the Government's plans for economic infrastructure over the next 5 years to support delivery of housing and social infrastructure. The Plan recognises that water services are likely to come under increasing pressure because of population growth and a changing climate. The Plan sets out the following key objectives for water: Start of construction on the Thames Tideway Tunnel Reductions in average bills of about 5% in real terms Further expenditure from 2020 with the start of Asset Management Period 7
Fixing the foundations: Creating a more prosperous nation, HM Government (2015)	Cross-cutting	The reports sets out the importance of productivity and the Government's vision to delivering a UK economy which is the richest of all major economies by 2030. It includes two pillars for raising productivity: Encouraging long term investment in economic capital, including infrastructure, skills and knowledge. Promoting a dynamic economy that encourages innovation and helps resources flow to their most productive use.
Environment Act 1995	Cross-cutting	The Act set out provisions for the creation of a number of government agencies including the Environment Agency and the Scottish Environment Protection Agency (SEPA). It also set out new standards for environmental protection.
The Environmental Damage (Prevention and Remediation) (England) Regulations 2015	Cross-cutting	The Regulations seek to ensure action is taken put any environmental damage right and are based on the 'polluter pays principle'. It transposes the European Commission Environmental Liability Directive into UK law. The Regulations require action in response to the most significant cases, covering specific types of: damage to species and habitats; damage to water; or risks to human health from contamination of land.
Environmental Assessment of Plans and Programmes Regulations 2004	Cross-cutting	The regulations transpose the SEA Directive into UK law which requires an assessment of the effects of certain plans and programmes on the environment. Article 3 (2b) states that SEA is required for plans and programmes which are prepared for water management, set the framework for development consents, and/or are likely to have a significant environmental effect.
Creating a great place for living: together we are building a green and healthy future (2018)	Cross-cutting	The Defra group sets out make air purer, water cleaner, land greener and food more sustainable, and their mission is to restore and enhance the environment for the next generation, and to leave the environment in a better state. There are 10 goals which underpin this mission and include: Sustainable farming and food Pure air, clean rivers and a resilient water supply Healthy seas and oceans Beautiful landscapes, flourishing wildlife and native species Thriving rural economies and communities Efficient resource use and reduced waste Protecting animals and plants from health risks Resilient communities and economies Great places for living for people and animals Green global Britain
Planning (Listed Buildings and Conservation Areas) Act 1990	Historic Environment	An Act of Parliament that altered the laws on granting of planning permission for building works, notably including those of the listed building system in England and Wales
The Ancient Monuments and Archaeological Areas Act 1979	Historic Environment	This Act is concerned with the provisioning, investigation, recording and the preservation and protection of archaeological sites and ancient monuments.
Climate Change and the Historic Environment, English Heritage (2008)	Historic Environment	The statement recognises the climate change impacts the UK is facing and how this poses a risk to the historic environment.
Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment, Historic Environment (2016)	Historic Environment	Provides guidance on SEA in relation to the historic environment.
The Setting of Heritage Assets, Historic Environment Good	Historic Environment	Sets out guidance on managing change within the settings of heritage assets, including archaeological remains and historic buildings, sites, areas, and landscapes, against the backdrop of the NPPF. It gives general advice on understanding setting, and how it may contribute to the significance of heritage assets and allow that significance to be appreciated, as well as advice on how views contribute to setting.

Policy, Plan or Programme	Topic	Key objectives, guidance and references
Practice Advice in Planning 3, Historic Environment (2017)		
Ancient Woodland and Veteran Trees: Protecting them from development, Forestry Commission and Natural England (2014)	Landscape	Sets out guiding principles for considerations when developments affect ancient woodlands or veteran trees. Ancient woodland is defined as an irreplaceable habitat which is important for wildlife, soils, recreational value and cultural, historical and landscape value. Ancient tree is one which attributes include the following: great age, size, condition, biodiversity, cultural heritage and value. The guidance also states that all ancient trees are veteran trees but not all veteran trees are ancient. A veteran tree may not be very old, but it has decay features, such as branch death and hollowing which contribute to its biodiversity, cultural and heritage value. When making decisions the following should be considered: conserving and enhancing biodiversity reducing the level of impact of the proposed development on ancient woodland and ancient and veteran trees
Our Waste, Our Resources: A Strategy for England, HM Government (2018)	Material Assets	The Strategy recognises that natural capital is one of our most valuable assets and sets out how the Government plans to preserve the stock of material resources by minimising waste, promoting resource efficiency and moving towards a circular economy. They also set out how they aim to minimise damage to the natural environment and is aligned to the Government's 25 Year Environment Plan. This is our blueprint for eliminating avoidable plastic waste over the lifetime of the 25 Year Plan, doubling resource productivity, and eliminating avoidable waste of all kinds by 2050.
Safeguarding our Soils - A strategy for England, Defra (2009)	Soil	The Strategy recognises that soil is fundamental resource and sets out a 2030 vision for the sustainable management of soil where degradation threats are tackled successfully. It aims to improve the quality of England's soils and safeguard their ability to provide essential services for future generations.
Water Resources Act 1991	Water	The Act sets out the functions of National Rivers Authority (now the Environment Agency) and introduced water quality classifications and objectives for the first time.
Water Industry Act 1991	Water	The Act sets out the main powers and duties of the water and sewerage companies, thus replacing those set out in the Water Act 1989 and defined the powers of the Director General of Water Services (now the Water Services Regulation Authority (Ofwat)).
Water Act 2003 (as amended)	Water	The Act amends the Water Resources Act and Regulations 1991 and the Water Industry Act 1991. The Act has the following four broad aims: the sustainable use of water resources strengthening the voice of consumers a measured increase in competition the promotion of water conservation
Preparing for a drier future: England's water infrastructure needs, National Infrastructure Commission (2018)	Water	Sets out the National Infrastructure Commission's advice on how to address England's water supply challenges and deliver the appropriate level of resilience for the long term. It recognises that water shortages is a risk in England and that climate change alongside an increasing population A (especially in the drier south and east) and the need to protect the environment will result in further challenges.
Draft National Policy Statement for Water Resources Infrastructure, Defra (2018)	Water	The draft National Policy Statement for Water Resources Infrastructure (NPS) sets out the need and government's policies for the development of nationally significant infrastructure projects relevant to water resources in England. It is aligned with the goal of clean and plentiful water as set out in the UK Government's 25 Year Environment Plan and recognises that a twin track approach is required to secure resilient water supplies.
Water for Life White Paper, Defra (2011)	Water	This White Paper sets out a vision for future water management in which the water sector is resilient; water companies are more efficient and customer focused; and water is valued as the precious and finite resource it is. It explains that everyone has a part to play in the realisation of this vision. It sets out the principles and timetable for an overhaul of the abstraction regime, which governs how and when water can be taken from the environment for use by business, agriculture and the public; and explains how improved interconnections between water catchments will allow water to be moved more easily around the country to areas of need. It details Government policy on charging for water and providing help to those who struggle to afford their bills.
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (as amended)	Water	The Regulations transpose the EC WFD in UK law. They will help implement the WFD requirement in England and Wales. They aim to protect and enhance the quality of: Surface freshwater (including lakes, streams and rivers) Groundwaters Groundwater dependant ecosystems Estuaries Coastal waters out to one mile from low-water
Protect groundwater and prevent groundwater pollution, Environment Agency (2017)	Water	It aims to avoid negative impacts on groundwater sources including impacts of pollution by providing guidance on discharging or abstracting from groundwater sources.
Groundwater protection technical guidance, Environment Agency (2017)	Water	It aims to avoid negative effects on the quality and quantity of groundwater resources by providing guidance on the inputs of substances and pollutants to groundwater, discernibility of hazardous substances and when geological formations can be determined permanently unsuitable for other purposes.
The Environment Agency's approach to groundwater protection, Environment Agency (2018)	Water	These position statements describe the Environment Agency's approach to managing and protecting groundwater. They update Groundwater protection: principles and practice (GP3).
The Groundwater (England and Wales) Regulations 2009	Water	The Regulations transpose the EU Groundwater Directive (2006/118/EC) into UK law. The Regulations set out to protect groundwater from being polluted by hazardous substances.
Flood and Water Management Act 2010	Water	The Act seeks to address the threat of flooding and water scarcity. The Act takes forward a number of recommendations from the Pitt Review into the 2007 floods and places new responsibilities on the Environment Agency, local authorities and others to manage the risk of flooding. Climate projections suggest extreme weather will happen more frequently in the future and this Act is central to reducing the flood risk associated with extreme weather.
National Flood and Coastal Erosion Risk Management Strategy for England, Environment Agency (2020)	Water, Climatic Factors, Population, Human Health	The Strategy sets out the long-term delivery objectives the nation should take over the next 10 to 30 years as well as shorter term, practical measures risk management authorities should take working with partners and communities. It includes the following long term vision: 'a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100', and includes the following three long-term ambitions: Climate resilient places Today's growth and infrastructure resilient in tomorrow's climate A nation ready to respond and adapt to flooding and coastal change

Policy, Plan or Programme	Topic	Key objectives, guidance and references
The Flood and Coastal Erosion Risk Management Policy Statement, Defra (2020)	Water, Climatic Factors, Population, Human Health	The Policy Statement sets out the long-term goal of the Government to create a nation which is resilient to future flood and coastal erosion, and therefore protects people, the environment and the economy. The National Flood and Coastal Erosion Strategy has helped to inform this policy statement. It identifies five key areas for action which include: Upgrading and expanding our national flood defences and infrastructure Managing the flow of water more effectively Harnessing the power of nature to reduce flood and coastal erosion risk and achieve multiple benefits Better preparing our communities Enabling more resilient places through a catchment-based approach
Flood risk assessments: climate change allowances, Environment Agency (2016)	Water, Climatic Factors	The guidance sets out how climate change should be accounted for when local authorities prepare strategic flood risk assessment as well as when developers and their agents when they prepare flood risk assessments for planning applications, and development consent orders for nationally significant infrastructure projects. The guidance provides allowances for anticipated change of the following and are aligned to each river basin in some cases: peak river flow; peak rainfall intensity; sea level rise; and offshore wind speed and extreme wave height.
The Water Resources Management Plan Regulations 2007	Water	The regulations set out the statutory duty for water companies to prepare and publish a WRMP.
Water Resources Planning Framework (2015-2065), Water UK (2016)	Water	The project aims to develop a high-level strategy and framework for the long-term management and planning of water resources in England and Wales. It identifies the challenges facing water resources including climate change, resilience to droughts and demand growth and presents options to mitigate the issues.
Water Supply (Water Quality) Regulations 2016 (as amended)	Water	The regulations consolidate legislation concerning the quality of water supplies for human consumption in England. They also apply in Wales where the water undertaker or licensee is primarily based in England.
National Policy Statement for Wastewater (2012)	Water	National Policy Statement (NPS) sets out Government policy for the provision of major wastewater infrastructure. It aims to make existing policy and practice clear and transparent in relation to nationally significant wastewater infrastructure.
Climate change approaches in water resources planning – Overview of new methods, Environment Agency (2013)	Water, Climatic Factors	The report explores different ways in which the possible impacts of climate change could be incorporated into Water Resource Management Plans (WRMPs) in England and Wales. A number of improvements are suggested, but not limited to: Undertaking vulnerability assessments to evaluate Water Resource Zones (WRZs) vulnerability to current and future climate and using the outcomes to determine the level of modelling required to assess future impacts of climate change. Alternative methods to scaling the impacts of climate change from the base year to the 2030s and beyond. Headroom assessment should clearly distinguish between climate and non-climate risks and report outputs for specific reference levels of headroom.
Drought response: our framework for England, Environment Agency (2017)	Water, Climatic Factors	The document outlines the national framework for how drought is managed by the Environment Agency, the government and water companies to reduce the effects on the people, business and the environment. It sets out how drought affects different areas of England, who is involved in management drought and how those stakeholders, and how drought is managed, monitored and reported on.
Future Water: The Government's water strategy for England, Defra (2008)	Water	The Strategy sets Defra's vision for the water sector up to 2030 and outlines the steps they will implement to achieve that vision. Their vision is where rivers, canals, lakes and seas have improved for people and wildlife, with benefits for angling, boating and other recreational activities, and with continued provisions for excellent quality drinking water. It is structured around water supply and demand, water quality in the natural environment, surface water drainage, river and coastal flooding, greenhouse gas, water charging, the regulatory framework and innovation.
Water Resources Planning Guideline, Environment Agency (2016)	Water	This document provides guidance on the requirements and process for water resource planning through WRMPs to ensure resilient and sustainable water supplies. It is currently being updated and is out for public consultation until October 2020.
The Urban Waste Water Treatment (England and Wales) Regulations 1994	Water	The Regulations transpose the EU Urban Waste Water Treatment Directive (91/271/EEC) and sets out to regulate the disposal of sewage.
The Nitrate Pollution Prevention Regulations 2015	Water	The Regulations transpose EU Nitrates Directive (91/676/EEC) into UK law and aim to reduce the pollution in the water environment from nitrates.
Managing Water Abstraction, Environment Agency (2016)	Water	Sets out how the Environment Agency manage water resources in England and outlines the technical, legal and policy requirements behind the abstraction licensing strategies.
Marine Plans – South East Inshore, South Inshore, South Offshore (Marine Management Organisation)	Water	A marine plan: Sets out priorities and directions for future development within the plan area Informs sustainable use of marine resources Helps marine users understand the best locations for their activities, including where new developments may be appropriate. Each of the 11 marine plan areas will have a marine plan with a long-term (20 years) view of activities and will be reviewed every three years. There will be ten marine plans as the North West will have a single plan following requests to have a single process and one plan for these areas. All marine plan areas are scheduled to have a plan by 2021.
UK Marine Policy Statement (2011)	Water	The UK Marine Policy Statement (MPS) provides the policy framework for the marine planning system. It provides the context for marine plans. Marine plans put into practice the objectives for the marine environment that are identified in the MPS alongside the National Planning Policy Framework (NPPF) and the Localism Act 2011. Where there is no marine plan in place, the MPS sets the direction for decisions that affect the marine areas, such as granting licences for all public bodies.
<b>Regional and Local</b>		
Site Improvement Plans for Natura 2000 Sites, Natural England	Biodiversity	Site Improvement Plans (SIPs) have been developed for each Natura 2000 site in England as part of the Improvement Programme for England's Natura 2000 Sites (IPENS). Natura 2000 sites is the combined term for sites designated as Special Areas of Conservation (SAC) and Special Protected Areas (SPA). There are 23 SACs and 11 SPAs within the Northumbrian Water supply region. The plans provide a high level overview of the issues (both current and predicted) affecting the condition of the Natura 2000 features on the site(s) and outlines the priority measures required to improve the condition of the features. It does not cover issues where remedial actions are already in place or ongoing management activities which are required for maintenance.

