Drought Permit Environmental Assessment Report: River Derwent at Ambergate

21 October 2025

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Report status: Final

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Executive Summary

What is a drought order / drought permit?

In periods of unusually low rainfall, where water resources become scarce, powers are available to grant drought permits (DPs) and ordinary and emergency drought orders under the Water Resources Act 1991 (as amended). DPs are granted by the Environment Agency (EA) and drought orders and emergency drought orders are granted by the Secretary of State. DPs can be applied for where the main change is variation of an abstraction licence condition, such as the maximum yearly abstraction allocation or to reduce a compensation flow.

The water industry is required by the Government to demonstrate that they have adequate drought contingency plans, and there is a statutory duty for water companies to agree publicly available drought plans following consultation with the EA, the Secretary of State, the Water Services Regulation Authority (Ofwat) and other statutory bodies.

DP options are identified in Severn Trent's Drought Plan 2022-27. The Drought Plan details the range of actions that Severn Trent will consider implementing during drought conditions to maintain essential water supplies to its customers and minimise environmental impact.

Background

Severn Trent abstracts water from the River Derwent at Ambergate for the purpose of public water supply. The Ambergate site is listed as a potential DP site within Severn Trent's Drought Plan 2022-27 (STWL, 2022).

What will the drought permit entail?

The Ambergate abstraction licence permits the abstraction of an average rate of 170 Ml/d from the River Derwent at Ambergate, with a peak abstraction rate of 320 Ml/d. This abstraction is authorised for the purpose of transfer of raw water to Carsington and Ogston Reservoirs. The flow control conditions attached to the licence are:

- A reduction in abstraction to 15 Ml/d when the daily mean flow falls below 680 Ml/d in the River Derwent at the Derby St Mary's Bridge (DSM) river flow gauging station ; and
- A cessation of abstraction when the daily mean flow falls below 340 Ml/d in the River Derwent at DSM.

What does this environmental assessment cover?

An Environmental Assessment Report (EAR), which includes a monitoring plan and mitigation measures, is required for each supply-side management action (e.g. DPs and/or drought orders) included within the Drought Plan. Each EAR should provide details of baseline environmental conditions, assess the environmental impacts of potential changes to the flow regime due to implementation of the DP, and provide an Environmental Monitoring Plan (EMP) to support the requirement for baseline, during and post DP/drought order monitoring.

Following a 'source-pathway-receptor' approach, the environmental assessment focuses first on examining how the proposed DP (the 'source') will affect the hydrological, hydrogeological and geomorphological environment (the 'pathways') and then considers how ecological and other features (the 'receptors') will respond to changes in those pathways.

This report forms the assessment of likely impacts of the proposed DP on the pathways and receptors of interest for the River Derwent: hydrology; habitat; geomorphology; water quality; ecology; and other receptors.

What are the likely impacts of the drought permit on the environment?

The significance of impact on receptors draws on the impact magnitude on relevant pathways and the sensitivity of the receptor. These two elements are combined to determine overall impact significance for each receptor.

The effect of the DP is predicted to be minor on all receptors in comparison with the baseline. DPs are granted on the basis of being in place for six months and so this assessment is made on the basis that the DP would be in place for up to six months from the end of October 2025.

What measures will be used to mitigate significant impacts?

Mitigation measures for the Ambergate DP will only be triggered if significant negative impacts are observed during the permit's operation. These measures are not intended to address the broader effects of drought, but specifically to reduce or prevent adverse consequences resulting from the permit itself. If such impacts arise, the EA will be consulted to agree on appropriate responses.

Should ecological distress or harm to river users be detected, several mitigation options may be deployed. These include measures may involve aeration of affected areas, installation of fish refugia, or—if no other options are viable—fish rescue and relocation. In cases of water quality deterioration, particularly elevated phosphate concentrations, operational adjustments at sewage treatment works may be considered to reduce pollutant concentrations. Additionally, the draft drought permit includes provisions for suspending its operation as a mitigation measure.

These interventions will only be implemented if monitoring confirms that significant impacts are occurring, and not pre-emptively. If no such impacts are observed, it is likely that no mitigation measures will be necessary.

What monitoring will be carried out?

An Environmental Monitoring Plan (EMP) has been developed which includes baseline, pre-DP implementation during-DP implementation and post-DP implementation monitoring.

Monitoring has been recommended to capture any changes before, during and after implementation of the proposed DP. This includes checking for signs of ecological stress including: potential effects on flow and water quality; inhibition of movement of fish past river structures or other barriers; habitat availability for adult and juvenile life stages (including spawning/nursery areas); and concentration of fish in restricted areas/pools which could increase susceptibility to predation, as well as evidence of establishment or expansion of invasive non-native species.

It is important to note that the level of monitoring is risk-based. The environmental assessment indicates that the proposed DP presents an overall low risk to the environment (only minor negative impacts are predicted for most receptors in most water bodies). Nevertheless, given the risk to some fish species, at some life stages and the uncertainties inherent in some of the assessments undertaken, monitoring has been recommended to check the predicted degree of impact, and to identify any unexpected impacts to trigger mitigation measures, if needed.

Glossary

Term	Definition
BOD	Biochemical Oxygen Demand
CIEEM	Chartered Institute of Ecology and Environmental Management
DO	Drought order
DP	Drought permit
DSM	Derby St Mary's Bridge gauging station
EA	Environment Agency
EAR	Environmental Assessment Report
EMP	Environmental Monitoring Plan
EQS	Environmental Quality Standard
Froude number	The dimensionless velocity / depth ratio used to describe the different flow regimes of open channel flow
GEP	Good Ecological Potential
GES	Good Ecological Status
HMC	Habitat Modification Class
HMS	Habitat Modification Score
HMWB	Heavily Modified Water Body
HQA	Habitat Quality Assessment
INNS	Invasive Non-Native Species
LOD	Limit of Detection
mAOD	Metres Above Ordnance Datum
MEP	Moderate Ecological Potential
Ml/d	Megalitres per day
NRW	Natural Resources Wales
RHS	River Habitat Survey
SAC	Special Area of Conservation
Sonde	A probe that automatically transmits information about its surroundings
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WwTw	Wastewater treatment works
UIA	Un-Ionised Ammonia
UKAS	United Kingdom Accreditation Service
WFD	Water Framework Directive

1 Introduction

1.1 Background

Severn Trent abstracts water from the River Derwent at Ambergate for the purpose of public water supply and is listed as a potential drought permit (DP) site within Severn Trent's Drought Plan 2022-27 (STWL, 2022).

1.2 Drought permits and drought orders

In periods of unusually low rainfall, where water resources become scarce, powers are available to grant DPs, ordinary drought orders (DOs) and emergency DOs under the Water Resources Act 1991 (as amended by the Environment Act 1995 and the Water Act 2003). DPs and DOs are drought management actions that, if granted, can allow more flexibility to manage water resources and the effects of drought on public water supply and the environment (EA & Defra, 2025).

In the case of DPs, the Environment Agency (EA) must be satisfied that a serious deficiency of supplies of water in any area exists or is threatened and that the reason for the deficiency is an exceptional shortage of rain.

DPs can be applied for under the Water Resources Act 1991 (Section 79A) where the main change is variation of an abstraction licence condition, such as the maximum yearly allocation or a compensation flow. The EA determines applications and, where a valid duly made objection is received, must offer a public hearing—except in cases of extreme urgency—allowing objectors to present their case before an independent inspector.

Following the severe drought in northern England in 1995/96, the Government set out a wide range of actions to be taken by the water industry, including the need for water companies to demonstrate that they have adequate drought contingency plans. As required under Sections 39B and 39C of the Water Industry Act 1991, as amended by the Water Act 2003 and in accordance with the Drought Plan Regulations 2005 the Drought Plan Direction 2020, water companies have a duty to prepare and maintain a Drought Plan.

Prospective DP/DO options are identified in Severn Trent's Drought Plan 2022-27. The Drought Plan details the range of actions that Severn Trent will consider implementing during drought conditions in order to maintain essential water supplies to its customers and minimise environmental impact.

The environmental assessment of DPs/DOs is undertaken in recognition of the guidance from the EA and Defra, as contained in:

- EA and Defra (2025) Water company drought plan guideline. Final. Published March 2025.
- EA and Defra (2025) DPs and DOs. Supplementary guidance. Published March 2025.
- EA (2025) Environmental assessment for water company drought planning supplementary guidance. Finalised and Published March 2025.

An Environmental Assessment Report (EAR), which includes a monitoring plan and mitigation measures, is required for each supply-side management action (e.g. DPs) included within the Drought Plan. Each EAR should provide details of baseline flow conditions, assess impacts of potential changes to the flow regime due to implementation of the DP, and provide an Environmental Monitoring Plan (EMP) to support the requirement for baseline, during and post DP implementation monitoring. Severn Trent has prepared 'shelf-copy' EARs for each of the existing DP/DO sites in support of its Drought Plan. These reports provide a template report which can be updated to support an application for a DP/DO if required.

This version of the Ambergate EAR has been updated to support an application for a DP in October 2025. The report considers the implementation of a DP at Ambergate taking into account the six-month DP implementation period from October 2025 to March 2026.

1.3 Scope of assessment

Following a 'source-pathway-receptor' approach, this environmental assessment focuses first on examining how the DP (the 'source') will affect the hydrological, hydrogeological and geomorphological environment (the 'pathways'), and then considers how ecological and other features (the 'receptors') will respond to changes in those pathways.

