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REPORT TO INFORM HABITATS REGULATION ASSESSMENT

Yorkshire Water's Drought Plan 2027

Report for: Yorkshire Water

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

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

1.2 REQUIREMENT

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

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

Regulation 64 of the Habitats Regulations states:

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

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

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

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

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

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

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

Regulation 105 of the Habitats Regulations states:

(1) Where a land use plan—

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

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

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

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

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

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

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

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

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

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

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

1.3 CONTEXT

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

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

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

For ease of reference through this HRA report, these designations are collectively referred to as “European sites”. As per Natural England (NE) guidance[5], 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.

[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)

2. APPROACH

2.1 OVERVIEW OF HRA STAGES

There are four stages of the HRA process:

1. Firstly, a screening process was undertaken to identify whether each drought management measure in Yorkshire Water's Drought Plan 2027 (either alone or in combination with other plans or projects) is likely to have any significant effects on European sites (reported in this HRA Report). There was an important judgment in the Court of Justice of the European Union (CJEU) in April 2018[6] which ruled that Article 6(3) of the Habitats Directive must be interpreted as meaning that mitigation measures should be assessed within the framework of an Appropriate Assessment and that it is not permissible to take account of mitigation measures at the screening stage. The Stage 1 Screening within this assessment is presented within Section 4 of this report. There are three potential outcomes for screening, LSE alone, residual effects that are not 'significant', and no effect.
    i. Where LSE alone has been determined, it can be assumed that there is potential for effects in-combinations with other plans and projects and the in-combination assessment is deferred to Stage 2.
    ii. Where there is a residual effect that is not significant, there is potential for that effect to become significant in-combination with effects from other plans or projects, therefore an in-combination assessment for LSE is required.
    iii. Where there is no effect, there is no need to undergo an in-combination assessment.
2. Where a LSE cannot be ruled out (noting the precautionary principle and the requirement to exclude consideration of mitigation measures), an Appropriate Assessment should be undertaken of the drought management measure to determine whether this would adversely affect the integrity of the European site(s), either alone or in combination with other Drought Plan 2027 options or other plans and projects, taking into account available specific mitigation measures.
3. Where adverse effects cannot be ruled out at the Appropriate Assessment stage, alternative, reasonably feasible options should be examined to determine whether it is possible to avoid adverse effects on the integrity of the European site as Stage 3 of the HRA.
4. Stage 4 comprises an assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest, and consideration of compensation measures it has been concluded that the Secretary of State should be asked to determine that the Plan should proceed (this is decision of the Secretary of State, not Yorkshire Water).

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

2.2 POTENTIAL IMPACTS

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

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

The attributes of the European sites, which contribute to and define their integrity, have been considered with reference to Standard Data forms for SACs and SPAs and Information Sheets for Ramsar sites. An analysis of these information sources has enabled the identification of the site's qualifying features. This information, as well as Article 12 and 17 reporting, site conservation objectives, supplementary guidance, Site Improvement Plans, and the supporting Site of Special Scientific Interest's favourable condition tables, has been used to identify those features of each site which determine current conservation status, site integrity and the specific sensitivities of the site. Analysis of how potential impacts of the drought management measures may affect a European site has been undertaken using this information. The locations of the supply side and drought permit/order options were also mapped in order to establish their geographic proximity to the European sites. The Drought Plan 2027 proposes a number of options which would make more water available for supply than is available under normal licensed conditions. Drought options include demand side options (e.g. water use restrictions), continued utilisation of existing licensed water sources within Yorkshire Water's resource base (referred to as supply side options) and drought permits/orders.

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
Standard demand-side management options	
Drought publicity campaigns	Increased water efficiency messages via increased customer communications
Increased leakage detection and repair activity	Ensure that all maintenance programmes are up-to-date and undertake additional leakage control, leading to demonstrable water savings
Introduction of temporary use ban	Restrictions on the use of hosepipes for a range of uses, including the washing of vehicles and boats, watering gardens and sports grounds and filling of paddling pools
Introduction of a drought order to ban non-essential water uses (defined in the Drought Direction 2011)	Drought order to restrict non-essential water uses to be applied for when reservoir stocks fall below the Drought Control Line
Emergency drought order to temporarily supply water by means of rota cuts or standpipes	An Emergency Drought order may be applied for in the event of an exceptional drought, in consultation and liaison with the Environment Agency, local authorities and the Consumer Council for Water. This situation would be extremely unlikely to occur and would not arise under a repeat of the worst recorded drought events in Yorkshire
'Extreme' demand-side management options	
Removal of exceptions	Removal of temporary use ban (TUBs) non-statutory exceptions and concessions so that greater restrictions are applied and to a greater number of customers.
Drought orders	Use full range of powers available with non-essential use (NEU) drought orders. Removal of non-statutory NEU exceptions and concessions so that greater restrictions are applied and to a greater number of customers. Assumes all supply-side permit applications (where a benefit is achieved) are already in place.
Yorkshire Water customer campaign	Create awareness of the situation and appeal for extreme demand reduction action e.g. reduce use to 50Ml/d. All media channels will be used including regular appearances on local news channels.
National Media & Communications	National campaigns to change culture (e.g. excessive water use seen as socially unacceptable), keeping customers aware of the current situation and risks if do not take extreme action. Produce guides for customers to demonstrate how to

Demand-side options	Comments
	restrict water use e.g. to 50 litres/ person/day. Hard hitting messages and images will be developed and publicity increased by use of national campaign.
Pressure management	Reduce pressure while still maintaining essential services e.g. nighttime reductions. Pumping stations and pressure reduction valves controlling water distribution would be optimised to a level that would just meet standards.
Request commercial and agricultural water use reductions	Request non-households reduce use for purposes not prohibited by a drought order for a non-essential use ban. This could be by agreement with large users who may be able to operate differently e.g. reduce production at a site in the affected area if they have other sites elsewhere that could cope with additional demand.
Water efficiency in non-house properties	We will seek to work with retailers to deliver water efficiency devices and advice to non-household water users.

Table 2-2: Supply Side Options

Grid Surface Water Resource Zone	Water Source	Type of Drought Management Option
Drought permit/order options (level 3a)		
North Area	North Area Reservoir 1, North Area Reservoir 2, North Area Reservoir 3, North Area Reservoir 4, North Area Reservoir 5	Compensation flow release reductions
North West Area	North West Area Reservoir 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
South Area	South Area Reservoir 1, South Area Reservoir 2, South Area Reservoir 3a, South Area Reservoir 3b, South Area Reservoir 4, South Area Reservoir 5, South Area Reservoir 6, South Area Reservoir 7	Compensation flow or maintained flow release reductions
South West Area (Middle and Upper Calder)	South West Area Reservoir 1, South West Area Reservoir 2, South West Area Reservoir 3, South West Area Reservoir 4, South West Area Reservoir 6, South West Area Reservoir 7, South West Area Reservoir 8, South West Area Reservoir 10, South West Area Reservoir 11, South West Area Reservoir 12, South West Area Reservoir 13, South West Area Reservoir 14, South West Area Reservoir 15, South West Area Reservoir 16, South West Area Reservoir 17, South West Area Reservoir 18,	Compensation flow release reductions
Stand Alone	Ouse increased abstraction	Increase river abstraction rates at lower river flows
	Ure increased abstraction	Permit river abstraction at low flows
	Wharfe reduced regulated flow	Reduce river regulation requirements
	Hull increased abstraction	Reduce hands-off river flow to enable increased abstraction

Grid Surface Water Resource Zone	Water Source	Type of Drought Management Option
	Derwent annual abstraction increase	Decrease in annual abstraction at WTW with mirrored increase at downstream WTW.
Extreme options (level 3b)		
North	Catterick Groundwater Option 1	Increase in abstraction
Stand Alone	River Aire – Option 1	New river abstraction of up to 50 Ml/d
Stand Alone	River Aire – Option 2	New river abstraction of up to 50 Ml/d
Grid SWZ	South Area reservoir 2 to wider reservoir system transfer	System transfer; Construction of new raw water pump station and transfer pipeline
Grid SWZ	South West Reservoir 15 to other South West Reservoirs	New pumping main to create dual purpose network arrangement and controlled transfers
Grid SWZ	Doncaster Groundwater Option 1	Increased resilience, reducing wider grid input to supply area
Grid SWZ	Doncaster Groundwater Option 2	Unused existing licence
Grid SWZ	Doncaster Groundwater Option 3	Unused existing licence
Howardian Hills	Pickering / Thirsk Groundwater Option 1	Network infrastructure upgrade; Relocation of existing borehole
Selby Ring Main	Selby Groundwater Option 2	Installation of automated run to waste/ return service valve; Improved resilience; Potential increased abstraction
Selby Ring Main	Selby Groundwater Option 2	Maintenance to bring site back into service and achieve licenced output to support Selby Ring Main
Grid SWZ	Selby Aquifter Storage and Recovery Scheme 1	Unused existing licence
Grid SWZ	York Groundwater Option 1	Renewal of site assets and connections
Grid SWZ	Optimisation of York WTW 2	Increase capacity of WTW through upgrades; Increased pump activity at PS

In the event of a very severe drought, Yorkshire Water has proposed a number of Level 3b drought management actions that could be implemented (both demand and supply). These actions are more extreme

than Level 3a and will help reduce the potential requirement for Level 4 restrictions in an unprecedented drought event. Out of the 18 extreme supply side options outlined in Table 2-2, 14 have been considered suitable for assessment. The remaining four are non-site specific supply side extreme options that cannot be assessed at this stage, the details of which are provided in Appendix 1.