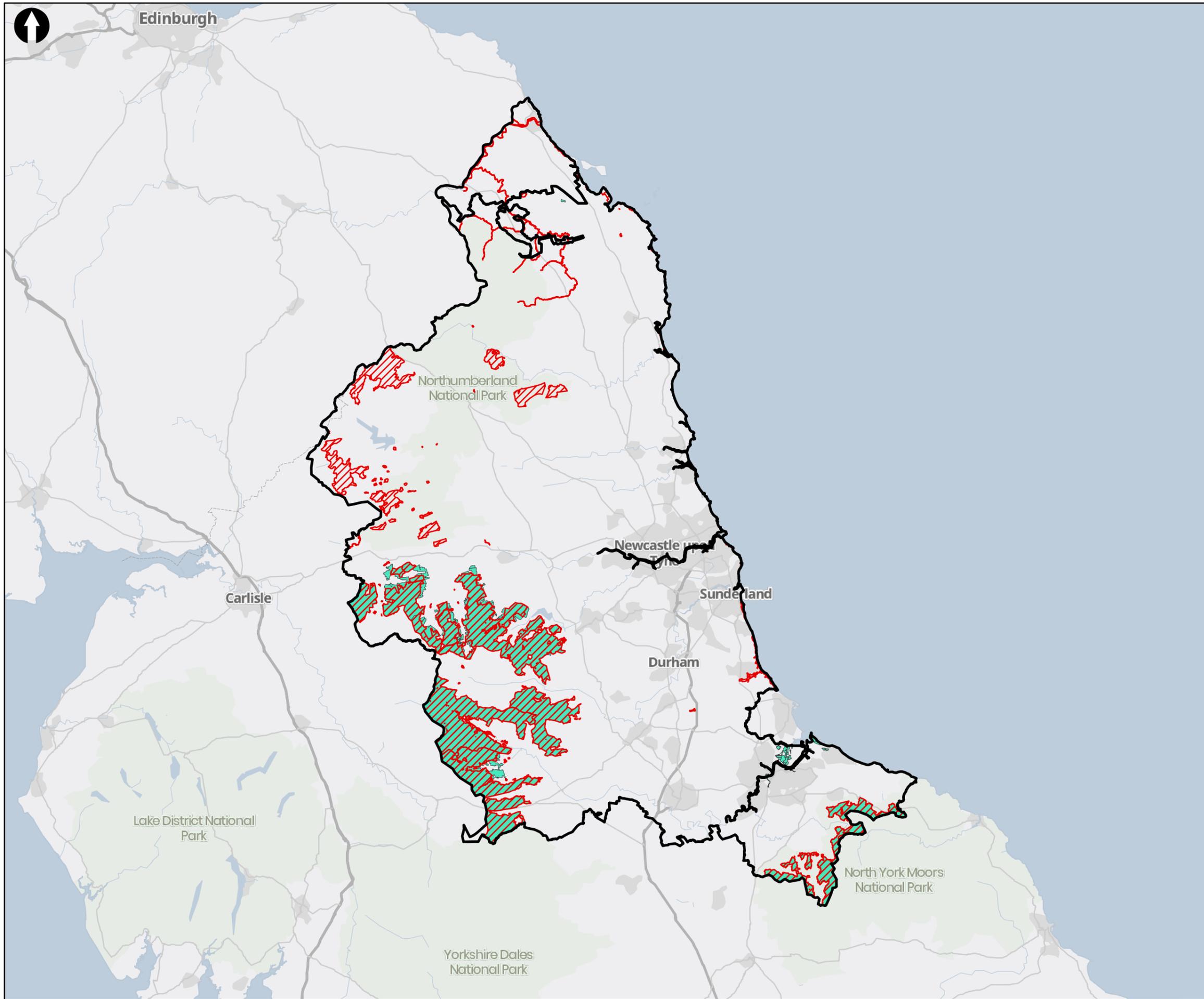
Policy, Plan or Programme	Topic	Key objectives, guidance and references		
Local Development Plans (Various)	Cross-cutting	Local Development Plans or Core Strategies are the main framework for planning in a local authorities and set out the long-term spatial vision to guide sustainable development. They include policies on key area such as housing, transport, the natural environment, employment and economic development, carbon reduction and resources, amongst others. The following local authorities are wholly or partially within the Northumbrian Water supply region: Carlisle, County Durham UA, Darlington UA, Gateshead, Hambleton, Hartlepool, Lake District National Park, Middlesbrough UA, Newcastle upon Tyne, North Tyneside, North York Moors, Northumberland UA, Redcar & Cleveland UA, Richmondshire, Scarborough, South Tyneside, Stockton-on-Tees UA, Sunderland, Yorkshire Dales National Park.		
Public Rights of Way Improvement Plans (ROWIPs)	Cross-cutting	ROWIPs outline how local authorities aim to improve public rights of way within their local area in order to ensure improved accessibility, connectivity and quality of the network for all.		
Local level Green Infrastructure Plans and Strategies	Cross-cutting	Green Infrastructure Strategies set out how local authorities will improve provision of and access to quality green spaces.		
National Natural Capital Atlas: Mapping Indicators, Natural England (2020)	Cross-cutting	The state of the natural capital in England is outlined in this report through a series of maps and indicators to show the quality, quantity and location of natural assets as well as the ecosystem services that they provide. Quantity indicators are divided into eight broad habitat type categories including freshwater; farmland; grasslands; mountain, moor and heath; woodland; urban; coastal; and marine. Quality indicators are also split out into broad categories which cover vegetation; nutrient and chemical status; soil / sediment process; species composition; vegetation; and cultural. These indicators are designed to inform decision making and to help to achieve the commitments set out in the 25 Year Plan, and also acts a baseline to measure change.		
AONB Management Plans	Landscape	The Management Plans summarise the key issues facing the AONBs and outline the management policies and actions required to conserve these areas. The following Plan is relevant to the Northumbrian Water supply region: The Northumberland Coast AONB Management Plan – 2020-2024 – key issues for the site include climate change and the potential for sea level rise and the possible impact on important intertidal habitats along the coastline, erosion, compaction and loss of soil organic matter. The North Pennines AONB Management Plan – 2019-2024 – key issues include conservation of peatland and other soils, conserving the dark night skies and promoting and protecting archaeological sites and features and historic buildings and structures.		
National Character Area (NCA) Profiles, Natural England	Landscape	The profiles for each outline the characteristics which are unique to that area and help to form distinctive sense of place. There are 17 NCAs within the Northumbrian Water supply region which include: <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> <li>North Northumberland Coastal Plain</li> <li>Northumberland Sandstone Hills</li> <li>Cheviot Fringe</li> <li>Cheviots</li> <li>Border Moors and Forests</li> <li>North Pennines</li> <li>Tyne Gap and Hadrian's Wall</li> <li>Mid Northumberland</li> </ul> </td> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> <li>South East Northumberland Coastal Plain</li> <li>Tyne and Wear Lowlands</li> <li>Durham Magnesian Limestone Plateau</li> <li>Durham Coalfield Pennine Fringe</li> <li>Pennine Dales Fringe</li> <li>Tees Lowlands</li> <li>North Yorkshire Moors and Cleveland Hills</li> </ul> </td> </tr> </table>	<ul style="list-style-type: none"> <li>North Northumberland Coastal Plain</li> <li>Northumberland Sandstone Hills</li> <li>Cheviot Fringe</li> <li>Cheviots</li> <li>Border Moors and Forests</li> <li>North Pennines</li> <li>Tyne Gap and Hadrian's Wall</li> <li>Mid Northumberland</li> </ul>	<ul style="list-style-type: none"> <li>South East Northumberland Coastal Plain</li> <li>Tyne and Wear Lowlands</li> <li>Durham Magnesian Limestone Plateau</li> <li>Durham Coalfield Pennine Fringe</li> <li>Pennine Dales Fringe</li> <li>Tees Lowlands</li> <li>North Yorkshire Moors and Cleveland Hills</li> </ul>
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Northumbria River Basin Management Plan (2015)	Water	The purpose of a river basin management plan is to provide a framework for protecting and enhancing the benefits provided by the water environment. To achieve this, and because water and land resources are closely linked, it also informs decisions on land-use planning. The following have been identified as key pressures for the basin: Physical modifications - affecting 38% of water bodies in this river basin district Pollution from waste water – affecting 13% of water bodies in this river basin district Pollution from towns, cities and transport - affecting 4% of water bodies in this river basin district Changes to the natural flow and level of water - affecting 2% of water bodies in this river basin district Negative effects of invasive non-native species - affecting 1% of water bodies in this river basin district Pollution from rural areas - affecting 10% of water bodies in this river basin district Pollution from abandoned mines – affecting 9% of water bodies in this river basin district		
Catchment Flood Management Plans (2009): Northumbria River Basin District	Water	CFMPs have been produced to assess inland flood risk across England and Wales. The CFMPs relevant to the WRMP are detailed in the column to the left. The CFMPs consider all types of inland flooding: from rivers, ground water, surface water and tidal flooding (but not coastal flooding, which is covered by Shoreline Management Plans. The role of the CFMPs is to establish flood risk management policies which will deliver sustainable flood risk management for the long term. CFMPs should be used to inform planning and decision making by key stakeholders such as the Environment Agency, local authorities, Internal Drainage Boards, water companies and other utilities; transportation planners; land owners, farmers and land managers; the public and businesses to enhance their understanding of flood risk and how it will be managed. The CFMPs identify six generic flood risk management policies: Policy 1 - Areas of little or no flood risk where the EA will continue to monitor and advise: this policy will tend to be applied in those areas where there are very few properties at risk of flooding. It reflects a commitment to work with the natural flood processes as far as possible. Policy 2 - Areas of low to moderate flood risk where the EA can generally reduce existing flood risk management actions: this policy will tend to be applied where the overall level of risk to people and property is low to moderate. Policy 3 - Areas of low to moderate flood risk where the EA are generally managing existing flood risk effectively: this policy will tend to be applied where the risks are currently appropriately managed and where the risk of flooding is not expected to increase significantly in the future. Policy 4 - Areas of low, moderate or high flood risk where the EA are already managing the flood risk effectively but where they may need to take further actions to keep pace with climate change: this policy will tend to be applied where the risks are currently deemed to be appropriately-managed, but where the risk of flooding is expected to significantly rise in the future. Policy 5 - Areas of moderate to high flood risk where the EA can generally take further action to reduce flood risk: this policy will tend to be applied to those areas where the case for further action to reduce flood risk is most compelling, for example where there are many people at high risk, or where changes in the environment have already increased risk. Policy 6 - Areas of low to moderate flood risk where the EA will take action with others to store water or manage run-off in: locations that provide overall flood risk reduction or environmental benefits. This policy will tend to be applied where there may be opportunities in some locations to reduce flood risk locally or more widely in a catchment by storing water or managing run-off. To select the most appropriate policy, the CFMPs consider how the social, economic and environmental objectives are affected by flood risk management activities under each policy option. The policies identified in the CFMPs will be delivered through a range of delivery plans, projects and actions.		
Catchment Abstraction Management Strategies (CAMS) (2016)	Water	The Catchment Abstraction Management Strategy (CAMS) set out how the EA will manage water abstraction. They outline where water is available, and also, if relevant, where the EA needs to reduce current rates of abstraction. Each CAMS provides an overview of the catchment area and characteristics, including abstractions, geology, hydrology, hydrometry, water quality and discharges, ecology and conservation, recreation and navigation.		