As a preliminary screening step, the long list of pathways and receptors in

Table **1.1** was reviewed to identify the environmental features of interest for inclusion in the environmental assessment. Features were excluded only if:

- the pathway or receptor is absent from the area of potential impact;
- there is no pathway by which the receptor could be impacted;
- the receptor has negligible value; or
- the receptor is not sensitive to changes in these pathways.

Table 1.1 Environmental features considered in this environmental assessment

Category	Environmental feature	Included	Justification
Pathways	Hydrogeology	No	
	Hydrology	Yes	
	Habitat and geomorphology	Yes	
	Water quality	Yes	
Ecological receptors	Macrophytes and diatoms	No	Water bodies have not been designated for their macrophyte community; river does not dry out.[1]
	Macroinvertebrates	Yes	
	Fish (including angling groups)	Yes	
	Invasive non-native species	Yes	
	Protected species	Yes	
Other receptors	Other abstractors	Yes	
	Designated sites	Yes	
	Aesthetics, recreation and navigation	Yes	
	Archaeology and heritage	Yes	

1.4 This report

Figure 1.1 shows how the EA's requirements for environmental assessments of DPs are satisfied by this report.

[1] whilst detailed assessment of macrophytes was outside the scope of the EAR, no changes in WFD status are predicted based on the pathways assessments.

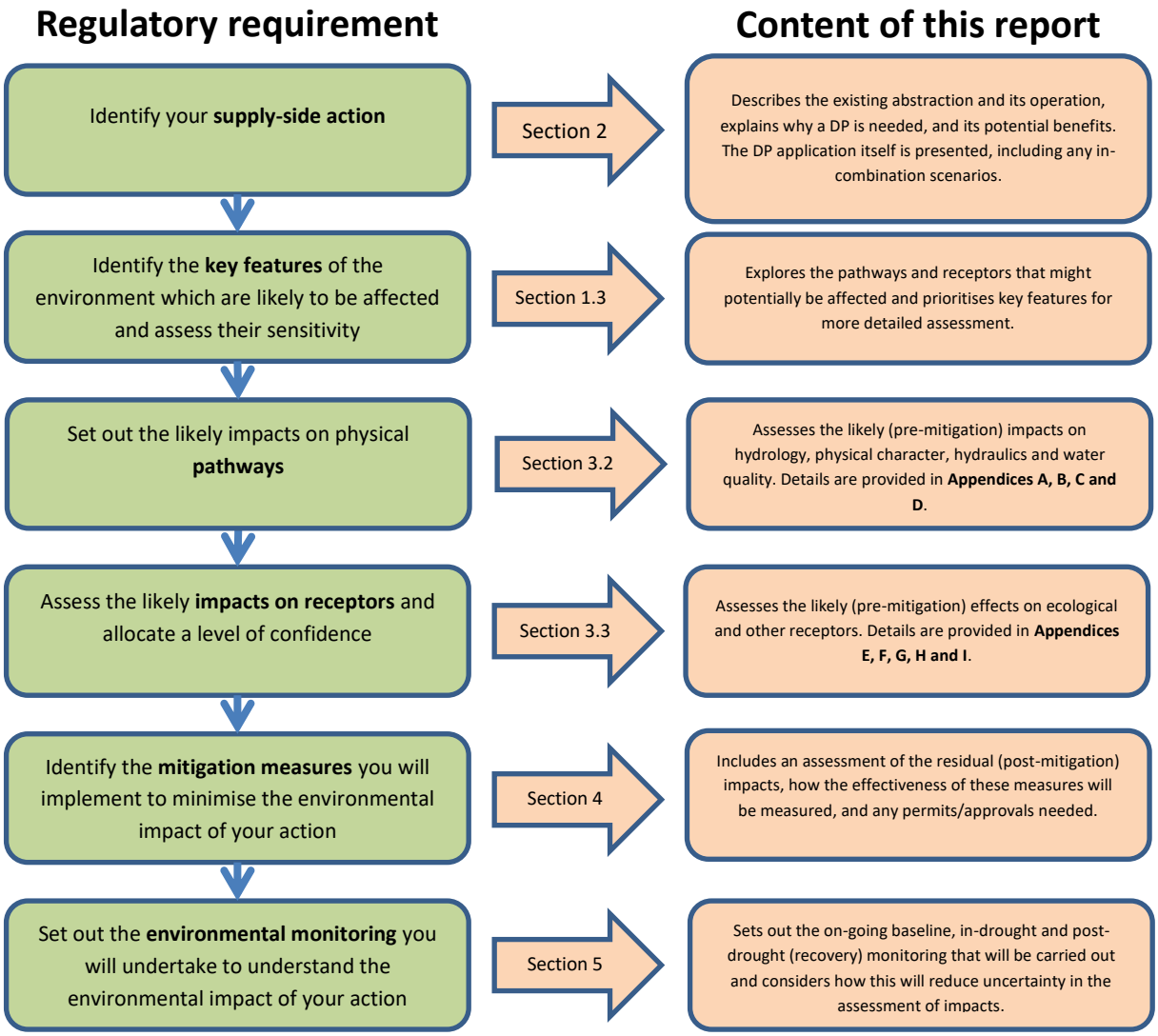

Figure 1.1 Flow chart detailing how the EA's requirements for drought permits are satisfied by this report.

This report constitutes both the 'pathways' and 'receptors' sections of the EAR. 'Pathways' is the term used to describe the routes by which the ecology ('receptors') might be affected by a potential stressor, in this case the application of the proposed DP. The pathways assessments included here comprise of hydrology, physical character, hydraulics and water quality. A draft document focusing only on the pathways assessments was consulted upon with the EA and Severn Trent and agreed in advance of the dependent ecological assessments.

This report updates the existing 'shelf-copy' EAR (Stantec and APEM, 2022) to support an application for a DP in 2025. For ease of reading, the report presents a technical summary of the more detailed assessments that are subsequently presented as a series of Appendices.

2 The Ambergate drought permit

This Chapter:

- provides details of the water sources and abstraction licences (Section 2.1);
- provides details of the supply side action to maintain water supply (Section 2.2);
- where there is a change to an abstraction or a discharge, explains where it is from/to and which sites, water bodies and other abstractions will be affected (Section 2.3); and
- describes the Water Framework Directive status of the water bodies of interest (Section 2.4), and designated sites therein (Section 2.5).

2.1 Site setting and background

2.1.1 Water sources

The major licensed abstractions and related operations undertaken within the Derwent catchment by Severn Trent for public water supply are outlined below:

- The **Derwent Valley Reservoirs** system comprises three impounding reservoirs, Howden, Derwent and, Ladybower, situated upstream to downstream respectively, on the upper River Derwent. Inflows to these reservoirs are augmented by transfers on the River Noe, River Ashop and Jagger's Clough. Water abstracted by Severn Trent from the Derwent Valley Reservoir system is treated at the nearest Water Treatment Works (WTW). Raw water is also transferred from the reservoirs to Sheffield and is covered by a bulk supply agreement with Yorkshire Water.

The **Ambergate abstraction** supplies water to Carsington and Ogston Reservoirs:

- **Ogston Reservoir** is situated on the River Amber and is augmented by abstractions from the River Derwent at Ambergate and Carsington Reservoir. The water treatment works for this source supplies parts of Derbyshire and Nottinghamshire.
- **Carsington Reservoir** impounds Henmore Brook, a tributary of the River Dove that is therefore outside of the Derwent Valley. However, the Henmore Brook accounts for only 12% of the water in the reservoir and the remainder is sourced by abstractions from the Derwent at Ambergate during periods of average to high flow. Carsington Reservoir is used to support flows in the Derwent and supplies to Ogston Reservoir during periods of low flow.

There are three other licensed abstractions from the Derwent for public water supply.

- **Little Eaton** provides water to the water treatment works supplying Derby.
- **Draycott** provides water to the water treatment works supplying Nottingham.

- Abstraction from **Meerbrook Sough** (tributary of the Derwent) at the water treatment works feeding the Derwent Valley Aqueduct and also supplying the Wirksworth area. This abstraction is regarded as a Derwent abstraction due to proximity to the main river and because the licence has restrictions pertaining to Derby St Mary's Bridge gauging station.

2.1.2 The Ambergate Abstraction Licence

The Ambergate abstraction licence permits the abstraction of an average rate of 170 Ml/d from the River Derwent at Ambergate, with a peak abstraction rate of 320 Ml/d. This abstraction is authorised for the purpose of transfer of raw water to Carsington and Ogston Reservoirs. The flow control conditions attached to the licence are:

- A reduction in abstraction to 15 Ml/d when the daily mean flow falls below 680 Ml/d in the River Derwent at Derby St Mary's Bridge river flow gauging station (DSM); and

- A cessation of abstraction when the daily mean flow falls below 340 Ml/d in the River Derwent at DSM.

The above flow controls can be managed by supporting river flows from additional Derwent Valley Reservoirs releases subject to allowance for travel time and losses.

2.1.3 Previous drought permits / drought orders

Historically, Severn Trent applied for the following DOs and licence variations within the Derwent catchment:

- DO for the Derwent in 1976;

- DO for reducing compensation flows from Ladybower Reservoir in 1989/90; and

- DO relating to refilling of Derwent Valley and Carsington in 1995/96.

DP applications were made in 1996 and 2003 for the Derwent catchment, but these applications were subsequently withdrawn due to changed weather conditions.