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

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

Table 2-3: Potential Impacts of Drought Options[7]

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

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

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
• Vibration (incl. underwater).	impacts could be significant up to 1km from the boundary of the European site[8,9,10]. Noise from vehicular traffic during operation of a scheme. Noise from construction traffic is only likely to be significant where the transport route to and from the scheme is within 3-5km of the boundary of the European site. Plant and personnel involved in in operation of the scheme. These effects (noise, visual/human presence) are only likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated). Schemes which might include artificial lighting, e.g. for security around a temporary pumping station. Effects from light pollution are only likely to be significant where the boundary of the scheme is within 500m of the boundary of the European site. Vibration from temporary construction From a review of Environment Agency internal guidance on HRA and various websites/sources[11] it is considered that effects of vibration are more likely to be significant if development is within 500m of a European site.
Water table/availability: • Drying • Flooding / stormwater • Changes to surface water levels and flows including both increases and reductions. • Changes in groundwater levels and flows • Changes to coastal water movement	Changes to water levels and flows due to increased water abstraction, reduced storage or reduced flow releases from reservoirs to river systems. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.
Toxic contamination: • Water pollution • Soil contamination • Air Pollution	Reduced dilution in downstream or receiving waterbodies due to changes in abstraction or reduced compensation flow releases to river systems. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site. Air emissions associated with plant and vehicular traffic during construction and operation of schemes. The effect of dust is only likely to be significant where site is within or in proximity to the boundary of the European site[12,13]. 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.

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

[9] 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.

[10] 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.

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

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

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

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
	Effects of road traffic emissions from the transport route to be taken by the project traffic are only likely to be significant where the protected site falls within 200 metres of the edge of a road affected[14].
Non-toxic contamination: • Nutrient enrichment (e.g. of soils and water) • Algal blooms • Changes in salinity • Changes in water chemistry (e.g. pH, calcium balance etc) • Changes in thermal regime • Changes in turbidity • Changes in sedimentation/silting	Changes to water salinity, nutrient levels, turbidity, thermal regime due to increased water abstraction, storage, or reduced compensation flow releases to river systems. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European Site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.
Biological disturbance: • Direct mortality • Changes to habitat availability • Out-competition by non-native species • Selective extraction of species • Introduction of disease • Rapid population fluctuations • Natural succession	Potential for changes to habitat availability, for example reductions in wetted width of rivers leading to desiccation of macrophyte beds due to changes in abstraction or reduced compensation flow releases to river systems. In addition, via removal of vegetation (including hedgerows and trees) used as foraging, roosting and hibernation sites and birds as roosting and nesting sites. Creation of new pathway of invasive non-native species. This effect is only likely to be significant where the scheme is situated within the European site or an upstream tributary of the European site (or affects groundwater levels supporting these sites or tributaries) Entrapment during in-river or terrestrial construction works causing injury and/or mortality of mobile species Likely to be a risk of entrapment, injury and/or mortality where the boundary of the option extends within or is directly adjacent to the boundary of a European site or within/adjacent to offsite functionally linked habitat. Mobile species could include fish, bats and European otters for example. Potential for changes to habitat availability via removal of vegetation (including hedgerows and trees) to facilitate construction activities and potential entrapment, injury and/or mortality of breeding birds and roosting/hibernating bats. This effect is dependent on the requirement to remove vegetation (if it cannot be avoided), ecological surveys to determine species presence and timing of removal based on species specific ecological considerations.

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

3. DATA SOURCES

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

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

Yorkshire Water has undertaken environmental assessment of the Drought Plan 2027 supply options according to guidance in the 2025 Drought permits and drought orders supplementary guidelines[15] DPG and the March 2025 'Water company drought plan guideline'. This is reported in the EARs. For each drought option, the assessment included the following stages:

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

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

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

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

3.1 CONSIDERATION OF IN-COMBINATION EFFECTS

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

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

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

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

- Other water company Water Resource Management Plans (WRMPs) and Drought Plans:
- Severn Trent
- United Utilities
- Northumbrian Water
- Anglian Water Services Limited
- Water Resource Management Plan for Yorkshire Water (2024)
- Environment Agency National Drought Action Plan
- Canal and Rivers Trust Putting Water into Waterways Water Resources Strategy 2015-2020 and website[16] .

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

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

3.2 REVIEW OF CONSENTS

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

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

4. HRA SCREENING RESULTS

4.1 POTENTIAL EFFECTS OF DROUGHT OPTIONS

The HRA of the Drought Plan has screened all of the applicable drought options in each of Yorkshire Water WRZs. A total of 62 options (48 drought permit/order and 14 extreme supply side options currently assessed) were screened. This provided an indication of the schemes that may be likely to have a significant effect on a European site(s). The HRA screening matrix for these assessments are presented across **Tables 4-1, 4-2, 4-3, 4-4, 4-5,** and **4-6**.

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

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

The tables show that, apart from the North Area Reservoir 1 and the Catterick Groundwater Option 1 abstraction drought option, all other options within Yorkshire Water Drought Plan 2027 are not considered to have likely significant effects on the qualifying features of European sites.

Table 4-1: HRA Screening of Drought Permit/Order Options – North Area Reservoirs

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
North Area Reservoirs				
North Area Reservoir 1	North Pennine Moors SAC (0.60km)	Northern Atlantic wet heaths with *Erica tetralix* (cross-leaved heath) European dry heaths *Juniperus communis* (common juniper) formations on heaths orcalcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* (holly) and *Blechnum* (hard fern) in the British Isles Marsh saxifrage *Saxifraga hirculus*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	North Pennine Moors SPA (0.60km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Curlew *Numenius arquata*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	Humber Estuary SAC (>10km[18])	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Annual vegetation of drift lines *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*	No construction related to this option has been identified. Any reduction in freshwater flows could potentially affect qualifying interests for which the Humber Estuary is designated, specifically river and sea lamprey (recruitment and reproductive capability and spatial distribution of the species). The drought permit being assessed involves a reduction in the compensation flow release from North Area Reservoir 1 to the River Burn. The operation of the option has the potential to impact on the flow/level regime downstream of the North Area Reservoir 1 within Pott Beck, River Burn and River Ure.	LSE Alone (Lamprey Species only)
North Area Reservoir 2	North Pennine Moors SAC (1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths orcalcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmo phytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage (*Saxifraga hirculus)*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	North Pennine Moors SPA (0.60km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Curlew *Numenius arquata*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect

[17] The distance given is to the nearest element of the drought option (e.g., impacted reaches or constructional element) and the designated site.
[18] 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[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
North Area Reservoir 3	North Pennine Moors SAC (6.4km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths orcalcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmo phytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage *Saxifraga hirculus* Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Curlew Numenius *arquata*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
North Area Reservoir 4	North Pennine Moors SAC (4.10km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths or calcareous grasslands *Calaminarian* grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage *Saxifraga hirculus*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	North Pennine Moors SPA (4.10km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Curlew *Numenius arquata*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
North Area Reservoir 5	North Pennine Moors SAC (0.6km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths or calcareous grasslands *Calaminarian* grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage *Saxifraga hirculus*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are designated on higher elevations above the river level. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions	No Effect
	North Pennine Moors SPA (0.6km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Curlew *Numenius arquata*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are designated on higher elevations above the river level. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions	No Effect

Table 4-2 HRA Screening of Drought Permit/Order Options – North West Area Reservoirs

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
North West Area Reservoirs				
North West Area Reservoir 1	South Pennine Moors SAC (1.20km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (1.20km)	Short eared owl *Asio flammeus* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect
North West Area Reservoir 2	South Pennine Moors SAC (1.0km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (1.0km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect
North West Area Reservoir 3	South Pennine Moors SAC (<1.0km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1.0km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect
North West Area Reservoir 4	South Pennine Moors SAC (3.0km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (3.0km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect
North West Area Reservoir 5	South Pennine Moors SAC (3.60km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (3.60km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect
North West Area Reservoir 6	South Pennine Moors SAC (1.00km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (1.00km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect
North West Area Reservoir 7	South Pennine Moors SAC (<1.0km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs	There is no construction related to this option and no operational impacts have been identified.	No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1.0km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect
North West Area Reservoir 8	South Pennine Moors SAC (<0.5km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<0.5km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect
North West Area Reservoir 9	South Pennine Moors SAC (2.20km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are designated on higher elevations above the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (2.20km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Only UK breeding site for the Twite (also known locally as the 'Pennine Finch')		No Effect
North West Area Reservoir 10	North Pennine Moors SAC (0.25km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths or calcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles Marsh saxifrage *Saxifraga hirculus*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	North Pennine Moors SPA (0.25km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Merlin *Falco columbarius*		No Effect
North West Area Reservoir 11	North Pennine Moors SPA (0.68km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
North West Area Reservoir 12	South Pennine Moors SAC (0km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The drought option will influence low flows in the watercourse, of which a 150m reach is situated within the site. However, the designated features of the site are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (0km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that	No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
			there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	

Table 4-3 HRA Screening of Drought Permit/Order Options – South Area Reservoirs

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
South Area Reservoirs				
South Area Reservoir 1	North Pennine Moors SAC (5.50km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths orcalcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage (*Saxifraga hirculus)*	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	North Pennine Moors SPA (5.50km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii* Curlew *Numenius arquata*		No Effect
South Area Reservoir 2	Peak District Moors (South Pennine Moors Phase 1) SPA (<0.50km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	South Pennine Moors SAC (<0.50km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		No Effect
South Area Reservoir 3a	Peak District Moors (South Pennine Moors Phase 1) SPA (1.90km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	South Pennine Moors SAC (1.90km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		No Effect
South Area Reservoir 3b	Peak District Moors (South Pennine Moors Phase 1) SPA (1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	South Pennine Moors SAC (1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		No Effect
South Area Reservoir 4	Peak District Moors (South Pennine Moors Phase 1) SPA (4.40km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	South Pennine Moors SAC (4.40km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		No Effect
South Area Reservoir 5	Peak District Moors (South Pennine Moors Phase 1) SPA (2.15km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	South Pennine Moors SAC (2.15km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths		No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		
South Area Reservoir 6	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria*		No Effect
South Area Reservoir 7	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria*		No Effect