Policy, Plan or Programme	Topic	Key objectives, guidance and references
		The CAMS make information on water resources and licensing practice publicly available and allow the balance between the needs of abstractors, other water users and the aquatic environment to be considered in consultation with the local community and interested parties. CAMS are also the mechanism for managing time limited licences by determining whether they should be renewed and, if so, on what terms.
Meeting our Future Water Needs: a National Framework for Water Resources, Environment Agency (2020)	Water	The Framework explores the long-term needs of all sectors that depend on a secure supply of water, taking into account the commitments set out in the UK Government's 25 Year Plan. It sets out the principles, expectations and challenges for the five regional groups which cover England's water supply in order to take a collaborative approach to address the current and future challenge of water resource planning. The importance of regional planning is paramount to address the following challenges: Resilience to drought Greater environmental improvement Reducing water use in the long-term Leakage reduction Reducing the use of drought permits and drought orders Increasing supplies Moving water to where it is needed
Long-term water resources environmental destination, Environment Agency (2020)	Water	Regional water resources plans provide the opportunity to deliver an environmental destination for water resources where environmental issues related to water supply and demand are addressed in the long term. The document provides guidance for regional groups and water companies to help to integrate the long-term environmental water resources needs when developing their regional plans. It sets out a standard approach to allow for both consistency whilst allowing for flexibility depending on specific needs and issues. It sets out the following: What the environmental destination should look like: Enable environmental resilience and protection for water resources up to at least 2050 through a variety of actions. Stages needed to propose a long-term environmental destination: Review national policy, use scenarios, engage with stakeholders, develop environmental destination and carry out testing. Defining a long-term environmental destination: Use the scenarios from the National Framework to support and inform the destination development. What a long-term environmental destination should include: Meet current regulatory requirements for abstraction and integrate future needs. Actions to meet an environmental destination: Resilience to climate change, integrates stakeholder views, considers costs and scale, supports wider government ambitions, prioritises the most vulnerable and protected sites, integrates a catchment approach and nature based solutions, supports net gain principles, uses the best data and is not constrained by previous decisions. The guidance also includes reference to how to carry out engagement, set milestones and outlines the governance for implementing a long-term environmental destination.
Water Resources Planning Guideline, Various (2021)	Water	The guideline was published by the Environment Agency, Natural Resources Wales and Ofwat. It is relevant to water companies in England and Wales and also to those producing regional plans. It provides guidance on how to produce a Plan (WRMP or Regional Plan), taking into account all the relevant statutory requirements and government policy. The guidance sets out the national, regional and local planning context, how to form and develop a WRMP, forecasting supply and demand, uncertainty allowances, option identification and developing a best value plan.
Forward programme 2021-22, RAPID (2021)	Water	The Regulator's Alliance for Progressing Infrastructure Development (RAPID) is a partnership formed of Ofwat, the Environment Agency and the Drinking Water Inspectorate with Natural Resources Wales involved in an advisory capacity for Welsh schemes. To achieve the vision for high quality, resilient and environmentally beneficial water resources which meet customer needs, Strategic Resource Options (SROs) are required and involve collaboration and complex arrangements between water companies and regions. Funding was allocated to water companies to develop these SRO infrastructure supply solutions and RAPID were established to support their development. RAPID undertakes the following roles: Gated process: The first role of RAPID is to provide oversight to the gated process which has been developed to ensure SROs are on track and meet needs in a cost and environmentally efficient way. Gate 1 submission has already taken place with Gate 2 due to complete in October 2022. Water Resources National Framework: RAPID acts as an enabler for the National Framework, supporting the co-ordination of the five regional groups and helping to shape regional plans. Regulatory and commercial framework: Thirdly, RAPID are developing the regulatory and commercial framework to support the timely delivery of water resources infrastructure. For the period 2021-2022, RAPID have identified the following five key delivery areas: developing a positive culture and driving performance; providing effective oversight of the strategic solutions engaging people and organisations; achieving effective long-term water resources resilience; and exploring and addressing regulatory and commercial opportunities, gaps and barriers.
<b>Northumbrian Water</b>		
Environment Strategy (2021)	Environment	The strategy sets out guidance on overall assets and operations management to avoid environmental effects. It includes guidance on interactions with the water environment to protect and improve rivers and beaches within the region and the overall environmental conditions.
Biodiversity Strategy (2021)	Biodiversity	This strategy supports the Government's national framework on biodiversity (July 2012) and uses an identified list of priority habitats and species called the Section 41 lists. The Section 41 lists are part of the Natural Environment and Rural Communities Act which upholds all water and sewerage companies to maintain, and where possible, enhance biodiversity on their landholdings. This strategy allows for engagement with local environmental partners in the region to deliver site management work and enhancement schemes.
Pollution Incident Reduction Plan (2020)	Water	The purpose of this plan for 2020-25 is to set out guidance for reducing pollutions and meeting the zero pollutions goal as a result of assets and operations. The plan considers expectations from varied stakeholders (the government, regulators, customers, environmental NGO's and the customer challenge group) with the objectives to maintain an industry-leading pollution performance; and reduce the number of pollution incidents from wastewater and water operations. This plan further includes proven business-as-usual activities and interventions and highlights transformative programmes to maintain and improve overall performance.
Draft Drought Plan 2022 (2021)	Water	The purpose of this plan is to identify how future droughts in the region will be managed; what measures are available to reduce demand and support supplies; what triggers can be used to identify when actions are required and communication strategies with customers during a drought. It identifies and advises on 4 levels of water restrictions; maps out the drought management process in 7 stages; highlights the order of drought implementations actions in 4 levels and summarizes extreme drought measures as detailed actions.
PR19 Business Plan (2020)	Cross Cutting	This plan is structured across six key themes as identified during the consultation process with stakeholders. The purpose of this plan is to provide guidance on the detailed goals and innovations needed in each theme to deliver set out objectives and aims. The themes include: Unrivalled Customer Experience - delivering a package of measures to support an unrivalled customer experience. Affordable and Inclusive services - ensuring water and sewerage services remain affordable for all customers. Reliable and Resilient services - anticipating change in services, plan and make correct long-term decisions. Leading in Innovation - keeping updated with innovative solutions through technological advances and changing political and physical climates. Improving the Environment - creating a step change in environmental activities with an aim to demonstrate leadership and improve the environment within the region. Building successful economies in the regions - demonstrating leadership and wider contributions to life within the region.
Safety, Health and Environment (SHE) Statement (2020)	Cross cutting	This statement highlights the overall ethical responsibility of the company by setting out clear directions on safety, health and the environment. It reflects the company safety direction, legislative and regulatory requirements which will be under a continuous review, with any significant changes identified and the policy updated to reflect the same.

Policy, Plan or Programme	Topic	Key objectives, guidance and references
Emission Possible Plan to achieve net zero by 2027 (2021)	Climatic Factors	The purpose of this plan is to identify the progress by the company so far regarding reduction of carbon emissions from 303,000 tonnes in 2008 to 56,000 tonnes in 2020 as well as the plan to hit the target of zero emissions by 2027. This plan recognizes the urgency and priorities for interventions needed to reach net zero emissions and provides information on possible solutions for the same: Fossil fuel reductions, Natural Gas Reductions, fuel change in operational vehicles, using renewables, managing offsets and implementing innovation strategies throughout the company.
Leakage Target (2020)	Water	This report identifies the use of space satellites, drones and the public support (through the Leakage Portal) to reduce water leakage throughout the network with an aim to reduce water leakage by 17.5% by 2025.
Water Environment Improvements / Blue spaces Scheme (2021)	Water	This scheme identifies, develops and includes water environment improvement projects throughout the network worth a £1 million for the period of 2020-25. It includes an anticipated overall 250km water environment improvement in areas that can be accessed and enjoyed for their water and wildlife, and the associated health and wellbeing benefits.

## **B. Baseline Maps**

### **B.1 Habitat Sites (SPA and SAC)**



**Key to Symbols**

- Northumbrian Water WRZ
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)

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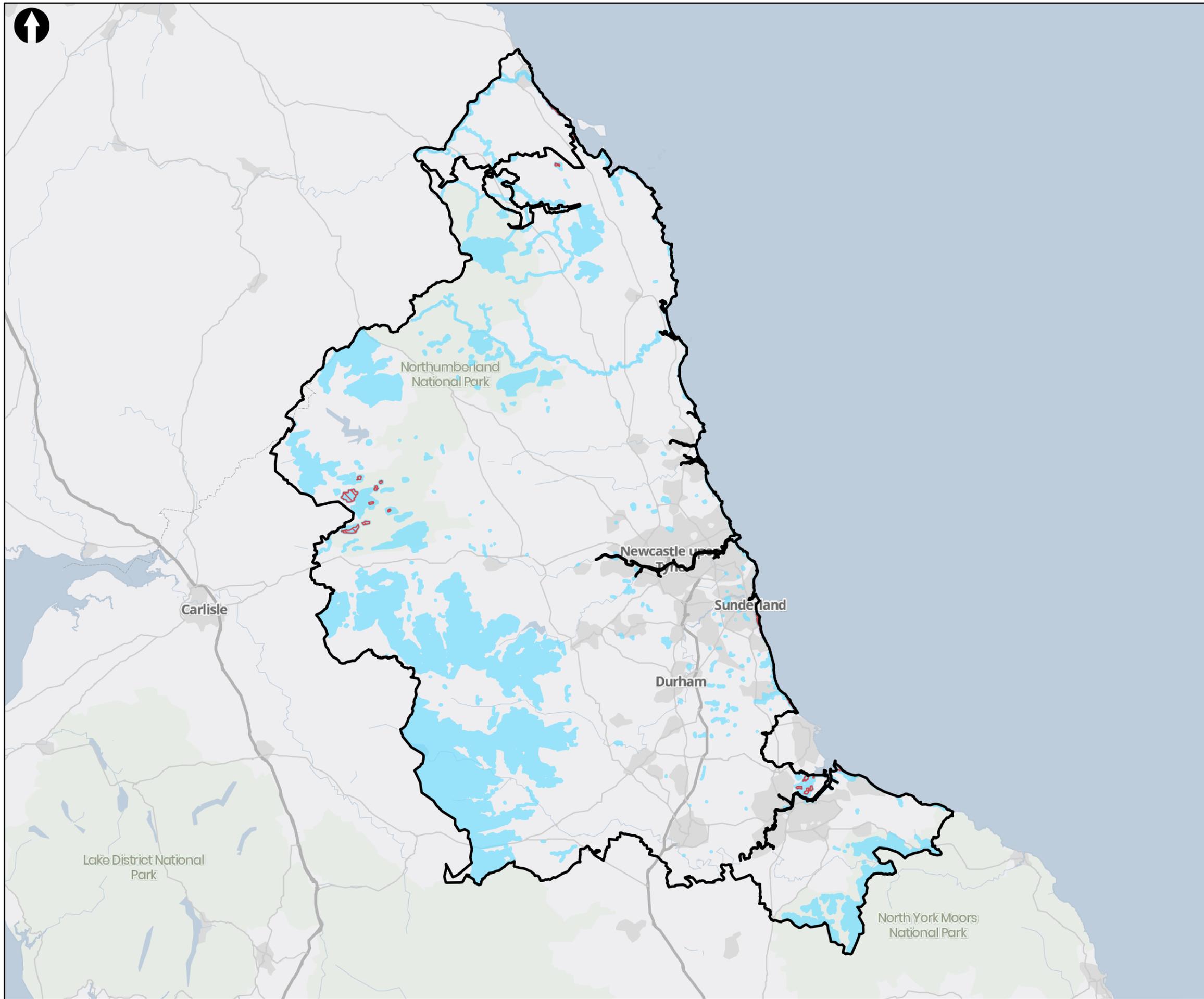
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 Designated Sites (SAC and SPA)

**B.2 Ramsar and SSSI**



**Key to Symbols**

- Northumbrian Water WRZ
- Ramsar
- Site of Special Scientific Interest (SSSI)

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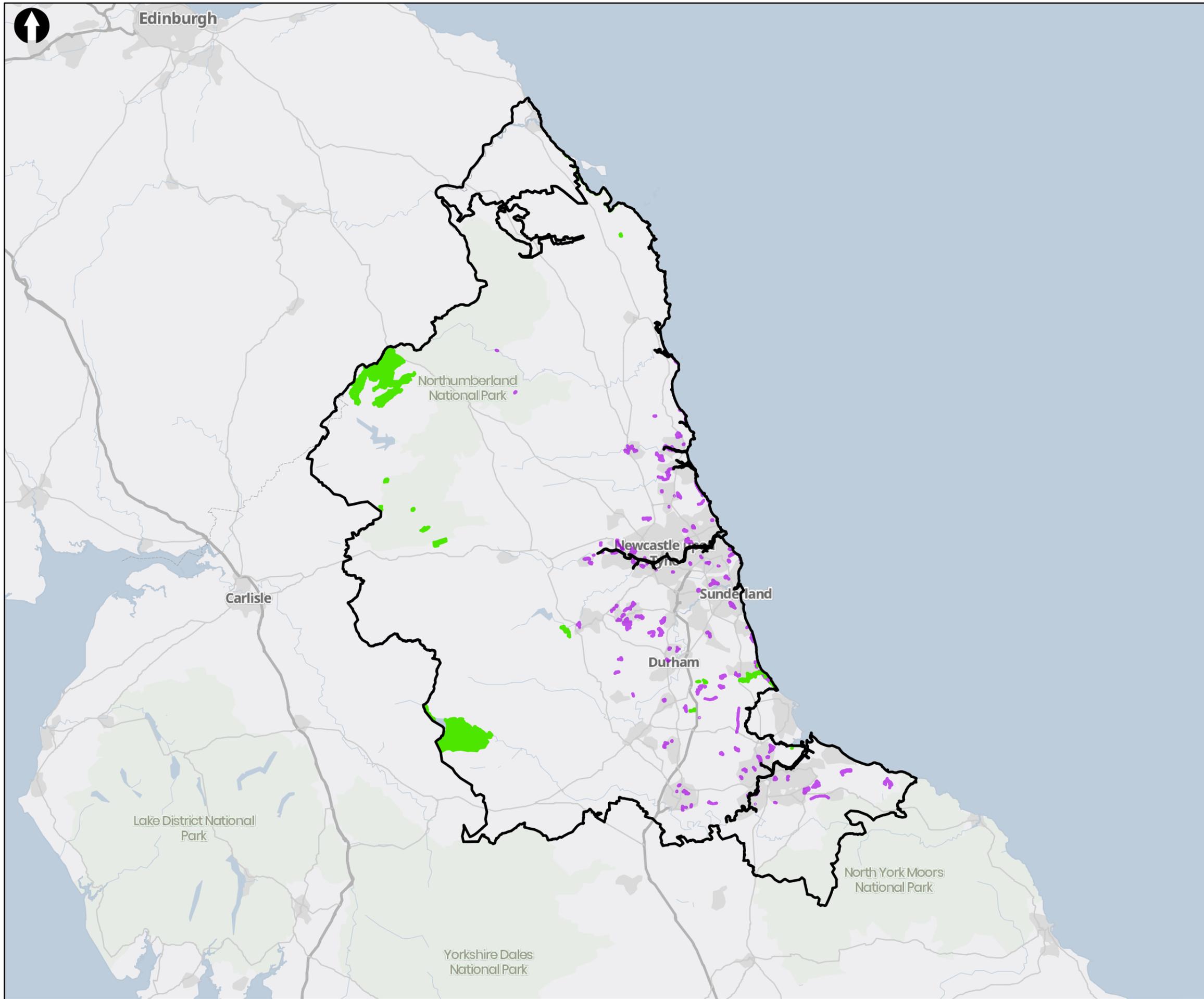
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**B.3 National Nature Reserves and Local Nature Reserves**