In addition, Severn Trent applied for a DP for the River Derwent at Derwent Valley reservoirs in 2022 to reduce compensation from 54Ml/d to 34Ml/d. This was granted on 14 October 2022 and was rescinded on 4 January 2023.

From April 1983 to December 1993 (inclusive) compensation flow to the River Derwent downstream of Ladybower Reservoir was also reduced to 39 Ml/d at times when the flow at DSM was greater than 340 Ml/d. This was related to construction works at Carsington Reservoir.

2.2 Proposed Drought Permit Operation

2.2.1 Drought Permit scenario

Operation of the Strategic Grid North (which includes the River Derwent at Ambergate abstraction) is described in Severn Trent's Drought Plan (STWL, 2022). The Ambergate DP allows a variation in the abstraction conditions for Ambergate, based on measured flows at DSM and combined storage in Carsington and Ogston.

The DP scenario allows for the following changes:

- In accordance with the Ambergate abstraction, abstraction of up to 320 Ml/d is permitted down to flows of 500 Ml/d at DSM during a DP, which is 180 Ml/d below the normal limit.

2.2.2 Simulation of Drought Permit operation

STWL's Drought Library Aquator Model (DLAM) was used to simulate the requirement for DP drought applications and the implementation of the DP operation using STWL's modelled historic and stochastic drought sequences. Analysis of the outputs of the DLAM simulations enabled a comprehensive hydrological impact assessment of the potential DP implementation.

STWL's Drought Library Aquator Model (DLAM) is an enhanced form of the standard STWL Aquator model with a drought library that facilitates simulation of stochastic hydrological regimes. The standard model represents the entire STWL's water supply network with water resource zones that can be activated or not as required. The DLAM platform constitutes a comprehensive environment for the development and simulation of conjunctive use. As such, the DLAM represents an advance on the version of STWL's Aquator model used in the previous DP EAR; the drought library includes stochastic "worse than historic" rainfall series and better represents the linkages in STWL's supply network.

"Modelled Historic baseline" series are generated using modelled historic flow inputs, which are derived using the rainfall-runoff model HYSIM (WRA, 2018) which are input into Aquator. Aquator then generates reservoir outflows and river flows using current infrastructure and licence arrangements. These Modelled Historic baseline flow time series therefore represent a modelled estimate of the flows that would have occurred during historic droughts (and intervening wetter periods) had STWL's water supply system operated as it does now, with demands as they are now.

HYSIM flows are calibrated against gauged or naturalised (or semi naturalised) flows; hence, they are intended to reproduce actual historic inflows. In contrast, the Modelled Historic river flows generated from HYSIM inputs by Aquator are not directly comparable with measured historic river flows. This is because they are based on current infrastructure and assume optimised abstractions and no outages.

"Modelled Stochastic" series have been modelled from rainfall in the same way as for the Modelled Historic baseline series, but the underlying rainfall inputs have been modified to enable consideration of worse than historic droughts. To derive the Modelled Stochastic series, 200 different sequences of daily rainfall and potential evapo-transpiration (PET) data were produced by a stochastic weather generator, using observed rainfall and PET data from the period 1918 to 1990. Daily flow data for each 73 year sequence were then produced from the rainfall and PET data, using the HYSIM rainfall-runoff model. Droughts of 12-, 18-, 24- and 30- month durations were drawn from each stochastic flow sequence. The sequences and droughts that most reduced the baseline deployable output (DO) of each of STWL's Water Resource Zones were determined using STWL's Aquator model. For the Derwent Valley / Strategic Grid zone, scenario 161 provides the most stringent test; the 73-year sequence has a return period of around 1:1000 years, while the most testing drought period in that sequence has a return period of 1 in 500 years. This drought corresponds to years 1959~60 in the original series. The Modelled Stochastic rainfall series have also been used in developing STWL's Drought Plan, with their derivation documented in Severn Trent Water Ltd.'s draft drought plan 2019-2024 (STWL, 2018) and as part of STWL's 2018 draft Water Resources Management Plan.

DP operation was supressed for the entire record for the "No DP" scenario and DP operation of appropriate licences enabled for the entire record for the Ambergate scenario.

Further detail of the modelling of the performance of STWL's supply network under the Drought Permit scenarios is given in the technical appendices.

2.2.3 Frequency of Drought Permit operation

The frequency and duration of DP enactions were determined from the "No DP" timeseries. The DLAM historical baseline modelling of the 95-year period 1920-2014 and modelling of a stochastic hydrological regime in the period 1920-1990 shows the potential timing of DP impacts associated with the most critical droughts in terms of causing Temporary Use Bans (TUBs) and Non Essential Use Bans (NEUBs).

An overview of the DLAM Aquator model simulation of Drought Trigger crossings under the Modelled Historic baseline (1920-2014) and the Modelled Stochastic (1920-1990) hydrological regimes is shown in Table 2.1.

Table 2.1 DLAM Aquator Model Simulation of Drought Trigger Crossings

River Catchment(s)	Reservoir or River System (DLAM Ref)	DLAM Aquator Model Note of Drought Trigger Crossing (Yes/No)		Comment
		Modelled Historic Baseline, 1920-2014 (No DP-DO)	Modelled Stochastic Hydrological Regime, 1920-1990 (No DP-DO)	
Derwent	Ambergate	No	Yes (1945-46, 1959-60, 1960)	STWL's drought water resources operational management, involving re-balancing of abstraction loads, helps to mitigate potential effects of DP or DO actions.

Results of the Modelled Historic DP simulations suggest DP operation is not triggered by any drought event in the Modelled Historic series. Simulations for this report suggest that DP activation came close in 1995/6, but although low reservoir storage was indicated during the historic 1975/6 drought, this event did not get any closer to the trigger curve than in the 1959/60 example given in the report. This suggests that, with STWL's water resource supply system would be sufficient to have supplied current demands during the 1976 and 1995/96 droughts (for which DP powers were previously enacted) without recourse to DP operation.

DP operation is, however, triggered by the "Modelled Stochastic" series – i.e. historic droughts modified to increase their severity. In the period covered by the Modelled Stochastic series (1920-1990), DP operation is triggered in 1945/46 and 1959/60 – twice in a 70 year period. 1959/60 is considered a 1 in 500 year event.

The conclusion that STWL's water resource supply system is resilient to the worst drought on record is important. It differs from both historical operation and from simulations undertaken for the previous DP EAR, which corroborated historic operation in suggesting DP operation would occur in the historical sequence in 1975/6 and 1995/6. There are many changes to STWL's water supply that explain this; differences from historical operation in 1976 are in part due to the addition of storage provision at Carsington. STWL have also improved their ability to move water throughout their supply network since the 1995/96 drought, and since the previous DP EAR STWL have also improved the representation of their supply network within Aquator. Demands are also different, with current leakage less high than in some previous droughts.

90-year gauged flow record from Derby St Mary's (1935–2024) (details available in technical appendices) provides a basis for evaluating the operational relevance of the drought permit associated with Ambergate abstraction. Across the full dataset, there were 388 days where flows were within the 500–680 Ml/d range, equating to an average of 4.3 days per year, representing a small proportion of the total record.

Monthly averages show that November had the highest frequency of qualifying flows, with 2.3 days per year, corresponding to 8% of November days. March and December each averaged 0.7 days per year, or 2% of days, while January and February had the lowest usage, at 0.3 days per year, or just 1%.

2.3 Drought Permit variation of Ambergate abstraction licence conditions

The Ambergate abstraction licence conditions are set out in Section 2.1.2.

The Ambergate DP is triggered by the combined storage in Ogston and Carsington Reservoirs. Ogston Reservoir, situated on the River Amber, is augmented by abstractions from the River Derwent at Ambergate. Carsington Reservoir, supplied by the Ambergate abstraction during periods of average to high flow, is used to support flows in the Derwent and hence supplies to Ogston during periods of low flow. A DP is triggered based on the combined storage within these reservoirs. Abstractions of up to 320 Ml/d are normally permitted whilst flows at St Mary's Bridge are above 680 Ml/d. When the DP is in force, this flow threshold falls to 500 Ml/d.

The DP is infrequently applied due to the relation to the flow thresholds at St Mary's Bridge. Flow duration analysis of modelled time series from Aquator for St Mary's Bridge has demonstrated that the flow range of 500 to 680 Ml/d has flow percentiles of around Q70 to Q80. The likelihood of reservoir storage being below the "Implement DP" curve and flow at St Mary's Bridge being between 500 and 680 Ml/d is thus relatively small.

2.4 Summary of the scenario

The DP scenario therefore allows for the following changes from baseline operation:

- The **Ambergate DP scenario** simulates the maximum permitted abstraction with a reduction in Hands off Flow (HOF) from 680 Ml/d to 500 Ml/d. This will only apply to the lower Derwent (i.e. downstream of Ambergate) and propagation of effects downstream will be modelled for stochastically modified drought inflows during January 1960, the most sustained period and the period of lowest accretion for which the Ambergate only scenario was predicted. Effects outside of the wintertime period have been considered, even though these appear very unlikely.

2.5 Geographical extent of study

Characterisation of major rivers efficiently necessarily means that long lengths of river must be represented with data collected at a series of single locations or along shorter reaches. The spatial extent of the River Derwent presents a particular problem because it drains a large proportion of the county of Derbyshire (**Error! Reference source not found.**). It is approximately 106 km long to its confluence with the River Trent near Sawley, with a catchment area of 1210 km².

