Annexe 3 – Doe Park Reservoir, DP2022-NE0270016027

A. Summary of the proposal

Yorkshire Water Services Limited (YW) is applying for drought powers under the Water Resources Act 1991 (as amended by Environment Act 1995) to replace the conditions under impoundment licence NE/027/0016/021. The impoundment licence permits the impoundment of water at Doe Park Reservoir at Denholme, West Yorkshire.

Figure 1: Doe Park Reservoir (Compensation Water Source) and Denholme Beck (Receiving Watercourse)

Under the conditions of licence NE/027/0016/021, YW must provide a compensation release from Doe Park Reservoir to the Denholme Beck. YW must continuously discharge not less than 3.6 Ml/d when the reservoir level is above the control line defined in the licence. If the water level is below the control line, YW must discharge not less than 1.8 Ml/d.

YW are applying for a drought permit to reduce the compensation release required to 1.8 Ml/d at all times, with a further reduction to 1.2 Ml/d if regional reservoir stocks were below the regional Drought Control Line (DCL) for four consecutive weeks or more.

The reason for the proposal is to reduce the compensation flow from Doe Park Reservoir to conserve water levels to maintain public water supply during winter 2022–23 and increase the chance of returning to normal reservoir levels by April 2023. The drought permit has been requested until 31st March 2023.

B. Details of proposal

Impoundment details	Existing Licence	New Proposal
Name and/or description of inland water to be impounded	Doe Park Reservoir, Denholme, West Yorkshire	No change
Point of impoundment	SE 07714 34132	No change
Manner and extent of impoundment	Earth fill with clay core dam not exceeding 245 metres above Ordnance Datum. Impoundment reservoir not to exceed 408,339 cubic metres capacity.	No change
Further conditions	See 'Existing further conditions' section below this table	See below this table
Other details	Licence NE/027/0016/021 formalises the compensation release originally specified under the Bradford Waterworks Act 1854.	No change

Existing further conditions

4. FURTHER CONDITIONS

4.1 Subject to condition 4.2, the Licence Holder shall release water from Doe Park Reservoir so as to maintain a flow of no less than 3.6 megalitres per day in Denholme Beck immediately downstream of the works. This flow shall be known as the Compensation Flow.

4.2 At all times when the Licence Holder maintains a gauge in Doe Park Reservoir for measuring the distance between the level of water therein and the top water level of 245m above Ordnance Datum (Newlyn):

(i) If the said distance as gauged on any Monday equals or exceeds the value shown in column 2 of the table below, as relates to the number of that Monday in column 1, the quantity of water that the Licence Holder shall release from Doe Park Reservoir to Denholme Beck on each subsequent day shall reduce from a minimum of 3.6 megalitres per day to no less than 1.8 megalitres, until the said distance on any subsequent Monday is less than the value in column 2 of the table below as relates to the number of that Monday in column 1, whereupon condition 4.1 shall apply. The first Monday in each calendar year is numbered 1 and each subsequent Monday is numbered consecutively thereafter.

Column 1	Column 2	Column 1	Column 2
1	5.84	28	4.51
2	5.84	29	4.56
3	5.84	30	4.61
4	5.84	31	4.66
5	5.84	32	4.76
6	5.65	33	4.90
7	5.33	34	5.05
8	5.00	35	5.19
9	4.68	36	5.33
10	4.47	37	5.45
11	4.41	38	5.58
12	4.36	39	5.70
13	4.30	40	5.82
14	4.25	41	5.84
15	4.27	42	5.84
16	4.28	43	5.84
17	4.30	44	5.84
18	4.32	45	5.84
19	4.33	46	5.84
20	4.34	47	5.84
21	4.34	48	5.84
22	4.35	49	5.84
23	4.37	50	5.84
24	4.39	51	5.84
25	4.41	52	5.84
26	4.44	53	5.84
27	4.46		

(ii) The Licence Holder shall take and record readings of the gauge specified in condition 4.2 each Monday during the whole of the period during which abstraction is authorised or as otherwise approved in writing by the Agency.

(iii) Each record shall be kept and be made available during all reasonable hours for inspection by the Agency for at least 6 years.

4.3 (i) From the date of issue until the 31/03/2027
The Licence Holder shall use a gaugeboard to measure the rate of Compensation Flow at the v notch weir at National Grid Reference SE 07685 34191 shown on the map marked 'Weir'.

(ii) From the 01/04/2027
The Licence Holder shall use a flow measurement device which can record the flow at the same time each day to measure the rate of Compensation Flow at the v notch weir at National Grid Reference SE 07685 34191 shown on the map marked 'Weir'.

4.4 (i) The Licence Holder shall monitor and maintain the flow measurement devices specified in condition 4.3(i) and 4.3(ii) so that at all times they measure the compensation flow accurately, and promptly replace them if they cease to be fit for purpose.

(ii) The Licence Holder shall maintain such v notch weir to prevent leakage and to be free from obstruction at all times and remain effective at all times.

4.5 (i) From the date of issue until the 31/03/2027
The Licence Holder shall use the measurement device specified in condition 4.3(i) to record the Compensation Flow on three days each week or as otherwise approved in writing by the Agency.

(ii) From the 01/04/2027
The licence holder shall use the measurement device specified in condition 4.3(ii) to record the Compensation Flow at the same time each day or as otherwise approved in writing by the Agency.

(iii) The Licence Holder shall keep a record required by condition 4.5(i) and 4.5(ii) and make it available during all reasonable hours for inspection by the Agency for at least 6 years.

Drought permit further conditions

The proposal is to reduce the compensation release to Denholme Beck. Please see sections C for quantities, and sections F and G for recommendations.