**Key to Symbols**

- Northumbrian Water WRZ
- National Nature Reserve (NNR)
- Local Nature Reserve (LNR)

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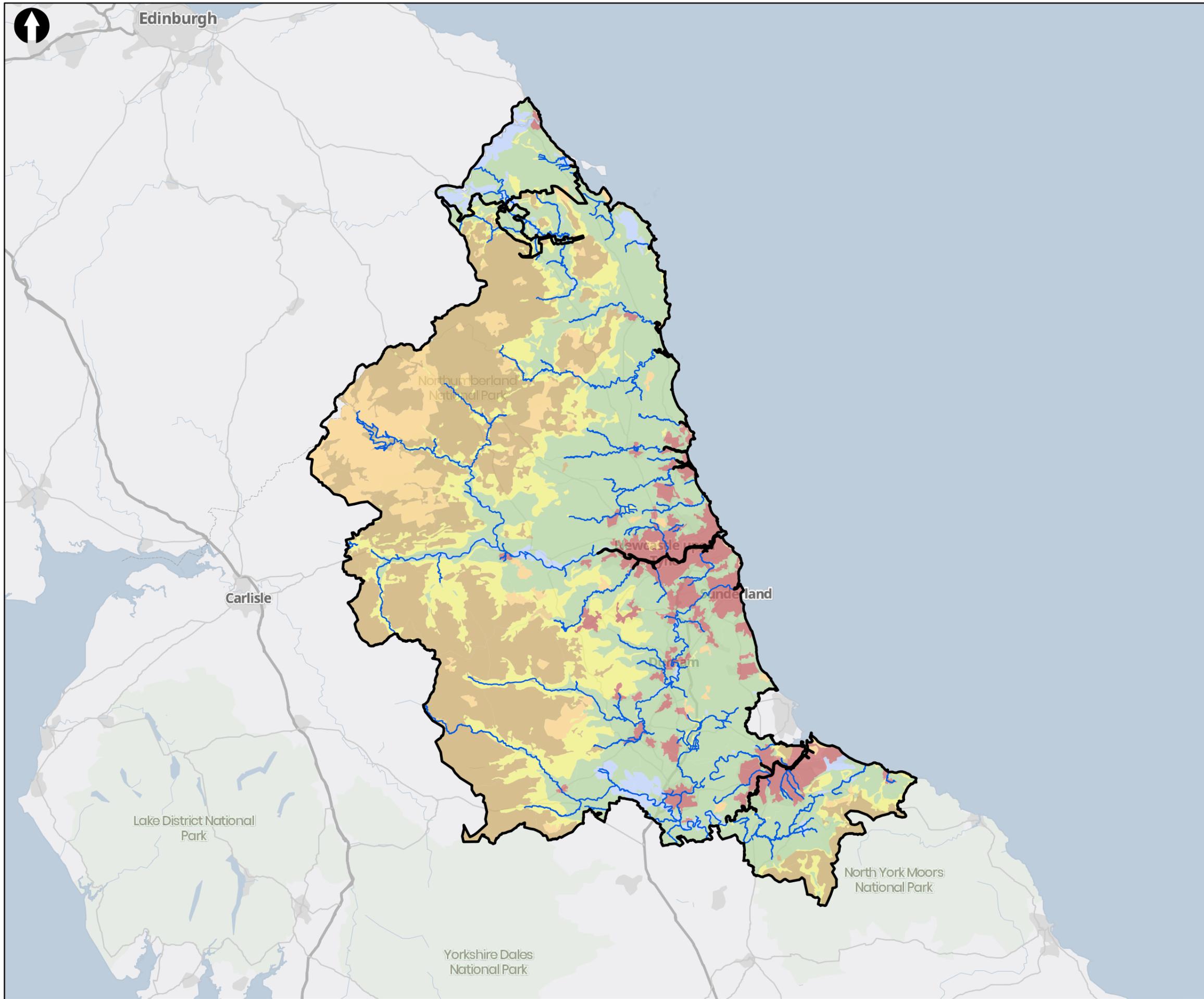
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**B.4 Main Rivers and Agricultural Land Classification**



**Key to Symbols**

- Northumbrian Water WRZ
- Main river

**Provisional Agricultural Land Classification (ALC)**

- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Non agricultural
- Urban

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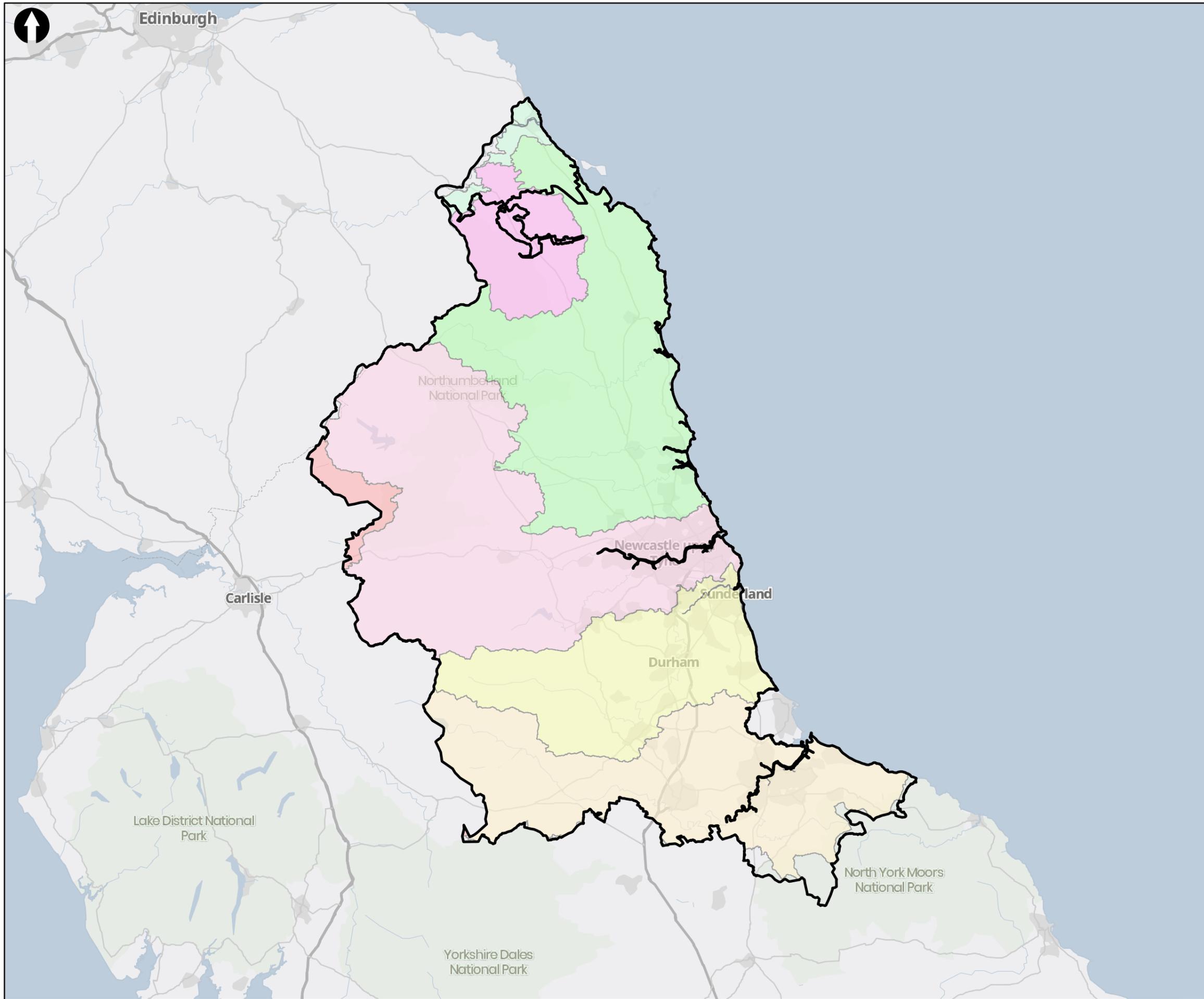
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 Scoping Report  
 Main Rivers and Agricultural Land  
 Classification

**B.5 Surface Water Catchments**



**Key to Symbols**

- Northumbrian Water WRZ
- Surface Water Catchment**
- Eden and Esk
- Northumberland Rivers
- Northumbria TraC
- Solway Tweed TraC
- Tees
- Till
- Tweed
- Tyne
- Waver and Wampool
- Wear

**Notes**

Water resources area surface water catchment: Essex and Suffolk Water, 2021-2022.  
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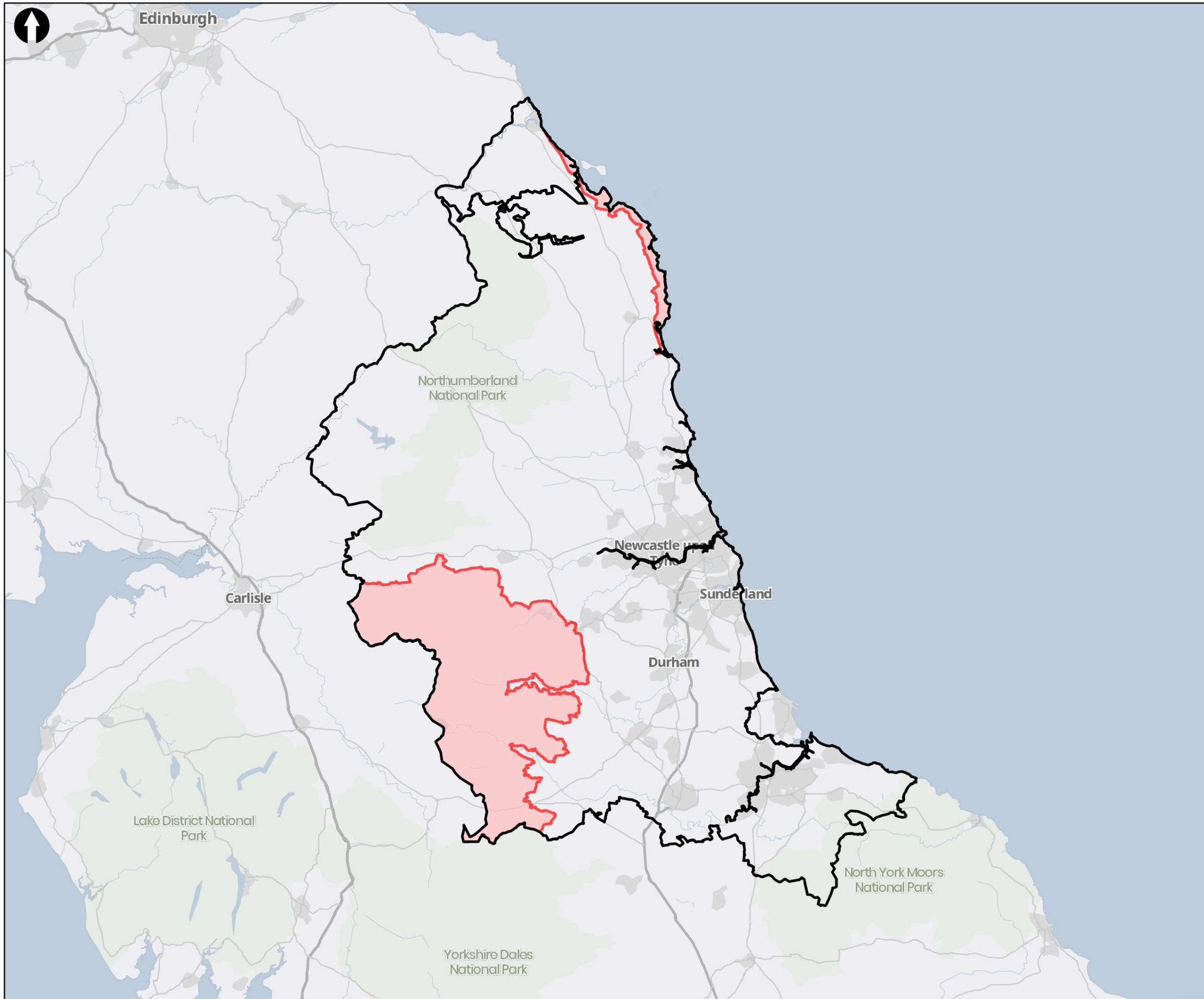
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 Catchment Boundary Overview