Table 4-4 HRA Screening of Drought Permit/Order Options – South West Area Reservoirs

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
Upper Calder Area Reservoirs				
South West Area Reservoir 1 South West Area Reservoir 2 South West Area Reservoir 3 South West Area Reservoir 5	South Pennine Moors SAC (option is within designated site)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to these options and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (option is within designated site)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 4	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to these options and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 8	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 9	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 10	South Pennine Moors SAC (1.4km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (1.4km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 11 South West Area Reservoir 12	South Pennine Moors SAC (<1km or within designation)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<1km or within designation)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
Middle Calder Area Reservoirs				
South West Area Reservoir 6	South Pennine Moors SAC (<1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs	There is no construction related to this option and no operational impacts have been identified.	No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	
	Peak District Moors (South Pennine Moors Phase 1) SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 7	South Pennine Moors SAC (1.70km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (1.70km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 14	South Pennine Moors SAC (<0.50km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (<0.50km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 16 South West Area Reservoir 15	South Pennine Moors SAC (<0.5km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 1&2) SPA (<0.5km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 17	South Pennine Moors SAC (2.6km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (2.6km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
South West Area Reservoir 18	South Pennine Moors SAC (3.10km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	There is no construction related to this option and no operational impacts have been identified. The South Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions. The drought options will only affect flows downstream of reservoirs. Drought options will help to maintain rate of drawdown within the bounds of normal operations.	No Effect
	Peak District Moors (South Pennine Moors Phase 1) SPA (3.10km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect

Table 4-5 HRA Screening of Drought Permit/Order Options – River Options

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
River Abstractions				
Ouse increased abstraction	Strensall Common SAC (7.1km)	North Atlantic wet heaths *with Erica tetralix* European dry heath	There is no construction related to this option and no operational impacts have been identified. The SAC is a sufficient distance from the impacted reach that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	Humber Estuary SAC (>33.6km[19])	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Annual vegetation of drift lines *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey (entrainment, attractant flows, dissolved oxygen etc). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site[20]. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027. The Derwent catchment was previous discounted from the assessment as no options were present in the catchment. The current plan does include an option in the Derwent catchment however the hydrological impacts of the option are restricted to a transfer of abstraction limits between two existing abstraction points and impacts are assessed as negligible. Since the assessment in 2011 Naburn Weir has been modified, and fish bypass was installed. An eel/lamprey bypass channel (lamprey bypass) was formalized next to the salmon ladder on the riverbank-side in 2014 to aid the upstream migration of European eel juveniles (elvers) and river lamprey. The bypass largely followed the route of a complex channel, littered with rocks, concrete debris and tree roots, partly water-fed by an erosion generated hole in the retaining wall adjoining the salmon ladder. A detailed study by Durham University looked at the behaviour of fishes (including lamprey) at Naburn Weir[21]. The study noted that under normal flows Naburn weir impacts on the upstream migration of river lamprey, delaying the movement of river lamprey through the reach. The lamprey moved quickly (less than two days) through the unobstructed tidal reach of the Yorkshire Ouse. However, river lamprey once entering the area immediately downstream of the weir took 32.6 days on average before either moving in an upstream direction passing the weir or a downstream one. This delay at Naburn weir under normal flow conditions will likely lead to an increase in predation pressure through the aggregation of river lamprey in a relatively small area. The assessment in 2011 remains valid as reduced flow levels triggered by the application of drought permits would not significantly alter the amount of time that Naburn Weir would be passable to sea and river lamprey, with the additional Lamprey bypass providing additional passability. It therefore follows that this option would individually have no likely significant effect[19]	No Effect
	Humber Estuary SPA (>33.6km)	Teal *Anas crecca* Wigeon *Anas penelope* Mallard *Anas platyrhynchos* Ruddy turnstone *Arenaria interpres* Pochard *Aythya ferina* Great Bittern *Botaurus stellaris* Dark bellied brent goose *Branta bernicla bernicla* A067 Goldeneye *Bucephala clangula* Sanderling *Calidris alba* Dunlin *Calidris alpina alpina*	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated. Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they	No Effect

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

[20] 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.

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

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Red Knot *Calidris canutus* Ringed plover *Charadrius hiaticula* Eurasian Marsh harrier *Circus aeruginosus* Hen harrier *Circus cyaneus* Oystercatcher *Haematopus ostralegus* Bar tailed godwit *Limosa lapponica* Black tailed godwit *Limosa limosa islandica* Curlew *Numenius arquata* Whimbrel *Numenius phaeopus* Ruff *Philomachus pugnax* European Golden plover *Pluvialis apricaria* Grey plover *Pluvialis squatarola* Pied avocet *Recurvirostra avosetta* Little tern *Sterna albifrons* Common Shelduck *Tadorna tadorna* Common greenshank *Tringa nebularia* Common Redshank *Tringa totanus* Lapwing *Vanellus vanellus* scaup *Aythya marila* golden plover *Pluvialis apricaria* knot *Calidris canutus*	are valid for the current suite of options included in the Drought Plan 2027. It therefore follows that this option would individually have no likely significant effect[19]	
	Humber Estuary Ramsar (>33.6km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** 12 Species/populations occurring at levels of international importance. **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.	There is no construction related to this option and no operational impacts have been identified. Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey (entrainment, attractant flows, dissolved oxygen etc). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027.	No Effect
Ure increased abstraction	North Pennine Moors SAC (3.2km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths or calcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Blanket bogs Petrifying springs with tufa formation (*Cratoneurion*) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles Marsh saxifrage (Saxifraga hirculus)	There is no construction related to this option and no operational impacts have been identified. The North Pennine Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	LSE In-Combination Only
	North Pennine Moors SPA (0.25km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
	Humber Estuary SAC (>72.3km[22])	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Annual vegetation of drift lines *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey (entrainment, attractant flows, dissolved oxygen etc). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027. The Derwent catchment was previous discounted from the	No Effect

[22] 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[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
			assessment as no options were present in the catchment. The current plan does include an option in the Derwent catchment however the hydrological impacts of the option are restricted to a transfer of abstraction limits between two existing abstraction points and impacts are assessed as negligible. Since the assessment in 2011 Naburn Weir has been modified, and fish bypass was installed. An eel/lamprey bypass channel (lamprey bypass) was formalized next to the salmon ladder on the riverbank-side in 2014 to aid the upstream migration of European eel juveniles (elvers) and river lamprey. The bypass largely followed the route of a complex channel, littered with rocks, concrete debris and tree roots, partly water-fed by an erosion generated hole in the retaining wall adjoining the salmon ladder. A detailed study by Durham University looked the behaviour of fishes (including lamprey) at Naburn Weir . The study noted that under normal flows Naburn weir impacts on the upstream migration of river lamprey quite dramatically, delaying the movement of river lamprey through the reach. The lamprey moved quickly (less than two days) through the unobstructed tidal reach of the Yorkshire Ouse. However, river lamprey once entering the area immediately downstream of the weir took 32.6 days on average before either moving in an upstream direction passing the weir or a downstream one. This delay at Naburn weir under normal flow conditions will likely lead to an increase in predation pressure through the aggregation of river lamprey in a relatively small area. The assessment in 2011 remains valid as reduced flow levels triggered by the application of drought permits would not significantly alter the amount of time that Naburn Weir would be passable to sea and river lamprey, with the additional Lamprey bypass providing additional passability. It therefore follows that this option would individually have no likely significant effect.	
	Humber Estuary SPA (>72.3km)	Teal *Anas crecca* Wigeon *Anas penelope* Mallard *Anas platyrhynchos* Ruddy turnstone *Arenaria interpres* Pochard *Aythya ferina* Great Bittern *Botaurus stellaris* Dark bellied brent goose *Branta bernicla bernicla* Goldeneye *Bucephala clangula* Sanderling *Calidris alba* Dunlin *Calidris alpina alpina* Red Knot *Calidris canutus* Ringed plover *Charadrius hiaticula* Eurasian Marsh harrier *Circus aeruginosus* Hen harrier *Circus cyaneus* Oystercatcher *Haematopus ostralegus* Bar tailed godwit *Limosa lapponica* Black tailed godwit *Limosa limosa islandica* Curlew *Numenius arquata* Whimbrel *Numenius phaeopus* Ruff *Philomachus pugnax* European Golden plover *Pluvialis apricaria* Grey plover *Pluvialis squatarola* Pied avocet *Recurvirostra avosetta* Little tern *Sterna albifrons* Common Shelduck *Tadorna tadorna* Common greenshank *Tringa nebularia* Common Redshank *Tringa totanus* Lapwing *Vanellus* scaup *Aythya marila* golden plover *Pluvialis apricaria* knot *Calidris canutus*	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated. Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027.	No Effect
	Humber Estuary Ramsar (>72.3km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001)	There is no construction related to this option and no operational impacts have been identified. Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey (entrainment, attractant flows, dissolved oxygen etc). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a	No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Ramsar Criterion 6 12 Species/populations occurring at levels of international importance. **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.	previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027.	
River Wharfe at Lobwood	North Pennine Moors SPA (1.40km)	Assemblages of breeding birds-upland moorland and grassland breeding birds with waterbodies. Species include common sandpiper, curlew and ringed plover. Golden Plover *Pluvialis apricaria* Hen harrier *Circus cyaneus* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	North Pennine Moors SAC (1.40km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths *Juniperus communis* formations on heaths or calcareous grasslands Calaminarian grasslands of the *Violetalia calaminariae* Siliceous alpine and boreal grasslands Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) Blanket bogs Petrifying springs with tufa formation (Cratoneurion) Alkaline fens Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) Calcareous rocky slopes with chasmophytic vegetation Siliceous rocky slopes with chasmophytic vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles *Saxifraga hirculus* Marsh saxifrage (*Saxifraga hirculus)*		No Effect
	Peak District Moors (South Pennine Moors Phase 2) SPA (1.20km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	There is no construction related to this option and no operational impacts have been identified. The Moors are upstream of the impacted reach. The gradients between the moor and the valley are sufficiently steep that there would be no hydrological connectivity between channel and the moor, particularly during dry conditions.	No Effect
	South Pennine Moors SAC (1.20km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		No Effect
	Humber Estuary SAC (>37.8km[23])	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Annual vegetation of drift lines *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey (entrainment, attractant flows, dissolved oxygen etc). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027. The Derwent catchment was previous discounted from the assessment as no options were present in the catchment. The current plan does include an option in the Derwent catchment however the hydrological impacts of the option are restricted to a transfer of abstraction limits between two existing abstraction points and impacts are assessed as negligible. It therefore follows that this option would individually have no likely significant effect[19].	No Effect
	Humber Estuary SPA (>37.8km)	Teal *Anas crecca* Wigeon *Anas penelope* Mallard *Anas platyrhynchos* Ruddy turnstone *Arenaria interpres* Pochard *Aythya ferina* Great Bittern *Botaurus stellaris* Dark bellied brent goose *Branta bernicla bernicla* Goldeneye *Bucephala clangula* Sanderling *Calidris alba* Dunlin *Calidris alpina alpina* Red Knot *Calidris canutus* Ringed plover *Charadrius hiaticula* Eurasian Marsh harrier *Circus aeruginosus* Hen harrier *Circus cyaneus*	Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated. Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site.	No Effect

