



Habitats Regulation Assessment Screening Report

Yorkshire Water's Drought Plan 2022

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Assessment Screening Report

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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 requirement for a 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 State in line with the timescales set out in the Drought Plan (England) Direction 2020. The Environment Agency’s Drought Plan Guidance¹ also specifies that a water company must ensure that its drought plan meets the requirements of the Habitats Regulations. The Environment Agency’s 2020 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 Plans³, 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*

¹ Environment Agency (2020) Water Company Drought Plan Guideline, December 2020 (Version 1.1)

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.

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.

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 guidance⁴ 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**

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

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.

For ease of reference through this HRA report, these designations are collectively referred to as “European sites”. As per Natural England (NE) guidance⁵, 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.

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 2022 (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 2018⁶ 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.
2. Where a likely significant effect 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 2022 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 Ministers should be asked to determine that the Plan should proceed (this is decision of the Welsh Ministers, not Yorkshire Water).

This document reports the HRA screening (i.e. Stage 1 as identified above) carried out for Yorkshire Water’s Drought Plan 2022. The HRA screening reaches conclusions as to whether

⁵ 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)

⁶ Court of Justice of the European Union Case C-323/17: People over Wind & Sweetman v Coillte Teoranta

LSE on European sites of the drought options contained within Yorkshire Water's Drought Plan 2022 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 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 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 2022 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.

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 **Table 2.1**).

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 **Table 2.2**.

Table 2.1: Demand-side Drought Management Options (All Water Resource Zones)

Demand-side options	Comments
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.

Table 2.2: Supply Side Options

Water Source		Type of Drought Management Option
Grid Surface Water Resource Zone		
North Area	Standard Option Reservoirs [5]⁷: North Area Reservoir 1, North Area Reservoir 2, North Area Reservoir 3, North Area Reservoir 4, North Area Reservoir 5	Compensation flow release reductions
	Long Term Option (LTO) [1]: North Yorkshire Groundwater increased abstraction ⁸	Increase in abstraction.
North West Area	Standard Option Reservoirs [12]: North West Area Reservoir 1, North West Area Reservoir 2, North West Area Reservoir 3, 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
	LTO [1]: North West Reservoir Abstraction	Increase in abstraction from Reservoir. Water abstracted from the reservoir would be transferred via a temporary pipeline to the aqueduct for subsequent treatment at e.g. Bradford WTW 1.
South Area	Standard Option Reservoirs [6]: South Area Reservoir 1, South Area Reservoir 2, South Area Reservoir 3, South Area Reservoir 4, South Area Reservoir 5, South Area Reservoir 6	Compensation flow or maintained flow release reductions

⁷ The number in square bracket refers to the number of drought options within each area.

⁸ This option was included in WRMP19 preferred solution and is scheduled to be brought into supply in 2022/23, however is included as a long term option in the drought plan until that time.

Water Source		Type of Drought Management Option
South West Area	<p><u>Standard Option Reservoirs [20]:</u> 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, South West Area Reservoir 21, South West Area Reservoir 22</p>	Compensation flow release reductions
South West (EA)	<p><u>Environment Agency Drought Order options [2]:</u> South West Area Reservoir 5, South West Area Reservoir 9</p>	Compensation flow release reductions
Stand Alone	<p><u>Standard option [6]:</u> Ouse increased abstraction</p>	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.
	Wharfe increased annual abstraction	Increase annual abstraction limit
	Hull increased abstraction	Reduce hands-off river flow to enable increased abstraction.
	Derwent annual abstraction increase	Increase annual abstraction limit
	<p><u>LTO: [7]</u> East Yorkshire Groundwater Option 2</p>	Utilisation of existing abstraction which will require relocation of borehole.
	Tees – Swale transfer	Permit abstraction of up to 40 MI/d from the River Tees for transfer by pipeline to the River Swale, with subsequent re-abstraction of the discharged water further downstream from the Ouse increased abstraction.
	<p>Tees - Derwent Pipeline <i>This option would not be additional to the River Tees to River Swale Transfer option. Only one of these two options would be implemented.</i></p>	Abstraction of up to 40 MI/d from the River Tees with construction of new pipelines to transfer the raw water to River Derwent Water Treatment Works.
	Aire abstraction	New river abstraction of up to 50 MI/d
	Ouse increased abstraction	<p>Increase the abstraction capacity of the Ouse pumping station by 10 MI/d. This would enable the full daily abstraction licence volume to be abstracted from the Ouse increased abstraction when river flows exceed the prescribed flow set in the abstraction licence (or in a drought permit if granted).</p>
Ouse water treatment works extension	Additional river abstraction and water	

Water Source		Type of Drought Management Option
		treatment capacity (additional 25 MI/d average abstraction) at Ouse abstraction, within existing abstraction licence conditions.
	Ouse Raw Water Transfer ⁹	Additional river abstraction capacity of 60 MI/d to enable the full average abstraction licence quantity of 96 MI/d average to be abstracted (130MI/d peak). New raw water pipeline to link to existing raw water pipeline Ouse pumping station to River Derwent Water Treatment Works 1.
East Surface Water Resource Zone		
None	n/a	n/a
East Groundwater Resource Zone		
None	n/a	n/a

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 2022 includes alternative long term 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 STW 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 Options¹⁰

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
Physical loss: <ul style="list-style-type: none"> 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).

⁹ It is most likely Yorkshire Water would only require one of the River Ouse options 1 and 2 but it is possible that they could also be developed as a combined scheme, but with the aggregate additional abstraction capacity limited to 60 MI/d to keep within the 96 MI/d average abstraction licence limit. This would give maximum treatment and water distribution flexibility.

¹⁰ 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)
<p>Physical damage:</p> <ul style="list-style-type: none"> • 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 	<p>Reduction in river flow leading to permanent and/or temporary loss of available habitat, sedimentation/siltation, fragmentation, etc.</p> <p>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, long shore drift along the coast, or the scheme impacts the linking habitat).</p>
<p>Non-physical disturbance:</p> <ul style="list-style-type: none"> • Noise (incl. underwater) • Visual presence • Human presence • Light pollution • Vibration (incl. underwater). 	<p>Noise from temporary construction or temporary pumping activities.</p> <p>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 impacts could be significant up to 1km from the boundary of the European site¹¹.</p> <p>Noise from vehicular traffic during operation of a scheme.</p> <p>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.</p> <p>Plant and personnel involved in in operation of the scheme.</p> <p>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).</p> <p>Schemes which might include artificial lighting, e.g. for security around a temporary pumping station.</p> <p>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.</p> <p>Vibration from temporary construction</p> <p>From a review of Environment Agency internal guidance on HRA and various websites/sources^{12,13,14} it is considered that effects of vibration are more likely to be significant if development is within 500m of a European site.</p>
<p>Water table/availability:</p> <ul style="list-style-type: none"> • Drying • Flooding / stormwater • Changes to surface water levels and flows including both increases and reductions. 	<p>Changes to water levels and flows due to increased water abstraction, reduced storage or reduced flow releases from reservoirs to river systems.</p> <p>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</p>

¹¹ British Standards Institute (BSI) (2009) BS5228 - Noise and Vibration Control on Construction and Open Sites. BSI, London.

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

¹³ 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.

¹⁴ 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.

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
<ul style="list-style-type: none"> Changes in groundwater levels and flows Changes to coastal water movement 	<p>the European site, and sometimes, whether the scheme is up or down stream from the European site.</p>
<p>Toxic contamination:</p> <ul style="list-style-type: none"> Water pollution Soil contamination Air Pollution 	<p>Reduced dilution in downstream or receiving waterbodies due to changes in abstraction or reduced compensation flow releases to river systems.</p> <p>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.</p> <p>Air emissions associated with plant and vehicular traffic during construction and operation of schemes.</p> <p>The effect of dust is only likely to be significant where site is within or in proximity to the boundary of the European site^{15,16}. 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.</p> <p>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 affected¹⁷.</p>
<p>Non-toxic contamination:</p> <ul style="list-style-type: none"> 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 	<p>Changes to water salinity, nutrient levels, turbidity, thermal regime due to increased water abstraction, storage, or reduced compensation flow releases to river systems.</p> <p>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.</p>
<p>Biological disturbance:</p> <ul style="list-style-type: none"> Direct mortality Changes to habitat availability Out-competition by non-native species Selective extraction of species Introduction of disease Rapid population fluctuations Natural succession 	<p>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 by based as foraging, roosting and hibernation sites and birds as roosting and nesting sites.</p> <p>Creation of new pathway of non-native invasive species.</p> <p>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)</p>

¹⁵ Highways Agency (2003) Design Manual for Roads and Bridges (DMRB), Volume 11.