**B.6 AONBs**



**Key to Symbols**

- Northumbrian Water WRZ
- Area of Outstanding Natural Beauty

**Notes**

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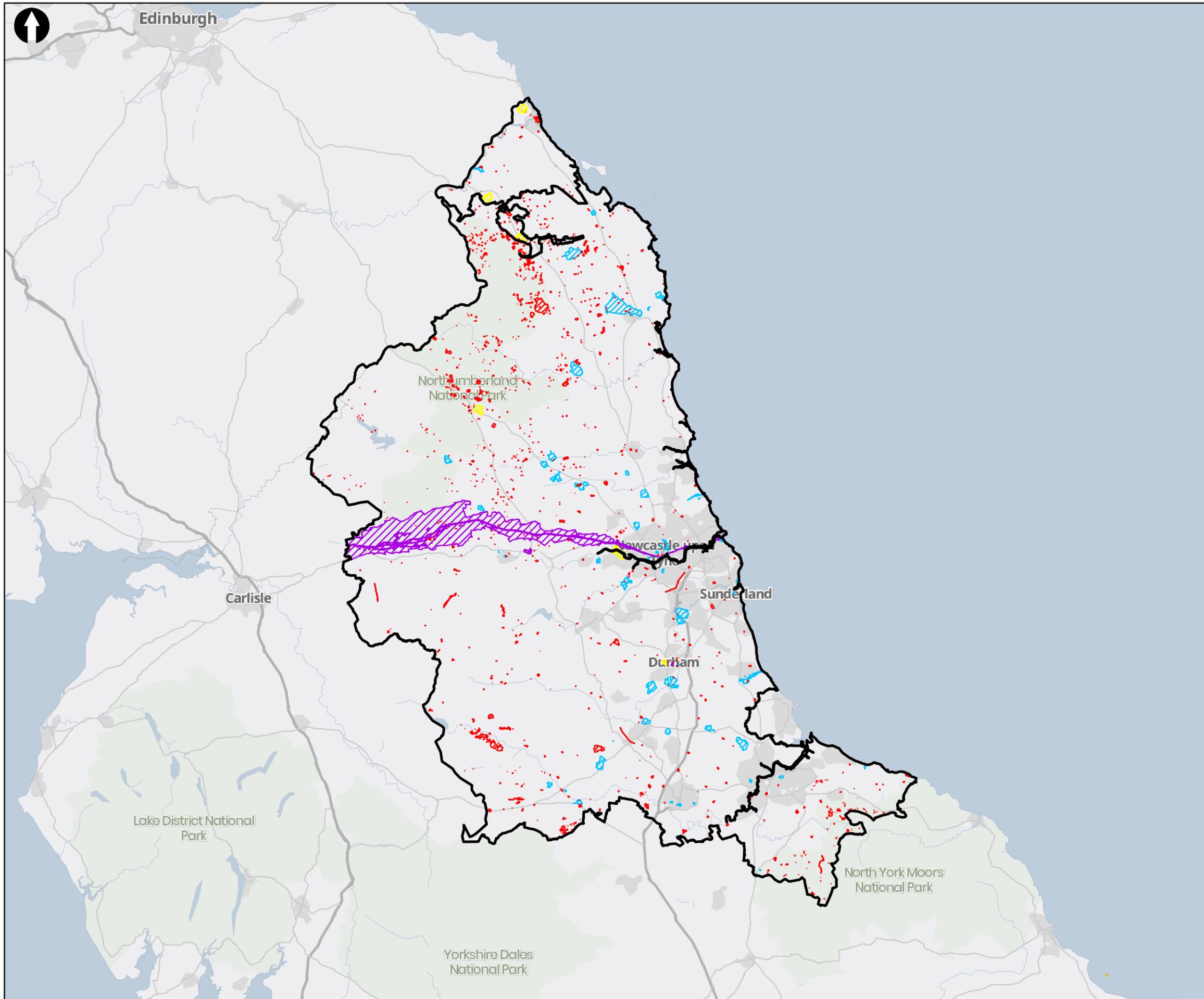
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 Areas of Outstanding Natural Beauty

**B.7 Heritage Sites**



**Key to Symbols**

- Northumbrian Water WRZ
- Registered battlefield
- World Heritage Site
- Scheduled monument
- Registered park and garden
- Protected wreck

**Notes**

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## C. SEA Process Tasks

**Table C.1: Description of SEA Stages and Tasks**

SEA Stage	SEA Task	Task Purpose
<b>Stage A</b> Setting the context and objectives, establishing the baseline and deciding on the scope	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 to identify SEA objectives
	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
	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
	A4: Developing SEA objectives	To provide a means by which the environmental performance of the plan or programme and alternatives can be assessed
	A5: Consulting on the scope of SEA	To ensure that the SEA covers the likely significant environmental effects of the plan or programme. This is a statutory five-week consultation period, as a minimum)
<b>Stage B</b> Developing and refining alternatives and assessing effects	B1: Testing the plan or programme objectives against the 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
	B2: Developing strategic alternatives	To develop and refine strategic alternatives
	B3: Predicting the effects of the draft plan or programme, including alternatives	To predict the significant environmental effects of the plan or programme and alternatives
	B4: Evaluating the effects of the draft 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
	B5: Considering ways of mitigating adverse effects	To ensure that adverse effects are identified and potential mitigation measures are considered
	B6: Proposing measures to monitor the environmental effects of plan or programme implementation	To details the means by which the environmental performance for the plan or programme can be assessed
<b>Stage C</b> Preparing the Environmental Report	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
<b>Stage D</b> Consulting on the draft plan or programme and the Environmental Report	D1: Consulting on the draft plan or programme and 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. There is no set time period for consultation. The SEA Directive states that the Consultation Bodies and the public ' <i>shall be given an early and effective opportunity within appropriate time frames to express their opinion on the draft plan or programme and the accompanying environmental report before the adoption of the plan or programme or its submission to the legislative procedure</i> '. The Environmental Report will be consulted upon alongside the draft WRMP To gather more information through the opinions and concerns of the public
	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
	D3: Decision making 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

SEA Stage	SEA Task	Task Purpose
<b>Stage E</b> Monitoring implementation of the plans or programme	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
	E2: Responding to adverse effects	To prepare for appropriate responses where adverse effects are identified

## D. Option Types Issues and Opportunities on types

### D.1 Aquifer storage and recovery

Aquifer storage options involve abstracting water from a river or reservoir, treating and injecting it underground to be stored in natural aquifers.

**Table D.1: Aquifer storage and recovery**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>● Potential loss of water through underground flows.</li> <li>● Pumping of water underground may exacerbate flooding from groundwater and reduce capacity for infiltration (because of a higher water table).</li> <li>● Risk of groundwater quality impacts such as mobilisation of heavy metals or fluoride upon injection of oxygenated surface water.</li> </ul>	<ul style="list-style-type: none"> <li>● A quantity of potable fresh water can be stored for use in times of drought/high demand.</li> <li>● Pumping of water underground may reduce overland flows and run-off which could reduce flooding in some circumstances.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>● Potential effect on agricultural land and consequently farmers' livelihoods through increase flood risk and land take for plant and pipelines.</li> <li>● If there is a reduction of downstream flows this could affect recreational activities such as canoeing and fishing activities, and downstream communities detrimentally.</li> </ul>	<ul style="list-style-type: none"> <li>● Source of water during drought conditions to maintain water supply for customers.</li> <li>● Pumping water underground during high flows could reduce flood risk to property and businesses.</li> <li>● Aquifer storage and recovery (ASR) could help maintain flows in drought conditions benefiting farming and recreational activities.</li> </ul>
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>● Potential loss of habitat resulting from land take for the construction of plant and pipeline (significance of effects will depend on the existing ecological value of the site).</li> <li>● Reduced amount of water available for downstream habitats which may be dependent on damp environments.</li> </ul>	<ul style="list-style-type: none"> <li>● There could be increased groundwater and discharge back to rivers enhancing habitats and improving resilience of habitats during droughts.</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>● New plant and pipeline associated with ASR options may not be in keeping with the existing landscape character and cause visual effects.</li> </ul>	-
Historic Environment	<ul style="list-style-type: none"> <li>● Potential damage, disturbance, or effects on the setting of heritage assets and archaeology from construction of plant and pipeline infrastructure.</li> </ul>	-
Climate Factors	<ul style="list-style-type: none"> <li>● The additional treatment of water and pumping may emit GHGs.</li> <li>● Short-term GHG emissions likely to be emitted during construction of plant and pipeline infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>● ASR options will provide an increased quantity of stored water which can be used in times of drought.</li> <li>● Potential for surface flood risk reduction by taking high flows of rivers and storing underground.</li> </ul>
Air	<ul style="list-style-type: none"> <li>● The additional treatment of water and pumping may emit pollutants.</li> <li>● Short-term emissions of air pollutants likely during construction.</li> </ul>	-
Soil	<ul style="list-style-type: none"> <li>● Risk of localised ground heave at ASR site.</li> </ul>	-
Material Assets	<ul style="list-style-type: none"> <li>● New infrastructure is required and therefore the use of materials is required. It is likely that energy use will increase during both construction and operation phases.</li> </ul>	<ul style="list-style-type: none"> <li>● Opportunity to implement sustainable design measures.</li> </ul>

## D.2 Catchment management

Catchment management options include flow augmentation and licencing; integrated catchment management; knowledge exchange, education and agricultural activity; natural water retention measures (including NFM and wetland creation); nutrient and sediment reduction; pesticide reduction; river restoration; Sustainable Urban Drainage Systems (SuDS); and terrestrial habitat creation/management.

**Table D.2: Catchment management**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>Improvement to water quality.</li> <li>Sustainable management of water.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>Community involvement in projects.</li> <li>Opportunity to create new recreation provision for the community and visitors at the reservoir such as fishing, bird watching, water sports, mountain biking.</li> <li>Increased community knowledge on catchment management.</li> </ul>
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>Management activities could affect species and habitats e.g., river restoration during construction work.</li> <li>Management activities such as woodland planting need to be in locations that do not impact other sensitive or designated habitats and sites.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunities for increased biodiversity and habitat creation and management, and through the creation of wetlands.</li> <li>Improved habitat through river restoration.</li> <li>Improved habitat through nutrient and sediment reduction.</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>Short-term construction effects of constructing.</li> </ul>	<ul style="list-style-type: none"> <li>Potential to create new aesthetic landscape.</li> </ul>
Historic Environment	<ul style="list-style-type: none"> <li>Potential for damage to uncovered archaeological artefacts if excavation needed.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Climate Factors	<ul style="list-style-type: none"> <li>Short-term GHG emissions likely to be emitted during construction.</li> </ul>	<ul style="list-style-type: none"> <li>Use of renewables during construction for energy supply and use of materials with lower embodied carbon.</li> <li>Reduce vulnerability to climate change risks and hazards through the implementation of a catchment management approach.</li> </ul>
Air	<ul style="list-style-type: none"> <li>Short-term emissions of air pollutants likely during construction.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Soil	<ul style="list-style-type: none"> <li>Potential loss of agricultural land for catchment schemes such as woodland planting.</li> </ul>	<ul style="list-style-type: none"> <li>Increased soil stability through the terrestrial habitat creation/management.</li> </ul>
Material Assets	<ul style="list-style-type: none"> <li>Short-term energy use required during construction.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to implement sustainable design measures.</li> </ul>

## D.3 Desalination

Desalination options involve pumping sea water or brackish water (from an estuary) for treatment and release into supply. The water will be blended before putting into supply, with the brine to be piped out to sea for disposal (in the case of sea desalination) or to a sewer (in the case of brackish water desalination).

**Table D.3: Desalination**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>Brine discharge into the sea or from sewer outfalls could affect salinity of water.</li> </ul>	<ul style="list-style-type: none"> <li>Desalination options will relieve pressure on the natural system by providing an alternative water resource resulting in more freshwater available for the natural systems.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>Desalination removes iodine from water and could increase risk of iodine deficiency disorders if this is not re-added, although micronutrient deficiencies could be addressed by re-adding elements to the water.</li> <li>Potential loss of agricultural land and effects on farmers' livelihoods if agricultural land is lost due to land take for plant and associated infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Indirect benefit to agriculture through increased supply of freshwater within terrestrial component of water supply available for agricultural irrigation use.</li> </ul>
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>Potential loss of habitats and species due to land take for construction of the desalination plant and associated infrastructure.</li> <li>Release of brine into the ocean could affect sensitive habitats and species.</li> <li>Intake structures have potential to suck in fish, shellfish (or their eggs), depending on intake type and water withdrawal rate. Potential for larger organisms to be injured/killed if they become trapped against screens at front of intake structures.</li> </ul>	<ul style="list-style-type: none"> <li>Increased quantity of freshwater within the system could supply more freshwater to habitats dependent on freshwater supply. Increased quantity could make habitats more resilient to climate change and therefore maintain them during drought conditions.</li> <li>Opportunity to include habitat creation within plant site through landscape planting.</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>Potential visual impact of desalination plant, especially if it located close to a beach or coastal path etc.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Historic Environment	<ul style="list-style-type: none"> <li>Desalination plant and site could alter heritage value of landscape or heritage assets (including archaeology) if insensitively located or designed.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Climate Factors	<ul style="list-style-type: none"> <li>Plant likely to be a net source of greenhouse gases emissions and will use large amounts of energy which will contribute to global warming and climate change.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to use renewable energy technologies in the future to power the plant.</li> <li>Increased quantity of freshwater within the system could increase resilience to drought.</li> </ul>
Air	<ul style="list-style-type: none"> <li>The pumping may emit pollutants.</li> <li>Short-term emissions of air pollutants likely during construction.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Soil	<ul style="list-style-type: none"> <li>Potential habitat loss from additional land take required for plant and associated infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Material Assets	<ul style="list-style-type: none"> <li>Production of highly saline and potentially contaminated by-products (sludge). If a re-use (e.g., industrial) cannot be disposed of.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>

## D.4 Distribution capacity expansion

Intra-zonal network enhancements (increased pipeline capacity or booster pumping capacity) to enable water to be transferred from new sources to demand centres within the water resource zone.

