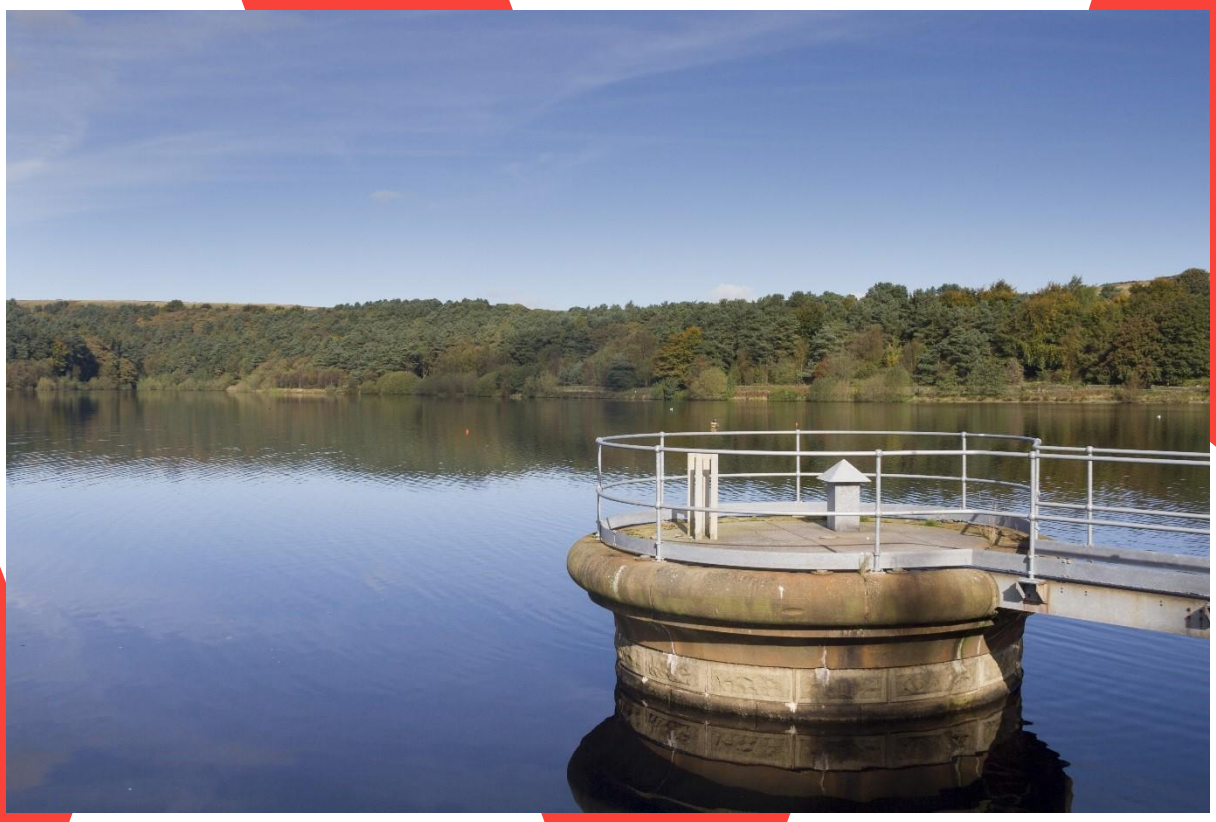
OFFICIAL SENSITIVE

Yorkshire Water

Habitats Regulations Assessment: Screening Report

Yorkshire Water's Revised Draft Drought Plan 2027



Client:
Yorkshire Water

WSP Contact:
Tim Darby, WSP, 8 First Street, Manchester, M15 4RP, United Kingdom

E: Tim.Darby@wsp.com

Customer reference:
Habitats Regulation Assessment Screening Report

Confidentiality, copyright and reproduction:

This report is the Copyright of United Utilities and has been prepared by WSP (formerly Ricardo), under contract 4600005769 dated 28 May 2024. The contents of this report may not be reproduced, in whole or in part, nor passed to any organisation or person without the specific prior written permission of United Utilities. WSP accepts no liability whatsoever to any third party for any loss or damage arising from any interpretation or use of the information contained in this report, or reliance on any views expressed therein, other than the liability that is agreed in the said contract

Author:
Daniel Hosking, Micah Edwards, Ali Santin, Jennifer Gibson

Reviewed by:
Jennifer Gibson

Approved by:
Laura Covington

WSP ref:

UK-RCE-ED19593100

Date:
9 November 2026

DISCLAIMER

This report was originally prepared by Ricardo prior to its acquisition by WSP on 1 July 2026 and hence, although the original legacy Ricardo template is still used in part, any reference to Ricardo has now been replaced with WSP. The report remains valid and has been updated where necessary to reflect consultation responses and other amendments made during the plan development process.

CONTENTS

CONTENTS 2
1. INTRODUCTION 1
1.1 BACKGROUND 1
1.2 REQUIREMENT 1
1.3 CONTEXT 2
2. APPROACH 4
2.1 OVERVIEW OF HRA STAGES 4
2.2 YORKSHIRE WATER'S DROUGHT OPTIONS 4
2.3 POTENTIAL IMPACTS 7
3. DATA SOURCES 11
3.1 CONSIDERATION OF IN-COMBINATION EFFECTS 11
3.2 REVIEW OF CONSENTS 12
4. HRA SCREENING RESULTS 12
4.1 HRA SCREENING OF SUPPLY SIDE DROUGHT OPTIONS 12
5. INFORMATION TO INFORM THE APPROPRIATE ASSESSMENT: SUPPLY SIDE DROUGHT OPTIONS 36
5.1 POTENTIAL IMPACTS OF NORTH AREA RESERVOIR 1 36
5.1.1 Humber Estuary SAC 36
6. INFORMATION TO INFORM THE APPROPRIATE ASSESSMENT: EXTREME SUPPLY SIDE DROUGHT OPTIONS 38
6.1 POTENTIAL IMPACTS OF THE CATTERICK GROUNDWATER OPTION 1 DROUGHT OPTION 38
6.1.1 Scheme Description 38
6.1.2 North Pennine Dales Meadows SAC 39
6.2 POTENTIAL IMPACTS OF THE DONCASTER GROUNDWATER OPTION 1 DROUGHT OPTION 43
6.2.1 Scheme Description 43
6.2.2 Hatfield Moor SAC 45
6.3 POTENTIAL IMPACTS OF THE DONCASTER GROUNDWATER OPTION 2 DROUGHT OPTION 47
6.3.1 Scheme Description 47
6.3.2 Hatfield Moor SAC 47
6.4 POTENTIAL IMPACTS OF THE DONCASTER GROUNDWATER OPTION 3 DROUGHT OPTION 49
6.4.1 Scheme Description 49
6.4.2 Hatfield Moor SAC 49
6.4.3 Thorne Moor SAC 50
6.5 POTENTIAL IMPACTS OF THE PICKERING/THIRSK GROUNDWATER OPTION 1 52
6.5.1 Scheme Description 52
6.5.2 Humber Estuary SAC 52
6.5.3 Humber Estuary Ramsar 54
6.5.4 River Derwent SAC 56
6.6 POTENTIAL IMPACTS OF SELBY GROUNDWATER OPTION 2 59
6.6.1 Scheme description 59
6.6.2 River Derwent SAC 59
6.7 POTENTIAL IMPACTS OF SELBY AQUIFER STORAGE AND RECOVERY SCHEME 1 60
6.7.1 Scheme description 60
6.7.2 Humber Estuary SAC 60
6.7.3 Humber Estuary Ramsar 61
6.7.4 River Derwent SAC 62
6.8 POTENTIAL IMPACTS OF YORK GROUNDWATER OPTION 1 62
6.8.1 Scheme Description 62

6.8.2 Humber Estuary SAC 62
6.8.3 Humber Estuary Ramsar 63
6.9 POTENTIAL IMPACTS OF OPTIMISATION OF YORK WTW 2 63
6.9.1 Scheme Description 63
6.9.2 Lower Derwent Valley Ramsar 64
6.9.3 Lower Derwent Valley SPA 64
6.9.4 Lower Derwent Valley SAC 65
6.9.5 River Derwent SAC 65
6.10 POTENTIAL IN-COMBINATION EFFECTS OF DROUGHT PERMIT/ORDER OPTIONS 66
6.10.1 In-combination effects with neighbouring water companies 66
6.11 POTENTIAL IN-COMBINATION EFFECTS OF EXTREME DROUGHT OPTIONS 66
7. CONCLUSIONS 69
APPENDIX A ADDITIONAL EXTREME SUPPLY OPTIONS 1

1. INTRODUCTION

1.1 BACKGROUND

Water companies in England and Wales are required to prepare and maintain statutory Drought Plans under Sections 39B and 39C of the Water Industry Act 1991, as amended by the Water Act 2014, which set out the operational steps a company will take before, during and after a drought. The Water Industry Act 1991 (as amended) defines a Drought Plan as 'a plan for how the water undertaker will continue, during a period of drought, to discharge its duties to supply adequate quantities of wholesome water, with as little recourse as reasonably possible to Drought Orders or Drought Permits'.

A water company must ensure its Drought Plan meets the requirements of the Habitats Regulations before implementation. The Habitats Regulations are made up for the Conservation of Habitats and Species Regulations 2017 (as amended) and the European Union Council Directive 2009/147/EC (Birds Directive), which are collectively referred to as the Habitats Regulations. The requirement for a Habitats Regulations Assessment (HRA) is established through the Conservation of Habitats and Species Regulations 2017 (as amended). Under Regulations 63 and 105, any plan or project which is likely to have a significant effect on a European site (either alone or in-combination with other plans or projects) and is not directly connected with, or necessary for the management of the site, must be subject to a HRA to determine the implications for the site in view of its conservation objectives.

Water companies in England are required to produce a Drought Plan every five years and submit a draft plan to the Secretary of State in line with the timescales set out in the Drought Plan (England) 2025. The Environment Agency's Drought Plan Guidance[1] also specifies that a water company must ensure that its drought plan meets the requirements of the Habitats Regulations. The Environment Agency's 2025 Drought Plan Guidance advises companies to consult the UK Water Industry Research (UKWIR) report 'Strategic Environmental Assessment and Habitat Regulations Assessment - Guidance for Water Resources Management Plans and Drought Plans[2] in preparing its HRA. The UKWIR report recommends that all Drought Plans should be subject to the first stage of HRA, i.e., screening for Likely Significant Effects (LSE).

1.2 REQUIREMENT

The responsibility for undertaking the Habitats Regulations Assessment lies with Yorkshire Water as the Plan making authority.

HRA Guidance for the appraisal of Plans[3] summarises the Habitats Regulations. Regulation 63 states that the Plan making authority (in this case Yorkshire Water) shall adopt, or otherwise give effect to, the Plan only after having ascertained that it will not adversely affect the integrity of a European site, subject to Regulation 64 or 105 of the Habitats Regulations.

Regulation 64 of the Habitats Regulations states:

(1) If the competent authority is satisfied that, there being no alternative solutions, the plan or project must be carried out for imperative reasons of overriding public interest (which, subject to paragraph (2), may be of a social or economic nature), it may agree to the plan or project notwithstanding a negative assessment of the implications for the European site or the European offshore marine site (as the case may be).

(2) Where the site concerned hosts a priority natural habitat type or a priority species, the reasons referred to in paragraph (1) must be either—

(a) reasons relating to human health, public safety or beneficial consequences of primary importance to the environment; or

(b)any other reasons which the competent authority, having due regard to the opinion of the European Commission, considers to be imperative reasons of overriding public interest.

[1] Environment Agency (2025) Water Company Drought Plan Guideline, March 2025 (Version 1.4)

[2] UKWIR (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (WR/02/S). Prepared by Ricardo Energy & Environment.

[3] Tyldesley, D. & Chapman, C. (2013) The Habitats Regulations Assessment Handbook, November 2020 edition UK: DTA Publications Limited.

Regulation 105 of the Habitats Regulations states:

(1) Where a land use plan—

(a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and

(b) is not directly connected with or necessary to the management of the site,

the plan-making authority for that plan must, before the plan is given effect, make an appropriate assessment of the implications for the site in view of that site's conservation objectives.

(2) The plan-making authority must for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations made by that body within such reasonable time as the authority specifies.

(3) The plan-making authority must also, if it considers it appropriate, take the opinion of the general public, and if it does so, it must take such steps for that purpose as it considers appropriate.

(4) In the light of the conclusions of the assessment, and subject to regulation 107, the plan-making authority must give effect to the land use plan only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).

(5) A plan-making authority must provide such information as the appropriate authority may reasonably require for the purposes of the discharge by the appropriate authority of its obligations under this Chapter.

(6) This regulation does not apply in relation to a site which is—

(a) a European site by reason of regulation 8(1)(c), or

(b) a European offshore marine site by reason of regulation 18(c) of the Offshore Marine Conservation Regulations (site protected in accordance with Article 5(4) of the Habitats Directive).

Best practice guidance[4][5] recommends that if there are no alternative solutions and if, in exceptional circumstances, it is proposed that a Plan be adopted despite the fact that it may adversely affect the integrity of a European site, the HRA will need to address and explain the Imperative Reasons of Overriding Public Interest (IROPI) which the Plan making authority considers to be sufficient to outweigh the potentially adverse effects on the European site(s). It must also agree and secure a package of compensation measures for the features of the site that may be adversely affected by implementation of the Plan.

1.3 CONTEXT

The amended 2017 Habitats Regulations have created a national site network on land and at sea, including both the inshore and offshore marine areas in the UK. The national site network includes:

- existing Special Areas of Conservation SACs and Special Protected Areas (SPAs)
- new SACs and SPAs designated under these Regulations
- SPAs are classified under the European Council Directive 'on the conservation of wild birds' (2009/147/EC; 'Birds Directive') for the protection of wild birds and their habitats (including particularly rare and vulnerable species listed in Annex 1 of the Birds Directive, and migratory species).
- SACs are designated under the Habitats Directive (92/43/EEC) and target particular habitats (Annex 1) **and/or species** (Annex II) identified as being of European importance.
- Designated Wetlands of International Importance (known as Ramsar sites) do not form part of the national site network. Many Ramsar sites overlap with SACs and SPAs and may be designated for the same or different species and habitats. All Ramsar sites are protected in the same way as SACs and SPAs.

[4] Tyldesley, D. & Chapman, C. (2013) The Habitats Regulations Assessment Handbook, November 2020 edition UK: DTA Publications Limited.

[5] This guidance is no longer available but still relevant for best practice principles of HRA.

For ease of reference through this HRA report, these designations are collectively referred to as “European sites”. As per Natural England (NE) guidance[6], any HRA should also consider any European Marine Protected Areas (MPAs) within England’s inshore waters (out to 12 nautical miles) to support sites in achieving conservation objectives and to guide effective management. No MPAs of European importance or Marine Conservation Zones (MCZs) are associated with the study area.

[6] Help Note: Tips and advice on how to assess potential impacts of water company statutory plans on the marine environment1 – Focussing on Marine Conservation Zones (MCZ)

2. APPROACH

2.1 OVERVIEW OF HRA STAGES

There are four stages of the HRA process:

1. Firstly, a screening process was undertaken to identify whether each drought management measure in Yorkshire Water's Drought Plan 2027 (either alone or in combination with other plans or projects) is likely to have any significant effects on European sites (reported in this HRA Report). There was an important judgment in the Court of Justice of the European Union (CJEU) in April 20187 which ruled that Article 6(3) of the Habitats Directive must be interpreted as meaning that mitigation measures should be assessed within the framework of an Appropriate Assessment and that it is not permissible to take account of mitigation measures at the screening stage. The Stage 1 Screening within this assessment is presented within Section 4 of this report. There are three potential outcomes for screening, LSE alone, residual effects that are not 'significant', and no effect. Where LSE alone has been determined, it can be assumed that there is potential for effects in-combinations with other plans and projects and the in-combination assessment is deferred to Stage 2. Where there is a residual effect that is not significant, there is potential for that effect to become significant in-combination with effects from other plans or projects, therefore an in-combination assessment for LSE is required. Where there is no effect, there is no need to undergo an in-combination assessment.
2. Where a LSE cannot be ruled out (noting the precautionary principle and the requirement to exclude consideration of mitigation measures), an Appropriate Assessment should be undertaken of the drought management measure to determine whether this would adversely affect the integrity of the European site(s), either alone or in combination with other Drought Plan 2027 options or other plans and projects, taking into account available specific mitigation measures.
3. Where adverse effects cannot be ruled out at the Appropriate Assessment stage, alternative, reasonably feasible options should be examined to determine whether it is possible to avoid adverse effects on the integrity of the European site as Stage 3 of the HRA.
4. Stage 4 comprises an assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest, and consideration of compensation measures it has been concluded that the Secretary of State should be asked to determine that the Plan should proceed (this is decision of the Secretary of State, not Yorkshire Water).

This document reports the HRA screening (i.e. Stage 1 as identified above) carried out for Yorkshire Water's Drought Plan 2027. The HRA screening reaches conclusions as to whether LSE on European sites of the drought options contained within Yorkshire Water's Drought Plan 2027 can be ruled out, and, as such, determines the requirement for Appropriate Assessment. HRA is based on a rigorous application of the precautionary principle. Where uncertainty or doubt remains, an impact should be assumed, triggering the requirement for Appropriate Assessment of that option. This document also reports the Appropriate Assessment where that is relevant.

2.2 YORKSHIRE WATER'S DROUGHT OPTIONS

Yorkshire Water operates a conjunctive use system that balances river, reservoir and groundwater sources to maintain security of supply while complying with operational and licence constraints. This provides flexibility to respond to changing hydrological conditions and enables water resources to be managed across the region.

The company has a range of drought management options that optimise water availability across its different sources. These include reducing reservoir compensation releases, increasing river abstractions where appropriate, bringing reserve supplies into use, enhancing asset capacity, implementing drought permits or orders, and applying demand management measures such as Temporary Use Bans (TUBs).

The Drought Plan sets out WRZ-specific triggers that act as decision points for implementing drought management actions. Depending on the severity and location of the drought, actions may be applied at company-wide, WRZ or local scale.

[7] Court of Justice of the European Union Case C-323/17: People over Wind & Sweetman v Coillte Teoranta

Demand side options are designed to reduce the demand for water and the options available to Yorkshire Water are consistent across all resource zones (see Error! Reference source not found.).

Supply side measures are measures available to Yorkshire Water to introduce during the course of a drought to increase the amount of water available for supply. Supply side drought options that require drought permits/orders are listed in Error! Reference source not found..

Table 2-1 Demand-side Drought Management Options (All Water Resource Zones)

Demand-side options	Comments
Standard demand-side management options	
Drought publicity campaigns	Increased water efficiency messages via increased customer communications
Increased leakage detection and repair activity	Ensure that all maintenance programmes are up-to-date and undertake additional leakage control, leading to demonstrable water savings
Introduction of temporary use ban	Restrictions on the use of hosepipes for a range of uses, including the washing of vehicles and boats, watering gardens and sports grounds and filling of paddling pools
Introduction of a drought order to ban non-essential water uses (defined in the Drought Direction 2011)	Drought order to restrict non-essential water uses to be applied for when reservoir stocks fall below the Drought Control Line
Emergency drought order to temporarily supply water by means of rota cuts or standpipes	An Emergency Drought order may be applied for in the event of an exceptional drought, in consultation and liaison with the Environment Agency, local authorities and the Consumer Council for Water. This situation would be extremely unlikely to occur and would not arise under a repeat of the worst recorded drought events in Yorkshire
'Extreme' demand-side management options	
Removal of exceptions	Removal of temporary use ban (TUBs) non-statutory exceptions and concessions so that greater restrictions are applied and to a greater number of customers.
Drought orders	Use full range of powers available with non- essential use (NEU) drought orders. Removal of non-statutory NEU exceptions and concessions so that greater restrictions are applied and to a greater number of customers. Assumes all supply-side permit applications (where a benefit is achieved) are already in place.
Yorkshire Water customer campaign	Create awareness of the situation and appeal for extreme demand reduction action e.g. reduce use to 50Ml/d. All media channels will be used including regular appearances on local news channels.
National Media & Communications	National campaigns to change culture (e.g. excessive water use seen as socially unacceptable), keeping customers aware of the current situation and risks if do not take extreme action. Produce guides for customers to demonstrate how to restrict water use e.g. to 50 litres/ person/day. Hard hitting messages and images will be developed and publicity increased by use of national campaign.
Pressure management	Reduce pressure while still maintaining essential services e.g. nighttime reductions. Pumping stations and pressure reduction valves controlling water distribution would be optimised to a level that would just meet standards.
Request commercial and agricultural water use reductions	Request non-households reduce use for purposes not prohibited by a drought order for a non-essential use ban. This could be by agreement with large users who may be able to operate differently e.g. reduce production at a site in the affected area if they have other sites elsewhere that could cope with additional demand.
Water efficiency in non-house properties	We will seek to work with retailers to deliver water efficiency devices and advice to non-household water users.

Table 2-2 Supply Side Options

Grid Surface Water Resource Zone	Water Source	Type of Drought Management Option
Drought permit/order options (level 3a)		
North Area	North Area Reservoir 1, North Area Reservoir 2, North Area Reservoir 3, North Area Reservoir 4, North Area Reservoir 5	Compensation flow release reductions
North West Area	North West Area Reservoir 1a, North West Area Reservoir 1b, North West Area Reservoir 4, North West Area Reservoir 5, North West Area Reservoir 6, North West Area Reservoir 7, North West Area Reservoir 8, North West Area Reservoir 9, North West Area Reservoir 10, North West Area Reservoir 11, North West Area Reservoir 12	Compensation flow release reductions
South Area	South Area Reservoir 1, South Area Reservoir 2, South Area Reservoir 3a, South Area Reservoir 3b, South Area Reservoir 4, South Area Reservoir 5, South Area Reservoir 6, South Area Reservoir 7	Compensation flow or maintained flow release reductions
South West Area (Middle and Upper Calder)	South West Area Reservoir 1, South West Area Reservoir 2, South West Area Reservoir 3, South West Area Reservoir 4, South West Area Reservoir 6, South West Area Reservoir 7, South West Area Reservoir 8, South West Area Reservoir 10, South West Area Reservoir 11, South West Area Reservoir 12, South West Area Reservoir 13, South West Area Reservoir 14, South West Area Reservoir 15, South West Area Reservoir 16, South West Area Reservoir 17, South West Area Reservoir 18, South West Area Reservoir 19, South West Area Reservoir 20	Compensation flow release reductions
Stand Alone	Ouse increased abstraction	Increase river abstraction rates at lower river flows
	Ure increased abstraction	Permit river abstraction at low flows
	Wharfe reduced regulated flow	Reduce river regulation requirements
	Hull increased abstraction	Reduce hands-off river flow to enable increased abstraction
	Derwent annual abstraction increase	Decrease in annual abstraction at WTW with mirrored increase at downstream WTW.
Extreme options (level 3b)		
North	Catterick Groundwater Option 1	Increase in abstraction
Stand Alone	River Aire – Option 1	New river abstraction of up to 50 Ml/d

Grid Surface Water Resource Zone	Water Source	Type of Drought Management Option
Stand Alone	River Aire – Option 2	New river abstraction of up to 50 Ml/d
Grid SWZ	South Area reservoir 2 to wider reservoir system transfer	System transfer; Construction of new raw water pump station and transfer pipeline
Grid SWZ	Doncaster Groundwater Option 1	Increased resilience, reducing wider grid input to supply area
Grid SWZ	Doncaster Groundwater Option 2	Unused existing licence
Grid SWZ	Doncaster Groundwater Option 3	Unused existing licence
Howardian Hills	Pickering / Thirsk Groundwater Option 1	Network infrastructure upgrade; Relocation of existing borehole
Selby Ring Main	Selby Groundwater Option 2	Installation of automated run to waste/ return service valve; Improved resilience; Potential increased abstraction
Selby Ring Main	Selby Groundwater Option 2	Enabling works to achieve licenced output to support Selby Ring Main
Grid SWZ	Selby Aquifer Storage and Recovery Scheme 1	Unused existing licence
Grid SWZ	York Groundwater Option 1	Renewal of site assets and connections
Grid SWZ	Optimisation of York WTW 2	Increase capacity of WTW through upgrades; Increased pump activity at PS

2.3 POTENTIAL IMPACTS

To provide an indication of those measures more likely to have a significant effect on a European site(s), those drought management measures that are within 10km of a European site were identified initially. Consideration has also been given to the relative spatial locations of the drought management measures and designated sites within the same surface water and groundwater catchments and/or estuarine system to ensure that any hydrological connectivity over a longer distance that might affect water-dependent sites, qualifying features and designated mobile species has been taken into account. GIS data were used to map the locations and boundaries of European sites within or adjacent to the Yorkshire Water Resource Zones (WRZs) using publicly available data from Natural England.