¹⁶ Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction v1.1.

¹⁷ NE Internal Guidance – Approach to Advising Competent Authorities on Road Traffic Emissions and HRAs V1.4 Final - June 2018

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
	<p>Entrapment during in-river or terrestrial construction works causing injury and/or mortality of mobile species</p> <p>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.</p> <p>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.</p> <p>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.</p>

3 Environmental Assessment of the Drought Plan 2022

For the Drought Plan 2022, 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 2022 supply options according to guidance in the 2020 Drought Plan Guidelines¹⁸ DPG and the July 2020 'Environmental Assessment for Water Company Drought Plans - supplementary guidance'. 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 cumulative effects of simultaneous option deployment where options were located within the same catchment, and across catchments. The assessment also considered cumulative 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 sites and features which could be impacted by drought option implementation. These included European sites (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 for further consideration in the environmental 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 2022 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.

¹⁸ Environment Agency (2020) Water Company Drought Plan Guideline, December 2020 (Version 1.1)

3.1 Consideration of In-Combination Effects

The hydrological impact assessment described above and documented in the EARs considered cumulative hydrological impacts of simultaneous deployment of options within the same catchments, and across different catchments. Cumulative impacts 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 2022, and the in-combination effects of the final Drought Plan 2022 and a number of plans and projects, that could have an impact on the European sites identified within this HRA of the Drought Plan 2022. The following plans and projects have been considered in the cumulative effects assessment:

- Inter-option effects within the Yorkshire Water Drought Plan 2022
- 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 (2019)¹⁹
- Environment Agency National Drought Action Plan
- Canal and Rivers Trust Putting Water into Waterways Water Resources Strategy 2015-2020.

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 cumulative 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 2022 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.

¹⁹ Yorkshire Water Services Limited 2018. Revised Draft Water Resources Management Plan 2019. September 2018.

3.3 HRA Screening Results

3.3.1 Potential Effects of Drought Options

The HRA of the Drought Plans screened all of the drought options in each of Yorkshire Water WRZs. A total of 65 options (demand side, supply side and supply side drought permit/order options) 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 matrix for this assessment is presented in **Tables 3.1 - 3.3**.

Effects in combination with other drought options within Yorkshire Water Drought Plan 2022 were assessed and are documented in the matrix.

The tables show that, apart from the North Yorkshire Groundwater increased abstraction drought option, all of the other options within Yorkshire Water Drought Plan 2022 are not considered likely to have significant adverse effects on the qualifying features of European sites.

Table 3.1: Screening of Demand Side Drought Options for Impacts on European Sites

Option	Likely Significant Effect and Potential for Alteration of Measure to Avoid Effects?	Further HRA Assessment Required?
Drought publicity campaigns	None – media/water efficiency campaign includes increased water efficiency messages via increased customer communications. No impacts on designated sites are anticipated, other than to acknowledge that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites due to reduced pressure on water resources and reduced abstraction at source.	No
Increased leakage detection and repair activity	None - it is envisaged that leakage detection and repair schemes will largely be undertaken primarily in urban areas. No impacts on designated sites are anticipated, other than to acknowledge that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites due to reduced pressure on water resources and reduced abstraction at source.	No
Introduction of temporary use ban	None – a hose pipe ban, or any restrictions on consumer water use are demand management measures and as such, are not anticipated to have impacts on European sites. It is acknowledged that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites, due to reduced pressure on water resources and reduced abstraction at source.	No
Introduction of a drought order to ban non-essential water uses (defined in the Drought Direction 2011)	None – a non-essential use ban and its components are demand management measures and as such are not anticipated to have impacts on European sites. It is acknowledged that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites due to reduced pressure on water resources and reduced abstraction at source.	No
Emergency drought order to temporarily supply water by means of rota cuts or standpipes	None – an emergency drought order includes extreme demand management measures and as such are not anticipated to have impacts on European sites. It is acknowledged that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites due to reduced pressure on water resources and reduced abstraction at source.	No

Table 3.2: HRA Screening of Supply Side Drought Options

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
North Area Reservoirs						
North Area Reservoir 1	North Pennine Moors SAC (0.60km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths <i>Juniperus communis</i> formations on heaths or calcareous grasslands <i>Calaminarian</i> grasslands of the <i>Violetalia calaminariae</i> Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) Blanket bogs Petrifying springs with tufa formation (<i>Cratoneurion</i>) Alkaline fens Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles <i>Saxifraga hirculus</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No

²⁰ 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 ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Marsh saxifrage <i>Saxifraga hirculus</i>				
	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 <i>Pluvialis apricaria</i> Hen harrier <i>Circus cyaneus</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i> Curlew <i>Numenius arquata</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
North Area Reservoir 2	North Pennine Moors SAC (1km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths <i>Juniperus communis</i> formations on heaths or calcareous grasslands Calaminarian grasslands of the <i>Violetalia calaminariae</i> Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) Blanket bogs Petrifying springs with tufa formation (<i>Cratoneurion</i>) Alkaline fens Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladanii</i>)	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Calcareous rocky slopes with chasmo-phytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles <i>Saxifraga hirculus</i> Marsh saxifrage <i>Saxifraga hirculus</i>				
	North Pennine Moors SPA (1km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover <i>Pluvialis apricaria</i> Hen harrier <i>Circus cyaneus</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i> Curlew <i>Numenius arquata</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
North Area Reservoir 3	North Pennine Moors SAC (6.4km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths <i>Juniperus communis</i> formations on heaths or calcareous grasslands Calaminarian grasslands of the <i>Violetalia calaminariae</i> Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>)	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Blanket bogs Petrifying springs with tufa formation (<i>Cratoneurion</i>) Alkaline fens Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles <i>Saxifraga hirculus</i> Marsh saxifrage <i>Saxifraga hirculus</i>				
	North Pennine Moors SPA (6.4km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover <i>Pluvialis apricaria</i> Hen harrier <i>Circus cyaneus</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i> Curlew <i>Numenius arquata</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
North Area Reservoir 4	North Pennine Moors SAC (4.10km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths <i>Juniperus communis</i> formations on	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		heaths or calcareous grasslands <i>Calaminarian</i> grasslands of the <i>Violetalia calaminariae</i> Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) Blanket bogs Petrifying springs with tufa formation (<i>Cratoneurion</i>) Alkaline fens Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladanii</i>) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles <i>Saxifraga hirculus</i> Marsh saxifrage <i>Saxifraga hirculus</i>	are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.			
	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. Golden Plover <i>Pluvialis apricaria</i> Hen harrier <i>Circus cyaneus</i> Merlin <i>Falco columbarius</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i> Curlew <i>Numenius arquata</i>				
North Area Reservoir 5	North Pennine Moors SAC (0.6km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths <i>Juniperus communis</i> formations on heaths or calcareous grasslands Calaminarian grasslands of the <i>Violetalia calaminariae</i> Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) Blanket bogs Petrifying springs with tufa formation (<i>Cratoneurion</i>) Alkaline fens Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles <i>Saxifraga hirculus</i> Marsh saxifrage <i>Saxifraga hirculus</i>	There is no construction related to this option and no operational impacts have been identified. The 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 hydrodynamic connectivity between channel and the moor, particularly during dry conditions	None	No	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
	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 <i>Pluvialis apricaria</i> Hen harrier <i>Circus cyaneus</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i> Curlew <i>Numenius arquata</i>	There is no construction related to this option and no operational impacts have been identified. The 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 hydrodynamic connectivity between channel and the moor, particularly during dry conditions	None	No	No
North West Area Reservoirs						
North West Area Reservoir 1	South Pennine Moors SAC (1.20km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (1.20km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				
North West Area Reservoir 2	South Pennine Moors SAC (1.0km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (1.0km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				
North West Area Reservoir 3	South Pennine Moors SAC (<1.0km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
		Peak District Moors (South Pennine Moors Phase 2) SPA (<1.0km)				
North West Area Reservoir 4	South Pennine Moors SAC (3.0km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions. The	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		<i>Blechnum</i> in the British Isles	drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (3.0km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				
North West Area Reservoir 5	South Pennine Moors SAC (3.60km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (3.60km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				
North West Area Reservoir 6	South Pennine Moors SAC (1.00km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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	None	None	No
	Peak District Moors	Short eared owl <i>Asio flammeus</i>				