**Table D.4: Distribution capacity expansion**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>• Potential reduction in river flows of new sources could reduce provision water for other users and dependent ecology.</li> <li>• Water from new sources may be of a different quality and mineral make-up which may require treatment.</li> </ul>	<ul style="list-style-type: none"> <li>• Additional water will be available in the receiving system.</li> <li>• Increased provision of freshwater for users connected to network.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>• If reduction of flows in identified new sources this could affect recreational activities such as canoeing and fishing activities, and downstream communities detrimentally.</li> <li>• If reduction of flows in identified new sources this could affect agricultural systems and habitats and make them more susceptible to drought stress.</li> </ul>	<ul style="list-style-type: none"> <li>• Additional source of water available to users.</li> </ul>
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>• If reduction in flows in identified new sources this could reduce freshwater supporting existing habitats.</li> <li>• Potential habitat loss from additional land take required to increase pipeline capacity or booster pumping capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• Enables water transfer from areas of surplus, reducing pressure on the local water environment.</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>• Potential habitat loss from additional land take required to increase pipeline capacity or booster pumping capacity.</li> <li>• Short-term construction effects of constructing network enhancements.</li> </ul>	<ul style="list-style-type: none"> <li>• Potential to create new aesthetic landscape.</li> </ul>
Historic Environment	<ul style="list-style-type: none"> <li>• Potential for damage to uncovered archaeological artefacts from excavation to support increased pipeline capacity or booster pumping capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• -</li> </ul>
Climate Factors	<ul style="list-style-type: none"> <li>• Short-term GHG emissions likely to be emitted during construction of network enhancements.</li> <li>• Carbon could be generated from materials used to construct network enhancements.</li> </ul>	<ul style="list-style-type: none"> <li>• Use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon.</li> </ul>
Air	<ul style="list-style-type: none"> <li>• Short-term emissions of air pollutants likely during construction.</li> </ul>	<ul style="list-style-type: none"> <li>• -</li> </ul>
Soil	<ul style="list-style-type: none"> <li>• Potential habitat loss from additional land take required to increase pipeline capacity or booster pumping capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• -</li> </ul>
Material Assets	<ul style="list-style-type: none"> <li>• New infrastructure to support network enhancements is required and therefore the use of materials is required. It is likely that energy use will increase during both construction and operation phases.</li> </ul>	<ul style="list-style-type: none"> <li>• Opportunity to implement sustainable design measures.</li> </ul>

## D.5 Drought intervention

Drought intervention options include drought order; drought permit; recommission abandoned sources; and temporary transfer. Under drought conditions, where a serious deficiency of supplies threatens to occur, or already exists, Drought Permits may be required in order to increase supplies to manage the supply-demand balance. Short-term options.

**Table D.5: Drought intervention**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>● Potential reduction in river flows could reduce provision water provision for other users and dependent ecology.</li> <li>● Additional pressure on sources of water, risk to water quality.</li> </ul>	<ul style="list-style-type: none"> <li>● -</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>● Reduction in river flows could affect recreation, communities, agricultural systems, and habitats, and make them more susceptible to drought stress.</li> </ul>	<ul style="list-style-type: none"> <li>● Water supply which can be relied on even in situation of drought.</li> </ul>
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>● Reduction in river flows could reduce freshwater supporting existing habitats.</li> </ul>	<ul style="list-style-type: none"> <li>● -</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>● Additional reduction in available water, risk to adversely impact existing landscaping.</li> </ul>	<ul style="list-style-type: none"> <li>● -</li> </ul>
Historic Environment	<ul style="list-style-type: none"> <li>● Landscape characteristics could be lost through the lack of water.</li> </ul>	<ul style="list-style-type: none"> <li>● -</li> </ul>
Climate Factors	<ul style="list-style-type: none"> <li>● Short-term GHG emissions could be emitted (for the duration of the drought conditions only).</li> </ul>	<ul style="list-style-type: none"> <li>● -</li> </ul>
Air	<ul style="list-style-type: none"> <li>● Short-term emissions of air pollutants (for the duration of the drought conditions only).</li> </ul>	<ul style="list-style-type: none"> <li>● -</li> </ul>
Soil	<ul style="list-style-type: none"> <li>● Potential loss of soils (depending on the temporary solution).</li> </ul>	<ul style="list-style-type: none"> <li>● -</li> </ul>
Material Assets	<ul style="list-style-type: none"> <li>● Short-term energy use required during construction and operation.</li> </ul>	<ul style="list-style-type: none"> <li>● Opportunity to implement sustainable design measures.</li> </ul>

## D.6 Groundwater sources

Usually a borehole which abstracts water from an aquifer which then goes to a treatment works.

**Table D.6: Groundwater sources**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>● Pumping of water underground may exacerbate flooding from groundwater and reduce capacity for infiltration (because of a higher water table).</li> <li>● Risk of groundwater quality impacts.</li> </ul>	<ul style="list-style-type: none"> <li>● Additional source of water available to users.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>● Potential loss of agricultural land and effects on farmers' livelihoods if agricultural land is lost due to land take for plant and associated infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>● Additional source of water available to users.</li> </ul>
Biodiversity, flora and fauna	<ul style="list-style-type: none"> <li>● Potential loss of habitat resulting from land take for the construction of plant and associated infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>● Opportunities for habitat creation.</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>● The treatment plant could affect the aesthetic value of the landscape.</li> </ul>	<ul style="list-style-type: none"> <li>● Potential for landscaping in proximity of the treatment works.</li> </ul>
Historic Environment	<ul style="list-style-type: none"> <li>● The treatment plant could affect fabric or setting of heritage assets.</li> <li>● Potential for damage to uncovered archaeological artefacts from borehole.</li> </ul>	<ul style="list-style-type: none"> <li>● -</li> </ul>
Climate Factors	<ul style="list-style-type: none"> <li>● Carbon could be generated from materials used to construct the treatment works</li> </ul>	<ul style="list-style-type: none"> <li>● Use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon.</li> </ul>

SEA Topic	Issues	Benefits/ Opportunities
	(embodied carbon), construction activities and from operation of the treatment works.	
Air	<ul style="list-style-type: none"> <li>● Short-term emissions of air pollutants likely during construction.</li> <li>● The additional treatment of water and pumping may emit pollutants.</li> </ul>	● -
Soil	<ul style="list-style-type: none"> <li>● Loss of soils due to land take required for treatment works.</li> </ul>	● -
Material Assets	<ul style="list-style-type: none"> <li>● New infrastructure therefore the use of materials is required. It is likely that energy use will increase during both construction and operation phases.</li> </ul>	<ul style="list-style-type: none"> <li>● Opportunity to implement sustainable design measures</li> </ul>

### D.7 Increase water treatment works (WTW) capacity and efficiency

Increase deployable output by removing constraints on dissolved oxygen within the treatment works, or reducing process losses.

**Table D.7: Increase water treatment works (WTW) capacity and efficiency**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>● Additional pressure on sources of water as a result of greater WTW capacity.</li> </ul>	<ul style="list-style-type: none"> <li>● Improved water quality as a result of amendments to the treatment process.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>● Potential loss of agricultural land and effects on farmers' livelihoods if agricultural land is lost due to land take for new infrastructure and/or expansion of existing infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>● Additional source of water available to users.</li> </ul>
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>● Potential habitat loss from additional land take required for new infrastructure and/or expansion of existing infrastructure.</li> </ul>	● -
Landscape	<ul style="list-style-type: none"> <li>● Potential habitat loss from additional land take from new infrastructure and/or expansion of existing infrastructure.</li> <li>● Short-term construction effects of constructing new infrastructure and/or expansion of existing infrastructure.</li> <li>● New infrastructure and/or expansion of existing infrastructure could affect the aesthetic value of the landscape.</li> </ul>	<ul style="list-style-type: none"> <li>● Potential to create new aesthetic landscape.</li> </ul>
Historic Environment	<ul style="list-style-type: none"> <li>● Potential for damage to uncovered archaeological artefacts from excavation to support new infrastructure and/or expansion of existing infrastructure.</li> <li>● The treatment plant could affect setting of heritage assets.</li> </ul>	● -
Climate Factors	<ul style="list-style-type: none"> <li>● Short-term GHG emissions likely to be emitted during construction.</li> <li>● Carbon could be generated from materials used for new infrastructure and/or expansion of existing infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>● Use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon.</li> </ul>
Air	<ul style="list-style-type: none"> <li>● Short-term emissions of air pollutants likely during construction.</li> </ul>	● -
Soil	<ul style="list-style-type: none"> <li>● Potential habitat loss from additional land take required for new infrastructure and/or expansion of existing infrastructure.</li> </ul>	● -

SEA Topic	Issues	Benefits/ Opportunities
Material Assets	<ul style="list-style-type: none"> <li>New infrastructure and/or expansion of existing infrastructure is required and therefore the use of materials is required. It is likely that energy use will increase during both construction and operation phases.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to implement sustainable design measures.</li> </ul>

## D.8 Effluent reuse

Effluent is treated and discharged into rivers for re-abstraction downstream into potable water treatment works or piped into supply.

**Table D.8: Effluent reuse**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>Potential reduction in flows downstream of effluent treatment plant could reduce provision water provision for other users and dependent ecology;</li> <li>Potential for increased salinity and metals in final effluent from reverse osmosis.</li> </ul>	<ul style="list-style-type: none"> <li>Increased provision of freshwater for users connected to network with effluent treatment.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>Transfers of treated effluent could provide route for disease spread.</li> <li>Reduction in flows downstream of effluent treatment plant could affect recreation, communities, agricultural systems, and habitats, and make them more susceptible to drought stress.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> <li>Potential for additional water in the system to support agriculture;</li> <li>Treated effluent can be abstracted to meet demand.</li> </ul>
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>Reduction in river flows downstream of effluent treatment could reduce freshwater supporting existing habitats;</li> <li>Potential land take for treatment plant could cause habitat loss.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity for treated effluent to be distributed to support conservation efforts for ecologically important habitats in threatened catchments;</li> <li>Opportunity to include wetland treatment which would provide additional habitat.</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>The new treatment plant could affect the aesthetic value of the landscape.</li> </ul>	-
Historic Environment	<ul style="list-style-type: none"> <li>The treatment plant could affect fabric or setting of heritage assets.</li> </ul>	-
Climate Factors	<ul style="list-style-type: none"> <li>Potential for release of polluting gases during treatment process, pumping, and construction of plant.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to use renewable technology to power treatment plant and pumps;</li> <li>Reduction in flows downstream of effluent treatment could reduce impacts of flooding.</li> </ul>
Air	<ul style="list-style-type: none"> <li>Short-term emissions of air pollutants likely during construction.</li> </ul>	-
Soil	<ul style="list-style-type: none"> <li>Potential habitat loss from additional land take required for plant and associated infrastructure</li> </ul>	-
Material Assets	<ul style="list-style-type: none"> <li>New plant and associated infrastructure are required and therefore the use of materials is required. It is likely that energy use will increase during both construction and operation phases.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to implement sustainable design measures.</li> </ul>

## D.9 Reservoirs

Reservoir options include dam raising (increasing the capacity of existing reservoirs), or creation of new reservoirs. It is likely that most of these will be bunded reservoirs (i.e. not within a valley) with piped transfers in and out of supply.

**Table D.9: Reservoirs**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>• A reservoir may reduce downstream flows further during dry periods;</li> <li>• Potential eutrophication risk through nutrient inputs from surrounding farmland.</li> </ul>	<ul style="list-style-type: none"> <li>• A reservoir will provide fresh water storage and increased provision of water for use.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>• Reservoirs could provide medium for disease transmission.</li> <li>• Potential for loss of agricultural land and associated effects on farmers' livelihoods, and loss of recreational and tourism assets through land take for creation of the reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>• Opportunity to enhance well-being through creation of a multi-functional reservoir which includes recreation and nature provision.</li> <li>• Opportunity to create new recreation provision for the community and visitors at the reservoir such as fishing, bird watching, water sports, mountain biking.</li> </ul>
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>• The reservoir could provide a medium for pest transmission, including fish parasites. Potential risk of eutrophication and algal 'pests' within new reservoir.</li> <li>• Potential loss of habitat due to land take for creation of the reservoir.</li> <li>• If new dam is a river dam, then it could block migratory fish.</li> <li>• Reservoirs can experience considerable variations in levels which limits species able to survive in these conditions.</li> <li>• Reduced flows downstream could result in alterations in habitat cover reliant on damp conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• Opportunities for increased biodiversity and habitat creation through landscaping and use of wetlands.</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>• Loss of existing landscape beneath new reservoir.</li> <li>• Visual effects of new reservoir.</li> </ul>	<ul style="list-style-type: none"> <li>• Potential to create new aesthetic landscape through introduction of reservoir and landscaping.</li> </ul>
Historic Environment	<ul style="list-style-type: none"> <li>• Distinct landscapes characteristics could be lost through inundation for a new reservoir.</li> <li>• Effects on setting or fabric of heritage assets including archaeology.</li> </ul>	<ul style="list-style-type: none"> <li>• Opportunity for new dams and interconnecting features to be designed as 'art'.</li> <li>• Cultural heritage can form an important part of the local landscape e.g. the dam itself can be a heritage feature.</li> </ul>
Climate Factors	<ul style="list-style-type: none"> <li>• Likely short term loss of GHGs from land beneath new reservoir as vegetation degrades causing release of pollutant gases.</li> <li>• Creation of a large area of open water could increase exposure to wind.</li> </ul>	<ul style="list-style-type: none"> <li>• In the long term the reservoir water body could act as a sink for industrial emissions.</li> <li>• Likely to change local microclimate - increasing humidity and reducing extremes of temperatures.</li> <li>• Increased monitoring and control of flows could assist in downstream flood alleviation.</li> </ul>
Air	<ul style="list-style-type: none"> <li>• Short-term emissions of air pollutants likely during construction.</li> </ul>	<ul style="list-style-type: none"> <li>• -</li> </ul>
Soil	<ul style="list-style-type: none"> <li>• Loss of soils due to land take for reservoir construction.</li> </ul>	<ul style="list-style-type: none"> <li>• -</li> </ul>

SEA Topic	Issues	Benefits/ Opportunities
Material Assets	<ul style="list-style-type: none"> <li>New reservoir is required and therefore the use of materials is required. It is likely that energy use will increase during both construction and operation phases.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to implement sustainable design measures.</li> </ul>

## D.10 Redevelopment of existing resources with increased yields

Increase the potential yield of an existing water resource asset in order to increase deployable output.