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

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Oystercatcher *Haematopus ostralegus* Bar tailed godwit *Limosa lapponica* Black tailed godwit *Limosa limosa islandica* Curlew *Numenius arquata* Whimbrel *Numenius phaeopus* Ruff *Philomachus pugnax* European Golden plover *Pluvialis apricaria* Grey plover *Pluvialis squatarola* Pied avocet *Recurvirostra avosetta* Little tern *Sterna albifrons* Common Shelduck *Tadorna tadorna* Common greenshank *Tringa nebularia* Common Redshank *Tringa totanus* Lapwing *Vanellus vanellus* scaup *Aythya marila* golden plover *Pluvialis apricaria* knot *Calidris canutus*		
	Humber Estuary Ramsar (>37.8km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** 12 Species/populations occurring at levels of international importance. **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.	There is no construction related to this option and no operational impacts have been identified. Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey (entrainment, attractant flows, dissolved oxygen etc). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period, review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027. The Derwent catchment was previous discounted from the assessment as no options were present in the catchment. The current plan does include an option in the Derwent catchment however the hydrological impacts of the option are restricted to a transfer of abstraction limits between two existing abstraction points and impacts are assessed as negligible. Since the assessment in 2011 Naburn Weir has been modified, and a fish bypass was installed. An eel/lamprey bypass channel (lamprey bypass) was formalized next to the salmon ladder on the river bankside in 2014 to aid the upstream migration of European eel juveniles (elvers) and river lamprey. The bypass largely followed the route of a complex channel, littered with rocks, concrete debris and tree roots, partly water-fed by an erosion generated hole in the retaining wall adjoining the salmon ladder. A detailed study by Durham University looked the behaviour of fishes (including lamprey) at Naburn Weir. The study noted that under normal flows Naburn weir impacts on the upstream migration of river lamprey quite dramatically, delaying the movement of river lamprey through the reach. The lamprey moved quickly (less than two days) through the unobstructed tidal reach of the Yorkshire Ouse was relatively fast, however, river lamprey once entering the area immediately downstream of the weir took 32.6 days on average before either moving in an upstream direction passing the weir or a downstream one. This delay at Naburn weir under normal flow conditions will likely lead to an increase in predation pressure through the aggregation of river lamprey in a relatively small area. The assessment in 2011 remains valid as reduced flow levels triggered by the application of drought permits would not significantly alter the amount of time that Naburn Weir would be passable to sea and river lamprey, with the additional Lamprey bypass providing additional passability. It therefore follows that this option would individually have no likely significant effect.	No Effect

Option(s)	European Site within zone of minor, moderate or major hydrological impact[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
Hull increased abstraction	Humber Estuary SAC/SPA/ Ramsar (<1km)	As above	There is no construction related to this option and no operational impacts have been identified. Reductions in freshwater flows to the Humber Estuary from the River Hull would not affect any qualifying interests for which the Estuary is designated a SAC/SPA/Ramsar. The lamprey population within the River Hull is unlikely to be impacted directly by flow changes associated with this option due to the impacted reach falling within the tidal limit, limiting the loss of habitat due to reduced flow, however, the water quality implications of reduced flow on estuarine flushing (of 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 be potential to result in a small-scale, localised and temporary barrier to lamprey migration. The timing of a potential temporary localised DO sag is most likely to occur in summer/autumn which does not coincide with lamprey migration to spawning grounds which occur between November and March[24]. Any temporary and localised DO sag is not expected to prevent the downstream movement of any post metamorphic individuals either. It therefore follows that this option would have no likely significant effect[19]. Additionally, a review of the lamprey population in the Humber basin made no reference to the River Hull as an important river for lamprey populations; unlike the Ouse, Derwent and Trent catchments[25]. However, lamprey are not SAC Monitored Features and are not allocated to unit(s) for conditions assessments. In all, the Humber basin provides an excellent habitat for river lamprey feeding, shelter, reproduction and migration across all life stages, and is considered the most important river lamprey habitat potentially supporting the largest population in the UK[26]. The River Hull discharges to the estuary through natural gravity flow (there is normally no barrier unless the tidal gate is lowered), at a location where impacts on designated habitats would not occur, through the docks of Kingston upon Hull. Any potential barriers to migration are not anticipated to result in significant impacts on the lamprey's migration route and will likely remain free of obstacles – physical or pollution in order to reach their spawning grounds with minimal delay.	LSE In-Combination Only
Derwent annual abstraction increase	River Derwent SAC (<1km)	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*	In hydrological terms a 20Ml/d increase in daily average flows (to be confirmed at time of application) is a potentially positive impact (7.6-9.9% increase in low flows) as is it changes flow in the direction of a more natural flow regime for the lower River Derwent (when compared with Buttercrambe flow gauge). The extent considered is for 24km of the River Derwent. The hydrological effect is considered indiscernible (i.e. negligible), when compared with the range of winter flows in the river, and in the context of daily variability. Furthermore, where there are significant sub-daily differences in flow, as caused by the Barmby Barrage (at least from Bubwith Bridge some 16.5km downstream of the Yorkshire Water intake) that pattern is the dominant feature on river hydrology.	No Effect
	Lower Derwent Valley SAC (<1km)	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) Otter *Lutra lutra*	None	No Effect
	Lower Derwent Valley SPA (<1km)	Corncrake *Crex crex*, Ruff *Philomachus pugnax* Spotted Crake *Porzana porzana* Bewick's Swan *Cygnus columbianus bewickii* Bittern *Botaurus stellaris* Golden Plover *Pluvialis apricaria* Teal *Anas crecca* Over winter, the area regularly supports 39,936 individual waterfowl (5-year peak mean 1991/2 - 1995/6) including: Lapwing *Vanellus vanellus*, Pochard *Aythya ferina*, Shoveler *Anas clypeata*, Mallard *Anas platyrhynchos*, Wigeon *Anas penelope*, Teal *Anas crecca*, Ruff *Philomachus pugnax*, Golden Plover *Pluvialis apricaria*, Bewick's Swan *Cygnus columbianus bewickii*, Bittern *Botaurus stellaris*.		No Effect

[24] Hopkins, D. 2008. River lamprey. Brief summary of Humber basin information: The Bellflask Ecological Survey Team.
[25] APEM (2007). Review of information on lamprey populations in the Humber Basin.
[26] 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[17]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
	Lower Derwent Valley Ramsar (<1km)	**Ramsar Criterion 1** The site represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK and they play a substantial role in the hydrological and ecological functioning of the Humber basin. **Ramsar Criterion 2** The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates and is the only known site in GB for the leafhopper *Cicadula ornata* **Ramsar Criterion 4** The site qualifies as a staging post for passage birds in spring, with nationally important numbers of ruff *Philomachus pugnax* and whimbrel *Numenius phaeopus*. **Ramsar Criterion 5** The site supports an internationally important assemblage of waterfowl in the winter with 31,942 waterfowl. **Ramsar Criterion 6** The site supports Eurasian wigeon *Anas penelope* and Eurasian teal *Anas crecca* at levels of international importance during the winter.		No Effect