The attributes of the European sites, which contribute to and define their integrity, have been considered with reference to Standard Data forms for SACs and SPAs and Information Sheets for Ramsar sites. An analysis of these information sources has enabled the identification of the site's qualifying features. This information, as well as Article 12 and 17 reporting, site conservation objectives, supplementary guidance, Site Improvement Plans, and the supporting Site of Special Scientific Interest's favourable condition tables, has been used to identify those features of each site which determine current conservation status, site integrity and the specific sensitivities of the site. Analysis of how potential impacts of the drought management measures may affect a European site has been undertaken using this information. The locations of the supply side and drought

permit/order options were also mapped in order to establish their geographic proximity to the European sites. The Drought Plan 2027 proposes a number of options which would make more water available for supply than is available under normal licensed conditions. Drought options include demand side options (e.g. water use restrictions), continued utilisation of existing licensed water sources within Yorkshire Water's resource base (referred to as supply side options) and drought permits/orders.

In determining the likelihood of significant effects on European sites from any drought management measure, particular consideration has been given to the possible source-receptor pathways through which effects may be transmitted from activities associated with the measures to features contributing to the integrity of the European sites (e.g. groundwater or surface water catchments, air, etc.). **Table 2-3** provides examples of the types of impacts the measures might have on European site qualifying features. Screening for LSEs has been determined on a proximity basis for many of the types of impacts, based on the proximity of the potential location of each measure to each European site. However, there are many uncertainties associated with using set distances as there are very few standards available as a guide to how far impacts will extend. Different types of impacts can occur over different distances, and the assumptions and distances used in the HRA and justification for them are shown in **Table 2-3**.

Yorkshire Water's Drought Plan 2027 includes alternative extreme options available to the company in the event of a third consecutive year of drought which would, if deployed, involve some construction activity (e.g. intakes, pumping stations, recommissioning of boreholes and WTW and pipelines). For all of the remaining options, there is no construction phase associated with the option, and it is only operational impacts that will need to be considered.

Table 2-3 Potential Impacts of Drought Options[8]

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
Physical loss: • Removal (including offsite effects, e.g. foraging habitat, and removal of supporting habitat within boundary of a SPA) • Smothering	Development of infrastructure associated with scheme, e.g. new or temporary pipelines, transport infrastructure, temporary weirs. Indirect effects from a reduction in flows e.g. drying out marginal habitat. Physical loss is most likely to be significant where the boundary of the scheme extends within the boundary of the European site, or within an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated).
Physical damage: • Sedimentation / silting • Prevention of natural processes including coastal and fluvial bank stabilisation, prevention of long-shore drift etc. • Habitat degradation • Erosion • Fragmentation • Severance/barrier effect • Edge effects	Reduction in river flow leading to permanent and/or temporary loss of available habitat, sedimentation/siltation, fragmentation, etc. Physical damage is likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated, or where natural processes link the scheme to the site, such as through hydrological connectivity downstream of a scheme, longshore drift along the coast, or the scheme impacts the linking habitat).
Non-physical disturbance: • Noise (incl. underwater) • Visual presence • Human presence • Light pollution	Noise from temporary construction or temporary pumping activities. Taking into consideration the noise level generated from general building activity (c. 122dB(A)) and considering the lowest noise level identified in appropriate guidance as likely to cause disturbance to bird species, it is concluded that noise

[8] Note that the distances given in Table 2.3 are illustrative only and should be defined for each DP on a case-by-case basis.

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
• Vibration (incl. underwater).	impacts could be significant up to 1km from the boundary of the European site[9][10][11]. Noise from vehicular traffic during operation of a scheme. Noise from construction traffic is only likely to be significant where the transport route to and from the scheme is within 3-5km of the boundary of the European site. Plant and personnel involved in in operation of the scheme. These effects (noise, visual/human presence) are only likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated). Schemes which might include artificial lighting, e.g. for security around a temporary pumping station. Effects from light pollution are only likely to be significant where the boundary of the scheme is within 500m of the boundary of the European site. Vibration from temporary construction From a review of Environment Agency internal guidance on HRA and various websites/sources[12] it is considered that effects of vibration are more likely to be significant if development is within 500m of a European site.
Water table/availability: • Drying • Flooding / stormwater • Changes to surface water levels and flows including both increases and reductions. • Changes in groundwater levels and flows • Changes to coastal water movement	Changes to water levels and flows due to increased water abstraction, reduced storage or reduced flow releases from reservoirs to river systems. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.
Toxic contamination: • Water pollution • Soil contamination • Air Pollution	Reduced dilution in downstream or receiving waterbodies due to changes in abstraction or reduced compensation flow releases to river systems. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site. Air emissions associated with plant and vehicular traffic during construction and operation of schemes. The effect of dust is only likely to be significant where site is within or in proximity to the boundary of the European site[13][14]. Without mitigation, dust and dirt from the construction site may be transported onto the public road network and then deposited/spread by vehicles on roads up to 500m from large sites, 200m from medium sites, and 50m from small sites as measured from the site exit.

[9] British Standards Institute (BSI) (2009) BS5228 - Noise and Vibration Control on Construction and Open Sites. BSI, London.

[10] Environment Agency (2013 Bird Disturbance from Flood and Coastal Risk Management Construction Activities. Overarching Interpretive Summary Report. Prepared by Cascade Consulting and Institute of Estuarine and Coastal Studies.

[11] Cutts N, Hemingway K and Spencer J (2013) The Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning and Construction Projects. Produced by the Institute of Estuarine and Coastal Studies (IECS). Version 3.2.

[12] Institute of Lighting Professionals (2011) Guidance Notes for the Reduction of Obtrusive Light GN01:2011

[13] Highways Agency (2003) Design Manual for Roads and Bridges (DMRB), Volume 11.

[14] Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction v1.1.

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
	Effects of road traffic emissions from the transport route to be taken by the project traffic are only likely to be significant where the protected site falls within 200 metres of the edge of a road affected[15].
Non-toxic contamination: • Nutrient enrichment (e.g. of soils and water) • Algal blooms • Changes in salinity • Changes in water chemistry (e.g. pH, calcium balance etc) • Changes in thermal regime • Changes in turbidity • Changes in sedimentation/silting	Changes to water salinity, nutrient levels, turbidity, thermal regime due to increased water abstraction, storage, or reduced compensation flow releases to river systems. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European Site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.
Biological disturbance: • Direct mortality • Changes to habitat availability • Out-competition by non-native species • Selective extraction of species • Introduction of disease • Rapid population fluctuations • Natural succession	Potential for changes to habitat availability, for example reductions in wetted width of rivers leading to desiccation of macrophyte beds due to changes in abstraction or reduced compensation flow releases to river systems. In addition, via removal of vegetation (including hedgerows and trees) used as foraging, roosting and hibernation sites and birds as roosting and nesting sites. Creation of new pathway of invasive non-native species. This effect is only likely to be significant where the scheme is situated within the European site or an upstream tributary of the European site (or affects groundwater levels supporting these sites or tributaries) Entrapment during in-river or terrestrial construction works causing injury and/or mortality of mobile species Likely to be a risk of entrapment, injury and/or mortality where the boundary of the option extends within or is directly adjacent to the boundary of a European site or within/adjacent to offsite functionally linked habitat. Mobile species could include fish, bats and European otters for example. Potential for changes to habitat availability via removal of vegetation (including hedgerows and trees) to facilitate construction activities and potential entrapment, injury and/or mortality of breeding birds and roosting/hibernating bats. This effect is dependent on the requirement to remove vegetation (if it cannot be avoided), ecological surveys to determine species presence and timing of removal based on species specific ecological considerations.

[15] NE Internal Guidance – Approach to Advising Competent Authorities on Road Traffic Emissions and HRAs V1.4 Final - June 2018

3. DATA SOURCES

For the Drought Plan 2027, environmental assessments of each drought option have been undertaken, culminating in the production of Environmental Assessment Reports (EARs) as described below. The outcomes of this assessment have informed this HRA.

According to the DPG, Drought Plan reporting requirements include undertaking significant environmental assessment which can be aligned to fulfil wider reporting requirements, such as those for HRA (and SEA if applicable). This approach ensures duplication of work between HRA, SEA and the Drought Plan itself can be minimised.

Yorkshire Water has undertaken environmental assessment of the Drought Plan 2027 supply options according to guidance in the 2025 Drought permits and drought orders supplementary guidelines[16] DPG and the March 2025 'Water company drought plan guideline'. This is reported in the EARs. For each drought option, the assessment included the following stages:

1. an assessment of the likely changes in flow/level regime due to implementing the drought permit;
2. identification of the environmental features that are sensitive to these changes and an assessment of the likely impacts on these features;
3. identification of mitigation that may be required to prevent or reduce impacts on sensitive features; and
4. recommendations for baseline, in-drought and post-drought permit monitoring requirements.

The initial stage determined the zone and extent of hydrological influence of each drought option both on an individual basis, and taking into account in-combination effects of simultaneous option deployment where options were located within the same catchment, and across catchments. The assessment also considered in-combination effects of other discharges and abstractions using abstraction licence and discharge consent information supplied by the Environment Agency.

The sensitivity assessment used these outputs and using GIS identified European sites and features which could be impacted by drought option implementation. These European sites included (SAC, SPA and Ramsar). The assessment considered the susceptibility of each site/feature to hydrological impacts (flow/level changes) in order to conclude the sensitivity of each site/feature, and whether it should be taken forward to Stage 2 Appropriate Assessment. Consideration of susceptibility in the case of SACs and SPAs took account of qualifying interests and whether, or to what extent, they were water dependent, and likely to be impacted by a drought option's implementation, taking into account the appropriate baseline conditions against which an impact would be likely to arise (often severe drought conditions).

Drought options within the Drought Plan 2027 comprise reservoir compensation release reductions, river abstraction licence changes, new river abstractions, inter-basin transfer, groundwater abstractions, and recommissioning of unused or under-utilised licensed water sources.

3.1 CONSIDERATION OF IN-COMBINATION EFFECTS

The hydrological impact assessment described above and documented in the EARs considered in-combination hydrological impacts of simultaneous deployment of options within the same catchments, and across different catchments. In-combination effects that could arise with other non-public water supply abstractions are also considered, as are indirect impacts on water quality as a result of reduced dilution.

In accordance with the Habitats Regulations, the review has therefore considered the in-combination effects of the drought options in the Yorkshire Water Drought Plan 2027, and the in-combination effects of the final Drought Plan 2027 and a number of plans and projects, that could have an impact on the European sites identified within this HRA of the Drought Plan 2027. The following plans and projects have been considered in the in-combination effects assessment:

- Inter-option effects within the Yorkshire Water Drought Plan 2027

[16] Environment Agency (2025) Water Company Drought Plan Guideline, June 2025

- Other water company Water Resource Management Plans (WRMPs) and Drought Plans:
- Severn Trent
- United Utilities
- Northumbrian Water
- Anglian Water Services Limited
- Water Resource Management Plan for Yorkshire Water (2024)
- Environment Agency National Drought Action Plan
- Canal and Rivers Trust Putting Water into Waterways Water Resources Strategy 2015-2020 and website[17] .

The assessment has used all publicly available information. It should also be noted that the water companies are at different stages of updating their WRMPs and Drought Plans and therefore further updates may be required to the HRA in-combination assessment as these become available between the draft and final submissions.

The findings of the in-combination impact assessments between each drought option and the schemes above can be found in **Table 3.2**, column 6: 'Effect in combination with other options, plans and projects.

3.2 REVIEW OF CONSENTS

The Environment Agency's Review of Consents process considered all existing abstraction licences to determine whether any could have the potential to affect the hydrogeological or hydrological regime of European sites. Investigations of relevance to Yorkshire Water's Drought Plan 2027 include those which reviewed licences in relation to impacts on the Humber Estuary SAC/SPA/Ramsar (collectively referred to as the Humber Estuary European Marine Site (or EMS)), and the North Pennine Moors SAC/Moorhouse and Upper Teesdale SPA. The Humber Estuary investigation resulted in the modification of two abstraction licences for the river intakes at two WTWs, to include the requirement for installing fish protection measures, to reduce the potential for lamprey entrainment.

4. HRA SCREENING RESULTS

4.1 HRA SCREENING OF SUPPLY SIDE DROUGHT OPTIONS

The HRA of the Drought Plan has screened all of the applicable drought options in each of Yorkshire Water WRZs. A total of 58 options 43 drought permit/order and 14 extreme supply side options currently assessed were screened. This provided an indication of the schemes that may be likely to have a significant effect on a European site(s). The HRA screening for these assessments are presented in **Table 4-1** and **Table 4-2.**

No demand side options have been brought forward for screening. Demand side options involve reducing water use by encouraging changes in behaviours or by limiting water use to decrease demand for water. The options involve no construction or operational changes and have no impact pathways, furthermore, reducing demand for water will help protect European Sites with water dependent features. The absence of impact pathways and overall benefit to the environment results in there being no LSE on European Sites.

Effects in combination with other drought options within Yorkshire Water's Drought Plan 2027 were assessed and are documented in the matrix.

[17] https://canalrivertrust.org.uk/our-cause/looking-after-canals-and-rivers/managing-our-water/reservoir-works-and-water-resources

Table 4-1 HRA Screening of Supply Side Drought Permit/Order Options

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
Drought Permit/Order Options				
North Area Reservoirs				
North Area Reservoir 1	North Pennine Moors SAC (0.60km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths orcalcareous grasslands *Calaminarian* grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmo phytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage *Saxifraga hirculus*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	North Pennine Moors SPA (0.60km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Curlew *Numenius arquata*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	Humber Estuary SAC (>10km[19])	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Annual vegetation of drift lines *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*	No construction related to this option has been identified. Any reduction in freshwater flows could potentially affect qualifying interests for which the Humber Estuary is designated, specifically river and sea lamprey (recruitment and reproductive capability and spatial distribution of the species). The drought permit being assessed involves a reduction in the compensation flow release from North Area Reservoir 1 to the River Burn. The operation of the option has the potential to impact on the flow/level regime downstream of the North Area Reservoir 1 within Pott Beck, River Burn and River Ure.	LSE Alone (Lamprey Species only)
North Area Reservoir 2	North Pennine Moors SAC (1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths orcalcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect

[18] The distance given is to the nearest element of the drought option (e.g., impacted reaches or constructional element) and the designated site.
[19] Although outside of the buffer zone (10km radius), this has been included as the River Ouse discharges into the Humber Estuary EMS.

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmo phytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage (*Saxifraga hirculus)*		
	North Pennine Moors SPA (0.60km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Curlew *Numenius arquata*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
North Area Reservoir 3	North Pennine Moors SAC (6.4km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths orcalcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmo phytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage *Saxifraga hirculus* Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Curlew Numenius *arquata*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
North Area Reservoir 4	North Pennine Moors SAC (4.10km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths or calcareous grasslands *Calaminarian* grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage *Saxifraga hirculus*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	North Pennine Moors SPA (4.10km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover.	There is no construction related to this option and no operational impacts have been identified.	No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Curlew *Numenius arquata*	The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	
North Area Reservoir 5	North Pennine Moors SAC (0.6km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths or calcareous grasslands *Calaminarian* grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage *Saxifraga hirculus*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are designated on higher elevations above the river level. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions	No Effect
	North Pennine Moors SPA (0.6km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Curlew *Numenius arquata*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are designated on higher elevations above the river level. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions	No Effect
North West Area Reservoirs				
North West Area Reservoir 1a	South Pennine Moors SAC (<1.0km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1.0km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect
North West Area Reservoir 1b	South Pennine Moors SAC (<1.0km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1.0km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect
North West Area Reservoir 4	South Pennine Moors SAC (3.0km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (3.0km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect
North West Area Reservoir 5	South Pennine Moors SAC (3.60km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (3.60km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
North West Area Reservoir 6	South Pennine Moors SAC (1.00km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (1.00km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')			No Effect
North West Area Reservoir 7	South Pennine Moors SAC (<1.0km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1.0km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')			No Effect
North West Area Reservoir 8	South Pennine Moors SAC (<0.5km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<0.5km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')			No Effect
North West Area Reservoir 9	South Pennine Moors SAC (2.20km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are designated on higher elevations above the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (2.20km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')			No Effect
North West Area Reservoir 10	North Pennine Moors SAC (0.25km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths or calcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles Marsh saxifrage *Saxifraga hirculus*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	North Pennine Moors SPA (0.25km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Merlin *Falco columbarius*		No Effect
North West Area Reservoir 11	North Pennine Moors SPA (0.68km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
North West Area Reservoir 12	South Pennine Moors SAC (0km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths	There is no construction related to this option and no operational impacts have been identified.	No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	The drought option will influence low flows in Carr Beck, of which a 150m reach is situated within the site. However, the designated features of the site are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	
	Peak District Moors (South Pennine Moors Phase 2) SPA (0km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
South Area Reservoirs				
South Area Reservoir 1	North Pennine Moors SAC (5.50km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths orcalcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage (*Saxifraga hirculus)*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	North Pennine Moors SPA (5.50km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Curlew *Numenius arquata*		No Effect
South Area Reservoir 2	Peak District Moors (South Pennine Moors Phase 1) SPA (<0.50km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	South Pennine Moors SAC (<0.50km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		No Effect
South Area Reservoir 3a	Peak District Moors (South Pennine Moors Phase 1) SPA (1.90km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	South Pennine Moors SAC (1.90km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		No Effect
South Area Reservoir 3b	Peak District Moors (South Pennine Moors Phase 1) SPA (1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	South Pennine Moors SAC (1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		No Effect
South Area Reservoir 4	Peak District Moors (South Pennine Moors Phase 1) SPA (4.40km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that	No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
	South Pennine Moors SAC (4.40km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
South Area Reservoir 5	Peak District Moors (South Pennine Moors Phase 1) SPA (2.15km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	South Pennine Moors SAC (2.15km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		No Effect
South Area Reservoir 6	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria*		No Effect
South Area Reservoir 7	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria*		No Effect
Upper Calder Area Reservoirs				
South West Area Reservoir 1 South West Area Reservoir 2 South West Area Reservoir 3 South West Area Reservoir 5	South Pennine Moors SAC (option is within designated site)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to these options and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (option is within designated site)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 4	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to these options and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 8	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 9	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus*		No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Dunlin *Calidris alpina schinzii*		
South West Area Reservoir 10	South Pennine Moors SAC (1.4km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (1.4km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 11 South West Area Reservoir 12	South Pennine Moors SAC (<1km or within designation)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1km or within designation)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
Middle Calder Area Reservoirs				
South West Area Reservoir 6	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 7	South Pennine Moors SAC (1.70km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (1.70km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 14	South Pennine Moors SAC (<0.50km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<0.50km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 16 South West Area Reservoir 15	South Pennine Moors SAC (<0.5km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 1&2) SPA (<0.5km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 17	South Pennine Moors SAC (2.6km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will	No Effect
	Peak District Moors (South Pennine	Short eared owl *Asio flammeus* Merlin *Falco columbarius*		No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
	Moors Phase 1) SPA (2.6km)	Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	
South West Area Reservoir 18	South Pennine Moors SAC (3.10km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (3.10km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
River Abstractions				
Ouse increased abstraction	Strensall Common SAC (7.1km)	North Atlantic wet heaths *with Erica tetralix* European dry heath	There is no construction related to this option and no operational impacts have been identified. The SAC is a sufficient distance from the impacted reach that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	Humber Estuary SAC (>33.6km[20])	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Annual vegetation of drift lines *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey (entrainment, attractant flows, dissolved oxygen etc). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site[21]. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027. The Derwent catchment was previous discounted from the assessment as no options were present in the catchment. The current plan does include an option in the Derwent catchment however the hydrological impacts of the option are restricted to a transfer of abstraction limits between two existing abstraction points and impacts are assessed as negligible. Since the assessment in 2011 Naburn Weir has been modified, and fish bypass was installed. An eel/lamprey bypass channel (lamprey bypass) was formalized next to the salmon ladder on the riverbank-side in 2014 to aid the upstream migration of European eel juveniles (elvers) and river lamprey. The bypass largely followed the route of a complex channel, littered with rocks, concrete debris and tree roots, partly water-fed by an erosion generated hole in the retaining wall adjoining the salmon ladder. A detailed study by Durham University looked at the behaviour of fishes (including lamprey) at Naburn Weir[22]. The study noted that under normal flows Naburn weir impacts on the upstream migration of river lamprey, delaying the movement of river lamprey through the reach. The lamprey moved quickly (less than two days) through the unobstructed tidal reach of the Yorkshire Ouse. However, river lamprey once entering the area immediately downstream of the weir took 32.6 days on average before either moving in an upstream direction passing the weir or a downstream one. This delay at Naburn weir under normal flow conditions will likely lead to an increase in predation pressure through the aggregation of river lamprey in a relatively small area. The assessment in 2011 remains valid as reduced flow levels triggered by the application of drought permits would not significantly alter the amount of time that Naburn Weir would be passable to sea and river lamprey, with the additional Lamprey bypass providing additional passability. The predominant channel substrate is silt, which is unsuitable for spawning river lamprey and sea lamprey, however, it is suitable	No Effect

[20] Although outside of the buffer zone (10km radius), this has been included as the River Ouse discharges into the Humber Estuary EMS.

[21] Scott Wilson (2011). Yorkshire Water Drought Plan: Assessment of Possible Impact on Humber Estuary SPA/SAC. Final Report Revision 2 February 2011. Report for Yorkshire Water.