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
	(South Pennine Moors Phase 2) SPA (1.00km)	Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>	maintain rate of drawdown within the bounds of normal operations.			
North West Area Reservoir 7	South Pennine Moors SAC (<1.0km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1.0km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>		None	None	No
North West Area Reservoir 8	South Pennine Moors SAC (<0.5km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (<0.5km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i>		None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				
North West Area Reservoir 9	South Pennine Moors SAC (2.20km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The 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 hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (2.20km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>		None	None	No
North West Area Reservoir 10	North Pennine Moors SAC (0.25km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths <i>Juniperus communis</i> formations on heaths or calcareous grasslands Calaminarian grasslands of the <i>Violetalia calaminariae</i> Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>)	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Blanket bogs Petrifying springs with tufa formation (<i>Cratoneurion</i>) Alkaline fens Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles Marsh saxifrage <i>Saxifraga hirculus</i>				
	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 <i>Pluvialis apricaria</i> Hen harrier <i>Circus cyaneus</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
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 <i>Pluvialis apricaria</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Hen harrier <i>Circus cyaneus</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				
North West Area Reservoir 12	South Pennine Moors SAC (0km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. 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 hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (0km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				
South Area Reservoirs						
South Area Reservoir 1	North Pennine Moors SAC (5.50km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths <i>Juniperus communis</i> formations on heaths or calcareous grasslands Calaminarian grasslands of the <i>Violetalia calaminariae</i> Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>)	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Blanket bogs Petrifying springs with tufa formation (<i>Cratoneurion</i>) Alkaline fens Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles <i>Saxifraga hirculus</i> Marsh saxifrage <i>Saxifraga hirculus</i>				
	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 <i>Pluvialis apricaria</i> Hen harrier <i>Circus cyaneus</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i> Curlew <i>Numenius arquata</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
South Area Reservoir 2	Peak District Moors (South Pennine Moors Phase 1) SPA (<0.50km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>	are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.			
	South Pennine Moors SAC (<0.50km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
South Area Reservoir 3	Peak District Moors (South Pennine Moors Phase 1) SPA (1.90km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
	South Pennine Moors SAC (1.90km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
South Area Reservoir 4	Peak District Moors (South Pennine Moors Phase 1) SPA (4.40km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
	South Pennine Moors SAC (4.40km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
South Area Reservoir 5	Peak District Moors (South Pennine Moors Phase 1) SPA (2.15km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
	South Pennine Moors SAC (2.15km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
South Area Reservoir 6	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with <i>Erica tetralix</i>	There is no construction related to this option and no operational impacts have been identified.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.			
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i>	There is no construction related to this option and no operational impacts have been identified. None. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
South West Area Reservoirs						
South West Area Reservoir 1	South Pennine Moors SAC (option is within designated site)	Northern Atlantic wet heaths with <i>Erica tetralix</i>	There is no construction related to these options and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
South West Area Reservoir 2		European dry heaths Blanket bogs Transition mires and quaking bogs				
South West Area Reservoir 3		Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles				
South West Area Reservoir 6	Peak District Moors (South Pennine Moors Phase 1) SPA (option is within designated site)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>		None	None	No
South West Area Reservoir 4	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs	There is no construction related to these options and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				
South West Area Reservoir 5 [EA Drought Order]	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are on higher elevations above the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>		None	None	No
South West Area Reservoir 7	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions. The	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		<i>Blechnum</i> in the British Isles	drought options will only affect flows downstream of reservoirs.			
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>		None	None	No
South West Area Reservoir 8	South Pennine Moors SAC (1.70km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	None	None	No
	Peak District Moors (South Pennine Moors Phase 1) SPA (1.70km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>		None	None	No
South West Area Reservoir 9 [EA Drought Order]	South Pennine Moors SAC (1.35km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	None	None	No
	Peak District Moors	Short eared owl <i>Asio flammeus</i>		None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
	(South Pennine Moors Phase 1) SPA (1.35km)	Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				
South West Area Reservoir 10	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>		None	None	No
South West Area Reservoir 11	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i>		None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				
South West Area Reservoir 12	South Pennine Moors SAC (1.4km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (1.4km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>		None	None	No
South West Area Reservoir 13 South West Area Reservoir 14	South Pennine Moors SAC (<1km or within designation)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1km or within designation)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i>		None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Dunlin <i>Calidris alpina schinzii</i>				
South West Area Reservoir 15	South Pennine Moors SAC (2.15km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (2.15km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				
South West Area Reservoir 16	South Pennine Moors SAC (<0.50km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (<0.50km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
South West Area Reservoir 17	South Pennine Moors SAC (within designation)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	None. No hydrological continuity with the canal.	None	None	No
	Peak District Moors (South Pennine Moors Phase 2) SPA (within designation)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>		None	None	No
South West Area Reservoir 18 South West Area Reservoir 19	South Pennine Moors SAC (<0.5km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 1&2) SPA (<0.5km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>		None	None	No
South West Area Reservoir 20	South Pennine Moors SAC (2.6km)	Northern Atlantic wet heaths with <i>Erica tetralix</i>	There is no construction related to this option and no operational impacts have been identified.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
	Peak District Moors (South Pennine Moors Phase 1) SPA (2.6km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>				
South West Area Reservoir 21	South Pennine Moors SAC (3.10km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic 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.	None	None	No
		Peak District Moors (South Pennine Moors Phase 1) SPA (3.10km)				
South West Area Reservoir 22	South Pennine Moors SAC (<1.0km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	are sufficiently steep that there would be no hydrodynamic 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.			
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1.0km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>		None	None	No
River Abstractions						
Ouse increased abstraction	Strensall Common SAC (7.1km)	North Atlantic wet heaths with <i>Erica tetralix</i> 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 hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
	Humber Estuary SAC (>10km ²¹)	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 <i>Salicornia</i> and other annuals colonising mud and sand	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). The potential impact associated with entrainment has been addressed by the installation of permanent fish screens and this will negate any likely significant effect on designated species. Extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency has shown that cumulative	None	None	No

²¹ 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 ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) Embryonic shifting dunes Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes") Fixed dunes with herbaceous vegetation ("grey dunes") Dunes with <i>Hippophae rhamnoides</i> Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra fluviatilis</i> Grey seal <i>Halichoerus grypus</i>	impacts of drought options [for implementation in the first two years of drought] would have no adverse effect on the integrity of the European site. It therefore follows that this option would individually have no adverse effect ²² .			
	Humber Estuary SPA (>10km)	Teal <i>Anas crecca</i> Wigeon <i>Anas penelope</i> Mallard <i>Anas platyrhynchos</i> Ruddy turnstone <i>Arenaria interpres</i> Pochard <i>Aythya ferina</i> Great Bittern <i>Botaurus stellaris</i> Dark bellied brent goose <i>Branta bernicla bernicla</i> A067 Goldeneye <i>Bucephala clangula</i> Sanderling <i>Calidris alba</i> Dunlin <i>Calidris alpina alpina</i> Red Knot <i>Calidris canutus</i>	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated. Extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency has shown that cumulative impacts of all drought options [for implementation in the first two years of drought] would have no adverse effect on the integrity of the European site. It therefore follows that this option would individually have no adverse effect ²¹ .	None	None	No

²² 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.

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Ringed plover <i>Charadrius hiaticula</i> Eurasian Marsh harrier <i>Circus aeruginosus</i> Hen harrier <i>Circus cyaneus</i> Oystercatcher <i>Haematopus ostralegus</i> Bar tailed godwit <i>Limosa lapponica</i> Black tailed godwit <i>Limosa limosa islandica</i> Curlew <i>Numenius arquata</i> Whimbrel <i>Numenius phaeopus</i> Ruff <i>Philomachus pugnax</i> European Golden plover <i>Pluvialis apricaria</i> Grey plover <i>Pluvialis squatarola</i> Pied avocet <i>Recurvirostra avosetta</i> Little tern <i>Sterna albifrons</i> Common Shelduck <i>Tadorna tadorna</i> Common greenshank <i>Tringa nebularia</i> Common Redshank <i>Tringa totanus</i> Lapwing <i>Vanellus vanellus</i> scaup <i>Aythya marila</i> golden plover <i>Pluvialis apricaria</i> knot <i>Calidris canutus</i>				
	Humber Estuary RAMSAR (>10km)	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,	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	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		<p>saltmarshes, and coastal brackish/saline lagoons.</p> <p>Ramsar Criterion 3 The Humber Estuary Ramsar site supports a breeding colony of grey seals <i>Halichoerus grypus</i> 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 <i>Bufo calamita</i>.</p> <p>Ramsar Criterion 5 Assemblages of international importance: 153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001)</p> <p>Ramsar Criterion 6 12 Species/populations occurring at levels of international importance.</p> <p>Ramsar Criterion 8 The Humber Estuary acts as an important migration route for both river lamprey <i>Lampetra fluviatilis</i> and sea lamprey <i>Petromyzon marinus</i> between coastal waters and their spawning areas.</p>	<p>and sea lamprey (entrainment, attractant flows, dissolved oxygen etc).</p> <p>Extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency has shown that cumulative impacts of all drought options [for implementation in the first two years of drought] would have no adverse effect on the integrity of the European site. It therefore follows that this option would individually have no adverse effect²¹.</p>			