Table 4-6: HRA Screening of Extreme Drought Options

Option(s)	European Site within zone of minor, moderate or major hydrological impact[27]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
South Area Reservoir 2 to wider reservoir system transfer	Peak District Moors (South Pennine Moors Phase 1) SPA (<10m)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	The high-level scheme involves construction of pipelines and supporting infrastructure at associated reservoirs. Due to close proximity (<10m) of the proposal to European sites and unknown construction methods LSE cannot be ruled out. Increases in abstraction rates may impact surrounding hydrology, impacting hydrologically connected sites. LSEs cannot be ruled out without suitable hydrological understanding.	LSE Alone
	South Pennine Moors Phase 2 SPA (8.8km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		LSE Alone
	South Pennine Moors SAC (<10m)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		LSE Alone
South West Reservoir 15 to other South West reservoirs	Peak District Moors (South Pennine Moors Phase 1) SPA (Within)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*	The high-level scheme involves construction of pipelines and supporting infrastructure at associated reservoirs. Due to close proximity (0km) of the proposal to European sites and unknown construction methods LSE cannot be ruled out. Increases in abstraction rates may impact surrounding hydrology, impacting hydrologically connected sites. LSEs cannot be ruled out without suitable hydrological understanding.	LSE Alone
	South Pennine Moors Phase 2 SPA (<1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		LSE Alone
	South Pennine Moors SAC (Within)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		LSE Alone
Catterick Groundwater Option 1	North Pennine Dales Meadows SAC (4.8 km)	Mountain hay meadows *Molinia* meadows on calcareous, peaty of clayey-silt-laden soils (*Molinion caeruleae*)	The SAC is located between 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 effects are likely to be significant.	LSE Alone
Doncaster Groundwater Option 1	Thorne and Hatfield Moors SPA (7.5km)	Breeding pairs of Nightjar (Caprimulgus europaeus)	The high-level scheme involves reinstatement of unused boreholes and may require further works to improve existing infrastructure. Depending on the scope of construction required, LSE on European sites cannot be ruled out. Increases in abstraction rates may impact surrounding hydrology, impacting hydrologically connected sites. LSEs cannot be ruled out without suitable hydrological understanding.	LSE Alone
	Hatfield Moor SAC (7.5km)	Degraded raised bogs (still capable of natural regeneration)		LSE Alone
Doncaster Groundwater Option 2	Thorne and Hatfield Moors SPA (7.1km)	Nightjar (Caprimulgus europaeus), Breeding	The high-level scheme involves reinstatement of unused boreholes and may require further works to improve existing infrastructure. Depending on the scope of construction required, LSE on European sites cannot be ruled out. Increases in abstraction rates may impact surrounding hydrology, impacting hydrologically connected sites. LSEs cannot be ruled out without suitable hydrological understanding.	LSE Alone
	Hatfield Moor SAC (7.1km)	Degraded raised bogs (still capable of natural regeneration)		LSE Alone
Doncaster Groundwater Option 3	Thorne and Hatfield Moors SPA (2km)	Breeding pairs of Nightjar (Caprimulgus europaeus)	The high-level scheme involves reinstatement of unused boreholes and will require further works to improve existing infrastructure. No LSE cannot be confirmed until the full construction scope has been provided. Increases in abstraction rates may impact surrounding hydrology, impacting hydrologically connected sites. LSEs cannot be ruled out without suitable hydrological understanding.	LSE Alone
	Hatfield Moor SAC (2km)	Degraded raised bogs (still capable of natural regeneration)		LSE Alone
	Thorne Moor SAC (5.75km)	Degraded raised bogs (still capable of natural regeneration)		LSE Alone
Pickering/Thirsk Groundwater Option 1	Humber Estuary Ramsar (~60km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5**	The borehole is hydrologically connected to the Humber Estuary SAC, SPA and Ramsar site and all of the qualifying features of the SAC, SPA and Ramsar site are water dependent (via the River Rye and River Derwent SAC). No impact pathways have been identified during the construction of this scheme. Potential impact pathways have been identified on sea and river lamprey, due to the potential LSE of functionally linked habitat present in the River Rye.	LSE Alone

[27] 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[27]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** 12 Species/populations occurring at levels of international importance. **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.		
	Humber Estuary SAC (~60km)	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Annual vegetation of drift lines *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*		LSE Alone
	Humber Estuary SPA (~60km)	Teal *Anas crecca* Wigeon *Anas penelope* Mallard *Anas platyrhynchos* Ruddy turnstone *Arenaria interpres* Pochard *Aythya ferina* Great Bittern *Botaurus stellaris* Dark bellied brent goose *Branta bernicla bernicla* Goldeneye *Bucephala clangula* Sanderling *Calidris alba* Dunlin *Calidris alpina alpina* Red Knot *Calidris canutus* Ringed plover *Charadrius hiaticula* Eurasian Marsh harrier *Circus aeruginosus* Hen harrier *Circus cyaneus* Oystercatcher *Haematopus ostralegus* Bar tailed godwit *Limosa lapponica* Black tailed godwit *Limosa limosa islandica* Curlew *Numenius arquata* Whimbrel *Numenius phaeopus* Ruff *Philomachus pugnax* European Golden plover *Pluvialis apricaria* Grey plover *Pluvialis squatarola* Pied avocet *Recurvirostra avosetta* Little tern *Sterna albifrons* Common Shelduck *Tadorna tadorna* Common greenshank *Tringa nebularia* Common Redshank *Tringa totanus* Lapwing *Vanellus vanellus* scaup *Aythya marila* golden plover *Pluvialis apricaria* knot *Calidris canutus*		LSE Alone
	River Derwent SAC (12km)	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*		LSE Alone
Selby Groundwater Option 2	Skipwith Common SAC (8.8km)	European dry heaths Northern Atlantic wet heaths with *Erica tetralix*	No impact pathways from construction have been identified. The site is located on the same highly productive aquifer (Wharfe and Lower Ouse Sherwood Sandstone WFD groundwater waterbody) and fluvial sandstone bedrock as the Brayton boreholes. There is potential for the European site to be hydrologically connected to the aquifer proposed for abstraction. European wet heaths are also groundwater dependent. Therefore, if the drawdown extent overlapped with the boundaries of Skipwith Common SAC, qualifying habitat may be exposed to reductions in groundwater supply. Based on the low rate of abstraction proposed (8 Ml/d) and Skipwith Common is outside of the source protection zone for the borehole; no LSEs are anticipated from the scheme alone.	LSE In-combination Only

Option(s)	European Site within zone of minor, moderate or major hydrological impact[27]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
			However as there is a pathway for effect, non-significant effects as a result of the scheme may have LSE when combined with effects from other plans or projects.	
	River Derwent SAC (4.8km)	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*	No impact pathways have been identified from the construction of the pumping station due to distance from the European site (9.2 km). The new pumping station is also approximately 700 m from the closest watercourse, Selby canal which is hydrologically connected to the River Derwent. This is deemed a sufficient distance to limit the potential exposure to pollution incidents if they were to occur on mobile qualifying species. Therefore, no LSEs are anticipated, however as there is a pathway for effect, non-significant effects as a result of the scheme may have LSE when combined with effects from other plans or projects.	LSE In-combination Only
	Lower Derwent Valley SPA (9.4km)	Corncrake *Crex crex*, Ruff *Philomachus pugnax* Spotted Crake *Porzana porzana* Bewick's Swan *Cygnus columbianus bewickii* Bittern *Botaurus stellaris* Golden Plover *Pluvialis apricaria* Teal *Anas crecca* Over winter, the area regularly supports 39,936 individual waterfowl (5-year peak mean 1991/2 - 1995/6) including: Lapwing *Vanellus vanellus*, Pochard *Aythya ferina*, Shoveler *Anas clypeata*, Mallard *Anas platyrhynchos*, Wigeon *Anas penelope*, Teal *Anas crecca*, Ruff *Philomachus pugnax*, Golden Plover *Pluvialis apricaria*, Bewick's Swan *Cygnus columbianus bewickii*, Bittern *Botaurus stellaris*.	Lower Derwent Valley SPA/ SAC/ Ramsar is approximately 9.4 km north-east of the Lower Derwent Valley SAC, SPA and Ramsar site. No impact pathways from construction of the proposed pumping station have been identified due to distance (12.1 km). Groundwater dependent qualifying features include lowland hay meadows and alluvial woods, plus otter that is also water dependent. Therefore, if the drawdown during operation were to extend to within the boundaries of the European sites, there is potential for reduction in groundwater supply. However, the European sites are sufficiently distanced from the source protection zones that no LSEs are anticipated, however as there is a pathway for effect, non-significant effects as a result of the scheme may have LSE when combined with effects from other plans or projects.	LSE In-combination Only
	Lower Derwent Valey SAC (9.4km)	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) Otter *Lutra lutra*		LSE In-combination Only
	Lower Derwent Valley Ramsar (9.4km)	**Ramsar Criterion 1** The site represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK and they play a substantial role in the hydrological and ecological functioning of the Humber basin. **Ramsar Criterion 2** The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates and is the only known site in GB for the leafhopper *Cicadula ornata*. **Ramsar Criterion 4** The site qualifies as a staging post for passage birds in spring, with nationally important numbers of ruff *Philomachus pugnax* and whimbrel *Numenius phaeopus*. **Ramsar Criterion 5** The site supports an internationally important assemblage of waterfowl in the winter with 31,942 waterfowl. **Ramsar Criterion 6** The site supports Eurasian wigeon *Anas penelope* and Eurasian teal *Anas crecca* at levels of international importance during the winter.		LSE In-combination Only
	Thorne Moor SAC (8.5km)	Degraded raised bogs (still capable of natural regeneration)	Thorne Moor SAC/ SPA and Thorne and Hatfield Moors SPA are approximately 8.5 km south-east of the WTW. Due to the distance from the proposed pumping station (17.4 km), no impact pathways during construction have been identified. Degraded raised bogs are groundwater dependent and nightjar is water dependent. Therefore, there is potential for an impact pathway if the drawdown extended to within the European sites and were hydrologically connected. The SAC and SPA are outside of the source protection zones associated with boreholes and it is not anticipated that the drawdown from 8 Ml/d will extend to the European sites. Therefore, LSE is not anticipated, however as there is a pathway for effect, non-significant effects as a result of the scheme may have LSE when combined with effects from other plans or projects.	LSE In-Combination Only
	Thorne and Hatfield Moors SPA (8.5km)	Breeding pairs of Nightjar (Caprimulgus europaeus)		LSE In-Combination Only
	Humber Estuary SPA (8km)	Teal *Anas crecca* Wigeon *Anas penelope* Mallard *Anas platyrhynchos* Ruddy turnstone *Arenaria interpres* Pochard *Aythya ferina* Great Bittern *Botaurus stellaris*	The Humber Estuary is approximately 8km east of the WTW. Due to the distance between the European sites and the proposed pumping station (15.1 km), no impact pathways from construction works are anticipated. All of the qualifying features of the SAC, SPA and Ramsar site are water dependent. No impacts pathways to coastal habitats associated with the Humber Estuary SAC and Ramsar site have been identified during operation. However, during operation of R12 there is a potential	LSE In-Combination Only