**Table D.10: Redevelopment of existing resources with increased yields**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>Additional pressure on sources of water as a result of greater capacity.</li> </ul>	<ul style="list-style-type: none"> <li>Increased provision of water for use</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>Potential loss of agricultural land and effects on farmers' livelihoods if agricultural land is lost due to land take for expansion of existing infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Additional source of water available to users.</li> </ul>
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>Potential habitat loss from additional land take required for expansion of existing infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>Potential habitat loss from additional land take from expansion of existing infrastructure.</li> <li>Short-term construction effects of constructing expansion of existing infrastructure.</li> <li>Expansion of existing infrastructure could affect the aesthetic value of the landscape.</li> </ul>	<ul style="list-style-type: none"> <li>Potential to create new aesthetic landscape.</li> </ul>
Historic Environment	<ul style="list-style-type: none"> <li>Potential for damage to uncovered archaeological artefacts from excavation to support expansion of existing infrastructure.</li> <li>The expansion could affect setting of heritage assets.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Climate Factors	<ul style="list-style-type: none"> <li>Short-term GHG emissions likely to be emitted during construction.</li> <li>Carbon could be generated from materials used for expansion of existing infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon.</li> </ul>
Air	<ul style="list-style-type: none"> <li>Short-term emissions of air pollutants likely during construction.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Soil	<ul style="list-style-type: none"> <li>Potential habitat loss from additional land take required for expansion of existing infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Material Assets	<ul style="list-style-type: none"> <li>Expansion of existing infrastructure is required and therefore the use of materials is required. It is likely that energy use will increase during both construction and operation phases.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to implement sustainable design measures.</li> </ul>

## D.11 Tankering

Sea tankering options from abroad are being considered. Storage and offloading facilities will be required in the UK with water piped or tankered to WTWs or reservoirs.

**Table D.11: Tankering**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>Water from donor system may be of a different quality and mineral make-up which may require treatment.</li> </ul>	<ul style="list-style-type: none"> <li>There will be additional water in the receiving system to increase resilience in low flow drought periods.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>Transfers between countries and pipes could provide conduit for disease transmission.</li> <li>Potential disruption to users if a new pipeline and pumping station is constructed on agricultural land, recreation land, right of way etc.</li> </ul>	<ul style="list-style-type: none"> <li>Increased water available in receiving catchment to support resilience of water supply to customers in severe drought conditions.</li> </ul>
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>Potential habitat loss from land take to build pipelines.</li> <li>Potential for non-native species transfer.</li> </ul>	<ul style="list-style-type: none"> <li>Additional water available in low flow periods (droughts) to for habitats in the receiving catchment.</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>Short-term construction effects of constructing new pipelines.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Historic Environment	<ul style="list-style-type: none"> <li>Potential for damage to uncovered archaeological artefacts from excavation for a new pipeline.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Climate Factors	<ul style="list-style-type: none"> <li>Short-term air pollution and emissions from construction effects of new pipelines.</li> <li>Increased air pollutant and GHG emissions from transport movements from sea and road tankering.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity for use of electric vehicles for tankering</li> </ul>
Air	<ul style="list-style-type: none"> <li>Short-term emissions of air pollutants likely during construction.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Soil	<ul style="list-style-type: none"> <li>Loss of soils due to land take for pipelines.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Material Assets	<ul style="list-style-type: none"> <li>New pipeline and pumping station are required and therefore the use of materials is required. It is likely that energy use will increase during both construction and operation phases.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to implement sustainable design measures.</li> </ul>

## D.12 Transfers

Transfers includes asset transfers, and bulk transfers within/into region, either of raw or treated water.

**Table D.12: Transfers**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>Water from different catchments may have different water qualities requiring additional treatment.</li> </ul>	<ul style="list-style-type: none"> <li>Additional water will be available in the receiving system.</li> <li>Habitat creation on banks and landscaping could provide a small degree of water purification of run-off prior to entering channel</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>Transfers between catchments and channels could provide conduit for disease transmission.</li> <li>Potential disruption to users if a new channel or pipeline and pumping station is constructed on agricultural land, recreation land, right of way etc.</li> </ul>	<ul style="list-style-type: none"> <li>Potential for open channels to be a local focal point for community interest e.g. fishing, and nature watching/walking.</li> </ul>

SEA Topic	Issues	Benefits/ Opportunities
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>• Potential habitat loss from land take to build channels or pipelines.</li> <li>• Potential for non-native species transfer.</li> </ul>	<ul style="list-style-type: none"> <li>• Potential for habitat creation (freshwater habitat and bankside habitat).</li> <li>• Increased water within the receiving system could benefit water dependant ecological areas.</li> <li>• Potential to alleviate low flows and drive habitat creation through the topping up of rivers to help rejuvenate backwaters and dried-up channels.</li> <li>• Land restoration following pipeline construction could include new habitat creation such as wild flower areas.</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>• Short-term construction effects of constructing new pipelines.</li> </ul>	<ul style="list-style-type: none"> <li>• Open channels including inherent bankside habitat may increase aesthetic diversity of the area.</li> </ul>
Historic Environment	<ul style="list-style-type: none"> <li>• Potential for damage to uncovered archaeological artefacts from excavation for new channels and pipelines.</li> </ul>	<ul style="list-style-type: none"> <li>• -</li> </ul>
Climate Factors	<ul style="list-style-type: none"> <li>• Likely short-term release of emissions during construction of channels and pipelines.</li> <li>• Carbon costs associated with pumping over the watershed.</li> </ul>	<ul style="list-style-type: none"> <li>• In the long term, open water bodies in channels could act as sinks for industrial emissions.</li> <li>• New channels could act as flood water storage.</li> <li>• Increased water within the receiving system will provide increased resilience against droughts.</li> </ul>
Air	<ul style="list-style-type: none"> <li>• Short-term emissions of air pollutants likely during construction.</li> </ul>	<ul style="list-style-type: none"> <li>• -</li> </ul>
Soil	<ul style="list-style-type: none"> <li>• Loss of soils due to land take for channel and pipeline construction.</li> </ul>	<ul style="list-style-type: none"> <li>• Landscape planting will stabilise soils around channels.</li> <li>• Soils and sediment could be collected from channels to be used as agricultural product.</li> </ul>
Material Assets	<ul style="list-style-type: none"> <li>• New pipelines and channels are required and therefore the use of materials is required. It is likely that energy use will increase during both construction and operation phases.</li> </ul>	<ul style="list-style-type: none"> <li>• Opportunity to implement sustainable design measures.</li> </ul>

### D.13 Trading

Involves an agreement with another water company to trade water where there is a surplus.

**Table D.13: Trading**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>• -</li> </ul>	<ul style="list-style-type: none"> <li>• Existing water infrastructure and source of water (no additional pressure on the water environment).</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>• If minor upgrades needed, could result in habitat loss.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased provision of water for use by the community.</li> </ul>
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>• If minor upgrades needed, could result in habitat loss.</li> </ul>	<ul style="list-style-type: none"> <li>• -</li> </ul>

SEA Topic	Issues	Benefits/ Opportunities
Landscape	<ul style="list-style-type: none"> <li>If minor upgrades needed, short-term construction effects.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Historic Environment	<ul style="list-style-type: none"> <li>If minor upgrades needed, potential for damage to uncovered archaeological artefacts from excavation for pipeline upgrades.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Climate Factors	<ul style="list-style-type: none"> <li>If minor upgrades needed, short-term GHG emissions likely to be emitted during construction.</li> <li>Carbon could be generated from materials used for upgrades e.g. booster pumps, pipeline upgrades.</li> </ul>	<ul style="list-style-type: none"> <li>Use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon.</li> </ul>
Air	<ul style="list-style-type: none"> <li>If minor upgrades needed, short-term emissions of air pollutants likely during construction.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Soil	<ul style="list-style-type: none"> <li>If minor upgrades needed, could result in habitat loss.</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Material Assets	<ul style="list-style-type: none"> <li>If minor upgrades needed, use of materials will be required. It is likely that energy use will increase during construction phase.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to implement sustainable design measures.</li> </ul>

## D.14 Metering

Involves reducing water consumption by installing meters in currently unmeasured properties, and can include compulsory metering for household and non-household uses, smart metering, and other metering such as optant metering.

**Table D.14: Metering**

SEA Topic	Issues	Benefits/ Opportunities
Water	<ul style="list-style-type: none"> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>Minimise water waste.</li> </ul>
Population and Human Health	<ul style="list-style-type: none"> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>Increased awareness on water usage within the community.</li> </ul>
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Historic Environment	<ul style="list-style-type: none"> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Climate Factors	<ul style="list-style-type: none"> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>Provides a better understanding of the water consumption and potential future needs.</li> <li>Identify future measures to minimise water waste.</li> </ul>
Air	<ul style="list-style-type: none"> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Soil	<ul style="list-style-type: none"> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>
Material Assets	<ul style="list-style-type: none"> <li>If minor upgrades needed, use of materials will be required. It is likely that energy use will increase during construction phase.</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to implement sustainable design measures.</li> </ul>

## D.15 Other consumption reduction

Involves reducing household and non-household consumption in ways other than metering. It can include tariffs/fees (introduction of special fees, changes to existing measured tariffs,

introduction of special tariffs for specific users) and water recycling (rainwater harvesting / grey water reuse for new or existing household and non-household). It can also include water efficiency measures such as the provision of advice and information on direct abstraction and irrigation techniques or leakage detection and fixing techniques, water use audit and inspection, awareness campaigns, sponsoring water efficiency enabling activities by others, home visits to reduce plumbing losses, and the promotion of water saving devices

**Table D.15: Other consumption reduction**

SEA Topic	Issues	Benefits/ Opportunities
Water	● -	● Minimise water waste.
Population and Human Health	● -	● Increased awareness on water usage within the community.
Biodiversity, Flora and Fauna	● -	● -
Landscape	● -	● -
Historic Environment	● -	● -
Climate Factors	● -	● -
Air	● -	● -
Soil	● -	● -
Material Assets	● If minor upgrades needed, use of materials will be required. It is likely that energy use will increase during construction phase.	● Opportunity to implement sustainable design measures.

## D.16 Loss reduction

Involves measuring non-metering savings from leakages, either from network level/company side (capital works, operational) or customer side.

**Table D.16: Loss reduction**

SEA Topic	Issues	Benefits/ Opportunities
Water	● -	● Minimise water waste.
Population and Human Health	● -	● Increased awareness on water usage within the community.
Biodiversity, Flora and Fauna	● -	● -
Landscape	● -	● -
Historic Environment	● -	● -
Climate Factors	● -	● -
Air	● -	● -
Soil	● -	● -
Material Assets	● If minor upgrades needed, use of materials will be required. It is likely that energy use will increase during construction phase.	● Opportunity to implement sustainable design measures.

## E. Assessment Scoring Criteria

SEA Objective	Datasets/Key Themes	Effect	Description
<p>Biodiversity, Flora, Fauna:</p> <ul style="list-style-type: none"> <li>To protect and enhance biodiversity, ecological functions, capacity and habitat connectivity, including protecting designated sites and their qualifying features, priority species and priority habitats.</li> <li>To provide opportunities for habitat creation or restoration and deliver a net benefit / gain for biodiversity (BNG).</li> <li>To avoid introducing or spreading and, where feasible, manage invasive non-native species (INNS).</li> </ul>	<ul style="list-style-type: none"> <li>SPA</li> <li>SAC</li> <li>Ramsar site</li> <li>SSSIs</li> <li>MPA</li> <li>MCZ</li> <li>NNR</li> <li>LNR</li> <li>Priority habitats and species</li> <li>Non-designated sites</li> <li>Terrestrial, aquatic and marine habitats, species and protected sites</li> <li>Green networks and corridors (e.g. foraging areas and commuting routes, migration routes, hibernation areas etc. at all scales)</li> <li>LWS (where available)</li> </ul>	+++	<p>Major Positive</p> <p>The option would result in a major enhancement on the quality of designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability. The option would result in a major increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or large amounts of creation or enhancement of habitat, promoting a major increase in ecosystem structure and function. The option would result in a major reduction or management of INNS.</p>
		++	<p>Moderate Positive</p> <p>The option would result in a moderate enhancement on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a moderate increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure and function. The option would result in a moderate reduction or management of INNS.</p>
		+	<p>Minor Positive</p> <p>The option would result in a minor enhancement of the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a minor increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or small amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure and function. The option would result in a minor reduction or management of INNS.</p>
		0	<p>Neutral</p> <p>The option would not result in any effects on designated or non-designated sites including habitats and/or species). It will not have an effect on INNS.</p>
		-	<p>Minor Negative</p> <p>The option would result in a minor negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a minor decrease in the population of a priority species.</p>

SEA Objective	Datasets/Key Themes	Effect	Description	
<ul style="list-style-type: none"> <li>To protect, conserve and enhance natural capital and the ecosystem services from natural capital to increase resilience to climate change.</li> <li>To meet WFD objectives relating to biodiversity.</li> </ul>			Effects could be caused by detrimental changes in flows/water quality, or small losses or degradation of habitat leading to a minor loss of ecosystem structure and function. The option would result in a minor increase or spread of INNS.	
		--	Moderate Negative	The option would result in a moderate negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a moderate decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or moderate loss or degradation of habitat leading to a moderate loss of ecosystem structure and function. The options would result in a moderate increase or spread of INNS.
		---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a major decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function. The option would result in a major increase or spread of INNS.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
Soil: <ul style="list-style-type: none"> <li>To protect geological and geomorphological features, and the functionality and quality of soils, including the protection of high-grade agricultural land.</li> </ul>	<ul style="list-style-type: none"> <li>Agricultural Land Classification</li> <li>Landfill sites – authorised and historic</li> <li>Mineral &amp; Waste allocations (where available)</li> </ul>	+++	Major Positive	The option would result in a major enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures.
		++	Moderate Positive	The option would result in a moderate enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures.
		+	Minor Positive	The option is located on a brownfield site and has no effect on soils or existing land use. The option results in the remediation of contaminated land.
		0	Neutral	The option would not result in any effects on soils or land use.
		-	Minor Negative	The option is not located on a brownfield site and/or results in a minor loss of best and most versatile agricultural land or is in conflict with existing land use. The option results in land contamination.