[22] Lothian, Angus,John (2021) Behaviour of fishes around engineered structures and in modified rivers, Durham theses, Durham University. Available at Durham E-Theses Online: http://etheses.dur.ac.uk/13872/

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
			habitat for juvenile lamprey ammocoetes. The drought option hydrological impacts only include a minor impact on wetted aquatic habitat. The absence of substantial spawning habitat, negligible impacts on longitudinal connectivity and minor impact on available aquatic habitat are therefore unlikely to have an adverse effect on lamprey within the River Ouse. It therefore follows that this option would individually have no likely significant effect[19]	
	Humber Estuary SPA (>33.6km)	Teal *Anas crecca* Wigeon *Anas penelope* Mallard *Anas platyrhynchos* Ruddy turnstone *Arenaria interpres* Pochard *Aythya ferina* Great Bittern *Botaurus stellaris* Dark bellied brent goose *Branta bernicla bernicla* A067 Goldeneye *Bucephala clangula* Sanderling *Calidris alba* Dunlin *Calidris alpina alpina* Red Knot *Calidris canutus* Ringed plover *Charadrius hiaticula* Eurasian Marsh harrier *Circus aeruginosus* Hen harrier *Circus cyaneus* Oystercatcher *Haematopus ostralegus* Bar tailed godwit *Limosa lapponica* Black tailed godwit *Limosa limosa islandica* Curlew *Numenius arquata* Whimbrel *Numenius phaeopus* Ruff *Philomachus pugnax* European Golden plover *Pluvialis apricaria* Grey plover *Pluvialis squatarola* Pied avocet *Recurvirostra avosetta* Little tern *Sterna albifrons* Common Shelduck *Tadorna tadorna* Common greenshank *Tringa nebularia* Common Redshank *Tringa totanus* Lapwing *Vanellus vanellus* scaup *Aythya marila* golden plover *Pluvialis apricaria* knot *Calidris canutus*	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated. Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027. It therefore follows that this option would individually have no likely significant effect[19]	No Effect
	Humber Estuary Ramsar (>33.6km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** 12 Species/populations occurring at levels of international importance. **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.	There is no construction related to this option and no operational impacts have been identified. Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey (entrainment, attractant flows, dissolved oxygen etc). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027.	No Effect
Ure increased abstraction	North Pennine Moors SAC (3.2km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths or calcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles Marsh saxifrage (Saxifraga hirculus)	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	LSE In-Combination Only
	North Pennine Moors SPA (0.25km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius*		No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		
	Humber Estuary SAC (>72.3km[23])	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Annual vegetation of drift lines *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey (entrainment, attractant flows, dissolved oxygen etc). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027. The Derwent catchment was previous discounted from the assessment as no options were present in the catchment. The current plan does include an option in the Derwent catchment however the hydrological impacts of the option are restricted to a transfer of abstraction limits between two existing abstraction points and impacts are assessed as negligible. Since the assessment in 2011 Naburn Weir has been modified, and fish bypass was installed. An eel/lamprey bypass channel (lamprey bypass) was formalized next to the salmon ladder on the riverbank-side in 2014 to aid the upstream migration of European eel juveniles (elvers) and river lamprey. The bypass largely followed the route of a complex channel, littered with rocks, concrete debris and tree roots, partly water-fed by an erosion generated hole in the retaining wall adjoining the salmon ladder. A detailed study by Durham University looked the behaviour of fishes (including lamprey) at Naburn Weir. The study noted that under normal flows Naburn weir impacts on the upstream migration of river lamprey quite dramatically, delaying the movement of river lamprey through the reach. The lamprey moved quickly (less than two days) through the unobstructed tidal reach of the Yorkshire Ouse. However, river lamprey once entering the area immediately downstream of the weir took 32.6 days on average before either moving in an upstream direction passing the weir or a downstream one. This delay at Naburn weir under normal flow conditions will likely lead to an increase in predation pressure through the aggregation of river lamprey in a relatively small area. The assessment in 2011 remains valid as reduced flow levels triggered by the application of drought permits would not significantly alter the amount of time that Naburn Weir would be passable to sea and river lamprey, with the additional Lamprey bypass providing additional passability. The impacted reach of the River Ure has a predominantly cobble substrate with limited suitable spawning and ammocoete habitat. The minor hydrological impacts are unlikely to significantly impact river lamprey and sea lamprey due to the dewatering of marginal silt beds, reduced flow over spawning gravels and increased difficulty traversing obstacles due to reduced flow. The minor risk to longitudinal connectivity suggests river lamprey and sea lamprey migration is unlikely to be prevented during implementation. It therefore follows that this option would individually have no likely significant effect, however, likely significant effects in-combination cannot be ruled out.	LSE In-Combination Only
	Humber Estuary SPA (>72.3km)	Teal *Anas crecca* Wigeon *Anas penelope* Mallard *Anas platyrhynchos* Ruddy turnstone *Arenaria interpres* Pochard *Aythya ferina* Great Bittern *Botaurus stellaris* Dark bellied brent goose *Branta bernicla bernicla* Goldeneye *Bucephala clangula* Sanderling *Calidris alba* Dunlin *Calidris alpina alpina* Red Knot *Calidris canutus*	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated. Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they	No Effect

[23] Although outside of the buffer zone (10km radius), this has been included as the River Wharfe discharges into the Humber Estuary EMS.

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Ringed plover *Charadrius hiaticula* Eurasian Marsh harrier *Circus aeruginosus* Hen harrier *Circus cyaneus* Oystercatcher *Haematopus ostralegus* Bar tailed godwit *Limosa lapponica* Black tailed godwit *Limosa limosa islandica* Curlew *Numenius arquata* Whimbrel *Numenius phaeopus* Ruff *Philomachus pugnax* European Golden plover *Pluvialis apricaria* Grey plover *Pluvialis squatarola* Pied avocet *Recurvirostra avosetta* Little tern *Sterna albifrons* Common Shelduck *Tadorna tadorna* Common greenshank *Tringa nebularia* Common Redshank *Tringa totanus* Lapwing *Vanellus* scaup *Aythya marila* golden plover *Pluvialis apricaria* knot *Calidris canutus*	are valid for the current suite of options included in the Drought Plan 2027.	
	Humber Estuary Ramsar (>72.3km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** 12 Species/populations occurring at levels of international importance. **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.	There is no construction related to this option and no operational impacts have been identified. Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey (entrainment, attractant flows, dissolved oxygen etc). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027. The impacted reach of the River Ure has a predominantly cobble substrate with limited suitable spawning and ammocoete habitat. The minor hydrological impacts are unlikely to significantly impact river lamprey and sea lamprey due to the dewatering of marginal silt beds, reduced flow over spawning gravels and increased difficulty traversing obstacles due to reduced flow.	No Effect
Wharfe reduced regulated flow	North Pennine Moors SPA (1.40km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	North Pennine Moors SAC (1.40km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths or calcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) Blanket bogs Petrifying springs with tufa formation (Cratoneurion) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage (*Saxifraga hirculus)*		No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (1.20km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	South Pennine Moors SAC (1.20km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs		No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		
	Humber Estuary SAC (>37.8km[24])	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Annual vegetation of drift lines *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey (entrainment, attractant flows, dissolved oxygen etc). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027. The Derwent catchment was previous discounted from the assessment as no options were present in the catchment. The current plan does include an option in the Derwent catchment however the hydrological impacts of the option are restricted to a transfer of abstraction limits between two existing abstraction points and impacts are assessed as negligible. It therefore follows that this option would individually have no likely significant effect[19].	No Effect
	Humber Estuary SPA (>37.8km)	Teal *Anas crecca* Wigeon *Anas penelope* Mallard *Anas platyrhynchos* Ruddy turnstone *Arenaria interpres* Pochard *Aythya ferina* Great Bittern *Botaurus stellaris* Dark bellied brent goose *Branta bernicla bernicla* Goldeneye *Bucephala clangula* Sanderling *Calidris alba* Dunlin *Calidris alpina alpina* Red Knot *Calidris canutus* Ringed plover *Charadrius hiaticula* Eurasian Marsh harrier *Circus aeruginosus* Hen harrier *Circus cyaneus* Oystercatcher *Haematopus ostralegus* Bar tailed godwit *Limosa lapponica* Black tailed godwit *Limosa limosa islandica* Curlew *Numenius arquata* Whimbrel *Numenius phaeopus* Ruff *Philomachus pugnax* European Golden plover *Pluvialis apricaria* Grey plover *Pluvialis squatarola* Pied avocet *Recurvirostra avosetta* Little tern *Sterna albifrons* Common Shelduck *Tadorna tadorna* Common greenshank *Tringa nebularia* Common Redshank *Tringa totanus* Lapwing *Vanellus vanellus* scaup *Aythya marila* golden plover *Pluvialis apricaria* knot *Calidris canutus*	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated. Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site.	No Effect
	Humber Estuary Ramsar (>37.8km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** 12 Species/populations occurring at levels of international importance. **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.	There is no construction related to this option and no operational impacts have been identified. Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey (entrainment, attractant flows, dissolved oxygen etc). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027. The Derwent catchment was previous discounted from the assessment as no options were present in the catchment. The current plan does include an option in the Derwent catchment however the hydrological impacts of the option are restricted to a transfer of abstraction limits between two existing abstraction points and impacts	No Effect

[24] Although outside of the buffer zone (10km radius), this has been included as the River Wharfe discharges into the Humber Estuary EMS.

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
			are assessed as negligible. It therefore follows that this option would individually have no likely significant effect[19].	
Hull increased abstraction	Humber Estuary SAC/SPA/ Ramsar (<1km)	As above	There is no construction related to this option and no operational impacts have been identified. Reductions in freshwater flows to the Humber Estuary from the River Hull would not affect any qualifying interests for which the Estuary is designated a SAC/SPA/Ramsar. The lamprey population within the River Hull is unlikely to be impacted directly by flow changes associated with this option due to the impacted reach falling within the tidal limit, limiting the loss of habitat due to reduced flow, however, the water quality implications of reduced flow on estuarine flushing (of Beverley one STW effluent plume) may become apparent and impact lamprey migration. At times of poor flushing a plume of diluted effluent is understood to persist within the tidal reach, with local water quality implications. Flushing of the tidal reach is dependent on the tidal cycle as well as the freshwater contribution from the River Hull. The potential for a dissolved oxygen (DO) sag as a result of Beverley one STW may be potential to result in a small-scale, localised and temporary barrier to lamprey migration. The timing of a potential temporary localised DO sag is most likely to occur in summer/autumn which does not coincide with lamprey migration to spawning grounds which occur between November and March[25]. Any temporary and localised DO sag is not expected to prevent the downstream movement of any post metamorphic individuals either. It therefore follows that this option would have no likely significant effect[19]. Additionally, a review of the lamprey population in the Humber basin made no reference to the River Hull as an important river for lamprey populations; unlike the Ouse, Derwent and Trent catchments[26]. However, lamprey are not SAC Monitored Features and are not allocated to unit(s) for conditions assessments. In all, the Humber basin provides an excellent habitat for river lamprey feeding, shelter, reproduction and migration across all life stages, and is considered the most important river lamprey habitat potentially supporting the largest population in the UK[27]. The River Hull discharges to the estuary through natural gravity flow (there is normally no barrier unless the tidal gate is lowered), at a location where impacts on designated habitats would not occur, through the docks of Kingston upon Hull. Any potential barriers to migration are not anticipated to result in significant impacts on the lamprey's migration route and will likely remain free of obstacles – physical or pollution in order to reach their spawning grounds with minimal delay.	LSE In-Combination Only
Derwent annual abstraction increase	River Derwent SAC (<1km)	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*	The drought permit option for the lower River Derwent would be implemented from the 1st January until the 31st March, with the annual abstraction limit resetting on the 1st April and coinciding with the expiration of drought permit conditions on the 1st April. In hydrological terms a 20Ml/d increase in daily average flows (to be confirmed at time of application) is a potentially positive impact (7.6-9.9% increase in low flows) as is it changes flow in the direction of a more natural flow regime for the lower River Derwent (when compared with Buttercrambe flow gauge). The extent considered is for 24km of the River Derwent. The hydrological effect is considered indiscernible (i.e. negligible), when compared with the range of winter flows in the river, and in the context of daily variability. Furthermore, where there are significant sub-daily differences in flow, as caused by the Barmby Barrage (at least from Bubwith Bridge some 16.5km downstream of the Yorkshire Water intake) that pattern is the dominant feature on river hydrology. Although lowland hay meadows are sensitive to inundation, particularly during the spring and summer months, implementation effects would be limited to March due to the annual abstraction limit resetting on 1 April. The magnitude of the predicted flow increase is negligible and remains within the range of normal seasonal variability. As such, the option is considered unlikely to give rise to significant effects on lowland hay meadow communities.	No Effect
	Lower Derwent Valley SAC (<1km)	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) Otter *Lutra lutra*		No Effect
	Lower Derwent Valley SPA (<1km)	Corncrake *Crex crex*, Ruff *Philomachus pugnax* Spotted Crake *Porzana porzana* Bewick's Swan *Cygnus columbianus bewickii* Bittern *Botaurus stellaris* Golden Plover *Pluvialis apricaria* Teal *Anas crecca* Over winter, the area regularly supports 39,936 individual waterfowl (5-year peak mean 1991/2 - 1995/6) including: Lapwing *Vanellus vanellus*, Pochard *Aythya ferina*, Shoveler *Anas clypeata*, Mallard *Anas platyrhynchos*, Wigeon *Anas penelope*, Teal *Anas crecca*, Ruff *Philomachus pugnax*, Golden Plover *Pluvialis apricaria*, Bewick's Swan *Cygnus columbianus bewickii*, Bittern *Botaurus stellaris*.		No Effect
	Lower Derwent Valley Ramsar (<1km)	**Ramsar Criterion 1**		No Effect

[25] Hopkins, D. 2008. River lamprey. Brief summary of Humber basin information: The Bellflask Ecological Survey Team.
[26] APEM (2007). Review of information on lamprey populations in the Humber Basin.
[27] Jang, M.-H. and Lucas, M. C. 2005. Reproductive ecology of the river lamprey. Journal of Fish Biology 499-512.

Option(s)	European Site within zone of minor, moderate or major hydrological impact[18]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		The site represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK and they play a substantial role in the hydrological and ecological functioning of the Humber basin. **Ramsar Criterion 2** The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates and is the only known site in GB for the leafhopper *Cicadula ornata* **Ramsar Criterion 4** The site qualifies as a staging post for passage birds in spring, with nationally important numbers of ruff *Philomachus pugnax* and whimbrel *Numenius phaeopus*. **Ramsar Criterion 5** The site supports an internationally important assemblage of waterfowl in the winter with 31,942 waterfowl. **Ramsar Criterion 6** The site supports Eurasian wigeon *Anas penelope* and Eurasian teal *Anas crecca* at levels of international importance during the winter.		

Table 4-2 HRA Screening of Extreme Supply Side Drought Options

Option(s)	European Site within zone of minor, moderate or major hydrological impact[28]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
Catterick Groundwater Option 1	North Pennine Dales Meadows SAC (4.8 km)	Mountain hay meadows *Molinia* meadows on calcareous, peaty of clayey-silt-laden soils (*Molinion caeruleae*)	The SAC is located between 4km and 6km from the borehole location. **Construction:** No impact pathways have been identified during the construction of this scheme due to distance. **Operation** Despite being some distance from the abstraction point, there is uncertainty with regards to the extent to which additional drawdown may impact on the designated habitats. As such, there is uncertainty with regards to the potential hydrological impacts on the designated features and whether these effects are likely to be significant.	LSE Alone (Operation)
Doncaster Groundwater Option 1	Thorne and Hatfield Moors SPA (7.5km)	Nightjar *Caprimulgus europaeus* - Breeding	The high-level scheme involves reinstatement of two existing boreholes and may require relining, headworks and new pumps. Additional infrastructure to be constructed include a new Glass Reinforced Plastic (GRP) contact tank (455m^3), two new kiosks for chemical storage and dosing, and a slab for a new Motor Control Centre (MCC) kiosk. The removal of existing infrastructure is also required, A new raw water pump will also be installed at both boreholes. The operation of the boreholes will allow for 2.28Ml/day per borehole to be extracted. **Construction** There is no surface water connectivity between the European sites and the option. As such, no LSE is anticipated during construction. **Operation:** Nightjar rely on dry heath and scrub for breeding. They are at risk of losing their habitat due to high water levels and rewetting of raised bog within the site. As the boreholes will be abstracting water from the system, no LSE is anticipated to nightjar. The Supplementary Advice for raised bogs raises uncertainty around the bog's reliance the water table. Increases in abstraction rates may impact surrounding hydrology, impacting hydrologically connected sites. Due to uncertainty of borehole location LSEs cannot be ruled out without suitable hydrological understanding of the bog's reliance on groundwater.	No Effect
	Hatfield Moor SAC (7.5km)	Degraded raised bogs (still capable of natural regeneration)		LSE Alone (degraded raised bog during operation only)
Doncaster Groundwater Option 2	Thorne and Hatfield Moors SPA (7.1km)	Nightjar *Caprimulgus europaeus* - Breeding	**Construction:** No impact pathways have been identified during the construction of this scheme due to distance. **Operation:** Nightjar rely on dry heath and scrub for breeding. They are at risk of losing their habitat due to high water levels and rewetting of raised bog within the site. As the boreholes will be abstracting water from the system, no LSE is anticipated to nightjar. The Supplementary Advice for raised bogs raises uncertainty around the bog's reliance the water table. Increases in abstraction rates may impact surrounding hydrology, impacting hydrologically connected sites by reducing ground water availability. LSEs cannot be ruled out without suitable hydrological understanding of the bog's reliance of groundwater.	No Effect
	Hatfield Moor SAC (7.1km)	Degraded raised bogs (still capable of natural regeneration)		LSE Alone (Operation)
Doncaster Groundwater Option 3	Thorne and Hatfield Moors SPA (2km)	Nightjar *Caprimulgus europaeus* - Breeding	The option involves reinstatement of three existing boreholes and will require treatment works and connection to the infrastructure grid. The boreholes will require relining, headworks and on-site treatment. Storage and chemical dosing kiosks are required. New infrastructure includes booster pumps, pipework and valves, contact tank, and backwash tank. It is assumed that the abstraction rate will be 3.03Ml/day per borehole for a total of 9.09Ml/day. **Construction:** Although raised bogs are precipitation fed, there are a series of drainage ditches connecting the Hatfield Moor SAC to the River Torne. The drainage ditches flow from the Hatfield Moor SAC and Thorne and Hatfield Moor SPA into the River Torne based on the elevation and therefore the site is located upstream. The SPA is sufficiently distant such that no impacts will occur to nightjar. As such, LSE is not anticipated during construction. **Operation:** Nightjar rely on dry heath and scrub for breeding. They are at risk of losing their habitat due to high water levels and rewetting of raised bog within the site. As the boreholes will be abstracting water from the system, no LSE is anticipated to nightjar. Although raised bogs are precipitation fed, there are a series of drainage ditches connecting the site to the River Torne. The drainage ditches flow from the SACs and SPA into the River Torne based on the elevation and as such are not connected via surface water. It is unknown if there is hydrological connectivity via ground water. As such, LSE cannot be ruled out due to uncertainty.	No Effect
	Hatfield Moor SAC (2km)	Degraded raised bogs (still capable of natural regeneration)		LSE Alone (degraded raised bog during operation only)
	Thorne Moor SAC (5.75km)	Degraded raised bogs (still capable of natural regeneration)		LSE Alone (degraded raised bog during operation only)
Pickering/Thirsk Groundwater Option 1	Humber Estuary Ramsar (~60km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons.	The Pickering/Thirsk Groundwater Option 1 is hydrologically connected to the Humber Estuary SAC, SPA and Ramsar site and all of the qualifying features of the SAC, SPA and Ramsar site are water dependent (via the River Rye and River Derwent SAC).	LSE Alone (Operation - river and sea lamprey only)

[28] The distance given is to the nearest element of the drought option (e.g., impacted reaches or constructional element) and the designated site.