For the purposes of the Water Framework Directive (WFD) the river has been split into four waterbodies separated at the confluences of major tributaries.

The River Derwent from Westend to Wye waterbody (GB104028057880) comprises the upper Derwent and marks a transition in character from an energetic, upland stream to a sizeable intermediate river. Rising on the eastern flank of Bleaklow, the upper Derwent catchment drains the Millstone Grit and peat moorland of the Dark Peak and includes the Derwent Valley Reservoirs. Between the reservoirs and the River Wye confluence, the valley opens out and the catchment receives drainage from both Millstone Grit/ peat moors and from the Carboniferous Limestone/ pasture of the White Peak. Urban land use is minimal, but is concentrated along the river, including the villages of Bamford, Hathersage, Grindleford and Baslow.

The Derwent from Wye to Amber (GB104028052390) and the Derwent from Amber to Bottle Brook (GB104028052310) waterbodies comprise the Middle Derwent. This includes the Ambergate abstraction and marks the transition to a mature lowland river, via flow through incised limestone topography. The Derbyshire Wye adds a substantial component of limestone/ pasture-derived drainage, with an increasing (though still fairly modest) urban component from Matlock, Cromford and Belper on the River Derwent itself, and from Buxton and Bakewell on the River Wye. These reaches include Ogston Reservoir and associated abstraction locations.

The Derwent from Bottle Brook to Trent (GB104028053240) waterbody is a mature lowland river more open in character, flowing over Coal Measures and Triassic sandstones and marls. These reaches drain pasture, some arable land and the substantial urban area of Derby, with abstractions made from the watercourse as described in Section **Error! Reference source not found.**.

Eight Assessment Points (APs) were selected to characterise these reaches, as detailed in the following table and shown on **Error! Reference source not found.**.

Table 2.3 Derwent Assessment Points

AP	Name	Relevance
AP1	Yorkshire Bridge	Immediately d/s Derwent Valley Reservoirs
AP2	Leadmill Bridge	d/s the Noe confluence
AP3	Baslow Bridge	
AP4	Matlock Bath	d/s Wye confluence
AP5	Whatstandwell	u/s Ambergate
AP6	Belper	d/s Ambergate
AP7	Allestree	
AP8	Derby St Mary's Bridge	Key control point for drought management actions

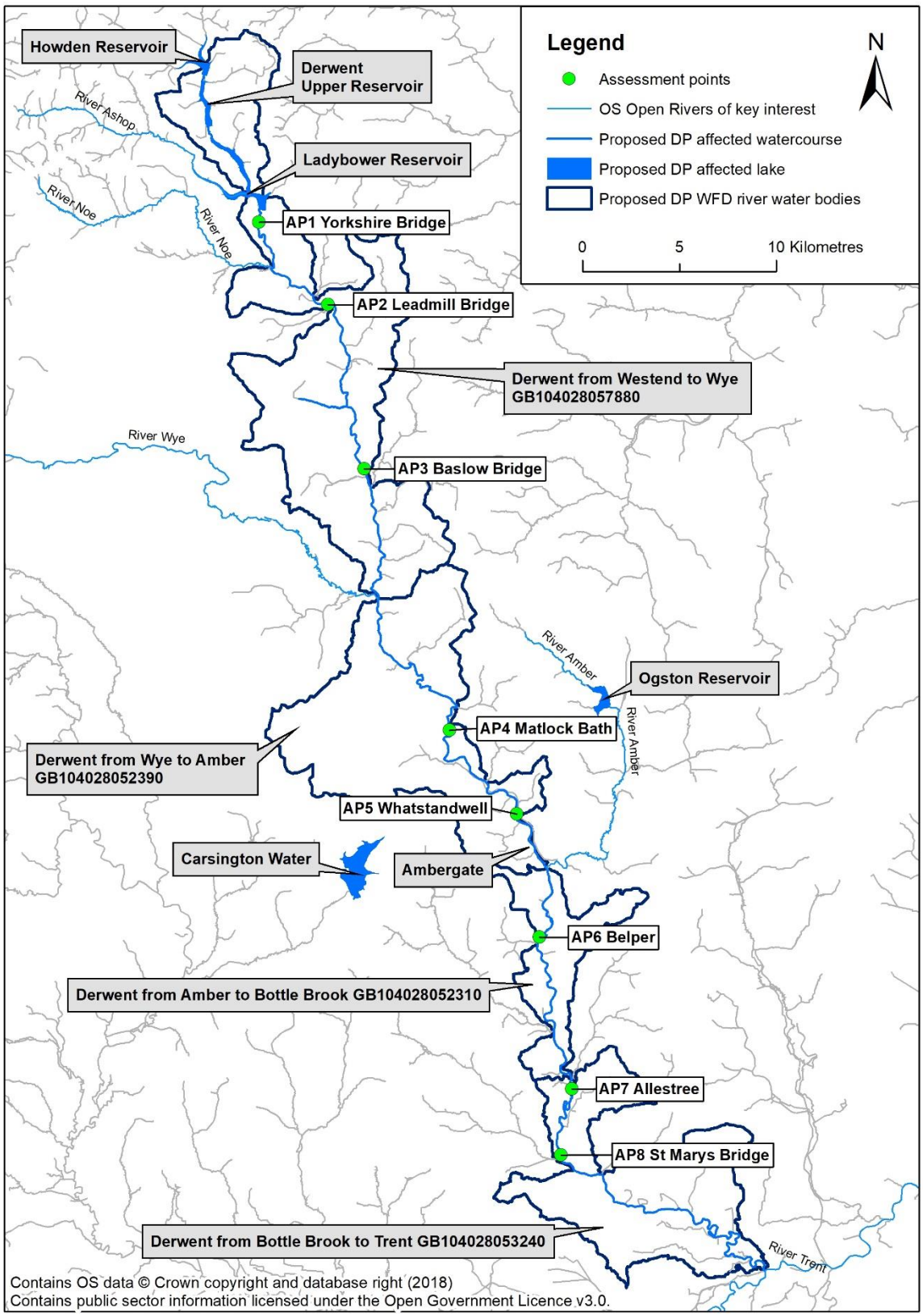

Figure 2.1 WFD water bodies and Assessment Point locations

Selection of APs was based on ecological and hydrological considerations to represent reaches of distinct hydrological, hydraulic or water quality characteristics, although compromises were also made in selecting transects that were a) also suited to reliable flow estimation and b) safely and easily accessible. Consideration was also given to the locations with existing long-term ecological datasets and those used for WFD classification, as these were considered likely to be most useful to allow comparison and analysis of current and historical monitoring data.

2.6 Water Framework Directive status

A key requirement of the WFD is to ensure 'no deterioration' in the ecological status of water bodies. Extreme natural events such as drought are recognised within the WFD, with temporary deterioration allowances covered by Article 4.6. This allows for temporary deterioration as a 'result of circumstances of natural cause which are exceptional or could not reasonably have been foreseen, in particular extreme floods and prolonged droughts'. This applies to situations where it is necessary to make use of the water environment in ways that result in a temporary deterioration of status (e.g. supplying the public with drinking water during prolonged drought).

When assessing impacts on WFD elements, it is necessary to consider whether the impacts are temporary, whether the water body will recover quickly and without the need for restoration measures and the extent to which the impact is a result of natural causes versus anthropogenic management practices.

2.6.1 Surface water WFD status

Summaries of current WFD classification status for the four River Derwent water bodies are shown in **Error! Reference source not found.** to

Table **2.4**, based on data from the EA's Catchment Data Explorer (accessed 05/08/2025).

Table 2.1 Summary of Cycle 3 WFD classification status and objectives for the Derwent from Westend to Wye Water Body (GB104028057880)

Classification	Ecological Status	Invertebrates	Fish	Phytobenthos and Macrophyte *	Ammonia	Dissolved Oxygen	pH	Phosphate	Temp	Chemical	Polybrominated diphenyl ethers	Mercury and Its Compounds
2019 (Cycle 2)	GEP	H	G	G	H	H	H	G	H	F	F	G
2022 (Cycle 3)	GEP	H	G	G	H	H	H	G	H	DN	-	-
Objectives	GEP 2015	G 2015	G 2015	G 2015	G 2015	G 2015	G 2015	G 2015	G 2015	G 2063	G 2063	G 2015

NB H=High, G=Good, M=Moderate, P=Poor, B=Bad, F=Failure to achieve Good status DN= Does not require assessment, GEP=Good Ecological Potential.

Table 2.2 Summary of Cycle 3 WFD classification status and objectives for the River Derwent from Wye to Amber Water Body (GB104028052390)

Classification	Ecological Status	Invertebrates	Fish	Phytobenthos and Macrophyte *	Ammonia	Dissolved Oxygen	pH	Phosphate	Temp	Chemical	Polybrominated diphenyl ethers	Perfluorooctane sulphonate (PFOS)	Mercury and its compounds
2019 (Cycle 2)	MEP	H	H	H	H	H	H	G	H	F	F	F	G
2022 (Cycle 3)	MEP	H	H	H	H	H	H	G	H	DN	-	-	-
Objectives	GEP 2027	G 2015	G 2015	N/A	G 2015	G 2015	G 2015	G 2015	G 2015	G 2063	-	-	-

NB H=High, G=Good, M=Moderate, P=Poor, B=Bad, F=Failure to achieve Good status DN= Does not require assessment, GEP=Good Ecological Potential, MEP=Moderate Ecological Potential

Table 2.3 Summary of Cycle 3 WFD classification status and objectives for the River Derwent from Amber to Bottle Brook Water Body (GB104028052310)

Classification	Ecological Status	Invertebrates	Fish	Phytobenthos and Macrophyte *	Ammonia	Dissolved Oxygen	pH	Phosphate	Temp	Chemical	Polybrominated diphenyl ethers	Perfluorooctane sulphonate (PFOS)	Mercury and its compounds
2019 (Cycle 2)	MEP	H	G	M	H	H	H	M	H	F	F	F	G
2022 (Cycle 3)	MEP	H	G	M	H	H	H	M	H	DN	-	-	-
Objectives	MEP 2015	G 2015	G 2021	N/A	G 2015	G 2015	G 2015	G 2015	G 2015	G 2063	-	-	-

NB H=High, G=Good, M=Moderate, P=Poor, B=Bad, F=Failure to achieve Good status DN= Does not require assessment, MEP=Moderate Ecological Potential.