SEA Objective	Datasets/Key Themes	Effect	Description
		--	Moderate Negative The option will result in a moderate loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option is partially overlying mineral resources leading to partial mineral sterilisation.
		---	Major Negative The option will result in a major loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option results in land contamination. The option is directly overlying mineral resources leading to mineral sterilisation.
		?	Uncertain From the level of information available the effect that the option would have on this objective is uncertain
<b>Water:</b> <ul style="list-style-type: none"> <li>To reduce or manage flood risk, taking climate change into account.</li> <li>To enhance or maintain the quality of surface and groundwater waterbodies.</li> <li>To enhance or maintain surface water flows and quantity and groundwater resources.</li> <li>To meet WFD objectives and support the achievement of environmental objectives set out in River Basin Management Plans.</li> </ul>	<ul style="list-style-type: none"> <li>Environment Agency Flood Defences</li> <li>Environment Agency Main Rivers</li> <li>Flood Zones 2 and 3</li> <li>Surface Water Features</li> <li>WFD River Waterbody Catchments</li> <li>WFD River Waterbodies Cycle 2</li> <li>Bathing Waters (for desal options)</li> <li>Shellfish Waters (desal options)</li> <li>Source Protection Zones</li> <li>WFD Groundwater bodies</li> </ul>	+++	Major Positive The option results in addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a major improvement to flood risk. The option would result in a major improvements in water efficiency, reduces demand and improves resilience.
		++	Moderate Positive The option achieves savings through demand management and does not require abstraction to achieve yield. The option contributes to addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a moderate improvement to flood risk. The option would result in a moderate improvements in water efficiency, reduces demand and improves resilience.
		+	Minor Positive The option achieves savings through demand management and does not require abstraction to achieve yield. The option would result in a minor improvement to flood risk. The option would result in a minor improvements in water efficiency, reduces demand and improves resilience.
		0	Neutral The option would have no discernible effect on river flows or surface/coastal water quality or on groundwater quality or levels. The option would not have an effect on or be affected by flood risk.
		-	Minor Negative The option would result in minor decreases in river flows. River and/or coastal water quality may be affected and lead to short term or intermittent effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not be avoided but could be mitigated.

SEA Objective	Datasets/Key Themes	Effect	Description	
<ul style="list-style-type: none"> <li>To increase water efficiency and increase resilience of water supplies and natural systems to droughts.</li> </ul>			<p>The option would result in minor decreases in groundwater quality or levels.</p> <p>The option is located in Flood Zone 2.</p> <p>The option would result in minor decreases in water efficiency, increases demand and reduces resilience.</p>	
		--	Moderate Negative	<p>The option would result in moderate decreases in river flows. River and/or coastal water quality may be affected and lead to long term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated.</p> <p>The option results in the likely deterioration of WFD classification.</p> <p>The option would result in moderate decreases in groundwater quality or levels.</p> <p>The option is located in Flood Zone 3.</p> <p>The option would result in moderate decreases in water efficiency, increases demand and reduces resilience.</p>
		---	Major Negative	<p>The option would result in major decreases in river flows. River and/or coastal water quality may be affected and lead to long term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated.</p> <p>The option results in the deterioration of WFD classification.</p> <p>The option would result in major decreases in groundwater quality or levels.</p> <p>The option is located in Flood Zone 2 or 3 and further contributes to flood risk.</p> <p>The option would result in major decreases in water efficiency, increases demand and reduces resilience.</p>
		?	Uncertain	<p>From the level of information available the effect that the option would have on this objective is uncertain.</p>
<p>Air:</p> <ul style="list-style-type: none"> <li>To reduce and minimise air emissions during construction and operation.</li> </ul>	<ul style="list-style-type: none"> <li>Air Quality Management Zones</li> <li>Air quality monitoring sites</li> </ul>	+++	Major Positive	<p>The option would result in a major enhancement of the air quality within one or more AQMAs.</p>
		++	Moderate Positive	<p>The option would result in a moderate enhancement of the air quality within one or more AQMAs.</p>
		+	Minor Positive	<p>The option would result in an enhancement of the air quality.</p>
		0	Neutral	<p>The option would not result in any effects on Air Quality and AQMAs.</p>
		-	Minor Negative	<p>The option would result in a decrease of the air quality.</p>

SEA Objective	Datasets/Key Themes	Effect	Description
		--	Moderate Negative The option would result in a decrease of the air quality within one or more AQMAs.
		---	Major Negative The option would result in a major decrease in the air quality within one or more AQMAs.
		?	Uncertain From the level of information available the effect that the option would have on this objective is uncertain.
Climate Factors: <ul style="list-style-type: none"> <li>To minimise or reduce embodied and operational carbon and greenhouse gas emissions.</li> <li>To introduce climate mitigation where required and improve the climate resilience of assets and natural systems to the threats of climate change.</li> </ul>	Option Carbon data UKCP18 climate data Sea level rise projections	+++	Major Positive The option will generate additional zero carbon energy that can be fed back into the grid The option will result in a major increase in carbon sequestration.
		++	Moderate Positive The option will be carbon neutral The option will increase resilience/decrease vulnerability to climate change effects. The option will reduce operational carbon emissions by between 100 and 1,000 tonnes CO <sub>2</sub> e/year. The option will result in a moderate increase in carbon sequestration.
		+	Minor Positive The option includes renewable energy sources that bring operational carbon to under 100 tonnes CO <sub>2</sub> e/year The option will increase resilience/decrease vulnerability to climate change effects. The option will reduce operational carbon emissions by up to 100 CO <sub>2</sub> e/year.
		0	Neutral The option would have no discernible effect on greenhouse gas emissions, nor would the option increase resilience/decrease vulnerability to climate change effects.
		-	Minor Negative The option will have a minor impact on resilience/decrease vulnerability to climate change effects. The option will generate operational carbon emissions of between 100 and 1,000 tonnes CO <sub>2</sub> e/year.
		--	Moderate Negative The option will have a moderate impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate operational carbon emissions of between 1,000 and 10,000 CO <sub>2</sub> e/year. The option will result in a moderate release of previously sequestered carbon.
		---	Major Negative The option will have a major impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate operational carbon emissions of more than 10,000 tonnes CO <sub>2</sub> e/year.

SEA Objective	Datasets/Key Themes	Effect	Description
			The option will result in a major release of previously sequestered carbon.
		?	Uncertain From the level of information available the effect that the option would have on this objective is uncertain.
Landscape: <ul style="list-style-type: none"> <li>To conserve, protect and enhance landscape and townscape character and visual amenity.</li> </ul>	<ul style="list-style-type: none"> <li>Areas of Outstanding Natural Beauty</li> <li>National Character Areas</li> <li>Green Belt land</li> <li>National Park</li> </ul>	+++	Major Positive The option would have a major positive contribution to designated landscape (AONB or National Park) management plan objectives The option results in new, above ground infrastructure that significantly enhances the local landscape, townscape or seascape.
		++	Moderate Positive The option would have a moderate positive contribution to designated landscape management plan objectives The option results in new, above ground infrastructure that has a moderate positive effect on the local landscape, townscape or seascape.
		+	Minor Positive The option results in new, above ground infrastructure that has a minor positive effect on the local landscape, townscape or seascape.
		0	Neutral The option would not result in any effects on the local landscape, townscape or seascape.
		-	Minor Negative The option results in new, above ground infrastructure that has a minor negative effect on the local landscape, townscape or seascape.
		--	Moderate Negative The option would have a moderate negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above ground infrastructure that has a moderate negative effect on the local landscape, townscape or seascape.
		---	Major Negative The option would have a negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above ground infrastructure that has a major negative effect on the local landscape, townscape or seascape.
		?	Uncertain From the level of information available the effect that the option would have on this objective is uncertain.

SEA Objective	Datasets/Key Themes	Effect	Description	
<p>Historic Environment</p> <ul style="list-style-type: none"> <li>To conserve, protect and enhance the historic environment and heritage assets, and their settings, including archaeologically important sites.</li> </ul>	<ul style="list-style-type: none"> <li>Listed buildings:                             <ul style="list-style-type: none"> <li>Grade I listed structures</li> <li>Grade II* listed structures</li> <li>Grade II listed structures</li> </ul> </li> <li>Registered Parks and Gardens:                             <ul style="list-style-type: none"> <li>Grade I Registered Parks and Gardens</li> <li>Grade II* Registered Parks and Gardens</li> <li>Grade II Registered Parks and Gardens</li> </ul> </li> <li>Protected Wreck</li> <li>Registered Battlefields</li> <li>Scheduled Monuments</li> <li>Conservation Areas</li> <li>World Heritage Sites</li> </ul>	+++	Major Positive	<p>The option will result in enhancements to designated heritage assets and/or their setting, fully realising the significance and value of the asset, such as:</p> <ul style="list-style-type: none"> <li>Securing repairs or improvements to heritage assets, especially those identified in the Historic England Buildings/Monuments at Risk Register;</li> <li>Improving interpretation and public access to important heritage assets.</li> </ul>
		++	Moderate Positive	The option will result in enhancements to designated heritage assets and/or their setting. Improving interpretation and public access to important heritage assets.
		+	Minor Positive	The option will result in enhancements to non-designated heritage assets and/or their setting.
		0	Neutral	The option will have no effect on cultural heritage assets or archaeology.
		-	Minor Negative	<p>The option will result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.</p> <p>There will be limited damage to known, undesignated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.</p>
		--	Moderate Negative	<p>The option will result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.</p> <p>The option will diminish of significance of designated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.</p>
		---	Major Negative	<p>The option will diminish the significance of designated heritage assets and/or their setting such as:</p> <ul style="list-style-type: none"> <li>Demolition or further deterioration in the condition of designated heritage assets especially those identified in the Historic England Buildings/Monuments at Risk Register.</li> <li>Loss of public access to important heritage assets and lack of appropriate interpretation.</li> <li>There will be major damage to known, designated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.</li> </ul>
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Population, Human Health	<ul style="list-style-type: none"> <li>Noise action important area</li> <li>Indices of Multiple Deprivation 2015</li> </ul>	+++	Major Positive	<p>The option leads to major positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits.</p> <p>The option creates new, and significantly enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area.</p>

SEA Objective	Datasets/Key Themes	Effect	Description	
<ul style="list-style-type: none"> <li>To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing.</li> <li>To secure resilient, high quality, sustainable and affordable water supplies over the long term for the health and wellbeing of the community.</li> <li>To increase access and connect customers to the natural environment, provide education or information resources for the public.</li> <li>To maintain and enhance the water environment for other users including recreation, tourism and navigation.</li> </ul>	<ul style="list-style-type: none"> <li>Functional site:                             <ul style="list-style-type: none"> <li>Schools</li> <li>Medical facilities</li> </ul> </li> <li>OS Greenspace dataset:                             <ul style="list-style-type: none"> <li>Allotments</li> <li>Bowling green</li> <li>Cemetery</li> <li>Golf course</li> <li>Sports facility</li> <li>Play space</li> <li>Playing field</li> <li>Public park or garden</li> <li>Religious grounds</li> <li>Tennis courts</li> </ul> </li> <li>Natural England - Country Parks</li> <li>National Parks</li> <li>Section 15 open access areas</li> <li>CRoW S4 Conclusive Registered Common Land</li> </ul>	++	Moderate Positive  The option leads to positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits. The option enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area	
		+	Minor Positive	The option has a temporary positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits
		0	Neutral	The option would not result in any effects on human health and existing recreational facilities and/or tourism.
		-	Minor Negative	The option has a temporary effect on human health (e.g. noise or air quality). The option reduces the availability and quality of existing recreational facilities and/or tourism within the operational area.
		--	Moderate Negative	The option results in the permanent removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area
		---	Major Negative	The option has a significant long-term effect on human health (e.g. noise or air quality). The option results in the removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Material Assets		+++	Major Positive The option will re-use or recycle substantial quantities of waste materials and any new infrastructure will incorporate substantial sustainable design measures and materials.	

SEA Objective	Datasets/Key Themes	Effect	Description	
<ul style="list-style-type: none"> <li>To reduce, and make more efficient, the consumption of resources, and minimise the generation of waste.</li> <li>Avoid negative effects on built assets and infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Housing allocations (where available)</li> <li>Transport:                             <ul style="list-style-type: none"> <li>Major roads – A roads</li> <li>Major roads motorway</li> <li>Railway line</li> <li>National cycle route</li> <li>National trails</li> </ul> </li> </ul>		<p>There will be no increase in energy consumption or energy will be from 100% renewable sources.</p> <p>The option improves national cycle routes or national trails.</p>	
		++	Moderate Positive	<p>The option will re-use or recycle moderate quantities of waste materials and any new infrastructure will incorporate some sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 90% renewable sources.</p> <p>The option improves national cycle routes or national trails.</p>
		+	Minor Positive	<p>The option will re-use or recycle a limited quantity of waste materials and any new infrastructure will incorporate some limited sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 80% renewable sources.</p> <p>The option improves national cycle routes or national trails.</p>
		0	Neutral	<p>The option would not result in any effects on material assets.</p>
		-	Minor Negative	<p>The option will require new infrastructure with only limited opportunities for the re-use or recycling of waste materials. There are limited opportunities for sustainable design or the use of sustainable materials.</p> <p>The option results in a minor increase in energy consumption with no renewable energy options.</p> <p>The option results in a minor disruption on built assets and infrastructure, including transport.</p>
		--	Moderate Negative	<p>The option will require new infrastructure with only limited opportunities for the re-use or recycling of waste materials.</p> <p>The option results in a moderate increase in energy consumption with no renewable energy options.</p> <p>The option results in a moderate disruption on built assets and infrastructure, including transport links.</p>
		---	Major Negative	<p>The option will require significant new infrastructure that cannot be provided through the re-use or recycling of waste materials. There are no opportunities for sustainable design or the use of sustainable materials.</p> <p>The option results in a major increase in energy consumption with no renewable energy options.</p> <p>The option results in a major distribution on built assets and infrastructure, including transport links.</p>

SEA Objective	Datasets/Key Themes	Effect	Description
		?	Uncertain From the level of information available the effect that the option would have on this objective is uncertain.