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
Ure increased abstraction	North Pennine Moors SAC (3.2km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths <i>Juniperus communis</i> formations on heaths or calcareous grasslands Calaminarian grasslands of the <i>Violetalia calaminariae</i> Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) Blanket bogs Petrifying springs with tufa formation (<i>Cratoneurion</i>) Alkaline fens Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladanii</i>) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles Marsh saxifrage <i>Saxifraga hirculus</i>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No
	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.	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Golden Plover <i>Pluvialis apricaria</i> Hen harrier <i>Circus cyaneus</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>	hydrodynamic connectivity between channel and the moor, particularly during dry conditions.			
	Humber Estuary SAC (>10km 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 <i>Salicornia</i> and other annuals colonising mud and sand Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) Embryonic shifting dunes Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes") Fixed dunes with herbaceous vegetation ("grey dunes") Dunes with <i>Hippophae rhamnoides</i>	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). The potential impact associated with entrainment has been addressed by the installation of permanent fish screens and this will negate any likely significant effect on designated species. Extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency has shown that cumulative impacts of drought options [for implementation in the first two years of drought] would have no adverse effect on the integrity of the European site. It therefore follows that this option would individually have no adverse effect ²¹ .	None	None	No

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

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra fluviatilis</i> Grey seal <i>Halichoerus grypus</i>				
	Humber Estuary SPA (>10km)	Teal <i>Anas crecca</i> Wigeon <i>Anas penelope</i> Mallard <i>Anas platyrhynchos</i> Ruddy turnstone <i>Arenaria interpres</i> Pochard <i>Aythya ferina</i> Great Bittern <i>Botaurus stellaris</i> Dark bellied brent goose <i>Branta bernicla bernicla</i> Goldeneye <i>Bucephala clangula</i> Sanderling <i>Calidris alba</i> Dunlin <i>Calidris alpina alpina</i> Red Knot <i>Calidris canutus</i> Ringed plover <i>Charadrius hiaticula</i> Eurasian Marsh harrier <i>Circus aeruginosus</i> Hen harrier <i>Circus cyaneus</i> Oystercatcher <i>Haematopus ostralegus</i> Bar tailed godwit <i>Limosa lapponica</i> Black tailed godwit <i>Limosa limosa islandica</i> Curlew <i>Numenius arquata</i> Whimbrel <i>Numenius phaeopus</i> Ruff <i>Philomachus pugnax</i>	<p>Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated.</p> <p>Extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency has shown that cumulative impacts of all drought options [for implementation in the first two years of drought] would have no adverse effect on the integrity of the European site. It therefore follows that this option would individually have no adverse effect²¹.</p>	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		European Golden plover <i>Pluvialis apricaria</i> Grey plover <i>Pluvialis squatarola</i> Pied avocet <i>Recurvirostra avosetta</i> Little tern <i>Sterna albifrons</i> Common Shelduck <i>Tadorna tadorna</i> Common greenshank <i>Tringa nebularia</i> Common Redshank <i>Tringa totanus</i> Lapwing <i>Vanellus</i> scaup <i>Aythya marila</i> golden plover <i>Pluvialis apricaria</i> knot <i>Calidris canutus</i>				
	Humber Estuary RAMSAR (>10km)	<p>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.</p> <p>Ramsar Criterion 3 The Humber Estuary Ramsar site supports a breeding colony of grey seals <i>Halichoerus grypus</i> 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</p>	<p>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).</p> <p>Extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency has shown that cumulative impacts of all drought options [for implementation in the first two years of drought] would have no adverse effect on the integrity of the European site. It therefore follows that this option would individually have no adverse effect²¹.</p>	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		<p>most north-easterly breeding site in Great Britain of the natterjack toad <i>Bufo calamita</i>.</p> <p>Ramsar Criterion 5 Assemblages of international importance: 153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001)</p> <p>Ramsar Criterion 6 12 Species/populations occurring at levels of international importance.</p> <p>Ramsar Criterion 8 The Humber Estuary acts as an important migration route for both river lamprey <i>Lampetra fluviatilis</i> and sea lamprey <i>Petromyzon marinus</i> between coastal waters and their spawning areas.</p>				
Wharfe reduced regulated flow	North Pennine Moors SPA (1.40km)	<p>Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover.</p> <p>Golden Plover <i>Pluvialis apricaria</i> Hen harrier <i>Circus cyaneus</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i></p>	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
	North Pennine Moors SAC (1.40km)	Dunlin <i>Calidris alpina schinzii</i> Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths <i>Juniperus communis</i> formations on heaths or calcareous grasslands Calaminarian grasslands of the <i>Violetalia calaminariae</i> 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 (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles <i>Saxifraga hirculus</i> Marsh saxifrage <i>Saxifraga hirculus</i>		None	None	No
	Peak District Moors (South Pennine)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i>	There is no construction related to this option and no operational impacts have been identified.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
	Moors Phase 2) SPA (1.20km)	Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>	The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.			
	South Pennine Moors SAC (1.20km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles		None	None	No
	Humber Estuary SAC (>10km 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 <i>Salicornia</i> and other annuals colonising mud and sand Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>) Embryonic shifting dunes Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes")	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). The potential impact associated with entrainment has been addressed by the installation of permanent fish screens and this will negate any likely significant effect on designated species. Extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency has shown that cumulative impacts of drought options [for implementation in the first two years of drought] would have no adverse effect on the integrity of the European site. It therefore follows that this option would individually have no adverse effect ²¹ .	None	None	No

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 ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Fixed dunes with herbaceous vegetation ("grey dunes") Dunes with <i>Hippophae rhamnoides</i> Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra fluviatilis</i> Grey seal <i>Halichoerus grypus</i>				
	Humber Estuary SPA (>10km)	Teal <i>Anas crecca</i> Wigeon <i>Anas penelope</i> Mallard <i>Anas platyrhynchos</i> Ruddy turnstone <i>Arenaria interpres</i> Pochard <i>Aythya ferina</i> Great Bittern <i>Botaurus stellaris</i> Dark bellied brent goose <i>Branta bernicla bernicla</i> Goldeneye <i>Bucephala clangula</i> Sanderling <i>Calidris alba</i> Dunlin <i>Calidris alpina alpina</i> Red Knot <i>Calidris canutus</i> Ringed plover <i>Charadrius hiaticula</i> Eurasian Marsh harrier <i>Circus aeruginosus</i> Hen harrier <i>Circus cyaneus</i> Oystercatcher <i>Haematopus ostralegus</i> Bar tailed godwit <i>Limosa lapponica</i> Black tailed godwit <i>Limosa limosa islandica</i> Curlew <i>Numenius arquata</i>	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated. Extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency has shown that cumulative impacts of all drought options [for implementation in the first two years of drought] would have no adverse effect on the integrity of the European site. It therefore follows that this <i>option</i> would individually have no adverse effect ²¹ .	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Whimbrel <i>Numenius phaeopus</i> Ruff <i>Philomachus pugnax</i> European Golden plover <i>Pluvialis apricaria</i> Grey plover <i>Pluvialis squatarola</i> Pied avocet <i>Recurvirostra avosetta</i> Little tern <i>Sterna albifrons</i> Common Shelduck <i>Tadorna tadorna</i> Common greenshank <i>Tringa nebularia</i> Common Redshank <i>Tringa totanus</i> Lapwing <i>Vanellus vanellus</i> scaup <i>Aythya marila</i> golden plover <i>Pluvialis apricaria</i> knot <i>Calidris canutus</i>				
	Humber Estuary RAMSAR (>10km)	<p>Ramsar Criterion 1</p> <p>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.</p> <p>Ramsar Criterion 3</p> <p>The Humber Estuary Ramsar site supports a breeding colony of grey seals <i>Halichoerus grypus</i> at Donna</p>	<p>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).</p> <p>Extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency has shown that cumulative impacts of all drought options [for implementation in the first two years of drought] would have no adverse effect on the integrity of the European</p>	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		<p>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 <i>Bufo calamita</i>.</p> <p>Ramsar Criterion 5 Assemblages of international importance: 153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001)</p> <p>Ramsar Criterion 6 12 Species/populations occurring at levels of international importance.</p> <p>Ramsar Criterion 8 The Humber Estuary acts as an important migration route for both river lamprey <i>Lampetra fluviatilis</i> and sea lamprey <i>Petromyzon marinus</i> between coastal waters and their spawning areas.</p>	<p>site. It therefore follows that this option would individually have no adverse effect²¹.</p>			
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	None	Yes	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
			<p>designated a SAC/SPA/Ramsar.</p> <p>The lamprey population within the River Hull is unlikely to be impacted directly by flow changes associated with this option, however the water quality implications of reduced flow on estuarine flushing (of 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 one STW may 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 March²⁵. Any temporary and localised DO sag is not expected to prevent the downstream movement of any post metamorphic individuals either.</p> <p>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 catchments²⁶. However, lamprey are not SAC</p>			

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.