Table 2.4 Summary of Cycle 3 WFD classification status and objectives for the River Derwent from Bottle Brook to Trent Water Body (GB104028053240)

Classification	Ecological Status	Invertebrates	Fish	Phytobenthos and Macrophyte *	Ammonia	Dissolved Oxygen	pH	Phosphate	Temp	Chemical	Polybrominated diphenyl ethers	Mercury and Its Compounds
2019 (Cycle 2)	MEP	H	H	M	H	H	H	M	G	F	F	G
2022 (Cycle 3)	MEP	H	H	M	H	H	H	M	H	DN	-	-
Objectives	MEP2015	G 2015	G 2015	M 2015	G 2015	G 2015	G 2015	M 2015	G 2015	G 2063	-	-

NB H=High, G=Good, M=Moderate, P=Poor, B=Bad, F=Failure to achieve Good status DN= Does not require assessment, MEP=Moderate Ecological Potential.

2.7 Designated sites

A search for environmentally designated sites within the River Derwent study area (e.g. SPA, SAC, ancient monuments, national nature reserves, local nature reserves, SSSIs and local wildlife sites) has been carried out. Those carried through to an impact assessment are listed below:

- River Derwent at Hathersage SSSI;
- Peak District Dales SAC; and
- Ogston Reservoir SSSI.

Further details of the designated sites are provided in Appendix I as part of the assessment of impacts on other receptors.

3 Assessment of pre-mitigation impacts

This Chapter:

- explains the methodology used to complete this environmental assessment;
- demonstrates how assessment of the proposed DP is in line with expectations set out in relevant legislation (Appendices A, B, C, D, E, F, G, H and I);
- describes the baseline environmental conditions (Appendices A, B, C, D, E, F, G, H and I);
- summarises the hydrological impacts of DP implementation (Section 3.2 and Appendix B);
- summarises the sensitivity of environmental features to this action (Section 3.3 and Appendices E, F, G, H and I);
- assesses the likely impacts on ecological and other receptors, designated sites, and the likelihood of the impacts being temporary or permanent (Section 3.3 and Appendices E, F, G, H and I);
- considers the likely impact on water body status or potential and risk of deterioration (Sections 3.2 and 3.3 and Appendices C, D and E);
- allocates a level of confidence to the environmental assessments (Sections 3.2 and 3.3 and Appendices A, B, C, D, E, F, G, H and I); and
- identifies sources of uncertainty in the assessment and sets out plans to reduce these (Sections 3.2 and 3.3 and Appendices A, B, C, D, E, F, G, H and I).

Full details of the environmental assessment are provided in Appendices A (hydrology) B (physical character), C (Hydraulics), D (water quality), E (macroinvertebrates), F (fish), G (INNS), H (protected species) and I (other receptors).

3.1 Environmental assessment methodology

Figure 3.1 summarises the process used to describe and categorise the impact of the DP on each receptor. The process is consistent with the latest EA draft guidance on Environmental Assessment for Water Company Drought Planning (EA, 2025) and draws on industry good practice for undertaking ecological impact assessments (CIEEM, 2018 updated 2024) and on NRW technical guidance for Water Company Drought Plans (NRW, 2024).

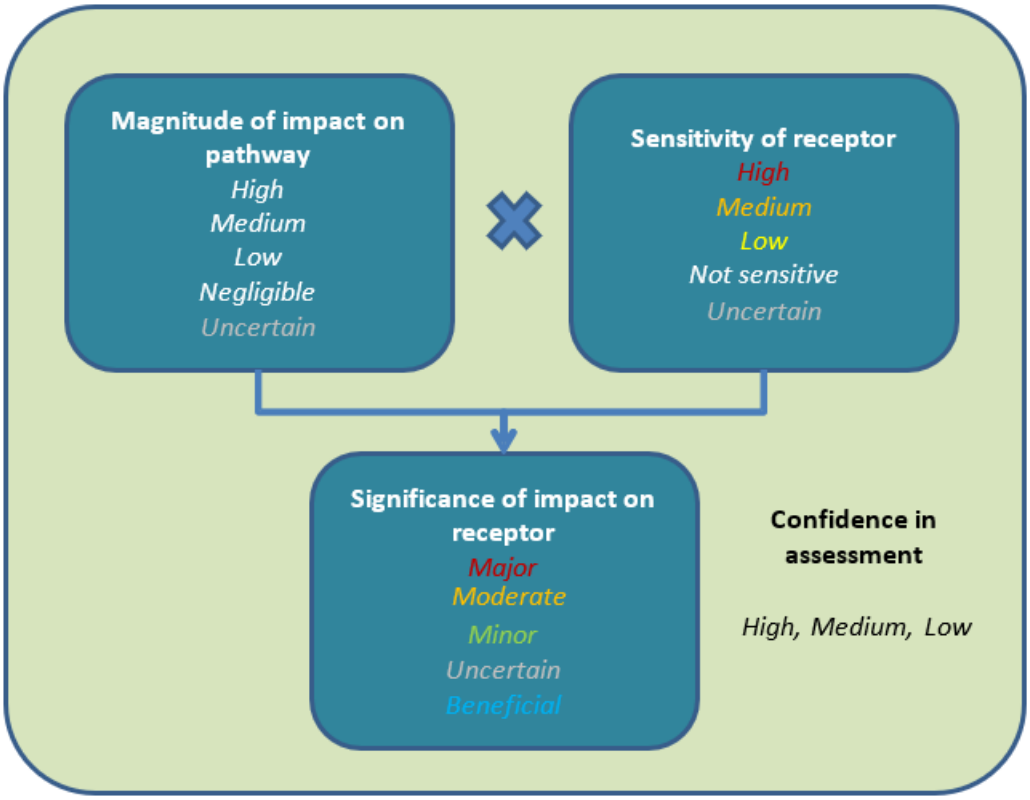

Figure 3.1 Flow chart outlining the environmental assessment process

The first step is to assess **magnitude of impact on each pathway**. We have chosen to categorise these impacts on a five-point scale similar to that advocated by the EA for assessing the sensitivity of receptors (EA, 2020b): High, Medium, Low, Negligible, or Uncertain. These categories and associated definitions are provided in Table 3.1.

Table 3.1 Magnitude categories

Category	Definition
High	A large, extensive, long-term and/or very frequent change.
Medium	A medium-sized, substantial, medium-term and/or frequent change.
Low	A small, localised, short-term and/or infrequent change.
Negligible	A change unlikely to be noticeable / measurable.
Uncertain	Insufficient information is available to judge the magnitude of impact.

Following NRW (2024) and CIEEM (2018, updated 2024) guidance, the assessment of magnitude takes into account some or all of the following factors (as necessary to understand the resulting impact on receptors):

- Severity – the degree of change, relative to the baseline (large, medium, small);
- Extent – the area over which the impact occurs (extensive, substantial, localised);

- Duration – the time for which the impact occurs (short-, medium-, long-term); and
- Frequency – how often the impact may occur (very frequent, frequent, infrequent).

Where relevant, the specific location and timing of any impacts is also described. Impacts on pathways may translate into positive or negative impacts on receptors, so whilst the direction of change is important (e.g. increase of decrease), impacts on pathways are not described as being positive or negative.

Next, the **sensitivity of each receptor** is categorised as High, Medium, Low, Not Sensitive, or Uncertain, in accordance with EA guidance (EA, 2025). Definitions are provided in Table 3.2.

Table 3.2 Sensitivity categories

Category	Definition
High	Receptor is highly sensitive to changing environments due to inability to tolerate and recover from changes.
Medium	Receptor is sensitive to changing environments due to limited ability to tolerate and/or recover slowly from the environmental change.
Low	Receptor is relatively insensitive to changing environments due to ability to tolerate and/or recover quickly from the environmental change.
Not sensitive	Receptor is not sensitive due to high tolerance to environmental change and/or ability to recover rapidly.
Uncertain	Insufficient information is available to judge the sensitivity of the receptor.

Sensitivity is a function of the receptor's capacity to accommodate change and its ability to recover if it is affected. A receptor may be more sensitive to changes in certain pathways than others. The assessment of sensitivity takes into account some or all of the following factors (EA, 2025):

- resistance (ability to remain unchanged by disturbance);
- redundancy (ability to avoid critical impairment (e.g. in ecosystem functioning) despite undergoing change);
- recovery capacity (ability to recover to baseline/avoid irreversible change); and
- recovery rate/resilience (time this recovery takes).

The conservation value of ecological receptors is also a factor to consider.