Option(s)	European Site within zone of minor, moderate or major hydrological impact[28]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Ramsar Criterion 3 The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** Species/populations occurring at levels of international importance: • Golden plover *Pluvialis apricaria* – Passage/Wintering • Red knot *Calidris canutus* – Passage/Wintering • Dunlin *Calidris alpina* –Passage/Wintering • Black-tailed godwit *Limosa limosa* – Passage/Wintering • Bar-tailed godwit *Limosa lapponica* – Wintering • Redshank *Tringa totanus* – Passage/Wintering • Shelduck *Tadorna tadorna* – Wintering **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.	**Construction:** No impact pathways have been identified during the construction of this scheme due to distance. **Operation** No operational impacts have been identified for SPA bird species and coastal habitats due to distance from the option. Potential impact pathways have been identified on sea and river lamprey, due to the potential for changes in hydrology and reduction of habitat suitability/availability of functionally linked habitat present in the River Rye. As such, LSE is anticipated during operation for lamprey species only.	
	Humber Estuary SAC (~60km)	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*		LSE Alone (Operation - river and sea lamprey only)
	Humber Estuary SPA (~60km)	Avocet *Recurvirosrta avosetta* – Breeding/Wintering Bittern *Botarus stellaris* – Breeding/Wintering Hen harrier *Circus cyaneus* – Breeding/Wintering Golden plover *Pluvialis apricaria* – Wintering Bar-tailed godwit *Limosa lapponica* – Wintering Ruff *Philomachus pugnax* – Passage Little tern *Sterna albifrons* – Breeding Marsh harrier *Circus aeruginosus* - Breeding Shelduck *Tadorna tadorna* – Wintering Red knot *Calidris canutus* – Wintering/Passage Dunlin *Calidris alpina* - Wintering/Passage Black-tailed godwit *Limosa limosa* – Wintering/Passage Redshank *Tringa totanus* – Wintering/Passage		No Effect
	River Derwent SAC (12km)	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*	**Construction:** Due to uncertainty surrounding the works and if construction activities will be required, there is potential for changes in hydrology and reduction of habitat suitability/availability of functionally linked habitat present in the River Rye. Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation and bullhead are not affected due to distance and lack of presence in the vicinity of the works. Due to uncertainty surrounding the works, LSE is cannot be ruled during construction for lamprey species and otter only. **Operation** Potential impact pathways have been identified on sea and river lamprey and otter due to the potential for changes in hydrology and reduction of habitat suitability/availability of functionally linked habitat present in the River Rye. Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation and bullhead are not affected due to distance and lack of presence in the vicinity of the works. Due to uncertainty surrounding the works, LSE is cannot be ruled during operation for lamprey species and otter only.	LSE Alone (Construction and Operation)
Selby Groundwater Option 1	Skipwith Common SAC (8.8km)	European dry heaths Northern Atlantic wet heaths with *Erica tetralix*	Borehole 2 (BH2) within the WTW produces a turbidity spike after approximately 4 hours after restart. The option will include installation of automated run to waste/return to service valve to allow BH2 to run, turn out high turbidity and continue running whilst returning to supply. **Construction:**	No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[28]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
			The proposed construction works are confined to the WTW site boundary and utilise existing pipework. No impact pathways from construction have been identified. **Operation:** The site is located on the same highly productive aquifer (Wharfe and Lower Ouse Sherwood Sandstone WFD groundwater waterbody) and fluvial sandstone bedrock as the Brayton boreholes. There is potential for the European site to be hydrologically connected to the aquifer proposed for abstraction. European wet heaths are also groundwater dependent. Therefore, if the drawdown extent overlapped with the boundaries of Skipwith Common SAC, qualifying habitat may be exposed to reductions in groundwater supply. Skipwith Common is outside of the source protection zone for the borehole; no LSEs are anticipated from the scheme alone. As such, no LSE is anticipated during operation.	
	River Derwent SAC (4.8km)	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*	**Construction:** The proposed construction works are confined to the WTW site boundary and utilise existing pipework. No impact pathways have been identified during construction as the option is not hydrologically connected to the site. As such, qualifying features have been screened out due to lack of hydrological connectivity and non-intrusive nature of the works. As such, no LSE is anticipated during construction. **Operation:** This option aims to reduce process loss by improving infrastructure within the WTW site and does not include any additional abstraction above recent actual rates. No impact pathways have been identified. As such no LSE is anticipated during operation.	No Effect
	Lower Derwent Valley SPA (9.4km)	Ruff *Philomachus pugnax* - Passage Bewick's Swan *Cygnus columbianus bewickii* - Wintering Golden Plover *Pluvialis apricaria* - Wintering Teal *Anas crecca*– Wintering Wigeon *Mareca penelope* – Wintering Shoveler *Anas clypeata*- Breeding Waterbird Assemblage – Wintering / Passage • Teal – Wintering • Wigeon – Wintering • Shoveler – Passage • Pochard *Aythya ferina* – Passage • Whimbrel *Numenius phaeopus* – Passage • Ruff - Passage	**Construction:** The proposed construction works are confined to the WTW site boundary and utilise existing pipework. No impact pathways have been identified during construction as the option is not hydrologically connected to the site and functionally linked land has not been identified to support qualifying species. As such, no LSE is anticipated during construction. **Operation:** This option aims to reduce process loss by improving infrastructure within the WTW site and does not include any additional abstraction above recent actual rates. No impact pathways have been identified. As such no LSE is anticipated during operation.	No Effect
	Lower Derwent Valley SAC (9.4km)	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) Otter *Lutra lutra*		No Effect
	Lower Derwent Valley Ramsar (9.4km)	**Ramsar Criterion 1** The site represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK and they play a substantial role in the hydrological and ecological functioning of the Humber basin. **Ramsar Criterion 2** The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates and is the only known site in GB for the leafhopper *Cicadula ornata*. **Ramsar Criterion 4** The site qualifies as a staging post for passage birds in spring, with nationally important numbers of ruff *Philomachus pugnax* and whimbrel *Numenius phaeopus*. **Ramsar Criterion 5** The site supports an internationally important assemblage of waterfowl in the winter with 31,942 waterfowl. **Ramsar Criterion 6** The site supports Eurasian wigeon *Anas penelope* and Eurasian teal *Anas crecca* at levels of international importance during the winter.		No Effect
	Thorne Moor SAC (8.5km)	Degraded raised bogs (still capable of natural regeneration)	**Construction:** The option is approximately 8.34km to the northwest of the SAC at the closest point of the proposed works. The proposed construction works are confined to the WTW site boundary and	No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[28]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
	Thorne and Hatfield Moors SPA (8.5km)	Nightjar *Caprimulgus europaeus* - Breeding	utilise existing pipework. No impact pathways have been identified during construction as the option is not hydrologically connected to the site. As such, qualifying features have been screened out due to lack of hydrological connectivity and non-intrusive nature of the works. As such, no LSE is anticipated during construction. **Operation:** This option aims to reduce process loss by improving infrastructure within the WTW site and does not include any additional abstraction above recent actual rates. No impact pathways have been identified. As such no LSE is anticipated during operation	No Effect
	Humber Estuary SPA (8km)	Avocet *Recurvirosrta avosetta* – Breeding/Wintering Bittern *Botarus stellaris* – Breeding/Wintering Hen harrier *Circus cyaneus* – Breeding/Wintering Golden plover *Pluvialis apricaria* – Wintering Bar-tailed godwit *Limosa lapponica* – Wintering Ruff *Philomachus pugnax* – Passage Little tern *Sterna albifrons* – Breeding Marsh harrier *Circus aeruginosus* - Breeding Shelduck *Tadorna tadorna* – Wintering Red knot *Calidris canutus* – Wintering/Passage Dunlin *Calidris alpina* - Wintering/Passage Black-tailed godwit *Limosa limosa* – Wintering/Passage Redshank *Tringa totanus* – Wintering/Passage	**Construction:** The Humber Estuary is approximately 8km east of the WTW. Due to the distance between the European sites and the proposed pumping station (15.1 km), no impact pathways from construction works are anticipated. **Operation:** All of the qualifying features of the SAC, SPA and Ramsar site are water dependent. No impacts pathways to tidal, coastal or marine habitats and species associated with the Humber Estuary SAC, SPA and Ramsar site have been identified during operation. However, during operation there is a potential impact pathway if the drawdown extent overlaps with the Humber Estuary or functionally linked habitat for river and sea lamprey and water birds that is hydrologically connected to groundwater. The location of the works are not considered functionally linked habitat. Whilst the European Sites are partly located on the same highly productive aquifer (Wharfe and Lower Ouse Sherwood Sandstone WFD groundwater waterbody) and fluvial sandstone bedrock as the boreholes; due to the presence of clay superficial deposits, hydrological connectivity of the groundwater to the surface is considered limited; except for a 670 m section of the Fleet Drain which flows into the River Went and lacks superficial clay deposits. Therefore, the Fleet Drain could be exposed to a reduction groundwater supply. Based on the size of the drain, length potentially impacted and proximity to arable land, it is not deemed likely to be key functionally linked habitat supporting populations of river and sea lamprey associated with the Humber Estuary.	No Effect
	Humber Estuary SAC (8km)	*Sandbanks which are slightly covered by sea water all the time* *Estuaries* *Mudflats and sandflats not covered by seawater at low tide* *Coastal lagoons* *Salicornia and other annuals colonising mud and sand* *Atlantic salt meadows (Glauco-Puccinellietalia maritimae)* *Embryonic shifting dunes* *Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")* *Fixed dunes with herbaceous vegetation ("grey dunes")* *Dunes with Hippophae rhamnoides* *Sea lamprey Petromyzon marinus* *River lamprey Lampetra fluviatilis* *Grey seal Halichoerus grypus*		No Effect
	Humber Estuary Ramsar (8km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** Species/populations occurring at levels of international importance: • Golden plover *Pluvialis apricaria* – Passage/Wintering • Red knot *Calidris canutus* – Passage/Wintering • Dunlin *Calidris alpina* –Passage/Wintering • Black-tailed godwit *Limosa limosa* – Passage/Wintering • Bar-tailed godwit *Limosa lapponica* – Wintering • Redshank *Tringa totanus* – Passage/Wintering • Shelduck *Tadorna tadorna* – Wintering **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.		No Effect
Selby Groundwater Option 2	Skipwith Common SAC (8.8km)	European dry heaths	The option at Selby Groundwater Option 2 involves the cleaning of the Raw Water Main and to recommission Borehole 3. It is one of four sources that supply the WTW. The works feeds	No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[28]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Northern Atlantic wet heaths with *Erica tetralix*	the Selby Ring Main that can provide water to Selby, the grid via Brayton SRE, and Doncaster/Nutwell WSS via Roall pumps. The output is limited by sand deposited in the raw water main to the WTW. The main needs cleaning (scouring to lagoon at the WTW, ice pigging are two options) to allow full flow to the WTW. Construction of a new on-site treatment process, including: cartridge filtration for removal of sand. Installation of new concrete slab, pipework and valve infrastructure associated with the above treatment and pumping upgrades. The estimated deployable output (DO) of this option is 3.2 Ml/d. The Selby Groundwater Option 2 site is licensed for 13.7 Ml/d (average daily). The current output is in the order of 10.0–10.4 Ml/d (July/August 2026). **Construction** No impact pathways have been identified as it is highly unlikely that there are surface water connections and therefore there is no hydrological connection to the site. As such, no LSE is anticipated during construction. **Operation:** The superficial material overlaying the Sherwood Sandstone Group is predominately impermeable lacustrine deposits of the Hemingbrough Glaciolacustrine Formation. Due to these factors, it is highly unlikely that there are surface water connections and therefore there is no hydrological connection to the site. The site is not located within the same aquifer as the option and as such does not have ground water connectivity. As such no LSEs anticipated during operation.	
	River Derwent SAC (4.8km)	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*	**Construction** No impact pathways have been identified as it is highly unlikely that there are surface water connections and therefore there is no hydrological connection to the site. As such, no LSE is anticipated during construction. **Operation:** The superficial material overlaying the Sherwood Sandstone Group is predominately impermeable lacustrine deposits of the Hemingbrough Glaciolacustrine Formation. Due to these factors, it is highly unlikely that there are surface water connections. However, there is ground water connectivity as the option is located within the same aquifer as the site. Due to uncertainty on the reliance of the River Derwent SAC and groundwater, LSE is anticipated.	LSE Alone (Operation only)
	Lower Derwent Valley SPA (15km)	Ruff *Philomachus pugnax* - Passage Bewick's Swan *Cygnus columbianus bewickii* - Wintering Golden Plover *Pluvialis apricaria* - Wintering Teal *Anas crecca*– Wintering Wigeon *Mareca penelope* – Wintering Shoveler *Anas clypeata*- Breeding Waterbird Assemblage – Wintering / Passage • Teal – Wintering • Wigeon – Wintering • Shoveler – Passage • Pochard Aythya ferina – Passage • Whimbrel Numenius phaeopus – Passage • Ruff - Passage	**Construction** The proposed construction works required to support the scheme are sufficiently distanced from the site for there to be no direct and in-direct impacts and therefore, no LSE is anticipated. **Operation:** The superficial material overlaying the Sherwood Sandstone Group is predominately impermeable lacustrine deposits of the Hemingbrough Glaciolacustrine Formation. Due to these factors, it is highly unlikely that there are surface water connections and therefore there is no hydrological connection to the site. The site is not located within the same aquifer as the option and as such does not have ground water connectivity. As such no LSEs anticipated during operation.	No Effect
	Lower Derwent Valley SAC 15km))	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) Otter *Lutra lutra*		No Effect
	Lower Derwent Valley Ramsar (15km)	**Ramsar Criterion 1** The site represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK and they play a substantial role in the hydrological and ecological functioning of the Humber basin. **Ramsar Criterion 2** The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates and is the only known site in GB for the leafhopper *Cicadula ornata*. **Ramsar Criterion 4** The site qualifies as a staging post for passage birds in spring, with nationally important numbers of ruff *Philomachus pugnax* and whimbrel *Numenius phaeopus*. **Ramsar Criterion 5** The site supports an internationally important assemblage of waterfowl in the winter with 31,942 waterfowl. **Ramsar Criterion 6** The site supports Eurasian wigeon *Anas penelope* and Eurasian teal *Anas crecca* at levels of international importance during the winter.		No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[28]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
	Thorne Moor SAC (8.9km)	Degraded raised bogs (still capable of natural regeneration)	**Construction:** The proposed construction works required to support the scheme are sufficiently distanced from the site for there to be no direct and in-direct impacts and therefore, no LSE is anticipated. **Operation:** Atmospheric precipitation is the sole source of water entering the site due to its elevation. As the site is located 8.90 km from the scheme and is located at a higher elevation than the scheme, additional groundwater abstraction will not have direct or indirect impacts to the site. As such, no LSE is anticipated to degraded raised bogs. The European nightjar is reliant on patches of European dry heath found within the site. Dry heath is not reliant on ground water and therefore any changes to ground water are not anticipated to have any direct or indirect effects on nightjar supporting habitat. As such, no LSE is anticipated to nightjar..	No Effect
	Thorne and Hatfield Moors SPA (8.9km)	Nightjar *Caprimulgus europaeus* - Breeding		No Effect
	Humber Estuary SPA (13.2km)	Avocet *Recurvirosrta avosetta* – Breeding/Wintering Bittern *Botarus stellaris* – Breeding/Wintering Hen harrier *Circus cyaneus* – Breeding/Wintering Golden plover *Pluvialis apricaria* – Wintering Bar-tailed godwit *Limosa lapponica* – Wintering Ruff *Philomachus pugnax* – Passage Little tern *Sterna albifrons* – Breeding Marsh harrier *Circus aeruginosus* - Breeding Shelduck *Tadorna tadorna* – Wintering Red knot *Calidris canutus* – Wintering/Passage Dunlin *Calidris alpina* - Wintering/Passage Black-tailed godwit *Limosa limosa* – Wintering/Passage Redshank *Tringa totanus* – Wintering/Passage	**Construction:** The proposed construction works required to support the scheme are sufficiently distanced from the site for there to be no direct and in-direct impacts and therefore, no LSE is anticipated. **Operation:** All of the qualifying features of the SAC, SPA and Ramsar site are water dependent. No impacts pathways to tidal, coastal or marine habitats and species associated with the Humber Estuary SAC, SPA and Ramsar site have been identified during operation. The superficial material overlaying the Sherwood Sandstone Group is predominately impermeable lacustrine deposits of the Hemingbrough Glaciolacustrine Formation. Due to these factors, it is highly unlikely that there are surface water connections and therefore there is no hydrological connection to the sites. As such no LSEs anticipated during operation.	No Effect
	Humber Estuary SAC (13.2km)	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*		No Effect
	Humber Estuary Ramsar (13.2km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** Species/populations occurring at levels of international importance: • Golden plover *Pluvialis apricaria* – Passage/Wintering • Red knot *Calidris canutus* – Passage/Wintering • Dunlin *Calidris alpina* –Passage/Wintering • Black-tailed godwit *Limosa limosa* – Passage/Wintering • Bar-tailed godwit *Limosa lapponica* – Wintering • Redshank *Tringa totanus* – Passage/Wintering • Shelduck *Tadorna tadorna* – Wintering **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.		No Effect
Selby Aquifer Storage and Recovery Scheme 1	Humber Estuary Ramsar (4.6km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3**	This option involves utilising an existing abstraction licence for recharge of groundwater with treated water abstracted from the River Derwent when excess is available. The option requires the replacement of existing electrical equipment, a new MCC kiosk, 6m x 3m concrete slab and borehole pump. The maximum borehole flow rate is 5Ml/d.	LSE Alone (Construction) LSE in combination (Operation)

Option(s)	European Site within zone of minor, moderate or major hydrological impact[28]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** Species/populations occurring at levels of international importance: • Golden plover *Pluvialis apricaria* – Passage/Wintering • Red knot *Calidris canutus* – Passage/Wintering • Dunlin *Calidris alpina* –Passage/Wintering • Black-tailed godwit *Limosa limosa* – Passage/Wintering • Bar-tailed godwit *Limosa lapponica* – Wintering • Redshank *Tringa totanus* – Passage/Wintering • Shelduck *Tadorna tadorna* – Wintering **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.	**Construction:** The hydrological distance between the option and the nearest point of the Humber European Sites is 12.6km. Coastal habitats and species can be screened out due to distance from the works. MAGIC Maps revealed that there is no functionally linked land for SPA and Ramsar bird species present within 500m of the option. As such LSE is not anticipated for coastal/marine features and birds. As the River Derwent is hydrologically connected to the Humber Estuary, there is an impact pathway for pollution and sedimentation as a result of construction due to the close proximity of the works (30m) to the River Derwent. The River Derwent is also considered functionally linked land for lamprey species and is a qualifying feature of the River Derwent SAC. As such, LSE is anticipated alone during construction to lamprey. **Operation:** All of the qualifying features of the SAC, SPA and Ramsar site are water dependent. No impacts pathways to tidal, coastal or marine habitats and species associated with the Humber Estuary SAC, SPA and Ramsar site have been identified during operation. As the option will abstract up to 5Ml/day only when excess is available, impacts to the Humber European Sites will be negligible. Therefore, LSE is not anticipated to sea lamprey, river lamprey. However, as there is a pathway for non-significant effects, LSE may occur when combined with effects from other plans or projects.	
	Humber Estuary SAC (4.6km)	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*	LSE Alone (Construction) LSE in combination (Operation)
	Humber Estuary SPA (4.6km)	Avocet *Recurvirosrta avosetta* – Breeding/Wintering Bittern *Botarus stellaris* – Breeding/Wintering Hen harrier *Circus cyaneus* – Breeding/Wintering Golden plover *Pluvialis apricaria* – Wintering Bar-tailed godwit *Limosa lapponica* – Wintering Ruff *Philomachus pugnax* – Passage Little tern *Sterna albifrons* – Breeding Marsh harrier *Circus aeruginosus* - Breeding Shelduck *Tadorna tadorna* – Wintering Red knot *Calidris canutus* – Wintering/Passage Dunlin *Calidris alpina* - Wintering/Passage Black-tailed godwit *Limosa limosa* – Wintering/Passage Redshank *Tringa totanus* – Wintering/Passage	No Effect
	River Derwent SAC (Within)	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*	**Construction:** As the abstraction point of the option is located within the SAC and construction is directly adjacent, there is an impact pathway for pollution and sedimentation as a result of construction due to the close proximity of the works to the River Derwent. Disturbance via vibration and noise may cause LSE to qualifying species. There is also a risk of disturbance to otter as there may be resting places or holts within the River Derwent SAC. As such, LSE is anticipated to all qualifying features. **Operation:** The abstraction will occur directly within the River Derwent SAC. As such, LSE is anticipated alone due to potential changes in hydrology within the SAC.	LSE Alone (Construction and Operation)
	Skipwith Common SAC (7.9km)	European dry heaths Northern Atlantic wet heaths with *Erica tetralix*	**Construction:** No impact pathways have been identified as the European Site is located upstream of the option. As such, no LSE is anticipated during construction. **Operation:** No impact pathways have been identified as the European Site is located upstream of the option. As such, no LSE is anticipated during operation.	No Effect
	Lower Derwent Valley SPA (2.6km)	Ruff Philomachus pugnax - Passage Bewick's Swan Cygnus columbianus bewickii - Wintering Golden Plover Pluvialis apricaria - Wintering Teal Anas crecca– Wintering Wigeon Mareca penelope – Wintering Shoveler Anas clypeata- Breeding	**Construction:** MAGIC Maps revealed that there is no functionally linked land for SPA and Ramsar bird species present within 500m of the option. No impact pathways have been identified as the European Site is located upstream of the option. As such, no LSE is anticipated during construction.	No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[28]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Waterbird Assemblage – Wintering / Passage • Teal – Wintering • Wigeon – Wintering • Shoveler – Passage • Pochard Aythya ferina – Passage • Whimbrel Numenius phaeopus – Passage • Ruff - Passage	**Operation:** No impact pathways have been identified as the European Site is located upstream of the option. As such, no LSE is anticipated during operation.	
	Lower Derwent Valley Ramsar (2.6km)	**Ramsar Criterion 1** The site represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK and they play a substantial role in the hydrological and ecological functioning of the Humber basin. **Ramsar Criterion 2** The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates and is the only known site in GB for the leafhopper *Cicadula ornata*. **Ramsar Criterion 4** The site qualifies as a staging post for passage birds in spring, with nationally important numbers of ruff *Philomachus pugnax* and whimbrel *Numenius phaeopus*. **Ramsar Criterion 5** The site supports an internationally important assemblage of waterfowl in the winter with 31,942 waterfowl. **Ramsar Criterion 6** The site supports Eurasian wigeon *Anas penelope* and Eurasian teal *Anas crecca* at levels of international importance during the winter.		No Effect
	Lower Derwent Valley SAC (2.6km)	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) Otter *Lutra lutra*	**Construction:** Although the Lower Derwent Valley SAC is located 2.6km upstream of the option, there is an impact pathway for otter during construction. Otter are highly mobile and may use the River Derwent for foraging and commuting. Potential impact pathways include pollution incidents and sedimentation within functionally linked land, disturbance via vibration and noise may cause LSE to qualifying species. **Operation:** The increased abstraction will occur directly within the River Derwent SAC which is also designated for otter.. As such, LSE is anticipated alone due to potential changes in hydrology within the functionally linked land present within the River Derwent SAC.	LSE Alone (Construction and Operation – otter only)
York Groundwater Option 1	Humber Estuary Ramsar (~50km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** Species/populations occurring at levels of international importance: • Golden plover *Pluvialis apricaria* – Passage/Wintering • Red knot *Calidris canutus* – Passage/Wintering • Dunlin *Calidris alpina* –Passage/Wintering • Black-tailed godwit *Limosa limosa* – Passage/Wintering • Bar-tailed godwit *Limosa lapponica* – Wintering • Redshank *Tringa totanus* – Passage/Wintering • Shelduck *Tadorna tadorna* – Wintering **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.	This option involves the recommissioning of two or three borehole locations and the WTW. This will require the renewal of all assets and connections at the option location. The boreholes will require drilling due to being backfilled. Installation of a WTW and associated infrastructure is required. This includes MCC at three locations, pumps, and ancillary equipment and pipework. The maximum total flow rate will be 4Ml/day. **Construction** Due to distance, no LSE from construction is anticipated to any marine, coastal, or tidal species. The River Ure is considered to be functionally linked habitat for sea lamprey as spawning has been recorded at Boroughbridge which is located 6.9km upstream of the option. As the option is 200m from the River Ure, there is an assumed pollution impact pathway due to uncertainty of the footprint required to complete the works. **Operation:** It is not anticipated that the drawdown from 4Ml/d will extend to the European sites. Therefore, LSE is not anticipated, however as there is a pathway for significant effects on lamprey species when combined with effects from other plans or projects.	LSE – (Alone) Construction LSE - (in-combination) Operation
	Humber Estuary SAC (~50km)	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)		LSE – (Alone) Construction LSE - (in-combination) Operation

Option(s)	European Site within zone of minor, moderate or major hydrological impact[28]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") Fixed dunes with herbaceous vegetation ("grey dunes") Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*		
Optimisation of York WTW 2	Lower Derwent Valley Ramsar (1km)	**Ramsar Criterion 1** The site represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK and they play a substantial role in the hydrological and ecological functioning of the Humber basin. **Ramsar Criterion 2** The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates and is the only known site in GB for the leafhopper *Cicadula ornata*. **Ramsar Criterion 4** The site qualifies as a staging post for passage birds in spring, with nationally important numbers of ruff *Philomachus pugnax* and whimbrel *Numenius phaeopus*. **Ramsar Criterion 5** The site supports an internationally important assemblage of waterfowl in the winter with 31,942 waterfowl. **Ramsar Criterion 6** The site supports Eurasian wigeon *Anas penelope* and Eurasian teal *Anas crecca* at levels of international importance during the winter.	This high-level option requires increasing the capacity of the WTW by upgrading high-lift pumps and adding Granular Activated Carbon (GAC) beds to increase flow, sacrificing energy efficiency for throughput on site with the potential for increased abstraction. The current capacity is capped at 223Ml/d and would increase to 270Ml/d using current abstraction intake at the River Derwent. An increase in pump availability at Moor Monkton PS, from 3 to 4 or 5 units would also be required. **Construction** Due to the close proximity to the works and the Lower Derwent Valley European Sites and the River Derwent SAC there are potential impact pathways resulting from pollution incidents, vibration, and noise during construction. In addition to this, MAGIC Maps revealed that there is Priority Habitat (Coastal Floodplain and Grazing Marsh and lowland hay meadows) directly adjacent to and downstream of the WTW. This may be utilised as functionally linked land by SPA and Ramsar bird species. There is also a risk of disturbance to otter as there may be resting places or holts within the River Derwent SAC. As such, LSE is anticipated to all qualifying features. **Operation:** The increase in abstraction would allow for an additional 47Ml/d at the current intake at the River Derwent. This may alter flows and hydrology within the River Derwent SAC, Lower Derwent Valley SPA located directly adjacent, and the Lower Derwent Valley SAC located 1km downstream of the option., as such LSE is anticipated during operation to all qualifying features	LSE Alone
	Lower Derwent Valley SPA (directly adjacent)	Ruff Philomachus pugnax - Passage Bewick's Swan Cygnus columbianus bewickii - Wintering Golden Plover Pluvialis apricaria - Wintering Teal Anas crecca– Wintering Wigeon Mareca penelope – Wintering Shoveler Anas clypeata- Breeding Waterbird Assemblage – Wintering / Passage • Teal – Wintering • Wigeon – Wintering • Shoveler – Passage • Pochard Aythya ferina – Passage • Whimbrel Numenius phaeopus – Passage • Ruff - Passage		LSE Alone
	Lower Derwent Valley SAC (1km)	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) Otter *Lutra lutra*		LSE Alone
	River Derwent SAC (Within)	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*		LSE Alone
River Aire Option 1	South Pennine Moors SAC (4.1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	The option requires the construction of a new river intake, a new pumping station, a brake pressure tank, and a pipeline to transfer water to Chellow WTW. The nearest designated site is >4km away from the proposed pipeline, the associated construction and the impacted reach. **Construction:** No impact pathways have been identified as the European Sites are located upstream of the option. As such, no LSE is anticipated during construction. **Operation:** No impact pathways have been identified as the European Sites are located upstream of the option. As such, no LSE is anticipated during construction.	No Effect
	South Pennine Moors Phase 2 SPA (2.4km)	Golden plover *Pluvialis apricaria* - Breeding Merlin *Falco columbarius* - Breeding Breeding Bird Assemblage • Peregrine *Falco peregrinus* • Dunlin *Calidris alpina schinzii* • Short eared owl *Asio flammeus*		No Effect
River Aire Option 2	South Pennine Moors SAC (2.4km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	This option requires the construction of a new intake and pumping station on the north bank of the River Aire at Crossflatts, adjacent to the junction of the A650 and B6265. A short length of pipeline and a valve connection would be needed to join into the existing48-inch diameter pipeline.The new abstraction would direct flows to be discharged to Graincliffe Reservoir and WTW. **Construction:** No impact pathways have been identified as the European Sites are located upstream of the option. The European Sites are sufficiently distant such that no impacts to qualifying species are anticipated. As such, no LSE is anticipated during construction. **Operation:** No impact pathways have been identified as the European Site is located upstream of the option. As such, no LSE is anticipated during construction.	No Effect
	South Pennine Moors Phase 2 SPA (2.4km)	Golden plover *Pluvialis apricaria* - Breeding Merlin *Falco columbarius* - Breeding Breeding Bird Assemblage • Peregrine *Falco peregrinus* • Dunlin *Calidris alpina schinzii* • Short eared owl *Asio flammeus*		No Effect

5. INFORMATION TO INFORM THE APPROPRIATE ASSESSMENT: SUPPLY SIDE DROUGHT OPTIONS

HRA Guidance indicates that the Plan making authority (in this case Yorkshire Water) shall adopt, or otherwise give effect to the Plan, only after having ascertained that it will not cause a likely significant effect on the integrity of a European site. Stage 1 HRA screening of the Drought Plan 2027 has indicated that likely significant effects on the Humber Estuary SAC as a result of the implementation of the North Area Reservoir 1. As such, a Stage 2 Appropriate Assessment is required to determine whether the implementation of the drought options could have an adverse effect on the conservation objectives and subsequently site integrity of these European sites.