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
			<p>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 UK²⁷.</p> <p>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.</p> <p>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.</p>			
Wharfe increased annual abstraction	North Pennine Moors SPA (1.40km)	<p>Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover.</p> <p>Golden Plover <i>Pluvialis apricaria</i> Hen harrier <i>Circus cyaneus</i> Merlin <i>Falco columbarius</i></p>	<p>There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.</p>	None	None	No

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 ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
	North Pennine Moors SAC (1.40km)	Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i> Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths <i>Juniperus communis</i> formations on heaths or calcareous grasslands Calaminarian grasslands of the <i>Violetalia calaminariae</i> 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 (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles <i>Saxifraga hirculus</i> Marsh saxifrage <i>Saxifraga hirculus</i>		None	None	No
	Peak District Moors (South Pennine)	Short eared owl <i>Asio flammeus</i>	There is no construction related to this option and no operational impacts have been identified.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
	Moors Phase 2) SPA (1.20km)	Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>	The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions.			
	South Pennine Moors SAC (1.20km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles		None	None	No
	Humber Estuary SAC (>10km ²⁸)	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 <i>Salicornia</i> and other annuals colonising mud and sand Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>) Embryonic shifting dunes	There is no construction related to this option and no operational impacts have been identified The drought permit would increase the daily average abstraction by ~23.7Ml/d (an indicative value that would be confirmed at time of application) which would otherwise be constrained by the annual licence total. This would affect river flows at moderate and higher flows. At most this would be up to a 5% reduction in flow at moderate flows (flows greater than 571.4Ml/d at Addingham gauge), proportionally less at higher flows and no change at low flows where these are supported by regulation releases. The extent considered is from the intake to the tidal limit of the river at Ulleskelf, North Yorkshire, 72km of the River	None	None	No

²⁸ 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 ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes") Fixed dunes with herbaceous vegetation ("grey dunes") Dunes with <i>Hippophae rhamnoides</i> Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra fluviatilis</i> Grey seal <i>Halichoerus grypus</i>	Wharf. The magnitude of effect is considered indiscernible (i.e. negligible), when compared with the range of winter flows in the river, and freshwater flows into the estuary will not be affected.			
	Humber Estuary SPA (>10km)	Teal <i>Anas crecca</i> Wigeon <i>Anas penelope</i> Mallard <i>Anas platyrhynchos</i> Ruddy turnstone <i>Arenaria interpres</i> Pochard <i>Aythya ferina</i> Great Bittern <i>Botaurus stellaris</i> Dark bellied brent goose <i>Branta bernicla bernicla</i> Goldeneye <i>Bucephala clangula</i> Sanderling <i>Calidris alba</i> Dunlin <i>Calidris alpina alpina</i> Red Knot <i>Calidris canutus</i> Ringed plover <i>Charadrius hiaticula</i> Eurasian Marsh harrier <i>Circus aeruginosus</i> Hen harrier <i>Circus cyaneus</i> Oystercatcher <i>Haematopus ostralegus</i>		None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Bar tailed godwit <i>Limosa lapponica</i> Black tailed godwit <i>Limosa limosa islandica</i> Curlew <i>Numenius arquata</i> Whimbrel <i>Numenius phaeopus</i> Ruff <i>Philomachus pugnax</i> European Golden plover <i>Pluvialis apricaria</i> Grey plover <i>Pluvialis squatarola</i> Pied avocet <i>Recurvirostra avosetta</i> Little tern <i>Sterna albifrons</i> Common Shelduck <i>Tadorna tadorna</i> Common greenshank <i>Tringa nebularia</i> Common Redshank <i>Tringa totanus</i> Lapwing <i>Vanellus vanellus</i> scaup <i>Aythya marila</i> golden plover <i>Pluvialis apricaria</i> knot <i>Calidris canutus</i>				
	Humber Estuary RAMSAR (>10km)	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		None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		<p>seals <i>Halichoerus grypus</i> 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 <i>Bufo calamita</i>.</p> <p>Ramsar Criterion 5 Assemblages of international importance: 153,934 waterfowl, non-breeding season (5 year peak mean 1996/97-2000/2001)</p> <p>Ramsar Criterion 6 12 Species/populations occurring at levels of international importance.</p> <p>Ramsar Criterion 8 The Humber Estuary acts as an important migration route for both river lamprey <i>Lampetra fluviatilis</i> and sea lamprey <i>Petromyzon marinus</i> between coastal waters and their spawning areas.</p>				
Derwent annual abstraction increase	River Derwent SAC (<1km)	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation River lamprey <i>Lampetra fluviatilis</i> Sea lamprey <i>Petromyzon marinus</i>	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	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Bullhead <i>Cottus gobio</i> Otter <i>Lutra lutra</i>	the lower River Derwent (when compared with Buttercrambe flow gauge). The extent considered is for 24km of the River Derwent.			
	Lower Derwent Valley SAC (<1km)	Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>) Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) Otter <i>Lutra lutra</i>	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 is significant sub-daily differences in flow, as caused by the Barmby Barrage (at least from Bubwith Bridge) that pattern is the dominant feature on river hydrology.	None	None	No
	Lower Derwent Valley SPA (<1km)	Corncrake <i>Crex crex</i> , Ruff <i>Philomachus pugnax</i> Spotted Crake <i>Porzana porzana</i> Bewick's Swan <i>Cygnus columbianus bewickii</i> Bittern <i>Botaurus stellaris</i> Golden Plover <i>Pluvialis apricaria</i> Teal <i>Anas crecca</i> Over winter, the area regularly supports 39,936 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Lapwing <i>Vanellus vanellus</i> , Pochard <i>Aythya ferina</i> , Shoveler <i>Anas clypeata</i> , Mallard <i>Anas platyrhynchos</i> , Wigeon <i>Anas penelope</i> , Teal <i>Anas crecca</i> , Ruff <i>Philomachus pugnax</i> , Golden Plover <i>Pluvialis apricaria</i> , Bewick's Swan <i>Cygnus columbianus bewickii</i> , Bittern <i>Botaurus stellaris</i> .		None	None	No
	Lower Derwent Valley Ramsar (<1km)	Ramsar Criterion 1 The site represents one of the most important examples of traditionally		None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		<p>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.</p> <p>Ramsar Criterion 2</p> <p>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 <i>Cicadula ornata</i>.</p> <p>Ramsar Criterion 4</p> <p>The site qualifies as a staging post for passage birds in spring, with nationally important numbers of ruff <i>Philomachus pugnax</i> and whimbrel <i>Numenius phaeopus</i>.</p> <p>Ramsar Criterion 5</p> <p>The site supports an internationally important assemblage of waterfowl in the winter with 31,942 waterfowl.</p> <p>Ramsar Criterion 6</p> <p>The site supports Eurasian wigeon <i>Anas penelope</i> and Eurasian teal <i>Anas crecca</i> at levels of international importance during the winter.</p>				
Long-term options						

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
East Yorkshire Groundwater Option 2	Skipwith Common SAC (8.7km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths	Hydrological impacts of the option are unlikely to influence the designated site. Impacts resulting from this are unlikely to lead to significant effects on qualifying features as the abstraction would not be associated with the aquifer underlying the SACs, SPA or Ramsar site. Abstraction would also be within the limits of the existing licence. The site is sufficiently distanced for proposed infrastructure for direct and in-direct impacts to be unlikely and is not located within the IRZ of any European Sites.	None	No	No
	River Derwent SAC (9.5km)	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation River lamprey <i>Lampetra fluviatilis</i> Sea lamprey <i>Petromyzon marinus</i> Bullhead <i>Cottus gobio</i> Otter <i>Lutra lutra</i>				
	Lower Derwent Valley SAC (>10km)	Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>) Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) Otter <i>Lutra lutra</i>				
	Lower Derwent Valley SPA (>10km)	Corncrake <i>Crex crex</i> , Ruff <i>Philomachus pugnax</i> Spotted Crake <i>Porzana porzana</i> Bewick's Swan <i>Cygnus columbianus bewickii</i> Bittern <i>Botaurus stellaris</i> Golden Plover <i>Pluvialis apricaria</i> Teal <i>Anas crecca</i> Over winter, the area regularly supports 39,936 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Lapwing <i>Vanellus vanellus</i> , Pochard <i>Aythya ferina</i> , Shoveler <i>Anas clypeata</i> , Mallard <i>Anas platyrhynchos</i> , Wigeon				