Option(s)	European Site within zone of minor, moderate or major hydrological impact[27]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Dark bellied brent goose *Branta bernicla bernicla* Goldeneye *Bucephala clangula* Sanderling *Calidris alba* Dunlin *Calidris alpina alpina* Red Knot *Calidris canutus* Ringed plover *Charadrius hiaticula* Eurasian Marsh harrier *Circus aeruginosus* Hen harrier *Circus cyaneus* Oystercatcher *Haematopus ostralegus* Bar tailed godwit *Limosa lapponica* Black tailed godwit *Limosa limosa islandica* Curlew *Numenius arquata* Whimbrel *Numenius phaeopus* Ruff *Philomachus pugnax* European Golden plover *Pluvialis apricaria* Grey plover *Pluvialis squatarola* Pied avocet *Recurvirostra avosetta* Little tern *Sterna albifrons* Common Shelduck *Tadorna tadorna* Common greenshank *Tringa nebularia* Common Redshank *Tringa totanus* Lapwing *Vanellus vanellus* scaup *Aythya marila* golden plover *Pluvialis apricaria* knot *Calidris canutus*	impact pathway if the drawdown extent overlaps with the Humber Estuary or functionally linked habitat for river and sea lamprey and water birds that is hydrologically connected to groundwater. The European sites are partly located on the same highly productive aquifer (Wharfe and Lower Ouse Sherwood Sandstone WFD groundwater waterbody) and fluvial sandstone bedrock as the boreholes. The source protection zone does not overlap with the Humber Estuary, but it does overlap with a number of hydrologically connected watercourses including the River Aire and lowland fen priority habitat. However, due to the presence of clay superficial deposits, hydrological connectivity of the groundwater to the surface is considered limited; except for a 670 m section of the Pollington Fleet Drain which flows into the River Went and lacks superficial clay deposits. Therefore, Pollington Fleet Drain could be exposed to a reduction groundwater supply. Based on the size of the drain, length potentially impacted and proximity to arable land, it is not deemed likely to be key functionally linked habitat supporting populations of river and sea lamprey associated with the Humber Estuary. Abstraction would also be within the existing licence limit for the Selby wellfield. The scale of the abstraction from the Selby boreholes and the periodic nature of the abstraction (four years out of every 10 on average). Therefore, LSE is not anticipated, however as there is a pathway for effect, non-significant effects as a result of the option may have LSE when combined with effects from other plans or projects.	
	Humber Estuary SAC (8km)	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Annual vegetation of drift lines *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*		LSE In-Combination Only
	Humber Estuary Ramsar (8km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** 12 Species/populations occurring at levels of international importance. **Ramsar Criterion 8**		LSE In-Combination Only

Option(s)	European Site within zone of minor, moderate or major hydrological impact[27]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.		
Selby Groundwater Option 2	Skipwith Common SAC (8.8km)	European dry heaths Northern Atlantic wet heaths with *Erica tetralix*	The high-level scheme involves reinstatement and servicing of out of service boreholes to maximise the WTW input to Selby Ring and may require further works to improve existing infrastructure. Depending on the scope of construction required, LSE on European sites cannot be ruled out. Increases in abstraction rates may impact surrounding hydrology, impacting hydrologically connected sites. LSEs cannot be ruled out without suitable hydrological understanding.	LSE Alone
	River Derwent SAC (4.8km)	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*		LSE Alone
	Lower Derwent Valley SPA (9.4km)	Corncrake *Crex crex*, Ruff *Philomachus pugnax* Spotted Crake *Porzana porzana* Bewick's Swan *Cygnus columbianus bewickii* Bittern *Botaurus stellaris* Golden Plover *Pluvialis apricaria* Teal *Anas crecca* Over winter, the area regularly supports 39,936 individual waterfowl (5-year peak mean 1991/2 - 1995/6) including: Lapwing *Vanellus vanellus*, Pochard *Aythya ferina*, Shoveler *Anas clypeata*, Mallard *Anas platyrhynchos*, Wigeon *Anas penelope*, Teal *Anas crecca*, Ruff *Philomachus pugnax*, Golden Plover *Pluvialis apricaria*, Bewick's Swan *Cygnus columbianus bewickii*, Bittern *Botaurus stellaris*.		LSE Alone
	Lower Derwent Valey SAC (9.4km)	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) Otter *Lutra lutra*		LSE Alone
	Lower Derwent Valley Ramsar (9.4km)	**Ramsar Criterion 1** The site represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK and they play a substantial role in the hydrological and ecological functioning of the Humber basin. **Ramsar Criterion 2** The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates and is the only known site in GB for the leafhopper *Cicadula ornata*. **Ramsar Criterion 4** The site qualifies as a staging post for passage birds in spring, with nationally important numbers of ruff *Philomachus pugnax* and whimbrel *Numenius phaeopus*. **Ramsar Criterion 5** The site supports an internationally important assemblage of waterfowl in the winter with 31,942 waterfowl. **Ramsar Criterion 6** The site supports Eurasian wigeon *Anas penelope* and Eurasian teal *Anas crecca* at levels of international importance during the winter.		LSE Alone
	Thorne Moor SAC (8.5km)	Degraded raised bogs (still capable of natural regeneration)		LSE Alone
	Thorne and Hatfield Moors SPA (8.5km)	Breeding pairs of Nightjar (Caprimulgus europaeus)		LSE Alone
	Humber Estuary SPA (8km)	Teal *Anas crecca* Wigeon *Anas penelope* Mallard *Anas platyrhynchos* Ruddy turnstone *Arenaria interpres* Pochard *Aythya ferina* Great Bittern *Botaurus stellaris* Dark bellied brent goose *Branta bernicla bernicla* Goldeneye *Bucephala clangula* Sanderling *Calidris alba* Dunlin *Calidris alpina alpina* Red Knot *Calidris canutus* Ringed plover *Charadrius hiaticula* Eurasian Marsh harrier *Circus aeruginosus* Hen harrier *Circus cyaneus* Oystercatcher *Haematopus ostralegus* Bar tailed godwit *Limosa lapponica* Black tailed godwit *Limosa limosa islandica* Curlew *Numenius arquata* Whimbrel *Numenius phaeopus* Ruff *Philomachus pugnax* European Golden plover *Pluvialis apricaria* Grey plover *Pluvialis squatarola* Pied avocet *Recurvirostra avosetta* Little tern *Sterna albifrons* Common Shelduck *Tadorna tadorna* Common greenshank *Tringa nebularia* Common Redshank *Tringa totanus*		LSE Alone

Option(s)	European Site within zone of minor, moderate or major hydrological impact[27]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Lapwing *Vanellus vanellus* Greater scaup *Aythya marila* Golden plover *Pluvialis apricaria* Knot *Calidris canutus*		
	Humber Estuary SAC (8km)	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Annual vegetation of drift lines *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*		LSE Alone
	Humber Estuary Ramsar (8km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** 12 Species/populations occurring at levels of international importance. **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.		LSE Alone
Selby Quifer Storage and Rcovery Scheme 1	Humber Estuary Ramsar (4.6km)	**Ramsar Criterion 1** The site is a representative example of a near-natural estuary with the following component habitats; dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons. **Ramsar Criterion 3** The Humber Estuary Ramsar site supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*. **Ramsar Criterion 5** Assemblages of international importance: 153,934 waterfowl, non-breeding season (5-year peak mean 1996/97-2000/2001) **Ramsar Criterion 6** 12 Species/populations occurring at levels of international importance. **Ramsar Criterion 8** The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.	This option involves utilising an existing abstraction licence for recharge of groundwater with treated water abstracted from the River Derwent when excess is available. Changes in abstraction rates may impact surrounding hydrology, impacting hydrologically connected European sites. Due to the potential works overlapping with some European sites and the close proximity of other European sites to the proposal and unknown construction methods LSE cannot be ruled out.	LSE Alone
	Humber Estuary SAC (4.6km)	Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Annual vegetation of drift lines *Salicornia* and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Embryonic shifting dunes Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”) Fixed dunes with herbaceous vegetation (“grey dunes”) Dunes with *Hippophae rhamnoides* Sea lamprey *Petromyzon marinus* River lamprey *Lampetra fluviatilis* Grey seal *Halichoerus grypus*		LSE Alone
	Lower Derwent Valley Ramsar (2.6km)	**Ramsar Criterion 1** The site represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK and they play a substantial role in the hydrological and ecological functioning of the Humber basin.		LSE Alone