5.1 POTENTIAL IMPACTS OF NORTH AREA RESERVOIR 1

5.1.1 Humber Estuary SAC

The potential minor impact on the Humber Estuary Special Area of Conservation (SAC) is from the change in hydrology due to the combined implementation of the drought options and the potential in-combination impacts on designated features resulting from these.

The site hosts both river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*). Sea and river lamprey are designated as part of the Humber Estuary SAC. Sea and river lamprey are Annex I (Habitats Directive) features and are classed as two separate features in the citation.

The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following Species listed in Annex II:

- *1095 Sea lamprey Petromyzon marinus*
- *1099 River lamprey Lampetra fluviatilis*

Of particular concern with regards to the proposed scheme is the potential hydrological impact of the scheme on the habitat availability and connectivity for lamprey species. The River Ure, downstream of the River Burn confluence to the confluence with the River Skell may provide suitable habitat (ammocoete habitat) for lamprey.

Both species can be present in parts of the Ouse catchment, though records of lamprey ammocoetes were not recorded to species level during historical surveys due to the difficulty in identification during the larval life-stage of lamprey. Lamprey ammocetes are likely to be brook lamprey (which don't migrate from sea) in upper reaches given the significant barriers that are present within the catchment.

The North Area Reservoir 1 drought option aims to reduce the compensation release by 50% to 6.83Ml/d from the date the permit is granted and to reduce further to 4.51Ml/d if North Area Reservoir 1 stocks are below the regional Drought Control Line for more than four consecutive weeks. Although the minor threats to the SAC are related to hydrological changes (water velocity, wetted depth, wetted width) the drought permit implementation period is outside the spawning periods of the designated river lamprey – March to April but could coincide with spawning period for sea lamprey. In addition, it is noted that the option may impact on the downstream migration for post-metamorphic transformers of both lamprey species.

The most upstream point of the SAC most likely to be affected by the scheme are located approximately 95km from the most downstream end of the North Area Reservoir 1.

The North Area Reservoir 1 drought option is not expected to result in impacts on passability due to the presence of significant impassable barriers under both drought and normal conditions.

Further to the absence of impacts on migration routes, hydrological impacts on the River Ure are predicted to have only a minor risk of reduction in both wetted aquatic habitat and available aquatic habitat. The presence of suitable river lamprey and sea lamprey spawning and ammocoete habitat is unlikely to be significantly impacted by implementation of the North Area Reservoir 1. The waterbody Pott Beck impacted by the North Area Reservoir 1 drought option is a 1.7km reach with a predominantly cobble and boulder substrate and is therefore unlikely to have significant suitable habitat for spawning or lamprey ammocoetes. A 7.3km reach of the River Burn is impacted by the North Area Reservoir 1 drought option, with the reach containing suitable

spawning habitat for river and sea lamprey. Spawning habitat could be impacted by a moderate reduction in available aquatic habitat.

Although potential impacts on lamprey have been identified within Pott Beck and the River Burn, the limited length of the affected reaches, the absence of river lamprey and sea lamprey records from these reaches both historically and in recent surveys, and the minor nature of effects on the **River Ure**, indicate that implementation of the North Area Reservoir 1 would not adversely affect the integrity of the Humber Estuary SAC.

Integrity Test

In conclusion, the North Area Reservoir 1 drought option will not have an impact on the conservation objectives or the qualifying features of the Humber estuary SAC.

6. INFORMATION TO INFORM THE APPROPRIATE ASSESSMENT: EXTREME SUPPLY SIDE DROUGHT OPTIONS

HRA Guidance indicates that the Plan making authority (in this case Yorkshire Water) shall adopt, or otherwise give effect to the Plan, only after having ascertained that it will not cause a likely significant effect on the integrity of a European site. Stage 1 HRA screening of the Drought Plan 2027 has indicated that likely significant effects are anticipated by implementation of the following extreme options:

1. Catterick Groundwater Option 1
    a. North Pennine Dales Meadows SAC
2. Doncaster Groundwater Option 1
    a. Hatfield Moor SAC
3. Doncaster Groundwater Option 2
    a. Hatfield Moor SAC
4. Doncaster Groundwater Option 3
    a. Hatfield Moor SC
    b. Throne Moor SAC
5. Pickering/Thirsk Groundwater Option 1
    a. Humber Estuary SAC
    b. Humber Estuary SPA
    c. Humber Estuary Ramsar
    d. River Derwent SAC
6. Selby Groundwater Option 2
    a. River Derwent SAC
7. Selby Aquifer Storage and Recovery Scheme 1
    a. Humber Estuary SAC
    b. Humber Estuary Ramsar
8. York Groundwater Option 1
    a. Humber Estuary SAC
    b. Humber estuary Ramsar
9. Optimisation of York WYW 2
    a. Lower Derwent Valley Ramsar
    b. Lower Derwent Valley SPA
    c. Lower Derwent Valley SAC
    d. River Derwent SAC

As such, a Stage 2 Appropriate Assessment is required to determine whether the implementation of the extreme options could have an adverse effect on the conservation objectives and subsequently site integrity of these European sites.

6.1 POTENTIAL IMPACTS OF THE CATTERICK GROUNDWATER OPTION 1 DROUGHT OPTION

6.1.1 Scheme Description

The Catterick Groundwater Option 1 drought option is to apply for a drought permit or drought order to increase abstraction from an existing borehole, giving a benefit of 2 Ml/d during drought conditions.

The abstraction licence varied in February 2024 with an increase in annual average daily output from 8 Ml/d to 10 Ml/d while the daily maximum remains at 12.5 Ml/d. Pumping tests carried out in 2022 showed that a

higher yield of 14 Ml/d is possible. However, the treatment works does not have capacity to treat this amount and there is derogation to a nearby abstractor. To obtain a DO value of 14 Ml/d would require improvements to the treatment works, both BHs to be pumped and mitigation for the derogation to the third-party abstraction. However, the potential option of pumping at 14 Ml/d during extreme drought for between one and three months with compensation to nearby sources is possible.

6.1.2 North Pennine Dales Meadows SAC

6.1.2.1 Description and designated features

The site contains a series of isolated fields within several north Pennine and Cumbrian valleys and encompasses the range of variation exhibited by mountain hay meadows in the UK. The grasslands included within the site exhibit very limited effects of agricultural improvement and show good conservation of structure and function. A wide range of rare and local meadow species are contained within the meadows, including globeflower *Trollius europaeus*, the lady's-mantles *Alchemilla acutiloba*, *A*. *monticola* and *A*. *subcrenata*, and spignel *Meum athamanticum*.

The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*). (purple moor-grass meadows).
- Mountain hay meadows.

Of particular concern with regards to the proposed scheme is the potential hydrological impact of the scheme on the *Molinia* meadows. These meadows are found mainly on moist, moderately base-rich, peats and peaty gley soils, often with fluctuating water tables. This habitat type includes the most species-rich *Molinia* grasslands in the UK, in which purple moor-grass *Molinia caerulea* is accompanied by a wide range of associated species, including rushes, sedges and tall-growing herbs.

Although the major threats to the SAC are related to soil compaction and land use management, there remains uncertainty with regards to the extent of drawdown associated with the increased abstraction and the subsequent impact on groundwater.

6.1.2.2 Conservation Objectives

The conservation objectives for North Pennine Dales Meadows SAC aims to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats
- The structure and function (including typical species) of qualifying natural habitats, and
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely.

6.1.2.3 Location of SAC in relation to the Catterick Groundwater Option 1

Details regarding the geographical location of the SAC in relation to the Catterick Groundwater Option 1 drought option is presented in **Table B6-1**. The units of the SAC most likely to be affected by the scheme are located between 4.9km and 6.7km from the Catterick Groundwater Option 1. North Pennines Dales Meadows Unit 1 is associated with the Richmond Meadows Site of Special Scientific Interest (SSSI), while Unit 2 and Unit 3 are associated with the Gingerfields SSSI.

Table B6-1 SAC Geological details

SAC name and NGR	Associated SSSI	Distance from borehole to closest point on the boundary (KM)	Surface elevation (lowest point) (mAOD)	Difference in surface elevation between SAC and borehole (68.4mAOD) (mAOD)
North Pennines Dales Meadows (Unit 1) (NZ1757900764)	Richmond Meadows	4.911	100.6	32.2
North Pennines Dales Meadows (Unit 2) (NZ1671102229)	Gingerfields	5.966	214	145.6
North Pennines Dales Meadows (Unit 3) (NZ1608402419)	Gingerfields	6.692	240	171.6

6.1.2.3.1 Richmond Meadows

Richmond Meadows are of special interest for their areas of unimproved neutral grassland of a type that is rare and threatened at the local and national levels. The nature conservation is maintained through hay meadow management without agricultural intensification. The site comprises two fields which lie at altitudes of approximately 100m (eastern field) and 150m (western field) above sea level. Both lie on moderately sloping ground, the former on a north-facing slope, the latter south-facing. The grassland communities present are typical of traditionally managed hay meadows of the Northern English Uplands.

Despite the differences in altitude and aspect, the two units are very similar in character and retain a rich flora throughout with a diverse range of hay meadow species. Wood crane's bill, ribwort plantain (*Plantago lanceolata*), common sorrel (*Rumex acetosa*), sweet vernal-grass and red fescue (*Festuca rubra*) are common components of both swards. Also occurring in both fields are meadow crane's bill (*Geranium pratense*), pignut (*Conopodium majus*), meadow vetchling (*Lathyrus pratensis*), crested dog's tail (*Cynosurus cristatus*), common mouse-ear (*Cerastium fontanum*), and lady's-mantle (*Alchemilla glabra*).

Localised variations in soil moisture contribute to variety in the sward's species composition, with great burnet (*Sanguisorba officinalis*)) and meadowsweet (*Filipendula ulmaria*) being locally frequent on the damper areas. A marked ditch runs across the eastern field, and this supports a range of moisture-loving species absent from the western half of the site, including, marsh-marigold (*Caltha palustris*), yellow iris (*Iris pseudacorus*), reed canarygrass (*Phalaris arundinacea*) and floating sweet-grass (*Gylceria fluitans*).

A condition assessment of the SSSI habitat units indicated that the habitats were in an Unfavourable (recovering) and favourable condition respectively. Considering the grassland species associated with the Richmond Meadows SSSI, the meadows are most likely representative of the Annex 1 habitat - Mountain hay meadows. This habitat type is not considered to be a water dependant habitat[29].

6.1.2.3.2 Gingerfields

Gingerfields comprises two meadows in close proximity which are botanically rich and depend on the continuation of traditional grazing and mowing management for the survival of their flora.

The eastern field (SSSI unit 1) is bounded by trees and shrubs including ash *Fraxinus excelsior*, hazel *Corylus avellana*, blackthorn *Prunus spinosa* and dog-rose *Rosa canina*. The sward is characterised by sweet vernal-grass *Anthoxanthum odoratum*, crested dog's-tail *Cynosurus cristatus*, yellow oatgrass *Trisetum flavescens*, quaking-grass *Briza* media and false oatgrass *Arrhenatherum elatius*. Herbs are abundant and include wood crane's-bill *Geranium sylvaticum*, meadow crane's-bill *G. pratense*, oxeye daisy *Leucanthemum vulgare*, red clover *Trifolium pratense*, cowslip *Primula veris*, meadow vetchling *Lathyrus pratensis*, lady'smantle *Alchemilla* agg., betony *Stachys officinalis* and goat's-beard *Tragopogon pratensis*.

[29] UK Technical Advisory Group on the Water Framework Directive (2003). Guidance on the Identification of Natura Protected Areas [Final].

The western field (SSSI unit 2) supports two distinct grassland types. Areas of thin soils have a calcicolous (lime-loving) sward typified by sheep's-fescue *Festuca ovina*, salad burnet *Sanguisorba* minor, common rockrose *Helianthemum nummularium*, lady's bedstraw *Galium verum* and mouseeared hawkweed *Hieracium pilosella*. The majority of the field supports a more neutral sward of crested dog's-tail, sweet vernal-grass, common bent *Agrostis capillaris* and perennial ryegrass *Lolium perenne*. Herbs include ribwort plantain *Plantago lanceolata*, cat's-ear *Hypochoeris radicata* and great burnet *Sanguisorba officinalis*. Most notably, the field supports a large population of the regionally rare species, meadow saffron *Colchicum autumnale*.

A condition assessment of the SSSI habitat units indicated that the habitats were in an unfavourable (recovering) and favourable condition respectively. Considering the grassland species associated with the Gingerfields SSSI, the meadows are most likely representative of the Annex 1 habitat - Mountain hay meadows. This habitat type is not considered to be a water dependent habitat[30].

6.1.2.4 Potential Impact on SAC designated features

6.1.2.4.1 Geology

A review of the geology associated with the study area has been undertaken. The Catterick Groundwater Option 1 borehole lies on a fault between Millstone Grit Group mudstones (to the south, Namurian stage: 326-315Ma (millions of years) and Richmond Chert (to the north, Pendelian stage: ~326Ma).

The geology of the North Pennine Dales Meadows SAC is described as follows:

- Unit 1: lies mostly on Richmond Chert. A small section of the SAC lies on Great Limestone Member (Pendelian, ~326Ma). (The Great Limestone Member is also known as the Main Limestone on British Geological Survey (BGS) 50k geological maps).
- Unit 2: Lies nearly wholly upon the Great Limestone Member. A small section of the site margin lies on Richmond Chert.
- Unit 3: Lies mostly upon the Alston Formation (sandstone) (Asbian stage to Pendelian stage, ~337.5-326Ma). Southern and western margins lie on the Great Limestone Member.

Faulting can commonly control groundwater movement. The borehole lies on an SW-NE trending fault, with no faults linking with SACs. Unit 3 lies on a fault but is not connected to others in the area (according to BGS mapping). It is therefore highly likely that there is no fault connectivity between the three sites and the borehole, and it is assumed that there is no connectivity in groundwater between the sites and the borehole.

6.1.2.4.2 Hydrogeology

A review of *Magic.gov.uk* shows no presence of springs at any of the three sites on its 1:10000 OS mapping layer.

BGS hydrogeology classification data (625k scale) indicates that the lithologies forming the rockhead around the borehole and outwards to the north and west (encompassing the three SAC sites) are the Yordale Group aquifers which are classed as multi-layered, moderately productive aquifers where flow is virtually all through fractures and discontinuities. The BGS data indicates that in these rocks, yields of less than 5l/s are common with most water being derived from limestones and sandstones. On the south side of the fault, where the borehole is situated, the BGS data indicates the rocks are of the Millstone Grit Group aquifer, also a regionally significant, multi-layered, moderately productive aquifer where virtually all flow is through fractures and other discontinuities.

At the Catterick Groundwater Option 1, BGS aquifer properties data state that the borehole abstracts from the Stainmore Formation, which suggests that the source aquifer is likely the Great Limestone Member.

Consideration of Environment Agency Source Protection Zones shows that there is a Zone 1 plotted around the Catterick Groundwater Option 1. This is funnel shaped with the wide end of the funnel pointing due west. The largest distance between the boundary of Zone 1 and the borehole itself is not more than 890m. At its nearest, the River Swale is located approximately 64m south of the Catterick Groundwater Option 1, outside of the Source Protection Zone.

There are two BGS boreholes drilled by George Stow for Yorkshire Water around the abstraction site:

[30] UK Technical Advisory Group on the Water Framework Directive (2003). Guidance on the Identification of Natura Protected Areas [Final].

- SE29NW91 (93.5m depth): http://scans.bgs.ac.uk/sobi_scans/boreholes/83334/images/14440971.html
- SE29NW121 (93.8m depth): http://scans.bgs.ac.uk/sobi_scans/boreholes/83304/images/10097947.html

Both boreholes were drilled between 2 September 1996 to 13 November 1996, and it appears that both of the aforementioned borehole logs are the same. Data indicates that the boreholes are lined to 46mbgl. It is assumed that these are directly related to the Catterick Groundwater Option 1. In the logs, the borehole is stated to be artesian and is lined to maintain this. The pumping rate was recorded as 144.7l/s with a pumped water level of 11.99mbgl. The log notes *"Two sets of casings were grouted in to ensure the artesian pressure could be contained at which ever depth it was encountered. Having hit a fissure at 81m the hole made water during drilling."* The lithology at 81mbgl is noted as *"Hard yellow/grey limestone"* of 6.5m in thickness.

The A8802 Resource Study report[31] indicates that the principal source rock for the borehole is the Great Limestone Member (which underlies the Richmond Chert). In addition to this, the report also indicates that water is supplied to the borehole from the underlying Yordale Cycle rocks of the Wensleydale Group. The aquifers are complex multi-layered aquifers comprising sequences of limestone, mudstone and sandstones. Correlation of the aforementioned borehole logs and BGS cross-section and stratigraphic log on BGS 1:50000 map sheet 41 indicates that the Four Fathom Limestone is located around 81mbgl and this is likely to be the other key groundwater source rock supplying the Catterick Groundwater Option 1. The presence of artesian conditions indicates a confined aquifer, and data indicates artesian flow from a head of up to 6m above ground level[32].

The combination of geological data and the study report therefore indicate that the Great Limestone Member and Four Fathom Limestone are the main sources of water to the borehole, with the former lithology being the principal source.

The Great Limestone Member outcrops around 3km northwest of the site and it is possible that this is in hydraulic continuity with the Richmond Chert and the rocks of the underlying Wensleydale Group. Several potential areas of recharge of the aquifer have been identified, specifically from rainfall falling on the Great Limestone Member where it outcrops to the north and northwest or Richmond, indirect recharge through superficial deposits and upward leakage from the underlying Carboniferous limestones particularly along faults and fractures[33]. Analysis of structural geology of the area indicates that these rocks lie on the southern limb of an anticlinal axis, the Middleton Tyas Anticline. As strata dip gently (~6-9°) in a southeasterly direction, groundwater flows are highly likely to follow the stratal dip. Therefore, the recharge areas are likely to lie to the north and northwest of Richmond.

Since all three units of the SAC lie to some degree on the Great Limestone Member or on a lithology likely to be in hydrological connectivity to it, and hence lie within recharge areas for the borehole, there are questions regarding the potential for impacts on groundwater at these sites.

However, the pressure head in the borehole leads to a piezometric surface for the confined water table to be around 6m above the ground level at the borehole (artesian) when the borehole is not being pumped[34]. The surface elevation at the borehole is around 68mAOD which places the confined water level at around an elevation of 75mAOD. Any drawdown during pumping will lower this piezometric surface. Even though the three SAC units lie on the primary source lithology for the water in the borehole, they all lie at elevations significantly higher than 75mAOD (**Table 6-4**) (the lowest being Unit 1 which is ~35m higher than this level). This indicates that although they lie in the recharge zone, they are all well above the confined groundwater water table even when the borehole is not being pumped.

6.1.2.5 Summary of impacts

The potential major threat to the North Pennine Dales Meadows SAC is from the change in hydrology due to the Catterick Groundwater Option 1 drought option and the potential impacts on designated features resulting from this.

The Resource Study report and analysis of borehole log for the borehole indicate that the Great Limestone Member is the principal aquifer at the borehole, with another source contributing, likely the Four Fathom Limestone. The aquifer itself is confined. These aquifers are multi-layered consisting of limestone beds with

[31] Arup (2006). A8802 Resource Study. Factual Report. September 2006. 123pp.
[32] Ibid.
[33] Ibid.
[34] Arup (2006). A8802 Resource Study. Factual Report. September 2006. 123pp.

interbedded mudstones, siltstones and sandstones. BGS data indicates that the aquifer is likely to be moderately productive aquifer with flow being virtually all through fractures and discontinuities.

Analysis of BGS geological data, particularly faults, indicates that the boreholes lie on a fault. Importantly this fault system does not appear to be connected, or pass close to, any of the three SAC Units. Unit 1 lies on Richmond Chert; Unit 2 lies mostly on the Great Limestone member while Unit 3 lies mostly on the Alston Formation. There are no springs identified on high-resolution OS mapping at any of these sites. The lithologies on which these SACs are found are either the principal source for the borehole or likely hydrologically connected to it (Great Limestone Member) and as such the SACs lie within the rainwater recharge area of the borehole.

Although the Four Fathom Limestone has been identified as another source, the SACs lie on rocks which are geologically younger and lie stratigraphically below the Four Fathom Limestone. This, and the presence of less permeable lithologies stacked vertically, indicates there is likely to be no impact on draw down in the Four Fathom Limestone.

The borehole is artesian, with a piezometric surface which is ~6mAOD above the ground level at the borehole. This means that the rest water level in the confined aquifer from which water is abstracted is no more than 75mAOD elevation. Compared with all three SAC sites, this is significantly lower than the elevation of these sites. Therefore, all three sites already lie above the groundwater water table and cannot be affected by drawdown.

It is also noted that the three SAC units are associated with the Richmond Meadows SSSI and Gingerfields SSSI respectively. Priority habitat data indicates that the habitats associated with these SSSIs are mountain hay meadows and this habitat is not considered to be a water dependant habitat.

Therefore, given the evidence presented above, namely faults, the absence of springs, stratigraphic relationships, dependency of vegetation habitats on water and relationships between groundwater level and SAC site elevation, it is concluded that even though the SACs lie within the recharge area, the sites cannot be impacted by abstraction from the borehole.

6.1.2.6 Integrity Test

In conclusion, the Catterick Groundwater Option 1 option will not, alone or in-combination with other plans or projects, have an impact on the conservation objectives or the qualifying features of the North Pennine Dales Meadows SAC. As such, the Catterick Groundwater Option 1 drought option will not have a adverse effect on the integrity of the European Site.

6.2 POTENTIAL IMPACTS OF THE DONCASTER GROUNDWATER OPTION 1 DROUGHT OPTION

6.2.1 Scheme Description

There are two boreholes at the Doncaster Groundwater Option 1 site with existing unused abstraction licenses (part of the Doncaster wellfield licence, is a complex multi-site licence) due to issues with sand in the abstraction, high nitrate levels, and infrastructure issues. This option aims to recommission the two existing boreholes and reintroduce into supply. This scheme likely requires the relining of boreholes and new headworks. New pumps are also required for the boreholes.

Proposed works include the construction of a new GRP contact tank, two new kiosks for chemical storage and dosing and a slab for a new Motor Control Centre (MCC) kiosk.