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
	Lower Derwent Valley Ramsar (>10km)	<p><i>Anas penelope</i>, Teal <i>Anas crecca</i>, Ruff <i>Philomachus pugnax</i>, Golden Plover <i>Pluvialis apricaria</i>, Bewick's Swan <i>Cygnus columbianus bewickii</i>, Bittern <i>Botaurus stellaris</i>.</p> <p>Ramsar Criterion 1</p> <p>The site represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK. The river and flood meadows play a substantial role in the hydrological and ecological functioning of the Humber Basin</p> <p>Ramsar Criterion 2</p> <p>The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates as well as a leafhopper, <i>Cicadula ornata</i> for which Lower Derwent Valley is the only known site in Great Britain.</p> <p>Ramsar Criterion 4</p> <p>The site qualifies as a staging post for passage birds in spring. Of particular note are the nationally important numbers of Ruff, <i>Philomachus pugnax</i> and Whimbrel, <i>Numenius phaeopus</i>.</p>				

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		<p>Ramsar Criterion 5</p> <p>Assemblages of international importance: Species with peak counts in winter: 31942 waterfowl (5 year peak mean 1998/99-2002/2003)</p> <p>Ramsar Criterion 6</p> <p>Two species/populations occurring at levels of international importance</p>				
North Yorkshire Groundwater increased abstraction	North Pennine Dales Meadows SAC (4.8 km)	<p>Mountain hay meadows</p> <p><i>Molinia</i> meadows on calcareous, peaty of clayey-silt-laden soils (<i>Molinion caeruleae</i>)</p>	The SAC is located between 4 and 6km from the borehole location. 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 impacts on the designated features and whether these impacts are likely to be significant.	Yes	No	Yes
Tees – Swale transfer	Moorhouse-Upper Teesdale SAC (~6.70km)	<p>Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara spp.</i></p> <p>European dry heaths</p> <p>Alpine and Boreal heaths</p> <p>Juniperus communis formations on heaths or calcareous grasslands</p> <p>Calaminarian grasslands of the Violetalia</p> <p>Siliceous alpine and boreal grasslands</p> <p>Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>)</p>	<p>These designated sites incorporate Cow Green Reservoir and the Upper Tees.</p> <p>These sites are designated for moorland and upland habitats which would not be impacted by water level changes in the River Tees as a result of the transfer. At Cow Green Reservoir, all releases and associated water level drawdown would be within the bounds of the current abstraction licences. The licensed abstractions and associated reservoir releases and changes in water levels have been considered by the Habitats Directive Review of Consents process,</p>	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Molinia meadows on calcareous, peaty or clayey-siltladen soils (<i>Molinion caeruleae</i>) Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels Mountain hay meadows Blanket bogs Petrifying springs with tufa formation (Cratoneurion) Alkaline fens Alpine pioneer formations of the <i>Caricion bicoloris-atrofuscae</i> Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) Calcareous and calcshist screes of the montane to alpine levels (<i>Thlaspietea rotundifolii</i>) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Limestone pavements Round mouthed whorl snail <i>Vertigo genesii</i> Marsh saxifrage <i>Saxifraga hirculus</i>	which concluded there would be no adverse effect on the integrity of these European sites.			
	North Pennine Moors SPA (<1km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed		None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		<p>plover.</p> <p>Golden Plover <i>Pluvialis apricaria</i> Hen harrier <i>Circus cyaneus</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i></p>				
	Humber estuary SAC/SPA/Ramsar (<1km)	As listed above	Transfer of water of potentially varying quality between catchments – Swale discharges to the Humber estuary via the Ouse. Water quality impacts on the Swale were deemed likely to be insignificant by the 2000 study. It follows that impacts of a much reduced transfer on the Humber Estuary would be negligible. At low flows (Q95), 42Ml/d transferred from the Tees/Tyne would make up 0.3% of the flow discharging to the Humber Estuary.	None	None	No
Aire abstraction	South Pennine Moors SAC (>4km)	<p>Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles</p>	<p>The option requires the construction of a new river intake, a new pumping station, a break pressure tank, and a pipeline.</p> <p>The nearest designated site is >4km away from the proposed pipeline, the associated construction and the impacted reach.</p> <p>The site is sufficiently distanced for proposed infrastructure for direct and in-direct impacts to be unlikely and is not located within the IRZ of any European Sites</p> <p>The operation of the proposed option is unlikely to impact upon the site hydrologically, with the site</p>	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
	South Pennine Moors SPA (>41km)	Short eared owl <i>Asio flammeus</i> Merlin <i>Falco columbarius</i> Golden plover <i>Pluvialis apricaria</i> Merlin <i>Falco columbarius</i> Peregrine <i>Falco peregrinus</i> Dunlin <i>Calidris alpina schinzii</i>	<p>located upstream in the catchment compared to the abstraction</p> <p>The option requires the construction of a new river intake, a new pumping station, a break pressure tank, and a pipeline.</p> <p>The nearest designated site is >4km away from the proposed pipeline, the associated construction and the impacted reach.</p> <p>The site is sufficiently distanced for proposed infrastructure for direct and in-direct impacts to be unlikely and is not located within the IRZ of any European Sites</p> <p>The operation of the proposed scheme is unlikely to impact upon the site hydrologically, with the site located upstream in the catchment compared to the abstraction.</p>	None	None	No
Ouse water treatment works extension	Strensall Common SAC (7.25km)	North Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths	<p>The option requires the construction of a new river intake and a new connection to the existing raw water main. The nearest designated site is 7.25km away and as it is sufficiently distanced, there should be no adverse impacts on noise or visual amenity. The construction will require minimal numbers of HGV lorries to transport the material. Transport will utilise the existing road network, however, the increase in vehicle numbers required for the construction of the scheme is considered to be negligible, and will be for a temporary period.</p> <p>No operational impacts have been identified. The SAC is a sufficient distance from the impacted reach that there would be no hydrodynamic</p>	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
			connectivity between channel and the common, particularly during dry conditions.			
Ouse Raw Water Transfer	Strensall Common SAC (7.25km)	North Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths	<p>The option requires the construction of a new river intake. The nearest designated site is 7.25km away as it is sufficiently distanced, there should be no adverse impacts on noise or visual amenity. The construction will require minimal numbers of HGV lorries to transport the material. Transport will utilise the existing road network, however, the increase in vehicle numbers required for the construction of the scheme is considered to be negligible, and will be for a temporary period.</p> <p>No operational impacts have been identified. The SAC is a sufficient distance from the impacted reach that there would be no hydrodynamic connectivity between channel and the common, particularly during dry conditions.</p>	None	None	No
Ouse increased abstraction	Strensall Common SAC (7.1km)	North Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths	<p>The option requires the construction of a new pipeline and pumps. The nearest designated site is 7.1km away and as it is sufficiently distanced, there should be no adverse impacts on noise or visual amenity. The construction will require minimal numbers of HGV lorries to transport the material. Transport will utilise the existing road network, however, the increase in vehicle numbers required for the construction of the scheme is considered to be negligible, and will be for a temporary period.</p> <p>The SAC is a sufficient distance from the impacted reach that there would be no hydrodynamic connectivity between channel and the common,</p>	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
			particularly during dry conditions and the operation.			
Tees - Derwent Pipeline	North Pennine Dales Meadows SAC (>7km)	Mountain hay meadows <i>Molinia</i> meadows on calcareous, peaty of clayey-silt-laden soils (<i>Molinion caeruleae</i>)	<p>Construction associated with this option includes a new pipeline and inline pumping station which will connect the existing Blackwell to Birkby pipeline to a high point and a new break pressure tank at the Yorkshire Water site. The construction will require number of HGV lorries to transport the material. Transport will utilise the existing road network, however, the increase in vehicle numbers required for the construction of the scheme is considered to be negligible, and will be for a temporary period. Noise and dust is likely to be minimal as the site is sufficiently distanced. Further, the proposed pipeline and infrastructure required for the scheme are sufficiently distanced from this European site for direct and in-direct impacts to be unlikely to affect qualifying features during construction and operation.</p> <p>A single component of the European site, Thorneyburn Meadow, an alluvial floodplain, is located adjacent to the River Tyne approximately 7km downstream of Kielder Water. Although the impacts of additional releases from Kielder Reservoir during dry weather flows have the potential to alter water levels in the Tyne, it is unlikely that they will be of significant magnitude to have a significant effect on the qualifying features.</p> <p>Elsewhere, operation of the proposed scheme will not affect this European site as the hydrological</p>	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
			connectivity falls outside of the area of influence of the scheme.			
	Border Mires, Kielder-Butterburn SAC (3.2km)	Blanket bogs Transition mires and quaking bogs Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Petrifying springs with tufa formation (<i>Cratoneurion</i>)	The construction associated with this option is not nearby to the designated site, therefore no construction impacts are anticipated. The operational impact of additional drawdown of the reservoir to support the scheme and higher releases in dry weather is unlikely to impact on the bogs and mire habitat as the reservoir and flow releases do not contribute to the hydrological balance of these habitats.	None	None	No
	North Pennine Moors SAC (10km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths <i>Juniperus communis</i> formations on heaths or calcareous grasslands Calaminarian grasslands of the <i>Violetalia calaminariae</i> Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) Blanket bogs Petrifying springs with tufa formation (<i>Cratoneurion</i>) Alkaline fens Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladanii</i>) Calcareous rocky slopes with	Construction associated with this option is not near this designated site. These designated sites incorporate Cow Green Reservoir and the Upper Tees. These sites are designated for moorland and upland habitats which would not be impacted by water level changes in the River Tees as a result of the transfer and operational use. At Cow Green Reservoir, all releases and associated water level drawdown would be within the bounds of the current abstraction licences. The licensed abstractions and associated reservoir releases and changes in water levels have been considered by the Habitats Directive Review of Consents process, which concluded there would be no adverse effect on the integrity of these European sites.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles <i>Saxifraga hirculus</i> Marsh saxifrage <i>Saxifraga hirculus</i>				
	Moor House - Upper Teesdale SAC (<1km)	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. Alpine and Boreal heaths <i>Juniperus communis</i> formations on heaths or calcareous grassland Calaminarian grasslands of the <i>Violetalia calaminariae</i> Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels Mountain hay meadows Blanket bogs Petrifying springs with tufa formation (<i>Cratoneurion</i>) Alkaline fens Alpine pioneer formations of the <i>Caricion bicoloris-atrofuscae</i>	Construction associated with this option is not near this designated site. These designated sites incorporate Cow Green Reservoir and the Upper Tees. These sites are designated for moorland and upland habitats which would not be impacted by water level changes in the River Tees as a result of the transfer and operational use. At Cow Green Reservoir, all releases and associated water level drawdown would be within the bounds of the current abstraction licences. The licensed abstractions and associated reservoir releases and changes in water levels have been considered by the Habitats Directive Review of Consents process, which concluded there would be no adverse effect on the integrity of these European sites.	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
		Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) Calcareous and calcshist screes of the montane to alpine levels (<i>Thlaspietea rotundifolii</i>) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Round-mouthed whorl snail <i>Vertigo genesii</i> Marsh saxifrage <i>Saxifraga hirculus</i> European dry heaths Limestone pavements				
	North York Moors SPA & SAC (13km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Falcon <i>Falco columbarius</i> golden plover <i>Pluvialis apricaria</i>	Construction associated with this option is not near this designated site. Operation of the proposed scheme will not affect the European site as the hydrological connectivity falls outside of the area of influence of the scheme. In addition, the proposed pipeline and infrastructure required for the scheme are sufficiently distanced from the European site for direct and in-direct impacts to be unlikely to affect qualifying features.	None	None	No
	Irthinghead Mires Ramsar (7.48km)	The site supports an outstanding example of undamaged blanket bog characteristic of the vegetation of upland north-western Britain. The site also supports a notable variety of <i>Sphagnum</i> moss, several rare plants and the rare spider <i>Eboria caliginosa</i> .	No construction associated with this option is near the designated site. The operation of option and the compensation release in dry weather conditions from Kielder Water is unlikely to influence the hydrology of this European site. In addition, the proposed infrastructure required for this scheme is sufficiently distanced (>10km) from this European	None	None	No