Option(s)	European Site within zone of minor, moderate or major hydrological impact[27]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Ramsar Criterion 2 The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates and is the only known site in GB for the leafhopper *Cicadula ornata*. **Ramsar Criterion 4** The site qualifies as a staging post for passage birds in spring, with nationally important numbers of ruff *Philomachus pugnax* and whimbrel *Numenius phaeopus*. **Ramsar Criterion 5** The site supports an internationally important assemblage of waterfowl in the winter with 31,942 waterfowl. **Ramsar Criterion 6** The site supports Eurasian wigeon *Anas penelope* and Eurasian teal *Anas crecca* at levels of international importance during the winter.		
	Humber Estuary SPA (4.6km)	Teal *Anas crecca* Wigeon *Anas penelope* Mallard *Anas platyrhynchos* Ruddy turnstone *Arenaria interpres* Pochard *Aythya ferina* Great Bittern *Botaurus stellaris* Dark bellied brent goose *Branta bernicla bernicla* Goldeneye *Bucephala clangula* Sanderling *Calidris alba* Dunlin *Calidris alpina alpina* Red Knot *Calidris canutus* Ringed plover *Charadrius hiaticula* Eurasian Marsh harrier *Circus aeruginosus* Hen harrier *Circus cyaneus* Oystercatcher *Haematopus ostralegus* Bar tailed godwit *Limosa lapponica* Black tailed godwit *Limosa limosa islandica* Curlew *Numenius arquata* Whimbrel *Numenius phaeopus* Ruff *Philomachus pugnax* European Golden plover *Pluvialis apricaria* Grey plover *Pluvialis squatarola* Pied avocet *Recurvirostra avosetta* Little tern *Sterna albifrons* Common Shelduck *Tadorna tadorna* Common greenshank *Tringa nebularia* Common Redshank *Tringa totanus* Lapwing *Vanellus vanellus* scaup *Aythya marila* golden plover *Pluvialis apricaria* knot *Calidris canutus*		LSE Alone
	River Derwent SAC (Within)	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*		LSE Alone
	Skipwith Common SAC (7.9km)	European dry heaths Northern Atlantic wet heaths with *Erica tetralix*		LSE Alone
	Lower Derwent Valley SPA (2.6km)	Corncrake *Crex crex*, Ruff *Philomachus pugnax* Spotted Crake *Porzana porzana* Bewick's Swan *Cygnus columbianus bewickii* Bittern *Botaurus stellaris* Golden Plover *Pluvialis apricaria* Teal *Anas crecca* Over winter, the area regularly supports 39,936 individual waterfowl (5-year peak mean 1991/2 - 1995/6) including: Lapwing *Vanellus vanellus*, Pochard *Aythya ferina*, Shoveler *Anas clypeata*, Mallard *Anas platyrhynchos*, Wigeon *Anas penelope*, Teal *Anas crecca*, Ruff *Philomachus pugnax*, Golden Plover *Pluvialis apricaria*, Bewick's Swan *Cygnus columbianus bewickii*, Bittern *Botaurus stellaris*.		LSE Alone
	Lower Derwent Valley SAC (2.6km)	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) Otter *Lutra lutra*		LSE Alone
York Groundwater Option 1	No sites within 10km.	N/A	N/A	N/A
Optimisation of York WTW 2	Lower Derwent Valley RAMSAR (1km)	**Ramsar Criterion 1** The site represents one of the most important examples of traditionally managed species-rich alluvial flood meadow habitat remaining in the UK and they play a substantial role in the hydrological and ecological functioning of the Humber basin.	This high-level option requires increasing the capacity of the WTW by upgrading high-lift pumps and adding Granular Activated Carbon (GAC) beds to increase flow, sacrificing energy efficiency for throughput on site with the potential for increased abstraction. An increase in	LSE Alone

Option(s)	European Site within zone of minor, moderate or major hydrological impact[27]	Qualifying features (European sites)	Potential for effects on qualifying features/main habitats?	Screening Outcome
		Ramsar Criterion 2 The site has a rich assemblage of wetland invertebrates including 16 species of dragonfly and damselfly, 15 British Red Data Book wetland invertebrates and is the only known site in GB for the leafhopper *Cicadula ornata*. **Ramsar Criterion 4** The site qualifies as a staging post for passage birds in spring, with nationally important numbers of ruff *Philomachus pugnax* and whimbrel *Numenius phaeopus*. **Ramsar Criterion 5** The site supports an internationally important assemblage of waterfowl in the winter with 31,942 waterfowl. **Ramsar Criterion 6** The site supports Eurasian wigeon *Anas penelope* and Eurasian teal *Anas crecca* at levels of international importance during the winter.	pump availability at the PS, from 3 to 4 or 5 units would also be required. Due to the potential works overlapping with some European sites and the close proximity of other European sites to the proposal and unknown construction methods LSE cannot be ruled out.	
	Lower Derwent Valley SPA (1km)	Corncrake *Crex crex*, Ruff *Philomachus pugnax* Spotted Crake *Porzana porzana* Bewick's Swan *Cygnus columbianus bewickii* Bittern *Botaurus stellaris* Golden Plover *Pluvialis apricaria* Teal *Anas crecca* Over winter, the area regularly supports 39,936 individual waterfowl (5-year peak mean 1991/2 - 1995/6) including: Lapwing *Vanellus vanellus*, Pochard *Aythya ferina*, Shoveler *Anas clypeata*, Mallard *Anas platyrhynchos*, Wigeon *Anas penelope*, Teal *Anas crecca*, Ruff *Philomachus pugnax*, Golden Plover *Pluvialis apricaria*, Bewick's Swan *Cygnus columbianus bewickii*, Bittern *Botaurus stellaris*.		LSE Alone
	Lower Derwent Valley SAC (1km)	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) Otter *Lutra lutra*		LSE Alone
	River Derwent SAC (Within)	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation River lamprey *Lampetra fluviatilis* Sea lamprey *Petromyzon marinus* Bullhead *Cottus gobio* Otter *Lutra lutra*		LSE Alone
River Aire – Option 1	South Pennine Moors SAC (4.1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	The option requires the construction of a new river intake, a new pumping station, a brake pressure tank, and a pipeline to transfer water to the WTW. The nearest designated site is >4km away from the proposed pipeline, the associated construction and the impacted reach. 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 The operation of the proposed option is unlikely to impact upon the site hydrologically, with the site located upstream in the catchment compared to the abstraction.	No Effect
	South Pennine Moors SPA (4.1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect
River Aire – Option 2	South Pennine Moors SAC (4.1km)	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Blanket bogs Transition mires and quaking bogs Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	This option requires the construction of a new intake on the River Aire and new pipeline discharging to the Aqueduct. The Aqueduct or 600- 80 mm mains would be the connection point. The nearest designated site is >4km away from the proposed pipeline, the associated construction and the impacted reach. The site is sufficiently distanced from proposed infrastructure for direct and in-direct impacts to be unlikely and is not located within the IRZ of any European Sites. 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.	No Effect
	South Pennine Moors SPA (4.1km)	Short eared owl *Asio flammeus* Merlin *Falco columbarius* Golden plover *Pluvialis apricaria* Merlin *Falco columbarius* Peregrine *Falco peregrinus* Dunlin *Calidris alpina schinzii*		No Effect

5. 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 cause a likely significant effect on the integrity of a European site. Stage 1 HRA screening of the Drought Plan 2027 has indicated that likely significant effects on the North Pennine Dales Meadows SAC and the Humber Estuary SAC could not be ruled out. Impacts on the North Pennine Dales Meadows SAC are a result of the implementation of the Catterick Groundwater Option 1 drought option. Impacts on the Humber Estuary SAC are a result of the implementation of the North Area Reservoir 1. As such, a Stage 2 Appropriate Assessment is required to determine whether the implementation of the drought options could have an adverse effect on the conservation objectives and subsequently site integrity of these European sites.

The screening assessment in **Table 4-2** identified Extreme Drought Options that have the potential to result in LSE. Those options where LSE was identified have not been included within this Stage 2 Appropriate Assessment as the current information on these options is too high level at this stage. If any of these options are required, full environmental assessments, including Stage 2 Appropriate Assessment, would need to be undertaken when the scope of the options is more defined.

5.1 POTENTIAL IMPACTS OF THE CATTERICK GROUNDWATER OPTION 1 DROUGHT OPTION

5.1.1 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 Catterick Groundwater Option 1 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 Catterick Groundwater Option 1 drought option increases average abstraction to 12.5Ml/d daily max pumping, 10Ml/d annual, and peak abstraction to 14.5Ml/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.

5.1.1.1 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.

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

Details regarding the geographical location of the SAC in relation to the Catterick Groundwater Option 1 drought option is presented in **Table B5-1**. The units of the SAC most likely to be affected by the scheme are located between 4.9km and 6.7km from the Catterick Groundwater Option 1. North Pennines Dales Meadows Unit 1 is associated with the Richmond Meadows Site of Special Scientific Interest (SSSI), while Unit 2 and Unit 3 are associated with the Gingerfields SSSI.

Table B5-1: SAC Geological details

SAC name and NGR	Associated SSS1	Distance from borehole to closest point on the boundary (KM)	Surface elevation (lowest point) (mAOD)	Difference in surface elevation between SAC and borehole (68.4mAOD) (mAOD)
North Pennines Dales Meadows (Unit 1) (NZ1757900764)	Richmond Meadows	4.911	100.6	32.2
North Pennines Dales Meadows (Unit 2) (NZ1671102229)	Gingerfields	5.966	214	145.6
North Pennines Dales Meadows (Unit 3) (NZ1608402419)	Gingerfields	6.692	240	171.6

5.1.1.3 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 (*Gylceria fluitans*).

A condition assessment of the SSSI habitat units indicated that the habitats were in an Unfavourable (recovering) and favourable condition respectively. Considering the grassland species associated with the Richmond Meadows SSSI, the meadows are most likely representative of the Annex 1 habitat - Mountain hay meadows. This habitat type is not considered to be a water dependant habitat[28].

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

5.1.1.4 Gingerfields

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

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

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

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

5.1.1.5 Potential Impact on SAC designated features

5.1.1.5.1 Geology

A review of the geology associated with the study area has been undertaken. The Catterick Groundwater Option 1borehole 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.

5.1.1.5.2 Hydrogeology

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

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

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

significant, multi-layered, moderately productive aquifer where virtually all flow is through fractures and other discontinuities.

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

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

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

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

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

The A8802 Resource Study report[30] indicates that the principal source rock for the borehole is the Great Limestone Member (which underlies the Richmond Chert). In addition to this, the report also indicates that water is supplied to the borehole from the underlying Yordale Cycle rocks of the Wensleydale Group. The aquifers are complex multi-layered aquifers comprising sequences of limestone, mudstone and sandstones. Correlation of the aforementioned borehole logs and BGS cross-section and stratigraphic log on BGS 1:50000 map sheet 41 indicates that the Four Fathom Limestone is located around 81mbgl and this is likely to be the other key groundwater source rock supplying the Catterick Groundwater Option 1. The presence of artesian conditions indicates a confined aquifer, and data indicates artesian flow from a head of up to 6m above ground level[31].

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

The Great Limestone Member outcrops around 3km northwest of the site and it is possible that this is in hydraulic continuity with the Richmond Chert and the rocks of the underlying Wensleydale Group. Several potential areas of recharge of the aquifer have been identified, specifically from rainfall falling on the Great Limestone Member where it outcrops to the north and northwest or Richmond, indirect recharge through superficial deposits and upward leakage from the underlying Carboniferous limestones particularly along faults and fractures[32]. Analysis of structural geology of the area indicates that these rocks lie on the southern limb of an anticlinal axis, the Middleton Tyas Anticline. As strata dip gently (~6-9°) in a southeasterly direction, groundwater flows are highly likely to follow the stratal dip. Therefore, the recharge areas are likely to lie to the north and northwest of Richmond.