The water tower has been decommissioned, so water abstracted would need to be treated elsewhere. There is a new treatment plant at Highfield Lane, which could be utilised. However, it is also feasible and may be preferable from a water resources perspective to transfer the water to Nutwell WTW which has better potential for blending with low nitrate sources. This may require further works (no existing schemes).

The option would provide resilience, rather than new water; reduce grid input, as Highfield Lane and Austerfield do, which minimises wider grid input to the Doncaster supply area. The estimated DO benefit is 4.55 Ml/d, based on existing licences. The option would provide local resilience, reducing input from elsewhere in the Grid into the Doncaster supply area, as Highfield Lane and Austerfield boreholes do, and freeing up resources elsewhere.

Table 6-2 Thorne and Hatfield Moors SPA and SAC Site Improvement Plan Summary[Error! Bookmark not defined.]

Priority	Issue	Feature(s) affected	Measure
1	Drainage	Degraded raised bog	Restore hydrology
2	Inappropriate scrub control	Degraded raised bog	Remove and control excess tree and scrub cover
3	Air Pollution: impact of atmospheric nitrogen deposition	Degraded raised bog	Control and reduce impacts of atmospheric nitrogen deposition
4	Public Access/Disturbance	European nightjar	Minimise disturbance to breeding nightjar
5	Planning Permission: general	European nightjar	Investigate cumulative impacts on nightjar
6	Peat extraction	Degraded raised bog	Reduce impacts of peat extraction and drainage
7	Invasive species	Degraded raised bog	Monitor, and if appropriate, control the Crassula population

6.2.2 Hatfield Moor SAC

6.2.2.1 Description and designated features

Hatfield Moor SAC is a 1,359ha site remnant of an extensive lowland raised bog which once occupied the Humberhead levels. Hatfield is unique in having developed directly upon nutrient deficient gravels without an initial reed-swamp phase. Much of the bog has been cut for peat yet a restricted representative flora and fauna persist within a mosaic of mire and dry heath habitats beneath birch scrub. The mire communities are dominated by cottongrasses *Eriophorum vaginatum* and *E. angustifolium*, cross-leaved heath *Erica tetralix* and bogmosses *Sphagnum* spp., but include locally rare species such as cranberry *Vaccinium oxycoccus*, bog myrtle *Myrica gale* and bog rosemary *Andromeda polifolia*.

The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Degraded raised bogs still capable of natural regeneration

6.2.2.2 Conservation Objectives

The conservation objectives for the Hatfield Moor SAC aims to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of the qualifying natural habitats
- The structure and function (including typical species) of the qualifying natural habitats, and,
- The supporting processes on which the qualifying natural habitats rely.

6.2.2.3 Current site status

The raised bogs within the SAC have undergone extensive historical peat extraction over the past few decades meaning little if any original bog surface remains. Peat-cutting has now ceased, and the bog is being restored over its remaining minimum average depth of 0.5 m of peat. The SAC is therefore in a highly degraded state.

Of the 18 SSSI units of the qualifying SAC habitat (degraded raised bogs), 15 are classified as ‘Unfavourable recovering’, and three are classified as ‘Unfavourable no change’.

Active restoration is ongoing and managed by Natural England (That’s Life Restoring the Humberhead Levels, LIFE13 NAT/UK/000451) to stabilise water levels and encourage the return of characteristic bog species such as *Sphagnum* mosses. The aim is to return the SAC back into a recovering position and to improve water conditions so that water levels are kept within a band of no less than 20cm below current ground levels and no more than 20cm above ground water levels mire communities are capable of re-establish themselves. Water retention within the SAC is therefore of high priority.

Table 6-3 Thorne and Hatfield Moors SPA and SAC Site Improvement Plan Summary[Error! Bookmark not defined.]

Priority	Issue	Feature(s) affected	Measure
1	Drainage	Degraded raised bog	Restore hydrology
2	Inappropriate scrub control	Degraded raised bog	Remove and control excess tree and scrub cover
3	Air Pollution: impact of atmospheric nitrogen deposition	Degraded raised bog	Control and reduce impacts of atmospheric nitrogen deposition
6	Peat extraction	Degraded raised bog	Reduce impacts of peat extraction and drainage
7	Invasive species	Degraded raised bog	Monitor, and if appropriate, control the Crassula population

The main threats to the habitat are the biocenotic evolution, human induced changes in hydraulic conditions and invasion of non-native species (*Rhododendron ponticum*, which is widely abundant in Thorne Moors SAC)[35].

6.2.2.4 Potential impact on designated features

The borehole sources are located approximately 7.5 km south-west of Hatfield Moors SAC. The primary potential impact on the SAC and raised bog habitats is through alterations in hydrology and groundwater levels. Given the highly degraded nature of the raised bog habitat, reduction in water levels could significantly impede restoration efforts and cause further adverse impacts on the feature. These impacts would be exacerbated further during extreme drought conditions.

Since the schemes aim is not to provide increased overall abstraction quantities but to improve operational resilience (i.e., reducing water input from elsewhere) of the Doncaster supply area, it is not anticipated that a significant hydrological impact will adversely impact the SAC. There is groundwater connectivity between the aquifer and the south-west side portion of the SAC. Water may be abstracted from this source in preference to other sources that are more distant from, or less hydrologically connected to, Hatfield Moor SAC. Given the high dependence of the effectiveness of raised bog restoration has on water levels within the SAC, further consideration may be required.

While the qualifying raised bog habitat is ombrotrophic and receives its water principally from precipitation, the integrity of the habitat can nevertheless be influenced by changes to surrounding groundwater and wider hydrological processes.

6.2.2.5 Integrity test

In conclusion, the recommissioning of the borehole may alter the ground source of water supplied to the site. Therefore, adverse effects to Hatfield Moor SAC are anticipated until there is drought modelling is conducted to rule out adverse effects.

6.3 POTENTIAL IMPACTS OF THE DONCASTER GROUNDWATER OPTION 2 DROUGHT OPTION

6.3.1 Scheme Description

The Doncaster Groundwater Option 2 drought option involves utilising existing borehole abstraction licenses (Doncaster wellfield licence, a complex multi-site licence) at two boreholes at the Donacster Groundwater Option 2 site, previously unused. The boreholes are not in use due to turbidity concerns, likely due to borehole integrity failure. Borehole relining is required due to a fissure at the base of the casing. As these are large diameter BHs, the relining is considered relatively straightforward. Rehabilitation would be followed by commissioning and testing. The water is high in nutrients but could be treated at Nutwell WTW which has sufficient capacity. The scheme would provide a likely benefit of 14.2 Ml/d.

6.3.2 Hatfield Moor SAC

6.3.2.1 Description and designated features

Hatfield Moor SAC is a 1359ha site remnant of an extensive lowland raised bog which once occupied the Humberhead levels. Hatfield is unique in having developed directly upon nutrient deficient gravels without an initial reed-swamp phase. Much of the bog has been cut for peat yet a restricted representative flora and fauna persist within a mosaic of mire and dry heath habitats beneath birch scrub. The mire communities are dominated by cottongrasses *Eriophorum vaginatum* and *E. angustifolium*, cross-leaved heath *Erica tetralix* and bogmosses *Sphagnum* spp., but include locally rare species such as cranberry *Vaccinium oxycoccus*, bog myrtle *Myrica gale* and bog rosemary *Andromeda polifolia*.

[35] Natural England (2016) LIFE Project Number LIFE13 NAT/UK/000451: Midterm Report Covering the Project Activities from 01/07/2014 to 01/05/2016. That's LIFE: Restoring the Humberhead Levels. York: Natural England.

The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Degraded raised bogs still capable of natural regeneration

6.3.2.2 Conservation Objectives

The conservation objectives for the Hatfield Moor SAC aims to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of the qualifying natural habitats
- The structure and function (including typical species) of the qualifying natural habitats, and,
- The supporting processes on which the qualifying natural habitats rely.

6.3.2.3 Current site status

The raised bogs within the SAC have undergone extensive historical peat extraction over the past few decades meaning little if any original bog surface remains. Peat-cutting has now ceased, and the bog is being restored over its remaining minimum average depth of 0.5 m of peat. The SAC is therefore in a highly degraded state.

Of the 18 SSSI units of the qualifying SAC habitat (degraded raised bogs), 15 are classified as 'Unfavourable recovering', and three are classified as 'Unfavourable no change'.

Active restoration is ongoing and managed by Natural England (That's Life Restoring the Humberhead Levels, LIFE13 NAT/UK/000451) to stabilise water levels and encourage the return of characteristic bog species such as *Sphagnum* mosses. The aim is to return the SAC back into a recovering position and to improve water conditions so that water levels are kept within a band of no less than 20cm below current ground levels and no more than 20cm above ground water levels mire communities are capable of re-establish themselves. Water retention within the SAC is therefore of high priority.

The main threats to the habitat are the biocenotic evolution, human induced changes in hydraulic conditions and invasion of non-native species (*Rhododendron ponticum*, which is widely abundant in Thorne Moors SAC)[36].

See Section **Error! Reference source not found.** above for a summary of the Site Improvement Plan for the Thorne and Hatfield Moors SPA and SAC.

6.3.2.4 Potential impact on designated features

The borehole sources are located approximately 7.1km from the Hatfield Moors SAC. The scheme does not involve the modification or use of any land within the SAC, therefore direct impacts on the qualifying features of the SPA such as habitat loss or fragmentation are not anticipated.

The primary potential impact on the SAC and raised bog habitats is through alterations in hydrology and groundwater levels. Given the highly degraded nature of the raised bog habitat, reduction in water levels could significantly impede restoration efforts and cause further adverse impacts on the feature. These impacts would be exacerbated further during extreme drought conditions.

Due to the volume of abstraction proposed and the high dependence that the raised bog feature and its restoration success has on water levels within the SAC, further hydrogeological assessment is likely to be required. Adverse effects on the SAC cannot be ruled out due to the potential for changes to groundwater levels and supporting processes.

While the qualifying raised bog habitat is ombrotrophic and receives its water principally from precipitation, the integrity of the habitat can nevertheless be influenced by changes to surrounding groundwater and wider hydrological processes.

[36] Natural England (2016) LIFE Project Number LIFE13 NAT/UK/000451: Midterm Report Covering the Project Activities from 01/07/2014 to 01/05/2016. That's LIFE: Restoring the Humberhead Levels. York: Natural England.

If other construction activities are required, then indirect construction impacts should be considered. However, given the distance to the SAC, it is not expected that these impacts will result in adverse effects on the site if construction best practices are followed.

6.3.2.5 Integrity test

In conclusion, the Doncaster Groundwater Option 2 has potential to have adverse effects on the qualifying features of Hatfield Moors SAC. Further hydrogeological information and drought modelling is required to rule out adverse effects on the integrity of Hatfield Moor SAC and bog restoration initiatives.

6.4 POTENTIAL IMPACTS OF THE DONCASTER GROUNDWATER OPTION 3 DROUGHT OPTION

6.4.1 Scheme Description

The Doncaster Groundwater Option 3 drought option involves utilising existing borehole abstraction licenses (Doncaster wellfield licence, a complex multi-site licence) and recommissioning of three existing boreholes and reintroducing into the supply. The site has been offline since 2002 due to hydrocarbon contamination.

This is considered a major scheme, as full treatment is required and connection to the grid. The boreholes may require relining, new headworks and on-site treatment. Sub-options for treatment are either a new on-site package treatment plant or transfer to Nutwell WTW (no additional treatment steps).

The scheme would provide a likely benefit of 9.09Ml/d. The option would provide local resilience, reducing input from elsewhere in the Grid into the Doncaster supply area freeing up resources elsewhere.

6.4.2 Hatfield Moor SAC

6.4.2.1 Description and designated features

Hatfield Moor SAC is a 1,359ha site remnant of an extensive lowland raised bog which once occupied the Humberhead levels. Hatfield is unique in having developed directly upon nutrient deficient gravels without an initial reed-swamp phase. Much of the bog has been cut for peat yet a restricted representative flora and fauna persist within a mosaic of mire and dry heath habitats beneath birch scrub. The mire communities are dominated by cottongrasses *Eriophorum vaginatum* and *E. angustifolium*, cross-leaved heath *Erica tetralix* and bog mosses *Sphagnum* spp., but include locally rare species such as cranberry *Vaccinium oxycoccus*, bog myrtle *Myrica gale* and bog rosemary *Andromeda polifolia*.

The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Degraded raised bogs still capable of natural regeneration

6.4.2.2 Conservation Objectives

The conservation objectives for the Hatfield Moor SAC aims to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of the qualifying natural habitats
- The structure and function (including typical species) of the qualifying natural habitats, and,
- The supporting processes on which the qualifying natural habitats rely.

6.4.2.3 Current site status

The raised bogs within the SAC have undergone extensive historical peat extraction over the past few decades meaning little if any original bog surface remains. Peat-cutting has now ceased, and the bog is being restored over its remaining minimum average depth of 0.5 m of peat. The SAC is therefore in a highly degraded state.

Of the 18 SSSI units of the qualifying SAC habitat (degraded raised bogs), 15 are classified as ‘Unfavourable recovering’, and three are classified as ‘Unfavourable no change’.

Active restoration is ongoing and managed by Natural England (That’s Life Restoring the Humberhead Levels, LIFE13 NAT/UK/000451) to stabilise water levels and encourage the return of characteristic bog species such

as *Sphagnum* mosses. The aim is to return the SAC back into a recovering position and to improve water conditions so that water levels are kept within a band of no less than 20cm below current ground levels and no more than 20cm above ground water levels mire communities are capable of re-establish themselves. Water retention within the SAC is therefore of high priority.

The main threats to the habitat are the biocenotic evolution, human induced changes in hydraulic conditions and invasion of non-native species (*Rhododendron ponticum*, which is widely abundant in Thorne Moors SAC)[35].

See Section **Error! Reference source not found.** above for a summary of the Site Improvement Plan for the Thorne and Hatfield Moors SPA and SAC.

6.4.2.4 Potential impact on designated features

The borehole sources are located approximately 2km from the Hatfield Moors SAC. The scheme does not involve the modification or use of any land within the SAC, therefore direct impacts on the qualifying features of the SPA such as habitat loss or fragmentation are not anticipated.

The primary potential impact on the SAC and raised bog habitats is through alterations in hydrology and groundwater levels. Given the highly degraded nature of the raised bog habitat, reduction in water levels could significantly impede restoration efforts and cause further adverse impacts on the feature. These impacts would be exacerbated further during extreme drought conditions.

Due to the volume of abstraction proposed, proximity to the SAC and the high dependence that the raised bog feature and its restoration success has on water levels within the SAC, further hydrogeological assessment is likely to be required. Adverse Effects on the SAC cannot be ruled out due to the potential for changes to groundwater levels and supporting processes.

While the qualifying raised bog habitat is ombrotrophic and receives its water principally from precipitation, the integrity of the habitat can nevertheless be influenced by changes to surrounding groundwater and wider hydrological processes.

If construction activities are required, then indirect construction impacts should be considered. However, given the distance to the SAC, it is not expected that these impacts will result in adverse effects on the site if construction best practices are followed (i.e. pollution prevention measures).

6.4.2.5 Integrity test

In conclusion, the Doncaster Groundwater Option 3 has potential to have adverse effects on the qualifying features of Hatfield Moors SAC. Further hydrogeological information, drought modelling, abstraction timings and duration is required to rule out adverse effects on the integrity of Hatfield Moor SAC and bog restoration initiatives.

6.4.3 Thorne Moor SAC

6.4.3.1 Description and designated features

Thorne Moor SAC is a 1,909ha site, comprising England's largest area of raised bog within the former floodplain of the rivers feeding the Humber estuary and includes the sub-components Goole Moors and Crowle Moors. Although management has increased the proportion of active raised bog at Thorne Moors, the inclusion of Goole Moors, where peat-extraction has now ceased, means that the site is still predominantly degraded raised bog. The restored secondary surface is rich in species of bogmosses *Sphagnum* spp., common and hare's-tail cottongrasses *Eriophorum angustifolium* and *E. vaginatum*, heather *Calluna vulgaris*, cross-leaved heath *Erica tetralix*, round-leaved sundew *Drosera rotundifolia*, cranberry *Vaccinium oxycoccos* and bog-rosemary *Andromeda polifolia*.

The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Degraded raised bogs still capable of natural regeneration

6.4.3.2 Conservation Objectives

The conservation objectives for the Thorne Moor SAC aims to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of the qualifying natural habitats
- The structure and function (including typical species) of the qualifying natural habitats, and,
- The supporting processes on which the qualifying natural habitats rely.

6.4.3.3 Current site status

The raised bogs within the SAC have undergone extensive historical peat extraction over the past few decades meaning little if any original bog surface remains. Peat extraction ended in 2004 providing an opportunity to conserve the lowland raised bog. The SAC is therefore in a highly degraded state.

Of the 27 SSSI units of the qualifying SAC habitat (degraded raised bogs), 10 are classified as 'Unfavourable recovering', three are classified as 'Unfavourable no change', and 14 are classified as 'Unfavourable declining'.

The main threats to the habitat are the biocenotic evolution, human induced changes in hydraulic conditions and invasion of non-native species (specifically Rhododendron (*Rhododendron ponticum*) and, Himalayan Balsam (*Impatiens glandulifera*) which are widely abundant in Thorne Moors SAC)[35,37].

Active restoration is ongoing and managed by Natural England (That's Life Restoring the Humberhead Levels, LIFE13 NAT/UK/000451) to stabilise water levels and encourage the return of characteristic bog species such as Sphagnum mosses. The aim is to return the SAC back into a recovering position and to improve water conditions so that water levels are kept within a band of no less than 20cm below current ground levels and no more than 20cm above ground water levels mire communities are capable of re-establish themselves. Water retention within the SAC is therefore of high priority[35]. Specific objectives of the LIFE Moor Space project include:

- Restore 400ha of degraded bog securing the long-term future of the 1,837ha of SAC habitat. This including removing scrub and restoring water levels.
- Work in partnership with land managers in and around the SAC providing practical advice, training and support to identify alternative funding that delivers land uses that work for them and the SAC.
- Promote better understanding and awareness of the value of the SAC to a wide range of audiences in the UK and Europe. This will include financially supporting replication of restoration activities on other sites in the UK and Europe[38].

See Section **Error! Reference source not found.** above for a summary of the Site Improvement Plan for the Thorne and Hatfield Moors SPA and SAC.

6.4.3.4 Potential impact on designated features

The borehole sources are located approximately 5.75km from Thorne Moor SAC. The scheme does not involve the modification or use of any land within the SAC, therefore direct impacts on the qualifying features of the SPA such as habitat loss or fragmentation are not anticipated.

The primary potential impact on the SAC and raised bog habitats is through alterations in hydrology and groundwater levels. Given the highly degraded nature of the raised bog habitat, reduction in water levels could significantly impede restoration efforts and cause further adverse impacts on the feature. These impacts would be exacerbated further during extreme drought conditions.

Due to the volume of abstraction proposed and the high dependence that the raised bog feature and its restoration success has on water levels within the SAC, further hydrogeological assessment is likely to be

[37] Natural England (2019) European Site Conservation Objectives: Supplementary advice on conserving and restoring site features. Thorne Moor Special Area of Conservation (SAC), Site Code: UK0012915. Peterborough: Natural England.

[38] Natural England and Lincolnshire Wildlife Trust (2024) LIFE Moor Space: Connecting the Humberhead Levels. LIFE20 NAT/UK/000697 project leaflet.

required. Adverse effects on the SAC cannot be ruled out due to the potential for changes to groundwater levels and supporting processes

While the qualifying raised bog habitat is ombrotrophic and receives its water principally from precipitation, the integrity of the habitat can nevertheless be influenced by changes to surrounding groundwater and wider hydrological processes.

If construction activities are required, then indirect construction impacts should be considered. However, given the distance to the SAC, it is not expected that these impacts will result in adverse effects on the site if construction best practices are followed (i.e. pollution prevention measures).

While the qualifying raised bog habitat is ombrotrophic and receives its water principally from precipitation, the integrity of the habitat can nevertheless be influenced by changes to surrounding groundwater and wider hydrological processes.

6.4.3.5 Integrity test

In conclusion, the Doncaster Groundwater Option 3 has potential to have adverse on the qualifying features of Thorne Moors SAC. Further hydrogeological information and drought modelling is likely required to rule out adverse effects on the integrity of Hatfield Moor SAC and bog restoration initiatives.

6.5 POTENTIAL IMPACTS OF THE PICKERING/THIRSK GROUNDWATER OPTION 1

6.5.1 Scheme Description

Support to East Ness/Huby/Howardian Hills WSSs. Provides more reliability and resilience. During lower groundwater levels, the flow at the Kelds springs east of the WTW reduces.

When flow over the exit weir ceases, total daily abstraction is limited to 12Ml/d from 17Ml/d. A Drought Permit may be possible to increase abstraction when flow over the Kelds weir is zero. Yield is available in the aquifer.

6.5.2 Humber Estuary SAC

6.5.2.1 Description and Designated features

The Humber is the second largest coastal plain Estuary in the UK, and the largest coastal plain estuary on the east coast of Britain. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. The range of salinity, substrate and exposure to wave action influences the estuarine habitats and the range of species that utilise them; these include a breeding bird assemblage, winter and passage waterfowl, river and sea lamprey, grey seals, vascular plants and invertebrates.

The high suspended sediment loads in the estuary feed a dynamic and rapidly changing system of accreting and eroding intertidal and sub-tidal mudflats and sandflats as well as saltmarsh and reedbeds. Other notable habitats include a range of sand dune types in the outer estuary, together with sub-tidal sandbanks and coastal lagoons. A number of developing managed realignment sites on the estuary also contribute to the wide variety of estuarine and wetland habitats. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion. As salinity declines upstream tidal reedbeds and brackish saltmarsh communities fringe the estuary.

Significant fish species include river lamprey and sea lamprey which migrate through the estuary to breed in the rivers of the Humber catchment. Grey seals come ashore in autumn to form large breeding colonies on the sandy shores of the south bank around Donna Nook.

Qualifying habitats: The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Coastal lagoons*[39]
- Dunes with *Hippophae rhamnoides*

[39] Annex I priority habitats are denoted by an asterisk (*)

- Embryonic shifting dunes
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide
- Fixed dunes with herbaceous vegetation (`grey dunes`)*
- Salicornia and other annuals colonising mud and sand
- Sandbanks which are slightly covered by sea water all the time
- Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes')

Qualifying species: The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Grey seal *Halichoerus grypus*
- River lamprey *Lampetra fluviatilis*
- Sea lamprey *Petromyzon marinus*

6.5.2.2 Conservation Objectives

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features by maintaining or restoring

- The extent and distribution of qualifying natural habitats and habitats of qualifying species
- The structure and function (including typical species) of qualifying natural habitats
- The structure and functions of the habitats of qualifying species
- The supporting processes on which the qualifying natural habitats and habitats of qualifying species rely
- The populations of qualifying species, and
- The distribution of qualifying species within the site.

6.5.2.3 Current Site Status

The Humber Estuary SSSI has 42.22% of features in favourable condition, 4.44% in Unfavourable – Recovering, 15.56% Unfavourable – No change, 22.22% Unfavourable – Declining, and 15.56% not recorded.

Atlantic salt meadows are in favourable condition. Overall, the condition of saltmarsh in 18 units was assessed as favourable. Targets passed in all units: total extent of saltmarsh/ intertidal reedbed and swamp; invertebrate habitat; absence of undesirable plant species; absence of other negative factors – including pollution (excluding inorganic tidal debris), poaching, new drainage, physical damage, increase in bare substrate as a result of anthropogenic activities such as vehicle use or trampling at vulnerable locations. In some units saltmarsh was assessed as unfavourable due to failing at least one of the following attributes: i) extent of SAC Atlantic saltmarsh. There are indications that these communities, which are mainly in the outer estuary, have declined in some units due to expansion of reedbed/couch grass and localised erosion.