Option(s)	European Site within zone of minor, moderate or major hydrological impact ²⁰	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Potential likely significant effect of scheme on European site(s) alone?	Effect in combination with other options, plans and projects?	Is scheme likely to have a significant effect on European site(s)?
			site for direct and in-direct impacts to be negligible.			
North West Reservoir Abstraction	South Pennine Moors SAC (2.20km)	Northern Atlantic wet heaths with <i>Erica tetralix</i> European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles	A temporary pump would be needed to transfer the water from North West Reservoir to Bradford WTW 1. The construction will require a number of HGV lorries to transport the material. Transport will utilise the existing road network, however, the increase in vehicle numbers required for the construction of the scheme is considered to be negligible, and will be for a temporary period. Noise and dust is likely to be minimal as it is sufficiently distanced. As the pipe is temporary there will be no long-lasting impacts on the designation. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrodynamic connectivity between channel and the moor, particularly during dry conditions. The drought option allows the continued release of compensational flows and operational impacts are considered negligible.	None	None	No

3.4 Information to Inform the Appropriate Assessment

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 adversely affect the integrity of a European site. Stage 1 HRA screening of the Drought Plan 2022 has indicated that likely significant effects on the North Pennine Dales Meadows SAC could not be ruled out as a result of the implementation of the North Yorkshire Groundwater increased abstraction drought option. As such, a Stage 2 HRA was required to determine whether the implementation of the drought option could impact on the conservation objectives and subsequently site integrity of these European sites.

The Information to Inform the Appropriate Assessment is provided in full as **Appendix A**.

In summary, the units of the North Pennine Dales Meadows SAC most likely to be affected by the scheme are located between 4.9km and 6.7km from the North Yorkshire Groundwater increased abstraction location. Analysis of geological and borehole data indicate that the SACs are above the groundwater water table level and that the SACs are designated for non-water dependant features. As such, it is concluded that abstraction from the proposed North Yorkshire Groundwater increased abstraction scheme will not have a significant adverse effect on the qualifying features of the North Pennine Dales Meadows SAC.

3.5 Potential In-Combination Effects of Drought Options

Individually, Yorkshire Water drought options were identified as having no likely significant effects on European sites (see **Table 3.2**). 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 3.2**, column 6. In addition, **Table 3.3** shows the cumulative effects assessment for the Humber Estuary EMS.

In summary, no cumulative or 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.

Table 3.3: Cumulative Effects 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 cumulative effects on qualifying features/main habitats?	Potential cumulative effect?	Are the cumulative effects of schemes likely to have a significant effect on European sites?
All Options	Humber Estuary SAC/SPA/ RAMSAR	As above	<p>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).</p> <p>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 cumulative impacts of all drought options would be unlikely to have any adverse effect on the integrity of the European site.</p> <p>Assessment of the cumulative 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. The two options involving abstraction from the River Tees would have no cumulative effect on flows to the Humber Estuary EMS. 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.</p> <p>If all of the River Ouse options were to be implemented (and assuming the Ouse increased abstraction drought permit is already in place), cumulative impacts downstream of a 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.</p>	Yes	No

4 Conclusions

4.1 HRA Screening and Requirement for Appropriate Assessment

Stage 1 HRA screening of the Drought Plan 2022 has indicated that likely significant effects on the North Pennine Dales Meadows SAC could not be ruled out as a result of the implementation of the North Yorkshire Groundwater increased abstraction drought option. An Appropriate Assessment has been undertaken and is provided as **Appendix A**. The Appropriate Assessment concludes that abstraction from the proposed North Yorkshire Groundwater increased abstraction drought option will not have an adverse effect on the qualifying features of the North Pennine Dales Meadows SAC.

The HRA screening concludes there are no likely significant effects on the Humber Estuary European Marine site (EMS) or other European Designated Sites within the drought option areas. **Table 3.2** shows the assessment for each drought option and **Table 3.3** shows the cumulative effects assessment for the Humber Estuary EMS. Accordingly, it is concluded that there are no other requirements for Appropriate Assessment.

The HRA has included Long Term Options (LTO) in the event of a third year of a drought, although the specific timing of the LTO is unknown. None of these options would lead to likely significant effects on a European site.

Should all of the River Ouse options be implemented in a third year of drought, the cumulative impact would be a moderate impact on river flows in the reach between two STW discharges and a minor impact on river flows downstream due to the flow contribution from the STWs. The cumulative impact on water quality downstream of a STW to the tidal limit due to reduced dilution is a minor change (7%) in ammonia concentrations and BOD at Q95 flows. The impacts of these changes in water quality are not considered to have a likely significant effect on water quality in the Humber Estuary EMS. It is important to distinguish between the impact of drought on the Humber Estuary 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 is not considered to have a likely significant effect on water quality in the Humber Estuary.