The magnitude of impact is combined with the sensitivity of receptor to assess the **significance of impact on each receptor**, as shown in **Error! Reference source not found.** (adapted from NRW, 2017). In accordance with draft EA guidance (EA, 2025), impacts on receptors are categorised as: Major, Moderate, Minor, or Uncertain. Impacts on receptors can be positive as well as negative, however, so we have also included a fifth category – **Beneficial** – to identify any positive impacts. Definitions, adapted from NRW (2017), are provided in Table 3.4.

Table 3.3 Determining the significance of impacts on receptors

Magnitude of impact on pathway	Sensitivity of receptor				
	High	Medium	Low	Not sensitive	Uncertain
High	Major	Major	Moderate	Minor	Uncertain
Medium	Major	Moderate	Minor	Minor	Uncertain
Low	Moderate	Minor	Minor	Minor	Uncertain
Negligible	Minor	Minor	Minor	Minor	Uncertain
Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain

Table 3.4 Significance categories

Category	Definition
Major	Very large or large change in environmental or socio-economic conditions, which, if lost, cannot be replaced or relocated. The impacts are generally but not exclusively associated with features and sites of national to regional importance because they contribute to achieving national / regional objectives. The impacts are likely to result in exceedance of statutory objectives and/or breaches of legislation (e.g. Likely Significant Effects or deterioration of WFD status).
Moderate	Intermediate change in environmental or socio-economic conditions. The impacts are likely to affect important considerations at a regional and local level. The impacts are unlikely to affect key decision-making processes (e.g. statutory objectives). Nevertheless, the cumulative effect of such impacts may lead to an increase of overall effect on a particular area or on a particular feature.
Minor	Small or negligible change in environmental or socio-economic conditions. These effects may be raised as local issues but are unlikely to be of importance in the decision-making process.
Uncertain	Insufficient information is available to judge the impact significance.
Beneficial	Any significant, moderate or minor change predicted to have a net positive effect on environmental or socio-economic conditions.

Impact significance provides a consistent means of expressing impacts which, in turn, inform the need for mitigation measures to offset the impacts. The determination of impact significance, both pre and post mitigation, also provides a transparent means for regulators to understand the impacts of a DP.

In practice, determining the significance of impact carries a degree of subjectivity and requires expert judgement. This may be because of limited evidence/ data on the sensitivity of the receptors and/ or the complexity of interactions that require assessment to determine the magnitude of change. For example, receptors may experience direct impacts because of changes in pathways, but also indirect impacts as a secondary response to changes in other receptors. If a receptor is subject to different impacts via different pathways, then the combined effect of the different pathways is integrated to assess the overall significance of impact.

Finally, in accordance with EA draft guidance (EA, 2025) and NRW guidance (NRW, 2024), the **degree of confidence** in the assessment of impact significance is categorised as **High, Medium** or **Low**. Definitions are provided in Table 3.5. Key sources of uncertainty are identified and used to inform the design of the EMP.

Table 3.5 Confidence categories

Category	Definition
High	Judgments based on high-quality, robust information, and/or the nature of the impact makes it possible to render a solid judgement.
Medium	Credibly sourced and plausible information, but not of sufficient quality or corroboration to warrant a higher level of confidence.
Low	The information available is too fragmented or poorly corroborated to make solid analytic inferences, or significant concerns or problems with information sources exist.

The assessment has also considered the legislative requirements of:

- Conservation of Habitats and Species Regulations 2017;
- Fisheries legislation: Salmon and Freshwater Fisheries Act 1975 and The Eels (England and Wales) Regulations 2009;
- Water Environment (Water Framework Directive) Regulations 2017 including the objectives set out in river basin management plans;
- Section 40 of the Natural Environment and Rural Communities Act 2006 (NERC);
- Legislation covering INNS;
- Other non-statutory requirements (local wildlife sites etc.);
- Protected areas designated under international agreements (incl. Ramsar & Natura 2000 sites); and
- Protected areas designated under national legislation (SSSIs), nationally protected species and habitats - Wildlife and Countryside Act 1981 and other locally important sites.

3.2 Impact on pathways

Error! Reference source not found. summarises the likely impacts of the proposed DP on hydrology, physical character, Hydraulics and water quality. **Error! Reference source not found.** is presented for information purposes only. Full details of the assessment are provided in Appendices A, B C and D.

Table 3.6 Summary of impacts on physical pathways

Pathway	Water body	Description	Magnitude of impact	Confidence level
Hydrology	River Derwent from Amber to Bottle Brook Water Body (GB104028052310) River Derwent from Bottle Brook to Trent Water Body (GB104028053240)	Hydrological modelling indicates that inflows from the River Amber and Bottle Brook are sufficient to attenuate flow alterations associated with the Ambergate DP/DO abstraction. Downstream of Bottle Brook, cumulative upstream contributions are predicted to buffer the effects of the Ambergate abstraction. At AP6, AP7 and AP8, flow reductions are similar— 26%, 25% and 24% respectively—due to modest accretion downstream of Ambergate. Across a 90-year flow record, qualifying conditions for DP use occurred on average just 4.3 days per year, with November being the most frequent (2.3 days/year), confirming the permit's role as a low-frequency but high-importance contingency measure.	Minor	Medium

Pathway	Water body	Description	Magnitude of impact	Confidence level
Habitat and geomorphology	River Derwent from Amber to Bottle Brook Water Body (GB104028052310)	The Ambergate abstraction is not predicted to induce measurable changes to channel form or sediment dynamics. Habitat conditions are expected to remain within baseline variability, with no significant impact on ecological function.	Negligible	Medium
	River Derwent from Bottle Brook to Trent Water Body (GB104028053240)	Geomorphological pressures from urbanisation and historic modification dominate this reach. The abstraction is not anticipated to alter sediment transport or instream habitat structure. Ecological integrity is expected to be maintained under proposed abstraction scenarios.	Negligible	Medium

Pathway	Water body	Description	Magnitude of impact	Confidence level
Water quality	River Derwent from Amber to Bottle Brook Water Body (GB104028052310)	The predicted scale of change to ammonia, biochemical oxygen demand (BOD), nitrate, dissolved oxygen (DO), temperature and metals is predicted to be Negligible.	Negligible	Medium
	River Derwent from Bottle Brook to Trent Water Body (GB104028053240)	Potential for ammonia and phosphate concentrations to increase as a result of the DP although this is unlikely to cause measurable change outside the normal background concentration range. Risk of increase in phosphate concentration causing a temporary deterioration in WFD status is increased during summer months if Derby STW discharges at permit limits, however the DP would not be in place during the summer period.	Low	Medium

Pathway	Water body	Description	Magnitude of impact	Confidence level
		The predicted scale of change to biochemical oxygen demand (BOD), nitrate, dissolved oxygen (DO), temperature and metals is predicted to be Negligible.		

3.3 Impact on receptors

Table 3.6 summarise the likely impacts of the proposed DP on invertebrates, fish, INNS, protected species and other receptors, as part of the receptors assessment. Full details of the assessment are provided in Appendices E, F, G, H and I.

Table 3.6 Summary of impacts on ecological and other receptors

Receptor	Water body	Sensitivity	Description	Significance of impact	Confidence level
Macroinvertebrates	The River Derwent from Amber to Bottle Brook (GB104028052310)	Low	Flow reductions on the River Derwent are predicted to be minor in this waterbody. As such reductions in velocity and depth are insignificant. Therefore, it is not anticipated that there will be any significant impact on the macroinvertebrate community of the River Derwent within this waterbody.	Minor*	Medium
	The River Derwent from Bottle Brook to Trent (GB104028053240)	Low	Flow reductions on the River Derwent are predicted to be minor in this waterbody. As such reductions in velocity and depth are insignificant. Therefore, it is not anticipated that there will be any significant impact on the macroinvertebrate community of the River Derwent within this waterbody.	Minor*	Medium

Receptor	Water body	Sensitivity	Description	Significance of impact	Confidence level
Fish (brown trout, spawning & egg incubation)	The River Derwent from Amber to Bottle Brook (GB104028052310)	High	The predicted DP reduction in flow (compared to baseline) during implementation of the Ambergate DP would still maintain a volume of water in excess of the minimum required for effective operation of the fish passes throughout the catchment. The precautionary water quality assessment concludes increased phosphate concentrations downstream of Derby STW will occur outside of the implementation period	Minor*	Medium
	The River Derwent from Bottle Brook to Trent (GB104028053240)	High	The predicted DP reduction in flow (compared to baseline) during implementation of the Ambergate DP would still maintain a volume of water in excess of the minimum required for effective operation of the fish passes throughout the catchment. The precautionary water quality assessment concludes increased phosphate concentrations downstream of Derby STW will occur outside of the implementation period	Minor	Medium

Receptor	Water body	Sensitivity	Description	Significance of impact	Confidence level
Fish (*Lampetra* sp.: spawning & egg incubation)	The River Derwent from Amber to Bottle Brook (GB104028052310)	High	A reduction in flow is predicted under the Ambergate DP, but the reduction would only apply at flows above 500 Ml/d due to the HOF associated with the abstraction. Any impacts would be small in spatial scale (applying to Peckwash Mill Weir) and short term in duration (passability would return to normal baseline levels upon cessation of the DP), equating to a Negligible overall effect and a Minor* (*impact predicted to be negligible but categorised as Minor in the absence of a negligible category)impact significance for all species and life stages.	Minor*	Medium
	The River Derwent from Bottle Brook to Trent (GB104028053240)	High	The reductions in flow associated with the Ambergate DP would not be expected to cause any of the fish passes to fall outside of their operational design range. The precautionary water quality assessment concludes increased phosphate concentrations downstream of Derby STW will occur outside of the implementation period.	Minor	Medium