Coastal lagoons are in favourable condition. At each location the lagoons passed the targets for the following attributes: habitat extent, littoral sediment, extent of water, depth of water, presence and nature of isolating barrier, restrict introduction of invasive non-native species, salinity regime.

Embryonic shifting dunes are in unfavourable – Declining condition. This is because there are areas which failed targets for the following attributes: lack of intact zonation from strandline to fixed dune grasslands; number of characteristic species (lack of species diversity); insufficient flowering and fruiting of dune species; anthropogenic influences on sediment mobility (e.g. sea embankments, groynes); bare ground from human activity. However, in some of the large units all targets were met and the feature was in favourable condition. The extent of sand dune zones and NVC communities has not changed significantly since 2001 (with some changes due to loss from erosion). There is generally good functional connectivity between sand dunes and saltmarsh, particularly in the larger units.

Estuary condition has not been recorded. However, Estuary has been recorded as Unfavourable recovering in Littoral Sediment Units as water quality parameters have failed within the last six year due to the dissolved oxygen sag in the Humber. Reduction of the DO Sag has been a priority of the Environment Agency through the recent review of consent work. he subtidal morphology of the Humber Estuary has been identified as displaying a cycle in the behaviour of the banks and channels with a period of approximately 14-years. These

cyclic changes have been related to similar patterns observed in the siltation rates within the estuary, which are themselves modified in magnitude of change by long-term and seasonal changes in freshwater flow which adjust density gradients and lead to changes in the flow characteristics close to the bed.

Fixed dunes are in unfavourable declining condition. The feature is failing targets for sward height, number of characteristic species, age structure of sea buckthorn, and the presence of INNS.

Grey seal are in favourable condition. There have been increasing numbers of pups and distribution has remained stable. The site remains accessible for grey seals during breeding season.

River lamprey and sea lamprey conditions have not been recorded. However, they have been assessed within Littoral Sediment Units. River lamprey and sea lamprey are continuing to breed in spawning rivers. Sea lamprey and the estuary features have been judged as unfavourable recovering (at risk) as water quality parameters have failed within the last six year due to the dissolved oxygen sag in the Humber which can affect migration. Reduction of the DO Sag has been a priority of the Environment Agency through the recent review of consent work.

6.5.2.4 Potential Impact on designated features

The Humber Estuary SAC is located approximately 60km downstream of the option. All coastal and marine features have been screened out in the Stage 1 Screening assessment and are not considered further. Only riverine species, bull head and lamprey are considered within the Stage 2 Appropriate Assessment.

The additional borehole will result in 4Ml/d taken from the aquifer at Keld Springs when there is no flow on over Keld Weir. The Humber Estuary is located over 60km from the option. The abstraction location is isolated from the River Derwent and the Humber Estuary by a barrier (a weir) and as such, there is limited habitat connectivity for lamprey and bullhead.

6.5.2.5 Integrity test

In conclusion, the increased borehole abstraction is limited to when there is no flow entering the river system over the weir in Keld Springs. As there will be no flow entering the catchment and the weir acting as a barrier to fish passage, abstraction will not lead to adverse effect on the integrity of the SAC

6.5.3 Humber Estuary Ramsar

6.5.3.1 Description and Designated features

The Humber Estuary is the largest macro-tidal estuary on the British North Sea coast. It drains a catchment of some 24,240km^2 and is the site of the largest single input of freshwater from Britain into the North Sea. It has the second-highest tidal range in Britain (max 7.4m) and approximately one-third of the estuary is exposed as mud or sand flats at low tide. The inner estuary supports extensive areas of reedbed with areas of mature and developing saltmarsh backed in places by limited areas of grazing marsh in the middle and outer estuary. On the north Lincolnshire coast the saltmarsh is backed by low sand dunes with marshy slacks and brackish pools. The Estuary regularly supports internationally important numbers of waterfowl in winter and nationally important breeding populations in summer.

Ramsar criterion 1

The site is a representative example of a near-natural estuary with the following component habitats: dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons.

Ramsar criterion 3

The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita.*

Ramsar criterion 5

Assemblages of international importance: 153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001).

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Eurasian golden plover, *Pluvialis apricaria altifrons* subspecies – NW Europe, W Continental Europe, NW Africa population 17,996 individuals, passage, representing an average of 2.2% of the population (5 year peak mean 1996-2000).

Red knot, *Calidris canutus islandica* subspecies 18,500 individuals, passage, representing an average of 4.1% of the population (5 year peak mean 1996-2000).

Dunlin, *Calidris alpina alpina* subspecies – Western Europe (non-breeding) population 20,269 individuals, passage, representing an average of 1.5% of the population (5 year peak mean 1996-2000).

Black-tailed godwit, *Limosa limosa islandica* subspecies 915 individuals, passage, representing and average of 2.6% of the population (5 year peak mean 1996-2000).

Common redshank, *Tringa totanus brittanica* subspecies 7,462 individuals, passage, representing an average of 5.7% of the population (5 year peak mean 1996-2000).

Common shelduck, *Tadorna tadorna* Northwestern Europe (breeding) population 4,464 individuals, wintering, representing an average of 1.5% of the population (5 year peak mean 1996/7-2000/1).

Eurasian golden plover, *Pluvialis apricaria altifrons* subspecies – NW Europe, W Continental Europe, NW Africa population 30,709 individuals, wintering, representing an average of 3.8% of the population (5 year peak mean 1996/7-2000/1).

Red knot, *Calidris canutus islandica* subspecies 28,165 individuals, wintering, representing an average of 6.3% of the population (5 year peak mean 1996/7-2000/1) .

Dunlin, *Calidris alpina alpina* subspecies – Western Europe (non-breeding) population 22,222 individuals, wintering, representing an average of 1.7% of the population (5 year peak mean 1996/7-2000/1).

Black-tailed godwit, *Limosa limosa islandica* subspecies 1,113 individuals, wintering, representing an average of 3.2% of the population (5 year peak mean 1996/7-2000/1) .

Bar-tailed godwit, *Limosa lapponica lapponica* subspecies 2,752 individuals, wintering, representing an average of 2.3% of the population (5 year peak mean 1996/7-2000/1).

Common redshank, *Tringa totanus brittanica* subspecies 4,632 individuals, wintering, representing an average of 3.6% of the population (5 year peak mean 1996/7-2000/1).

6.5.3.2 Conservation Objectives

Ramar sites are not awarded conservation objectives. As such, the Humber Estuary SPA Conservation Objectives will be used as a proxy. The SPA Conservation Objectives are below.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining and restoring;

- The extent and distribution of the habitats of the qualifying features
- The structure and function of the habitats of the qualifying features
- The supporting processes on which the habitats of the qualifying features rely
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site.

6.5.3.3 Current Site Status

Current site status for estuaries grey seal, and lamprey species can be found in Section 6.5.2.3.

The following conditions have been collated from the Humber Estuary SSSI, North Killingholme Haven Pits SSSI, Saltfleetby – Theddlethorpe Dunes SSSI, and Lagoons SSSI.

Golden plover – Favourable: The population across the whole estuary is very similar to baseline and as such, been given favourable status. The species is on medium WeBS alert for declines within the SPA since baseline due to broadscale population trends. Extent of habitat has been maintained (Humber Estuary SSSI).

Red knot – Favourable: The population across the whole estuary has declined less than 25% which is the threshold for favourable condition, although there are concerns about population decline. Extent of habitat has been maintained (Humber Estuary SSSI). The species has been assessed as favourable at Saltfleetby – Theddlethorpe Dunes SSSI, however, this assessment is based on the historic unit-specific conditions.

Dunlin – Unfavourable – no change: The population across the whole estuary has declined by more than 25% which is the threshold used for unfavourable condition. The population is within 25% of the previous assessment in 2010, therefore is no change. The species is on medium WeBS alert for long-term declines within the SPA. Extent of habitat has been maintained (Humber Estuary SSSI). The species has been assessed as favourable at Saltfleetby – Theddlethorpe Dunes SSSI, however, this assessment is based on the historic unit-specific conditions.

Black-tailed godwit – Favourable: The population has increased since the baseline assessment and habitat extent has been maintained (Humber Estuary SSSI). The population mean counts were 3476 in the latest counts, meeting the target set at 710 (North Killingholme Haven Pits SSSI).

Redshank – Unfavourable – declining: The population across the whole estuary has declined by more than 50% and is in unfavourable condition. This is a further decline by more than 25% since last assessed in 2010. The species is on high WeBS alert for declines within the SPA since baseline. Extent of habitat has been maintained (Humber Estuary SSSI). The species has been assessed as favourable at Saltfleetby – Theddlethorpe Dunes SSSI, however, this assessment is based on the historic unit-specific conditions.

Shelduck – Favourable: The population across the whole estuary is very similar to baseline and has been given favourable condition. Extent of habitat has been maintained (Humber Estuary SSSI).

Bar-tailed godwit – Unfavourable – declining: The population across the whole estuary has declined by more than 25% which is the threshold used for unfavourable conditions. This is a further decline by more than 25% since 2010 and has been declining since the baseline assessment. The species is on high WeBS alert for declines within the SPA since baseline (Humber Estuary SSSI).

Natterjack toad – Unfavourable – recovering: This baseline feature has been calculated from the historic unit-specific conditions (Saltfleetby - Theddlethorpe Dunes SSSI).

6.5.3.4 Potential Impact on designated features

The Humber estuary SAC is located approximately 60km downstream of the option. All coastal and marine features have been screened out in the Stage 1 Screening assessment and are not considered further. Only riverine species, bull head and lamprey are considered within the Stage 2 Appropriate Assessment.

The additional borehole will result in 4Ml/d taken from the aquifer at Keld Springs when there is no flow on over Keld Weir. The Humber Estuary is located over 60km from the option. The abstraction location is isolated from the River Derwent and the Humber Estuary by a barrier (a weir) and as such, there is limited habitat connectivity for lamprey and bullhead.

6.5.3.5 Integrity test

In conclusion, the increased borehole abstraction is limited to when there is no flow entering the river system over the weir in Keld Springs. As there will be no flow entering the catchment due to the weir, abstraction will not lead to adverse effect.

6.5.4 River Derwent SAC

6.5.4.1 Description and Designated Features

The Yorkshire Derwent is considered to represent one of the best British examples of the classic river profile. This lowland section, stretching from Ryemouth to the confluence with the Ouse, supports diverse communities of aquatic flora and fauna. Fed from an extensive upland catchment, the lowland course of the Derwent has been considerably diverted and extended as a result of glacial action in the Vale of Pickering. The river supports an aquatic flora uncommon in Northern Britain.

Several species, including river water-dropwort *Oesanthe fluviatalis*, flowering rush *Botomus umbellatus*, shining pondweed *Potamogeton lucens*, arrowhead *Sagittaria sagittifolia*, opposite leaved pondweed *Groenlandia densa*, and narrow leaved water-parsnip *Berula erecta* are more typically found in lowland rivers in southern England. The Derwent is noted for the diversity of its fish communities, which include river lamprey and sea lamprey populations that spawn in the lower reaches as well as bullhead *Cottus gobio*. The diverse habitats also supports otters *Lutra lutra.*

Qualifying habitats: The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Water courses of plain to montane levels with the *Ranunculion fluitanis* and *Callitricho-Batrachion* vegetation (Rivers with floating vegetation often dominated by water-crowfoot).

Qualifying species: The site is designated article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Bullhead *Cottus gobio*
- River lamprey *Lampetra fluviatilis*
- Sea lamprey *Petromyzon marinus*
- Otter *Lutra lutra*

6.5.4.2 Conservation Objectives

The objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring:

- the extent and distribution of qualifying natural habitats and habitats of the qualifying species
- the structure and function (including typical species) of qualifying natural habitats
- the structure and function of the habitats of the qualifying species
- the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
- the populations of each of the qualifying species
- the distribution of qualifying species within the site

6.5.4.3 Current Site Status

The overall feature condition of the River Derwent SSSI is 66.67% favourable, 16.67% Unfavourable recovering, and 16.67% Unfavourable no change. The overall condition of the River Derwent SSSI Units is 5.53% favourable, 93.69% Unfavourable recovering, and 0.78% unfavourable no change. Otter is in favourable condition; however, this has been calculated from the historic unit-specific conditions. There are no other species associated with the SAC that are assessed within the SSSI. Rivers and streams and River Supporting habitat has been assessed at Unfavourable recovering and Unfavourable no change respectively.

Table 6-4 River Derwent SAC Site Improvement Plan Summary[40]

Priority	Issue	Feature(s) affected	Measure
1	Physical modification	Rivers with floating vegetation often dominated by water-crowfoot, Sea lamprey, River lamprey, Bullhead	Implement the actions of the River Restoration Plan
2	Water pollution	Rivers with floating vegetation often dominated by water-crowfoot, Sea lamprey, River lamprey, Bullhead, Otter	Implement the actions of the Diffuse Water Pollution Plan (DWPP)
3	Invasive species	Rivers with floating vegetation often dominated by water-crowfoot, S1095 Sea lamprey, River lamprey, Bullhead	Development and implementation of an Invasives Control Plan
4	Change in land management	Rivers with floating vegetation often dominated by water-crowfoot, Sea lamprey, River lamprey, Bullhead	Establish appropriate riparian management through implementation of NELMS
5	Water abstraction	Rivers with floating vegetation often dominated by water-crowfoot, Sea lamprey, River lamprey, Bullhead	Implementation of water resource management, in line with Common Standards Monitoring Guidance

[40] SIP141008FINALv1.0 River Derwent (3).pdf

6.5.4.4 Potential Impact on designated features

The Pickering/Thirsk Groundwater Option 1 is located approximately 12km from the site. The additional borehole will result in 4Ml/d taken from the aquifer at Keld Springs when there is no flow on over Keld Weir. The River Derwent SAC is located 12km from the option. The abstraction location is isolated from the River Derwent and the Humber Estuary by a barrier (a weir) and as such, there is limited habitat connectivity for lamprey

There is a risk of visual and noise disturbance to otter. Otter are highly mobile and are not limited by watercourse barriers. An otter survey should be conducted to determine the presence of and inform mitigation to ensure no adverse effects to otter.

6.5.4.5 Integrity test

In conclusion, the increased borehole abstraction is limited to when there is no flow entering the river system over the weir in Keld Springs. As there will be no flow entering the catchment due to the weir, abstraction will not lead to adverse effect to lamprey. Following an otter survey and the implementation of mitigation, there will be no adverse effect to otter.

6.6 POTENTIAL IMPACTS OF SELBY GROUNDWATER OPTION 2

6.6.1 Scheme description

The Selby Groundwater Option 2 aims to increase groundwater supply from the Selby borehole system and improve raw water transfer to the Water Treatment Works (WTW). The scheme comprises enabling works to restore and optimise borehole performance, together with upgrades to the existing rising main between the Borehole Site and the WTW to improve transfer capacity.

Selby Groundwater Option 2 is one of four sources supplying the WTW. Water from the site feeds the Selby Ring Main, which supplies the Selby area and can transfer water to the wider Yorkshire Water grid via Brayton SRE and to the Doncaster/Nutwell Water Supply System via the Roall pumping station.

Selby Groundwater Option 2 is licensed to abstract up to 13.7 Ml/d on average and 15 Ml/d as a maximum. Current output is approximately 10-10.4 Ml/d, compared with a historical average of 8-9 Ml/d and a maximum recorded output of 11 Ml/d over the last four years. Output has been constrained by the loss of Borehole 3 and by sand deposition within the existing raw water main to the WTW, which restricts transfer capacity. Following completion of the proposed works, the option is expected to provide an additional deployable output of approximately 3.2 Ml/d.

6.6.2 River Derwent SAC

6.6.2.1 Description and Designated Features

Please see **Section 6.5.4.1** for description and designated features.

6.6.2.2 Conservation Objectives

Please see **Section 6.5.4.2**for conservation objectives.

6.6.2.3 Current Site Status

Please see 6.5.4.3 for current site status.

6.6.2.4 Potential impacts on designated features

The rivers within the Selby Wellfield are considered to be largely disconnected from the bedrock groundwater regime based on the geology, although there is limited surface water monitoring data to confirm this. Both the abstraction and the River Derwent SAC are located within the Sherwood Sandstone Aquifer. . The option would principally restore existing abstraction capacity within current licensed limits, although abstraction would increase by 3.2 Ml/d relative to current operating conditions.

The option would only be implemented during a severe and prolonged drought when groundwater recharge and river flows are already likely to be reduced. The River Derwent is predominantly groundwater-fed with flows being dependent on levels in the main aquifers[41].

Whilst available evidence from the AMP7 WINEP Groundwater Investigations[42] indicates a generally stable groundwater system with no currently identified risk of groundwater body deterioration, the assessment did not consider increased abstraction at Selby Groundwater Option 2 during an extreme drought event. Uncertainty therefore remains regarding the degree of hydraulic connectivity between the abstraction source and the River Derwent SAC and the potential effects of increased abstraction during prolonged drought conditions. Consequently, it cannot be excluded that implementation of the option could reduce groundwater availability to the SAC at a time when qualifying features are already under environmental stress

6.6.2.5 Integrity Test

The option would only be implemented during severe drought conditions when the qualifying features of the River Derwent SAC are likely to be most vulnerable to changes in water availability. Whilst available evidence indicates a generally stable groundwater system, uncertainty remains regarding the potential effects of increased abstraction on groundwater contributions to the SAC. Therefore, adverse effects on site integrity cannot be ruled out beyond reasonable scientific doubt.

6.7 POTENTIAL IMPACTS OF SELBY AQUIFER STORAGE AND RECOVERY SCHEME 1

6.7.1 Scheme description

The Selby Aquifer Storage and Recovery Scheme 1 is for recharge of groundwater with treated water abstracted from the River Derwent when excess is available, for use in a drought. The existing abstraction licence is currently unused, and the site connected to the Grid through the WTW. The site was tested during the 2018 drought, making use of the separate groundwater licence for the ASR scheme. The site currently requires an operative in a cabin for a few hours to perform the injection, so the system needs to be automated.

The proposed solution is to replace existing mechanical and electrical equipment to provide an automated injection and recovery system as its currently beyond its asset life. The license is due to expire in 2027. The daily output is expected to be 4-5Ml/d over a three to four month period (during short term drought).

6.7.2 Humber Estuary SAC

6.7.2.1 Description and Designated Features

Please see **Section 6.5.2.1** for description and designated features.

6.7.2.2 Conservation Objectives

Please see **Section 6.5.2.2** for conservation objectives.

6.7.2.3 Current Site Status

Please see **Section 6.5.2.3** for current site status.

6.7.2.4 Potential impacts on designated features

Selby Aquifer Storage and Recovery Scheme 1 is located approximately 4.6km from the Humber Estuary SAC. All coastal and marine features have been screened out in the Stage 1 Screening assessment and are not considered further. Only riverine species, bull head and lamprey are considered within the Stage 2 Appropriate Assessment.

---

[41] Environment Agency (2026) Yorkshire Derwent Abstraction Licensing Strategy. https://www.gov.uk/government/publications/abstraction-licensing-derwent-strategy/yorkshire-derwent-abstraction-licensing-strategy

[42] ARUP (2025) *AMP7 WINEP Groundwater Investigations: Water Resources Wellfield Investigations. Selby Wellfield Phase 3 Final Report, Issue 2.* Report prepared for Yorkshire Water Services Ltd., April 2025.

Construction impacts include pollution incidents, sedimentation, and dust emission as the site is directly adjacent to the River Derwent which flows into the Humber Estuary. With Best Practice mitigation measures, there will be not impacts during construction. A CEMP should be produced top address impacts from pollution incidents, sedimentation, and dust.

During operation, there may be impacts to lamprey species due to changes in hydrology and flows in the River Derwent, which is functionally linked habitat for lamprey species. Spawning of sea lamprey is restricted to the Ouse catchment. There is thought to be spawning within the River Derwent at Nunnington d/s. River lamprey spawn in River Ouse catchment. Spawning and larval development in both occur within the lower reaches of the River Derwent. Abstraction is listed in the SIP and changes in flow will change the overall hydrology of the River Derwent. As the additional abstraction will only be conducted when excess water is available within the River Derwent to be stored within the borehole, there will be no additional impact as baseline flows will be maintained.

6.7.2.5 Integrity Test

In conclusion, there will be no adverse effects on integrity during construction as long as a CEMP is produced to address impacts resulting from pollution incidents, sedimentation, and dust emission.. As abstraction will only be conducted while there is excess water available within the River Derwent, there will be no alteration to flows outside of baseline conditions. As such, there will be no adverse effects on integrity.

6.7.3 Humber Estuary Ramsar

6.7.3.1 Description and Designated Features

Please see **Section 6.5.3.1** for description and designated features.

6.7.3.2 Conservation Objectives

Please see **Section 6.5.3.2** for conservation objectives.

6.7.3.3 Current Site Status

Please see **Section 6.5.3.3** for current site status.

6.7.3.4 Potential impacts on designated features

The Selby Aquifer Storage and Recovery Scheme 1 is located approximately 4.6km from the Humber Estuary Ramsar. All coastal and marine features have been screened out in the Stage 1 Screening assessment and are not considered further. Only riverine species, bull head and lamprey are considered within the Stage 2 Appropriate Assessment.

Construction impacts include pollution incidents as the site is directly adjacent to the River Derwent which flows into the Humber Estuary. With Best Practice industry standard pollution measures, there will be not impacts during construction. A CEMP should be produced top address impacts from pollution incidents, sedimentation, and dust.

During operation, there may be impacts to lamprey species due to changes in hydrology and flows in the River Derwent, which is functionally linked habitat for lamprey species. Spawning of sea lamprey is restricted to the Ouse catchment. There is thought to be spawning within the River Derwent at Nunnington d/s. River lamprey spawn in River Ouse catchment. Spawning and larval development in both occur within the lower reaches of the River Derwent. Abstraction is listed in the SIP and changes in flow will change the overall hydrology of the River Derwent. As the additional abstraction will only be conducted when excess water is available within the River Derwent to be stored within the borehole, there will be no additional impact as baseline flows will be maintained.

6.7.3.5 Integrity Test

There will be no adverse effects on integrity during construction as long as a CEMP is produced to address impacts resulting from pollution incidents, sedimentation, and dust. As abstraction will only be conducted while there is excess water available within the River Derwent, there will be no alteration to flows outside of baseline conditions. As such, there will be no adverse effects on integrity.

6.7.4 River Derwent SAC

6.7.4.1 Description and Designated Features

Please see **Section 6.5.4.1** for description and designated features.

6.7.4.2 Conservation Objectives

Please see **Section 6.5.4.2** for conservation objectives.

6.7.4.3 Current Site Status

Please see **Section6.5.4.3** for current site status.

6.7.4.4 Potential impacts on designated features

The Selby Aquifer Storage and Recovery Scheme 1 is located within the River Derwent SAC. Construction impacts include pollution incidents as the site is directly adjacent to the River Derwent which flows into the River Derwent. With Best Practice industry standard pollution measures, there will be not impacts during construction. A CEMP should be produced to address impacts from pollution incidents, sedimentation, and dust. In addition to this, there is a risk of visual and noise disturbance to otter. Otter may have holts and resting places within the River Derwent near the option. An otter survey should be conducted to determine if otters are present. Mitigation should be outlined in an otter survey report.

During operation, there may be impacts to lamprey species due to changes in hydrology and flows in the River Derwent. Abstraction is listed in the SIP, however, the abstraction will only be conducted when excess water is available within the River Derwent to be stored within the borehole. There will be no adverse effect as baseline flows will be maintained within the River Derwent SAC..

6.7.4.5 Integrity Test

There will be no adverse effects on integrity during construction as long as a best practice industry measures for pollution and sediment are implemented and detailed within the CEMP. Mitigation should be implemented following otter surveys on the River Derwent. As abstraction will only be conducted while there is excess water available within the River Derwent, there will be no alteration to flows outside of baseline conditions. As such, there will be no adverse effects on integrity.