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

However, the pressure head in the borehole leads to a piezometric surface for the confined water table to be around 6m above the ground level at the borehole (artesian) when the borehole is not being pumped[33]. The

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

surface elevation at the borehole is around 68mAOD which places the confined water level at around an elevation of 75mAOD. Any drawdown during pumping will lower this piezometric surface. Even though the three SAC units lie on the primary source lithology for the water in the borehole, they all lie at elevations significantly higher than 75mAOD (**Table 5-2**) (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.

5.1.1.6 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.

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

5.1.2 Humber Estuary Special Area of Conservation SAC

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

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

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

- *1095 Sea lamprey Petromyzon marinus*

- *1099 River lamprey Lampetra fluviatilis*

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

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

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

5.1.2.1 Location of SAC in relation to the in-combination impact reach of North Area Reservoir 1 and Ure increased abstraction

The most upstream point of the SAC most likely to be affected by the scheme are located approximately 95km from the most downstream end of the North Area Reservoir 1 *and* Ure increased abstraction impacted reach at the confluence with the river Skell.

The drought permits being assessed involves a reduction in the compensation flow release from North Area Reservoir 1 to the River Ure and the increased abstraction from the River Ure.

The operation of the options has the potential to impact on the flow/level regime downstream of the confluence of the River Burn to the confluence of the River Skell.

Any reduction in freshwater flows could potentially affect qualifying interests for which Humber Estuary is designated, specifically river and sea lamprey by impacting on recruitment and reproductive capability as well as the presence and spatial distribution of the species. Such impacts will become apparent where there is any habitat degradation and/or loss in connectivity between habitats and watercourses as a result as a result of implementation of the drought permit.

As summarised in the North Area Reservoir 1 assessment above, impacts on passability isn't expected due to the presence of significant impassable barriers under both drought and normal conditions.

Due to the presence of these barriers, any functional habitat will be limited and impacts on this habitat is expected to be minor at most because of the lowland nature of the system with minor impacts on marginal habitats and there will still be significant areas of habitat available.

5.1.2.2 Summary of impacts

In summary, the evidence provided above shows that the North Area Reservoir 1 and Ure increased abstraction drought options would have no adverse impact on the integrity of the European site.

5.1.2.2.1 Integrity Test

In conclusion, the North Area Reservoir 1 drought option will not have an impact on the conservation objectives or the qualifying features of the Humber estuary SAC. As such, the North Area Reservoir 1 drought option will not have a significant adverse effect on the integrity of the European Site.

5.2 POTENTIAL IN-COMBINATION EFFECTS OF DROUGHT OPTIONS

Individually, apart from the North Area Reservoir 1 and the Catterick Groundwater Option 1 drought options, all of the other options within Yorkshire Water Drought Plan 2027 are not considered likely to have likely significant effects on the qualifying features of European sites. (see **Table 4-1**). However, a number of drought options could be used at a similar time, should they be required, and therefore an assessment has been completed to determine the potential for LSEs, as detailed in **Table 4-1**, column 5. In addition, **Table 5-2** shows the in-combination effects assessment for the Humber Estuary EMS.

5.2.1 In-combination effects with neighbouring water companies

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

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

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

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

Table 5-2: In-combination Assessment on the Humber Estuary

Option	European Site or SSSI within zone of minor, moderate or major hydrological impact	Qualifying features (European sites) and main habitats (SSSI	Potential for in-combination effects on qualifying features/main habitats?	AEoI on European Site in-combination with other plans and projects?
North Area Reservoir 1 North Area Reservoir 4 Ure increased abstraction. North West Area Reservoir 3 North West Area Reservoir 2 North West Area Reservoir 1 Ouse increased abstraction Hull increased abstraction Derwent annual abstraction increase	Humber Estuary SAC/Ramsar	As above	Any reduction in freshwater flows could potentially affect qualifying interests for which the Humber Estuary is designated, specifically river and sea lamprey (recruitment and reproductive capability and Presence and spatial distribution of the species). Previously in 2011, extensive work undertaken by Yorkshire Water and signed off by Natural England and the Environment Agency for those options to be implemented in the first two years of a drought has shown that in-combination impacts of all drought options would be unlikely to have any likely significant effect on the integrity of the European site. Though the report includes an assessment of a previous Drought Plan period[20], review of the reports finding show they are valid for the current suite of options included in the Drought Plan 2027. The Derwent catchment was previous discounted from the assessment as no options were present in the catchment. The current plan does include an option in the Derwent catchment however the hydrological impacts of the option are restricted to a transfer of abstraction limits between two existing abstraction points and impacts are assessed as negligible. Since the assessment in 2011 Naburn Weir has been modified, and fish bypass was installed. An eel/lamprey bypass channel (lamprey bypass) was formalized next to the salmon ladder on the riverbank-side in 2014 to aid the upstream migration of European eel juveniles (elvers) and river lamprey. The bypass largely followed the route of a complex channel, littered with rocks, concrete debris and tree roots, partly water-fed by an erosion generated hole in the retaining wall adjoining the salmon ladder. A detailed study by Durham University looked the behaviour of fishes (including lamprey) at Naburn Weir[34]. The study noted that under normal flows Naburn weir impacts on the upstream migration of river lamprey quite dramatically, delaying the movement of river lamprey through the reach. The lamprey moved quickly (less than two days) through the unobstructed tidal reach of the Yorkshire Ouse. However, river lamprey once entering the area immediately downstream of the weir took 32.6 days on average before either moving in an upstream direction passing the weir or a downstream one. This delay at Naburn weir under normal flow conditions will likely lead to an increase in predation pressure through the aggregation of river lamprey in a relatively small area. The assessment in 2011 remains valid as reduced flow levels triggered by the application of drought permits would not significantly alter the amount of time that Naburn Weir would be passable to sea and river lamprey, with the additional Lamprey bypass providing additional passability. The in-combination impacts from the implementation of the Hull increased abstraction and one STW is unlikely to impact the lamprey population within the River Hull. The water quality implications of reduced flow on estuarine flushing (of one STW effluent plume) do not coincide with lamprey migration to spawning grounds which occur between November and March[35]. Any temporary and localised DO sag is not expected to prevent the downstream movement of any post metamorphic individuals either. Assessment of the in-combination impact of options in a third year of drought has been carried out. Not all of the options for a third year of drought would be implemented. At most, only 2 options are likely to be implemented. Assessment indicates that the additional abstraction from any combination of the remaining long-term drought options is unlikely to lead to any significant effect on the Humber Estuary EMS. If all of the River Ouse options were to be implemented (and assuming the Ouse increased abstraction drought permit is already in place), in-combination impacts downstream of York sewage treatment works to the tidal limit at Q99 and Q95 flows would be moderate and minor adverse respectively. Mass balance water quality calculations suggest that this would not result in significant effects on water quality in the Humber Estuary, but this should be reviewed in more detail in the event that a decision was made to implement all of the River Ouse options in a 3rd consecutive year of drought. This would need to take into account the prevailing water quality conditions during that specific drought event which will vary according to time of year temperature and underlying water quality conditions in the lower Ouse and Humber Estuary.	No

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

6. CONCLUSIONS

Stage 1 HRA screening of the Drought Plan 2027 has indicated that likely significant effects on the North Pennine Dales Meadows SAC and the Humber Estuary SAC could not be ruled out. Impacts on the North Pennine Dales Meadows SAC are a result of the implementation of the Catterick Groundwater Option 1 drought option. Impacts on the Humber Estuary SAC are a result of the implementation of the North Area Reservoir 1. An Appropriate Assessment for each option has been undertaken and are provided in **Section 5**. The Appropriate Assessment for North Pennine Dales Meadows SAC concludes that abstraction from the proposed the Catterick Groundwater Option 1 drought option will not have a likely significant effect on the qualifying features of the North Pennine Dales Meadows SAC. The Appropriate Assessment for Humber Estuary SAC concludes that the North Area Reservoir 1 option will not have a likely significant effect on the qualifying features of the Humber Estuary 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 4-1** shows the assessment for each drought option, **Table 4-2** the extreme drought options and **Table 5-2** shows the in-combination effects assessment for the Humber Estuary EMS. Accordingly, it is concluded that there are no further assessment requirements for the Drought Plan 2027.

The HRA has included extreme supply options in the event of a long term drought, although the specific timing of the options is unknown. The majority of the extreme options have been included in the Stage 1 Screening but have not been taken through Appropriate Assessment (**see Table B4-3**). Should the requirement for extreme options arise, these will be subject to full HRA, including a full Appropriate Assessment when scheme details become more developed.

Should all of the River Ouse options be implemented in a long term drought, the in-combination impact would be a moderate impact on river flows in the reach. The in-combination impact on water quality downstream of York STW to the tidal limit due to reduced dilution is a minor impact to water quality and is not considered to have a likely significant effect on water quality in the Humber Estuary 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.

APPENDIX A ADDITIONAL EXTREME SUPPLY OPTIONS

Under the Water Industry Act 1991 as amended by the Water Act 2003, water companies must produce a drought plan every five years stating how it will maintain a secure water supply and protect the environment during dry weather and drought. As part of this plan, water companies need to include options to be considered during more extreme drought events. Extreme options (previously referred to as long-term options (LTOs) are displayed in **Table 4-2**. **Table A1** includes the Drought Plan 2027 additional extreme supply options that have not been included within the assessment. The extreme options provided below are high-level and not suitable for assessment at this stage. If any of these options are required, full environmental assessments would need to be undertaken when the scope of the options can be more defined by the potential onset of long-term and unprecedented drought.

Table A6-1: Extreme supply side options

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

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