Receptor	Water body	Sensitivity	Description	Significance of impact	Confidence level
Fish (all other species and life stages)	The River Derwent from Amber to Bottle Brook (GB104028052310)	High	A reduction in flow is predicted under the Ambergate DP, but the reduction would only apply at flows above 500 Ml/d due to the HOF associated with the abstraction. Any impacts would be small in spatial scale (applying to Peckwash Mill Weir) and short term in duration (passability would return to normal baseline levels upon cessation of the DP), equating to a Negligible overall effect and a Minor* (*impact predicted to be negligible but categorised as Minor in the absence of a negligible category)impact significance for all species and life stages.	Minor*	Medium
	The River Derwent from Bottle Brook to Trent (GB104028053240)	High	The reductions in flow associated with the Ambergate DP would not be expected to cause any of the fish passes to fall outside of their operational design range. The precautionary water quality assessment concludes increased phosphate concentrations	Minor	Medium

Receptor	Water body	Sensitivity	Description	Significance of impact	Confidence level
			downstream of Derby STW will occur outside of the implementation period.		
Bats	All	Medium	Abundance of macroinvertebrates will not be impacted as a result of the drought permit.	Minor*	Medium
Common Amphibians	All	Low	Abundance of macroinvertebrates will not be impacted as a result of the drought permit.	Minor*	Medium
Great Crested Newt	All	Medium	Abundance of macroinvertebrates will not be impacted as a result of the drought permit.	Minor*	Medium
Birds - All	All	Low	Abundance of macroinvertebrates will not be impacted as a result of the drought permit.	Minor*	Medium
Otters	All	Medium	Sensitive to changes in water levels and quality but presence in these water bodies is unconfirmed.	Minor	Medium
Reptiles	All	Low	Abundance of macroinvertebrates will not be impacted as a result of the drought permit.	Minor*	Medium

Receptor	Water body	Sensitivity	Description	Significance of impact	Confidence level
Water voles	All	High	Sensitive to changes in water levels and quality but presence in these water bodies is unconfirmed.	Minor	Medium
White-clawed crayfish	All	High	May be directly impacted by reduced flows, however presence of invasive species and lack of recent data. Sensitive to changes in water levels and quality but presence in these water bodies is unconfirmed.	Minor	Medium
INNS	All	Not Sensitive - Medium	The Ambergate abstraction transfers water to the River Dove catchment at Carsington, which may be released back into the Derwent. However, this transmission route is already present, and the Dove and Derwent are both tributaries of the River Trent and consequently INNS will be present throughout the Trent catchment.	Minor	Low
Ogston Reservoir SSSI	The River Derwent from Amber to Bottle Brook (GB104028052310)	Low	No impacts on are anticipated in this reach due to negligible changes to hydrology and hydromorphology.	Minor*	Medium

Receptor	Water body	Sensitivity	Description	Significance of impact	Confidence level
Fish (angling groups)	River Derwent from Amber to Bottle Brook Water Body (GB104028052310)		The abstraction is not anticipated to significantly alter flow or habitat conditions that underpin angling value. Tributary inflows and channel diversity are expected to maintain angling amenity and fishery integrity.	Minor*	Medium
	River Derwent from Bottle Brook to Trent Water Body (GB104028053240)		Flow regimes and ecological conditions are expected to remain within acceptable thresholds for recreational fisheries.	Minor*	Medium
Third-party abstractors	Derwent from Westend to Wye (GB104028057880) (upstream Ambergate DP)	Low	Four abstractions on this reach are controlled at Derby St Mary's Bridge. Of the four abstractions controlled at St Mary's Bridge has a high HOF of 720 Ml/d. This is higher than the trigger levels for the DP and the site will have ceased to abstract before the DP is triggered. It will not be impacted by the DP.	Minor*	Medium
	Derwent from Wye to Amber water body (upstream Ambergate DP)			Minor*	Medium

Receptor	Water body	Sensitivity	Description	Significance of impact	Confidence level
	River Derwent from Amber to Bottle Brook Water Body (GB104028052310)		Five abstractions on this reach have local controls including at Borrowash Weir and at Longbridge Weir. It is assumed that those abstractions controlled locally will also be subject to negligible impact, given consideration of the small scale of predicted hydromorphology parameter change Overall, no other third-party abstractions have been identified as potentially impacted by Ambergate DP.	Minor*	Medium
	River Derwent from Bottle Brook to Trent Water Body (GB104028053240)			Minor*	Medium
Aesthetics, recreation and navigation	River Derwent from Amber to Bottle Brook Water Body (GB104028052310)	Low	The abstraction is not expected to alter visual amenity, navigation, access, or recreational value.	Minor*	Medium

Receptor	Water body	Sensitivity	Description	Significance of impact	Confidence level
	River Derwent from Bottle Brook to Trent Water Body (GB104028053240)		The abstraction is not expected to alter visual amenity, access, or recreational value.	Minor*	Medium

** impact predicted to be negligible but categorised as Minor in the absence of a negligible category.*

4 Mitigation measures

This Chapter sets out how we will:

- minimise the environmental impact of our actions;
- mitigate the impacts and assess the effectiveness of these mitigation measures; and
- where legally required, compensate for the impacts where it's not possible to minimise or mitigate for them.

Where significant negative impacts (defined for this report as those of Moderate significance or greater) are identified during the environmental assessment process, there is a need to identify appropriate mitigation measures to avoid, reduce or remedy any impacts. Such measures may be identified either to be implemented in advance or implemented during implementation of a DP.

There are no impacts associated with the Ambergate DP that are predicted to be of Moderate significance or greater, even prior to mitigation. If present, these would necessitate compulsory mitigation. However, implementation of monitoring or mitigation measures may also be appropriate where there are elements of the assessment that are uncertain. Mitigation options have therefore been considered below to cater for the possibility that within drought monitoring shows habitat loss to be greater than anticipated.

4.1 Measures to mitigate environmental impacts during drought permit Implementation

Several mitigation measures could be implemented should monitoring during the DP indicate that significant impacts to ecological receptors, or other river users, are occurring. It may not be necessary to implement all these mitigation measures to reduce the observed impacts. Any such implementation of mitigation measures would be undertaken in consultation with the EA:

If fish are observed to be trapped, or in distress, during the proposed DP several measures could be taken. The decision on which method to deploy should be taken in discussion with the Environment Agency, and according to the specific nature of the problem. Options may include:

- Suspending the operation of the DP.
- Deployment of localised aeration.
- Installation of fish refugia in spatially limited areas.
- Fish rescue and relocation may also be used, as a spatially limited option, but is considered least preferable by the Environment Agency, to be deployed if no other suitable alternative is available.
- Funding of appropriate reasonable measures (e.g. habitat restoration) could be made in mitigation of ecological damage occurring in reaches affected by reduced compensation flows in the longer term.
- Discharges from Derby Sewage Treatment Works (WwTW) in recent years have tended to be well below the maximum consent limits for phosphorus (Appendix D). Should impacts on phosphate concentrations (or other water quality chemicals) be identified downstream of Derby STW (via the proposed during Ambergate DP monitoring), immediate discussions between Severn Trent water

resources and sewage treatment works staff and the EA should be held to determine if any adjustments can be made at the treatment works to reduce concentration of phosphate in final discharges.

- Return abstraction to non-drought permit conditions until suitable alternative mitigation is in place or period of risk has been demonstrated to have ended.

5 Environmental Monitoring Plan

This Chapter:

- Sets out an environmental monitoring plan (EMP) covering the baseline, in-drought and post-drought (recovery) monitoring that will be carried out to:
- understand the actual environmental impact of implementing the drought permit;
- improve the confidence of the environmental assessment; and
- assess the effectiveness of the mitigation measures detailed in Section 4.

5.1 Introduction

An EMP has been developed which includes baseline, pre-DP implementation, during-DP implementation and post-DP implementation monitoring. The receptors to be monitored are detailed in Table 5.1, together with the agreed monitoring locations.

It is important to note that the level of monitoring is risk-based. The environmental assessment indicates that the DP presents a low risk to the environment (negligible or minor negative impacts are predicted for all receptors). Despite this monitoring has been recommended, to check the predicted degree of impact, and identify any unexpected impacts to trigger mitigation measures, if needed, particularly the water quality pathways.

Baseline monitoring

Baseline monitoring is required to formulate a description of the existing ecological conditions, from which the impacts of DP operations over and above the effects of other pressures, such as natural drought, can be identified. Baseline monitoring can also help to establish the sensitivity of the environment to changes in flow and improve the level of confidence in the assessment of likely impacts. Significant baseline monitoring associated with previous versions of the EMP has already been carried out on the River Derwent. This EMP therefore considers if additional baseline monitoring is required beyond what has already been done.

Pre-DP monitoring

Pre-implementation monitoring should be triggered by Severn Trent DP preparations and undertaken prior to implementation of the Ambergate DP. Pre-implementation data can be important to demonstrate the precise baseline conditions ahead of the changes to the compensation flow regime.

During-DP monitoring

In-drought monitoring is required to assess any impacts from the implementation of the drought management action and for the management of mitigation measures during a drought.

It is recommended that during DP monitoring continues as per the pre-implementation period, except where, in consultation with the regulator, it is deemed that such monitoring may be environmentally damaging.