6.8 POTENTIAL IMPACTS OF YORK GROUNDWATER OPTION 1

6.8.1 Scheme Description

This option involves the recommissioning of two or three borehole locations and the WTW. This will require the renewal of all assets and connections at the option location. The boreholes will require drilling due to being backfilled. Installation of a WTW and associated infrastructure is required. This includes MCC at three locations, pumps, and ancillary equipment and pipework. The maximum total flow rate will be 4Ml/day.

6.8.2 Humber Estuary SAC

6.8.2.1 Description and Designated Features

Please see **Section 6.5.2.1** for description and designated features.

6.8.2.2 Conservation Objectives

Please see **Section 6.5.2.2** for conservation objectives.

6.8.2.3 Current Site Status

Please see **Section6.5.2.3** for current site status.

6.8.2.4 Potential impacts on designated features

The York Groundwater Option 1 is located approximately 50km from the Humber SAC, however, there is known spawning habitat of lamprey approximately 6.9km upstream on the River Ure All coastal and marine features have been screened out in the Stage 1 Screening assessment and are not considered further. Only riverine species, bull head and lamprey are considered within the Stage 2 Appropriate Assessment.

Construction impacts include pollution incidents, sedimentation, and dust emission as the site is directly adjacent to the River Ure which is functionally linked the River Derwent and Humber Estuary. With Best Practice industry standard pollution measures, there will be not impacts during construction. A CEMP should be produced top address impacts from pollution incidents, sedimentation, and dust.

The River Ure has been identified as functionally linked habitat for migratory lamprey species (river lamprey and sea lamprey). During operation, there may be impacts to lamprey species due to changes in hydrology and flows. Reduction in flows may reduce water quality and thus adversely affect lamprey species

6.8.2.5 Integrity Test

There will be no adverse effects on integrity during construction as long as a best practice industry measures for pollution and sediment are implemented and detailed within the CEMP. It is unclear if the boreholes are connected to surface water or the River Ure. As such, additional hydrology and hydrogeomorphology investigations must be completed to conclude no adverse effect. Due to uncertainty, adverse effects are anticipated during operation.

6.8.3 Humber Estuary Ramsar

6.8.3.1 Description and Designated Features

Please see **Section 6.5.3.1** for description and designated features.

6.8.3.2 Conservation Objectives

Please see **Section 6.5.3.2** for conservation objectives.

6.8.3.3 Current Site Status

Please see **Section 6.5.3.3** for current site status.

6.8.3.4 Potential impacts on designated features

The York Groundwater Option 1 is located approximately 50km from the Humber SAC, however, there is known spawning habitat of lamprey approximately 6.9km upstream on the River Ure All coastal and marine features have been screened out in the Stage 1 Screening assessment and are not considered further. Only riverine species, bull head and lamprey are considered within the Stage 2 Appropriate Assessment.

Construction impacts include pollution incidents, sedimentation, and dust emission as the site is directly adjacent to the River Ure which is functionally linked the River Derwent and Humber Estuary. With construction best practice , there will be not impacts during construction. A CEMP should be produced top address impacts from pollution incidents, sedimentation, and dust.

The River Ure has been identified as functionally linked habitat for migratory lamprey species (river lamprey and sea lamprey). During operation, there may be impacts to lamprey species due to changes in hydrology and flows. Reduction in flows may reduce water quality and thus adversely affect lamprey species

6.8.3.5 Integrity Test

There will be no adverse effects on integrity during construction as long as a best practice industry measures for pollution and sediment are implemented and detailed within the CEMP It is unclear if the boreholes are connected to surface water or the River Ure. As such, additional hydrology and hydrogeomorphology investigations must be completed to conclude no adverse effect. Due to uncertainty, adverse effects are anticipated during operation.

6.9 POTENTIAL IMPACTS OF OPTIMISATION OF YORK WTW 2

6.9.1 Scheme Description

This high-level option requires increasing the capacity of the WTW by upgrading high-lift pumps and adding Granular Activated Carbon (GAC) beds to increase flow, sacrificing energy efficiency for throughput on site with the potential for increased abstraction. The current capacity is capped at 223Ml/d and would increase to 270Ml/d using current abstraction intake at the River Derwent. An increase in pump availability at Moor Monkton PS, from 3 to 4 or 5 units would also be required.

6.9.2 Lower Derwent Valley Ramsar

6.9.2.1 Description and Designated Features

Please see **Section** Error! Reference source not found. for description and designated features.

6.9.2.2 Conservation Objectives

Please see **Section** Error! Reference source not found. for conservation objectives.

6.9.2.3 Current Site Status

Please see **Section** Error! Reference source not found. for current site status.

6.9.2.4 Potential impacts on designated features

Functionally linked land (coastal and floodplain grazing marsh priority habitat) for qualifying bird species has been identified adjacent to the proposed works. Potential construction impact pathways include noise and visual disturbance, air pollution and pollution incidents. The proposed abstraction would allow for an additional 47Ml/d to be abstracted from the River Derwent at the WTW Intake. The additional water being abstracted may reduce flows within the River Derwent and reduce water availability and quality for qualifying bird species within functionally linked land adjacent to the site.

6.9.2.5 Integrity test

In conclusion, the WTW Optimisation may result in adverse effects without mitigation. Pollution incidents may occur through fuel/oil spills. During construction works at the WTW, there may be increases in suspended sediment and deposition downstream in the River Derwent via run off. However, industry best practice will be followed to manage pollution incidents and sedimentation. Therefore, no adverse effect is anticipated during construction.

The extent of impacts regarding how additional abstraction will impact water quality and flows within the River Derwent is currently unknown. As such, additional hydrology and hydrogeomorphology investigations must be completed to conclude no adverse effect. Due to uncertainty, adverse effects are anticipated during operation.

6.9.3 Lower Derwent Valley SPA

6.9.3.1 Description and Designated Features

Please see **Section** Error! Reference source not found. for description and designated features.

6.9.3.2 Conservation Objectives

Please see **Section** Error! Reference source not found. for conservation objectives.

6.9.3.3 Current Site Status

Please see **Section** Error! Reference source not found. for current site status.

6.9.3.4 Potential impacts on designated features

The WTW is located approximately 1km from the Lower Derwent Valley SPA. Proposed construction works will be 300 m from adjacent to coastal and floodplain grazing marsh priority habitat, which is likely functionally linked to the SPA. Noise and visual disturbance during construction could affect qualifying species utilising this functionally linked habitat. The proposed abstraction would allow for an additional 47Ml/d to be abstracted from the River Derwent at the WTW Intake. The additional water being abstracted may reduce flows within the River Derwent and reduce water availability and quality for qualifying species.

6.9.3.5 Integrity Test

In conclusion, the WTW Optimisation may result in adverse effects without mitigation. Pollution incidents may occur through fuel/oil spills. During construction works at the WTW, there may be increases in suspended sediment and deposition downstream in the River Derwent via run off. However, industry best practice will be followed to manage pollution incidents and sedimentation. A noise assessment is required with subsequent mitigation and screening for visual disturbance will be for qualifying bird species Therefore, no adverse effect is anticipated during construction with mitigation in place for pollution, sediment, visual, and noise disturbance..

The additional water being abstracted may reduce flows within the SPA and reduce water availability and quality for qualifying bird species within functionally linked land adjacent to the site. The extent of about how

additional abstraction will impact water quality and flows within the River Derwent is currently unknown. As such, additional hydrology and hydrogeomorphology investigations must be completed to conclude no adverse effect. Due to uncertainty, adverse effects are anticipated during operation.

6.9.4 Lower Derwent Valley SAC

6.9.4.1 Description and Designated Features

Please see **Section** Error! Reference source not found. for description and designated features.

6.9.4.2 Conservation Objectives

Please see **Section** Error! Reference source not found. for conservation objectives.

6.9.4.3 Current Site Status

Please see **Section** Error! Reference source not found. for current site status.

6.9.4.4 Potential impacts on designated features

At its closest point, new infrastructure proposed at the WTW, including both the WTW building and pipeline, will be 855m from the boundary of the SAC. This closest section is directly adjacent to existing structures within the WTW. All construction works are assumed to be within the WTW footprint, as such there will be no direct loss of habitat to qualifying features. Due to the proximity of the works to the SAC, it is likely that construction noise at the WTW could affect both the SAC and functionally linked habitat located adjacent to the option. European otters are in favourable condition in Unit 3 of the underpinning SSSI River Derwent. The European otter would likely be present during the construction works, as otters breed throughout the year and utilise the full watercourse. Additionally, Magic Maps has confirmed that there is suitable habitat for otter resting and breeding immediately adjacent to the WTW. Construction works may result in visual and noise disturbance to otter while they are resting or breeding within this habitat.

The proposed abstraction would allow for an additional 47Ml/d to be abstracted from the River Derwent at the WTW Intake. The additional water being abstracted may reduce flows within the River Derwent and reduce water availability and quality for qualifying habitats.

6.9.4.5 Integrity Test

In conclusion, the WTW Optimisation may result in adverse effects without mitigation. Surveys for otter should be conducted to determine if holts and resting places are located within 500m of the construction works. Mitigation for otter should include a noise assessment and best practice mitigation to ensure that there is no risk of injury or death. All mitigation should be outlined in a CEMP to address spills or pollution incidents at the WTW. With mitigation in place, no adverse effect should occur during construction.

The extent of impacts is unknown with regards to how additional abstraction will impact water quality and flows within the River Derwent. As such, additional hydrology and hydrogeomorphology investigations must be completed to conclude no adverse effect. Due to uncertainty, adverse effects are anticipated during operation.

6.9.5 River Derwent SAC

6.9.5.1 Description and Designated Features

Please see **Section 6.5.4.1** for description and designated features.

6.9.5.2 Conservation Objectives

Please see **Section 6.5.4.2** for conservation objectives.

6.9.5.3 Current Site Status

Please see **Section 6.5.4.3** for current site status.

6.9.5.4 Potential impacts on designated features

The WTW is located within the River Derwent SAC. There is a potential risk of pollution incidents, including fuel or oil spills associated with construction vehicles and plant. Such incidents could result in contaminants entering the River Derwent, resulting in adverse effects on qualifying fish species present in the river. At present, Unit 3 of the River Derwent SSSI, which underpins the SAC, is classified as being in unfavourable - recovering condition, primarily due to agricultural runoff and diffuse pollution. The Site Improvement Plan for

the River Derwent shows that Water courses of plain to montane levels with *Ranunculion fluitanis and Calitricho-Batrachion* vegetation is sensitive to water pollution. In the absence of appropriate mitigation measures, construction works in close proximity to the River Derwent have the potential to exacerbate these existing pressures and further deteriorate the condition of the underpinning SSSI unit with consequent adverse effects on bullhead and lamprey species within the SAC.

Reduced flows may result in deterioration of water quality within the SAC, which could adversely affect lamprey populations. There is also a risk of a reduction in habitat availability due to low flows and reduced habitat suitability as a result of increased abstraction during drought.

6.9.5.5 Integrity Test

In conclusion, the WTW Optimisation may result in adverse effects without mitigation. Pollution incidents may occur through fuel/oil spills. During construction works at the WTW, there may be increases in suspended sediment and deposition downstream in the River Derwent via run off. However, industry best practice will be followed to manage pollution incidents and sedimentation. Therefore, no adverse effect is anticipated during construction.

The extent of impacts is unknown about how additional abstraction will impact water quality and flows within the River Derwent. As such, additional hydrology and hydrogeomorphology investigations must be completed to conclude no adverse effect. Due to uncertainty, adverse effects are anticipated during operation.

6.10 POTENTIAL IN-COMBINATION EFFECTS OF DROUGHT PERMIT/ORDER OPTIONS

Individually, apart from the North Area Reservoir 1 drought option, all of the other options within Yorkshire Water Drought Plan 2027 are not considered likely to have likely significant effects on the qualifying features of European sites. (see **Table 4-1**). However, a number of drought options could be used at a similar time, should they be required, and therefore an assessment has been completed to determine the potential for LSEs, as detailed in **Table 4-1**, column 5. In addition, **Table 6-4**5 shows the in-combination effects assessment for the Humber Estuary EMS.

6.10.1 In-combination effects with neighbouring water companies

Assessment of in-combination effects on the Humber Estuary EMS arising from drought plan options of neighbouring water companies that may affect river catchments draining to the Humber Estuary has also been carried out.

Anglian Water's draft Drought Plan 2027 includes one option (River Trent) with potential to impact the Humber Estuary; however, no LSEs were identified. There are a small number of options in the River Trent basin in the Severn Trent Water Drought Plan 2022, but these are located a considerable distance upstream in the Derbyshire Derwent catchment and are assessed as having only a negligible impact on flows to the Humber Estuary. A high-level review of drought options included in Northumbrian Water's and United Utilities' draft drought plans did not identify any options that would impact the Humber Estuary EMS.

Consequently, the assessment of other water company drought plan options acting in combination with the Yorkshire Water Drought Plan is assessed as not having likely significant effects on the Humber Estuary EMS.

In summary, no in-combination impacts of operating the drought options at the same time, or with other relevant plans and projects, on European Sites have been identified.

6.11 POTENTIAL IN-COMBINATION EFFECTS OF EXTREME DROUGHT OPTIONS

At present, it is not known whether the extreme drought options would be implemented in conjunction with other measures within the Yorkshire Water Drought Plan. Consequently, the potential for in-combination effects cannot be fully assessed at this stage. Given the current level of information available, and the fact that the option is not proposed for implementation at this stage, it is not considered proportionate to undertake a detailed in-combination assessment. Should the option be progressed in the future, and further assessment work be undertaken, potential in-combination effects will be reviewed as part of any subsequent HRA and supporting environmental assessment work using the most up-to-date information available.

Table 6-4 In-combination Assessment on the Humber Estuary

Option	European Site or SSSI within zone of minor, moderate or major hydrological impact	Qualifying features (European sites) and main habitats (SSSI	Potential for in-combination effects on qualifying features/main habitats?	AEoI on European Site in-combination with other plans and projects?
North Area Reservoir 1 North Area Reservoir 4 Ure increased abstraction. Ouse increased abstraction Hull increased abstraction Derwent annual abstraction increase	Humber Estuary SAC/Ramsar	River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus*	Any reduction in freshwater flows could potentially affect qualifying interests for which the Humber Estuary is designated, specifically river and sea lamprey (recruitment and reproductive capability and Presence and spatial distribution of the species). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period[21], review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027. The Derwent catchment was previous discounted from the assessment as no options were present in the catchment. The current plan does include an option in the Derwent catchment however the hydrological impacts of the option are restricted to a transfer of abstraction limits between two existing abstraction points and impacts are assessed as negligible. Since the assessment in 2011 Naburn Weir has been modified, and fish bypass was installed. An eel/lamprey bypass channel (lamprey bypass) was formalized next to the salmon ladder on the riverbank-side in 2014 to aid the upstream migration of European eel juveniles (elvers) and river lamprey. The bypass largely followed the route of a complex channel, littered with rocks, concrete debris and tree roots, partly water-fed by an erosion generated hole in the retaining wall adjoining the salmon ladder. A detailed study by Durham University looked at the behaviour of fishes (including lamprey) at Naburn Weir[43]. The study noted that under normal flows Naburn weir impacts on the upstream migration of river lamprey quite dramatically, delaying the movement of river lamprey through the reach. The lamprey moved quickly (less than two days) through the unobstructed tidal reach of the Yorkshire Ouse. However, river lamprey once entering the area immediately downstream of the weir took 32.6 days on average before either moving in an upstream direction passing the weir or a downstream one. This delay at Naburn weir under normal flow conditions will likely lead to an increase in predation pressure through the aggregation of river lamprey in a relatively small area. The assessment in 2011 remains valid as reduced flow levels triggered by the application of drought permits would not significantly alter the amount of time that Naburn Weir would be passable to sea and river lamprey, with the additional Lamprey bypass providing additional passability. The in-combination impacts from the implementation of the Hull increased abstraction and Beverley one STW is unlikely to impact the lamprey population within the River Hull. The water quality implications of reduced flow on estuarine flushing (of Beverley one STW effluent plume) do not coincide with lamprey migration to spawning grounds which occur between November and March[44]. Any temporary and localised DO sag is not expected to prevent the downstream movement of any post metamorphic individuals either. Assessment of the in-combination impact of options in a third year of drought has been carried out. Not all of the options for a third year of drought would be implemented - at most, only 2 options are likely to be implemented. Assessment indicates that the additional abstraction from any combination of the remaining long-term drought options is unlikely to lead to any significant effect on the Humber Estuary EMS. Hydrological impacts on the River Ure are predicted to have only a minor risk of reduction in both wetted aquatic habitat and available aquatic habitat. The presence of suitable spawning and ammocoete habitat is unlikely to be significantly impacted by implementation of the North Area Reservoir 1 and Ure increased abstraction options in-combination effects. If all of the River Ouse options were to be implemented (and assuming the Monkton Ouse increased abstraction drought permit is already in place), in-combination impacts downstream of York sewage treatment works to the tidal limit at Q99 and Q95 flows would be moderate and minor adverse respectively. Mass balance water quality calculations suggest that this would not result in significant effects on water quality in the Humber Estuary, but this should be reviewed in more detail in the event that a decision was made to implement all of the River Ouse options in a 3rd consecutive year of drought. This would need to take into account the prevailing water quality conditions during that specific drought event which will vary according to time of year temperature and underlying water quality conditions in the lower Ouse and Humber Estuary.	No

[43] Lothian, Angus,John (2021) Behaviour of fishes around engineered structures and in modified rivers, Durham theses, Durham University. Available at Durham E-Theses Online: http://etheses.dur.ac.uk/13872/
[44] Hopkins, D. 2008. River lamprey. Brief summary of Humber basin information: The Bellflask Ecological Survey Team.

7. CONCLUSIONS

Stage 1 HRA screening of the Drought Plan 2027 supply side options has indicated that LSE on the Humber Estuary SAC could not be ruled out for impacts on the Humber Estuary SAC are a result of the implementation of the North Area Reservoir 1. Full details of the Stage 1 screening can be found in **Section 4.1.**

The HRA has included extreme supply options in the event of a long-term drought, although the specific timing of the options is unknown. The Stage 1 screening concluded LSE for the following options and corresponding European Sites (as seen in **Section 4.2**):

1. Catterick Groundwater Option 1
    - North Pennine Dales Meadows SAC
2. Doncaster Groundwater Option 1
    - Hatfield Moor SAC
3. Doncaster Groundwater Option 2
    - Hatfield Moor SAC
4. Doncaster Groundwater Option 3
    - Hatfield Moor SAC
    - Thorne Moor SAC
5. Pickering/Thirsk Groundwater Option 1
    - Humber Estuary SAC
    - Humber Estuary SPA
    - Humber Estuary Ramsar
    - River Derwent SAC
6. Selby Groundwater Option 2
    - River Derwent SAC
7. Selby Aquifer Storage and Recovery Scheme 1
    - Humber Estuary SAC
    - Humber Estuary Ramsar
    - River Derwent SAC
8. York Groundwater Option 1
    - Humber Estuary SAC
    - Humber Estuary Ramsar
9. Optimisation of York WYW 2
    - Lower Derwent Valley Ramsar
    - Lower Derwent Valley SPA
    - Lower Derwent Valley SAC
    - River Derwent SAC

An Appropriate Assessment for each option has been undertaken and are provided in **Section 5 and 6**. The Appropriate Assessment for Humber Estuary SAC (**Section 5)** concludes that the North Area Reservoir 1 option will not have an adverse effect on the qualifying features of the Humber Estuary SAC. As such, no further assessment is required for this option.

The extreme options above were subject to Stage 2 Appropriate Assessment (**Section 6**). The Stage 2 Appropriate Assessment concluded no adverse effects for the following options:

- Catterick Groundwater Option 1
- Pickering/Thirsk Groundwater Option 1
- Selby Aquifer Storage and Recover Scheme 1

The Stage 2 Appropriate Assessment concluded adverse effects for the following options:

- Doncaster Groundwater Option 1
- Doncaster Groundwater Option 2
- Doncaster Groundwater Option 3
- York Groundwater Option 1
- Optimisation of York WTW 2
- Selby Groundwater Option 2

Additional information is required to address uncertainty within the Appropriate Assessment. Additional information is detailed within the relevant site's Appropriate Assessment within **Section 6**.

Should all of the River Ouse options be implemented in a long-term drought, the in-combination impact would be a moderate impact on river flows in the reach. The in-combination impact on water quality downstream of York STW to the tidal limit due to reduced dilution is a minor impact to water quality and is not considered to have a likely significant effect on water quality in the Humber Estuary European sites. It is important to distinguish between the impact of drought on the Humber Estuary European sites and the additional impact due to implementation of the drought management options. The reduction in river flow due to the drought management options is ameliorated by the dry weather flow from a sewage works discharge, such that the reduction in the River Ouse discharge to the Humber Estuary European sites is not considered to have a likely significant effect on water quality in the Humber Estuary European sites.

APPENDIX A ADDITIONAL EXTREME SUPPLY OPTIONS

Under the Water Industry Act 1991 as amended by the Water Act 2003, water companies must produce a drought plan every five years stating how it will maintain a secure water supply and protect the environment during dry weather and drought. As part of this plan, water companies need to include options to be considered during more extreme drought events. Extreme options (previously referred to as long-term options (LTOs) are displayed in Error! Reference source not found.. **Table A1** includes the Drought Plan 2027 additional extreme supply options that have not been included within the assessment. The extreme options provided below are high-level and not suitable for assessment at this stage. If any of these options are required, full environmental assessments would need to be undertaken when the scope of the options can be more defined by the potential onset of long-term and unprecedented drought.

Table A77-1 Extreme supply side options

Water Resource Zone	Option	Summary of action	Trigger for action to be considered*
Grid SWZ + East GWZ	Mobile Package Plants (Desalination, Micro-filtration or Ultrafiltration)	This option considers mobile, plug-and-play package plant treatment - reverse osmosis (RO) desalination or micro-filtration/ultrafiltration - for use with a variety of small SW (or GW) sources to provide water to constrained areas in an extreme drought. The option can potentially be used with brackish waters, mine water or high nitrate sources. De-commissioning and re-commissioning mobile desalination package plant between drought event would not be onerous, based on supplier engagement.	Level 3a actions in place and regional reservoir stocksto fall below 20% within next 4 weeks or within 6 weeks in a drought lasting 2 or more years. Would be linked to network and need during drought conditions. No regrets actions if localised and combined
Grid SWZ	Transfers	In an extreme drought water could be transferred within YWS' supply area, if any customers supplies were at risk of running out. The option would likely be used in areas where network limitations prevent support from other assets and WTWs across the company area.	Level 3a actions in place and regional reservoir stocks to fall below 20% within next 4 weeks or within 6 weeks in a drought lasting 2 or more years Would be linked to network and need during drought conditions.
Grid SWZ + East SWZ	Tankering	In an extreme drought water could be transferred within YWS' supply area, and from other companies, if any customers supplies were at risk of running out. In line with the rest of the industry, YWS would use this option primarily only for smaller, isolated, rural areas and in relatively low volumes and numbers. The option would likely be used in areas where network limitations prevent support from other assets and WTWs across the company area.	Level 3a actions in place and regional reservoir stocks to fall below 20% within next 4 weeks or within 6 weeks in a drought lasting 2 or more years. Would be linked to network and need during drought conditions. No regrets actions if localised and combined
Grid SWZ + East SWZ	Network changes	As an option for transfer of treated water and an alternative to tankering, YWS supply network could be extended in parts to transfer water to areas at risk. This could be through use of overland pipes where required. This could also be combined with package plant options where a source is identified which can be fed into the existing local transfer network.	Level 3a actions in place and regional reservoir stocks to fall below 20% within next 4 weeks or within 6 weeks in a drought lasting 2 or more years. Would be linked to network and need during drought conditions.