4.2 In-combination Impacts

4.2.1 Between Yorkshire Water Drought Options

As identified above, cumulative impacts have been assessed between drought options and the conclusion reached that no likely significant effects on European sites would occur (see **Tables 3.1-3.3**).

It would be important to review the potential for cumulative effects on the Humber Estuary EMS as a drought develops, taking into consideration the prevailing water quality conditions, time of year, water temperatures and the prevailing quality of the key effluent discharges to the river systems draining to the Humber. This information would be available from the in-drought baseline monitoring set out in the Environmental Monitoring Plan.

4.2.2 With neighbouring water companies

Assessment of cumulative impacts 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. There are no drought plan options in the Anglian

Water Drought Plan 2019 that impact on the Humber Estuary. There are a small number of options in the River Trent basin in the Severn Trent Water Drought Plan 2019, 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.

Consequently, the cumulative impact 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.

Appendix A: Information to Inform the Appropriate Assessment

Introduction

Requirement for Habitats Regulations Assessment

This Appendix presents the information required to inform the Appropriate Assessment of the North Yorkshire Groundwater increased abstraction which must be undertaken by the competent authorities, in this case Yorkshire Water. This Appendix represents Stage 2 of the Habitats Regulations Assessment (HRA) process.

The Stage 2 assessment is required as screening has indicated that likely significant effects on the North Pennine Dales Meadows Special Area of Conservation (SAC) could not be ruled out as a result of the implementation of the North Yorkshire Groundwater increased abstraction drought option.

It should be noted that screening identified that the implementation of the North Yorkshire Groundwater increased abstraction is not likely to result in effects when considered in combination with any other plans or projects.

HRA Guidance for the appraisal of Plans²⁹, summarises the Habitats Regulations. Regulation 63(5) 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:

- 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.

Regulation 105 of the Habitats Regulations states:

- 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.

²⁹ Tyldesley, D. & Chapman, C. (2015) The Habitats Regulations Assessment Handbook. DTA Publications. Version 4.

- (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).

Article 6 of the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna) states:

- 6(3). Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.
- 6(4). If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

The Integrity test

The integrity test is the conclusion of the Stage 2 HRA (Appropriate Assessment) and requires the competent authority to ascertain whether the Plan (either alone or in-combination with other plans or projects), will not have a significant adverse effect on site integrity. The following definition of site integrity is provided by Defra; the integrity of the site is:

“the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the level of populations of the species for which it was classified”³⁰.

From the evidence and assessments undertaken, a statement has been made as to whether it can be ascertained that the North Yorkshire Groundwater increased abstraction drought option alone, or in-combination with other plans or projects, will not adversely affect the integrity of a European site.

³⁰ Defra Circular 01/2005.

Aims and content of this Appendix

This assessment considers the potentially damaging aspects of the North Yorkshire Groundwater increased abstraction drought option and the potential effects on the European sites' qualifying features and achievement of the conservation objectives.

The potential for adverse effect on the integrity of the site depends on the scale and magnitude of the proposed activity and its predicted impacts, taking into account the distribution of the designated features across the site in relation to the predicted impact and the location, timing and duration of the proposed activity and the level of understanding of the effect, such as whether it has been recorded before and, based on current ecological knowledge, whether it can be expected to operate at the site in question. Where qualitative and/or quantitative information is available, this has been used to inform the assessment. Where this information is not available, professional judgement has been used.

This report aims to set out, in sufficient detail for it to be transparent and understandable, what the effects of the North Yorkshire Groundwater increased abstraction drought option are likely to be on the internationally-designated site's qualifying feature, referring to relevant background documents and other information on which these judgements, which are essentially ecological judgements, rely. Guidance states that the size or complexity of the HRA Stage 2 report to inform the Appropriate Assessment will not necessarily reflect the scale of the project or plan, but rather the complexity of potential effects. The length of the report may not reflect the complexity of ecological judgements made to arrive at the necessary conclusions. Very complex ecological analysis and judgements may be expressed succinctly, with detailed supporting analyses contained in appendices or clearly referenced separate documents.

The main concern regarding the North Yorkshire Groundwater increased abstraction drought option relates to the increased abstraction and the potential increase in groundwater drawdown which could impact on the structure and function of water dependant habitat such as *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (purple moor-grass meadows), a qualifying feature of the North Pennine Dales Meadows SAC.

The following sections describe the European sites and their associated conservation objectives, the location of the SAC and the SPA in relation to the North Yorkshire Groundwater increased abstraction option, the potential impacts on the European sites and the findings of the integrity test.

Potential impacts of the North Yorkshire Groundwater increased abstraction Drought Option

North Pennine Dales Meadows SAC

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

The North Yorkshire Groundwater increased abstraction drought option aims to increase average abstraction by 2MI/d (from 8MI/d to 10MI/d) and peak abstraction from 12.5 to 14.5MI/d. 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.

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.

Location of SAC in relation to the North Yorkshire boreholes

Details regarding the geographical location of the SAC in relation to the North Yorkshire Groundwater increased abstraction drought option is presented in **Table A1**. The units of the SAC most likely to be affected by the scheme are located between 4.9km and 6.7km from the North Yorkshire boreholes. 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 A1: SAC geographical details

SAC name and NGR	Associated SSSI	Distance from borehole to closest point on 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

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 (SSSI units) 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 (*Glyceria 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 habitat³¹.

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

³¹ UK Technical Advisory Group on the Water Framework Directive (2003). Guidance on the Identification of Natura Protected Areas [Final].

sward is characterised by sweet vernal-grass *Anthoxanthum odoratum*, crested dog's-tail *Cynosurus cristatus*, yellow oat-grass *Trisetum flavescens*, quaking-grass *Briza media* and false oat-grass *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's-mantle *Alchemilla* agg., betony *Stachys officinalis* and goat's-beard *Tragopogon pratensis*.

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 rock-rose *Helianthemum nummularium*, lady's bedstraw *Galium verum* and mouse-eared 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 depended habitat³².

Potential Impact on SAC designated features

Geology

A review of the geology associated with the study area has been undertaken. The North Yorkshire 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.

³² UK Technical Advisory Group on the Water Framework Directive (2003). Guidance on the Identification of Natura Protected Areas [Final].

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 North Yorkshire boreholes, 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 North Yorkshire boreholes. 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 North Yorkshire boreholes, outside of the Source Protection Zone.

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

- 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 North Yorkshire boreholes. 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 report³³ 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 North Yorkshire boreholes. The presence of artesian conditions indicates a confined aquifer, and data indicates artesian flow from a head of up to 6m above ground level³⁴.

³³ Arup (2006). A8802 Resource Study. Factual Report. September 2006. 123pp.

³⁴ Ibid.

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 north west 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 north west or Richmond, indirect recharge through superficial deposits and upward leakage from the underlying Carboniferous limestones particularly along faults and fractures³⁵. 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 pumped³⁶. 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 (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.

Summary of impacts

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 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.

³⁵ Ibid.

³⁶ Arup (2006). A8802 Resource Study. Factual Report. September 2006. 123pp.

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.

Integrity Test

In conclusion, the North Yorkshire Groundwater increased abstraction drought 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 North Yorkshire boreholes drought option will not have a significant adverse effect on the integrity.

Conclusion

Stage 1 HRA screening has indicated that likely significant effects on the North Pennine Dales Meadows SAC could not be ruled out as a result of the implementation of the North Yorkshire Groundwater increased abstraction drought option. Similarly, the Stage 1 HRA screening also concluded that likely significant effects on the South Pennine Moors (Phase 2) SPA could not be ruled out as a result of the construction activities associated with the new pipeline for the North Yorkshire Groundwater increased abstraction drought option.

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 adversely affect the integrity of a European site. As such, a Stage 2 HRA was required to determine whether the implementation of the North Yorkshire Groundwater increased abstraction drought option could impact on the conservation objectives or the qualifying features of the North Pennine Dales Meadows SAC and the South Pennine Moors (Phase 2) SPA respectively.

The units of the SAC most likely to be affected by the North Yorkshire Groundwater increased abstraction drought option are located between 4.9km and 6.7km from the North Yorkshire boreholes location. Analysis of geological and borehole data³⁷ indicate that the SACs are above the groundwater water table level and that the SACs are designated for non-water dependant features. As such, it is concluded that abstraction from the proposed North Yorkshire Groundwater increased abstraction drought option will not have a significant adverse effect on the qualifying features of the North Pennine Dales Meadows SAC.

³⁷ Arup (2006). A8802 North Yorkshire Groundwater Borehole Resource Study. Factual Report. September 2006. 123pp.



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