Post-DP monitoring

Post-DP monitoring aims to assess a site's recovery and to check that there are no long-term effects on any environmental features. This is important as results are needed to assess the success of mitigation measures. It can also feed back into the assessment of sensitivity and likely impact and inform the management of future drought actions.

The duration of post DP monitoring will depend upon the severity of the natural drought but will cover the period of recovery and will be carried out in consultation with the regulator.

5.2 River Derwent Environmental Monitoring Plan

A summary of the EMP for the River Derwent is provided in Table 5.1.

5.2.1 Hydrology

Flows in potentially affected reaches of the River Derwent, i.e. between the Ambergate abstraction and the River Trent, should be gauged within the range 500 – 680 Ml/d. Gauging should be undertaken at existing APs and other locations within free-flowing sections and should be referenced to Ordnance Datum, with a surveyed cross section. A single round of such gauging is considered sufficient during the DP when flows are within the range 500 – 680 Ml/d. No baseline or post-DP flow gauging is required.

5.2.2 Macroinvertebrates

Baseline Macroinvertebrates

Given that any impact to the macroinvertebrate communities of the River Derwent water bodies was minor and of relatively low risk, additional monitoring of macroinvertebrate communities for the purposes of baseline drought assessment is not recommended at this time. The current available data (as presented in Appendix D) is considered a suitable baseline for assessment of future impacts. It is assumed that monitoring will continue on the River Derwent at the current frequency and suite of locations, as per the 2025 Derwent Drought Monitoring SIP; these data will be suitable for use under future baseline assessment, if required.

During-DP Macroinvertebrates

Seasonal sampling (spring, summer & autumn) of macroinvertebrates is required for the duration of the DP.

Post-DP Macroinvertebrates

Seasonal sampling (spring, summer & autumn) of macroinvertebrates is required for a minimum of three years post-DP.

5.2.3 Fish

Baseline Fish

Fish surveys were completed by the EA annually between 2010 and 2022 to achieve a continuous baseline dataset. Further monitoring was undertaken by Ricardo in autumn 2023. These data are described further in Appendix F. The baseline dataset comprised wet and dry years and given that inherent variability of these data mean that only broad comparisons can be drawn between baseline and DP operation, the data are considered sufficient for baseline purposes.

During-DP Fish

Targeted walkovers and fixed-point photography should be undertaken immediately prior and during DP implementation to allow identification of any unforeseen effects e.g., fish in distress. and will help define the likely duration of any possible impediment to habitat connectivity. Fixed point photography should include reference points from which water levels can be accurately assessed. These may include clearly observable points on fish passage structures etc., or if necessary, require installation of gaugeboards.

Post-DP Fish

No Post-DP fish monitoring is required unless specific impacts are identified that require monitoring of recovery.

5.2.4 Water Quality

Baseline Water Quality

Water quality monitoring will be undertaken as part of the macroinvertebrate surveys detailed above- no additional surveys, above and beyond the existing monitoring is required.

During-DP Water Quality

In situ water quality monitoring (water temperature, DO, pH and conductivity) should be undertaken on implementation of DP operation. This is recommended not in direct response to predicted water quality change, but rather to provide an early indication of potential ecological stress. This monitoring should take place as part of the fish walkover surveys which will be located at AP5, AP6, AP7 and AP8.

High frequency or continuous monitoring of water is not considered to be necessary for the duration of the DP from the end of October to April, as this period is typically cooler and wetter compared to the summer months and is considered low risk for water quality impacts on the River Derwent. Fortnightly monitoring is therefore recommended. Any water quality probe readings will ideally be carried out at a similar time of day, during each visit to minimise any changes due to normal diurnal effects.

In addition, monitoring is recommended in the lower river, centred on Derby WwTW, to validate the current water quality assessment particularly with respect to ammonia and phosphate concentrations. The precise monitoring locations, frequency of visits and suite of analyses will be confirmed in consultation with the EA and Severn Trent, to complement ongoing data collection and to understand during-DP WwTW operation. A provisional monitoring scope is defined as:

- 1x location upstream of Derby WwTW e.g., at AP8.
- 2x locations downstream of Derby STW, e.g. at EA monitoring locations River Derwent Anglers Car Park D Cut (MD-49692300) and River Derwent at Borrowash (MD-49692250).
- Fortnightly frequency of DP water quality sampling, potentially reducing to monthly to complement/alternate with the existing EA monthly sampling i.e., if appropriate reduce to 1 DP visit and 1 routine EA water quality visit per month.
- Field measurable water quality measurement (temperature, DO, pH and conductivity).

Submission of samples for laboratory testing of orthophosphate,, total ammonia (as N), BOD and nitrate.

Post-DP Water Quality

No post-DP water quality monitoring is required for the same reasons as described for baseline monitoring.

Table 5.1 River Derwent EMP

Parameter	Location	By whom	Brief scope	Baseline Timing/ Frequency	Pre-DP Timing/ Frequency	During-DP Timing/ Frequency	Post-DP Timing/ Frequency
Hydrology	Whatstandwell (AP5), Belper Mill (AP6), Allestree Ford (AP7) and St Mary's Bridge Derby (AP8)	Severn Trent	Routine flow gauging and cross section	None	None	Single visit when flows are within the range 500 – 680 Ml/d	None
Water quality: temperature, DO, pH, conductivity	As per fish walkover surveys: Whatstandwell (AP5), Belper Mill (AP6), Allestree Ford (AP7) and St Mary's Bridge Derby (AP8)	Severn Trent	*In situ* monitoring of temperature, DO, pH, conductivity.	None	At least once prior to implementation	Fortnightly initially. Frequency may be reduced after 1 month, in agreement with EA.	None
Water quality: temperature, DO, pH, conductivity, orthophosphate, ammonia, BOD, nitrate	Derby St Marys Bridge (AP8), River Derwent Anglers Car Park D Cut (MD-49692300) and River Derwent At	Severn Trent	Monitoring upstream and downstream of Derby WwTW. *In situ* monitoring of temperature, DO, pH, conductivity. Lab analysis of samples for orthophosphate,	None	At least once prior to implementation	Fortnightly initially. Frequency may be reduced after 1 month, in agreement with EA.	None

Parameter	**Location**	**By whom**	**Brief scope**	**Baseline Timing/ Frequency**	**Pre-DP Timing/ Frequency**	**During-DP Timing/ Frequency**	**Post-DP Timing/ Frequency**
	Borrowash (MD-49692250)		ammonia, BOD, nitrate.				
Macroinvertebrates	Whatstandwell (AP5), Belper Mill (AP6), Allestree Ford (AP7) and St Mary's Bridge Derby (AP8)	Severn Trent	Seasonal macroinvertebrate sampling.	Not required, existing baseline data is available.	Not required.	Seasonal sampling (spring, summer & autumn) for the duration of the DP.	Seasonal sampling (spring, summer & autumn) for a minimum of three years post-DP.
Fish	Whatstandwell (AP5), Belper Mill (AP6), Allestree Ford (AP7) and St Mary's Bridge Derby (AP8)	Severn Trent	Targeted walkovers to allow identification of any unforeseen effects e.g., fish in distress. And fixed point photography	Not required, existing baseline data is available.	Immediately prior to DP implementation	TBC with regulators at DP application stage e.g., initially weekly, then dropping in frequency.	Likely not required unless specific impacts require post DP monitoring

6 Conclusions and recommendations

The pre-mitigation potential impacts are summarised in Table 6.1.

Table 6.1 Pre-mitigation potential impacts of the Amberagte DP Scenario

Water body	Impact significance Ambergate DP	Receptors
River Derwent from Amber to Bottle Brook Water Body (GB104028052310)	**Minor**	Macroinvertebrates Fish ((brown trout spawning & egg incubation;, bullhead and rheophilic coarse fish: juvenile and adults; *Lampetra* sp.: spawning & egg incubation; eurytopic coarse fish: spawning & egg incubation and adults; eurytopic coarse fish: juvenile; Angling groups) INNS Protected species Derwent Valley Mills World Heritage Site Ogston Reservoir SSSI Aesthetics, recreation, navigation Archaeology and heritage Third-party Abstractors
River Derwent from Bottle Brook to Trent Water Body (GB104028053240)	**Minor**	Macroinvertebrates Fish (Fish (brown trout, spawning & egg incubation) bullhead and rheophilic coarse fish: juvenile and adults; *Lampetra* sp.: spawning & egg incubation; eurytopic coarse fish: spawning & egg incubation and adults; eurytopic coarse fish: juvenile; Angling groups) INNS Protected species Aesthetics, recreation, navigation Archaeology and heritage Third-party Abstractors

Based on the assessment and given the uncertainties inherent in some of the assessments undertaken, a range of precautionary mitigation measures have been developed, in the event that environmental monitoring during DP implementation identifies that unexpected impacts are occurring (Section 5).

Monitoring has been recommended to capture any changes before, during and after the DP implementation (see Section 6). This includes checking for signs of ecological stress including potential effects on flow, potential effects of poor water quality, inhibition of movement of fish past river structures or other barriers and habitat availability for adult and juvenile life stages (including spawning / nursery areas).

It should be noted that not all the mitigation measures described may be required or appropriate. If unexpected impacts are found to be occurring, potential mitigation measures will be discussed and agreed with the EA. Mitigation measures will be implemented to reduce the impacts of the DP and not the impacts of the drought itself.

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