C. QUANTITIES

Licence NE/027/0016/021 is an impoundment licence so there are no abstraction quantities. However, the drought permit proposal is to reduce the compensation release quantity as follows:

Normal conditions	Drought permit proposal	Regional reservoir levels below regional Drought Control Line
3.6 Ml/day	1.8 Ml/day	1.2 Ml/day

Table 1: Doe Park compensation releases

D. WFD

This application is outside the Abstraction Licensing Strategy process. This is because it relies on drought powers to address exceptional circumstances. However, the proposal still needs to be Water Framework Directive (WFD) compliant. The proposal will be assessed against the WFD statuses, including identifying the risk of any temporary deterioration of status.

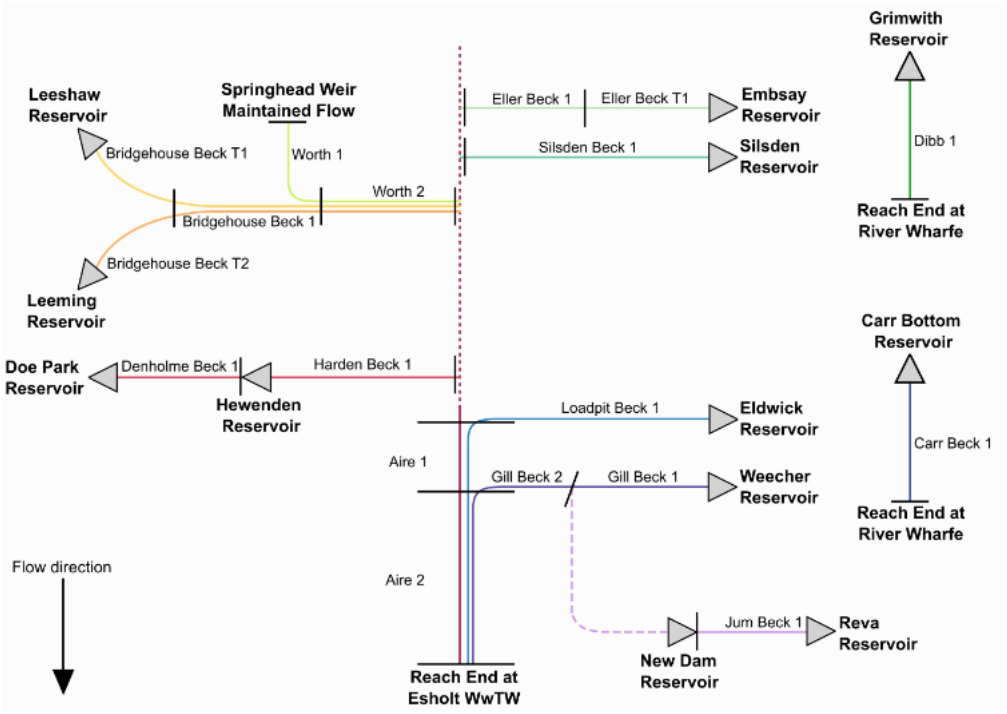

Figure 2: North West Area reservoirs drought permits reach schematic

Doe Park Reservoir is hydrologically linked to the following reaches (as shown above in Figure 2):

- Denholme Beck 1 – Harden Beck from Source to River Aire, GB104027062870
- Harden Beck 1 - Harden Beck from Source to River Aire, GB104027062870

The corresponding WFD waterbodies have therefore been assessed in relation to the Doe Park Reservoir drought option.

Harden Beck from Source to River Aire, GB104027062870

Harden Beck from Source to River Aire (GB104027062870) is classed as a heavily modified waterbody. These are water bodies where there is a significant risk of failing to achieve a good ecological status because of modifications to their hydro-morphological characteristics. Therefore, they have a target of achieving Good Ecological Potential (GEP) rather than Good Ecological Status (GES). For heavily modified water bodies, flow is the first element assessed as part of the classification. If flow standards are passed, then potential is based on a combination of mitigation measures and ‘non-sensitive’ quality elements. For river water bodies, these consist of the physico-chemical, specific pollutants and phytobenthos elements. If flow standards fail, then potential is based on the worst result of either the mitigation measures assessment or any of the quality element assessments.

Consideration	Status		
	Baseline status (2015)	**Cycle 2 current status (2019)**	**Cycle 2 Objective**
Overall WB status	Moderate (Quite Certain)	Moderate	Moderate by 2015
Ecological potential	Moderate (Quite Certain)	Moderate (Very Certain)	Moderate by 2015
Fish	Moderate (Uncertain)	Good	Good by 2027
Invertebrates	Good	Good	Good by 2015
Macrophytes and Phytobenthos Combined	Good	Moderate (Very Certain)	Good by 2015
Phytobenthos	Good	Moderate (Very Certain)	-
Hydrological regime	No data	Not assessed	Not set
Mitigation measures	Moderate/Less	Moderate/Less (Uncertain)	Moderate/Less by 2015
Physico-chemical	Moderate (Quite Certain)	Moderate (Quite Certain)	Moderate by 2015
Chemical	Good	Fail (Uncertain)	Good by 2015

Table 2: Harden Beck from Source to River Aire, GB104027062870 (Heavily Modified)

Reasons For Not Achieving Good:

Ecological Potential – The ecological potential is at moderate status and does not meet Good WFD status due to several contributing factors explained below.

Macrophytes and Phytobenthos – Macrophytes and Phytobenthos are currently at Moderate in this waterbody. This is due to nutrient and phosphate inputs. There is probable point source pollution from continuous discharge and poor nutrient management by the water industry and the agricultural sector respectively. Additionally, this status is also due to physical modification (probable) by an impoundment in position for the water industry.

Hydrological Regime – The hydrological regime element is not assessed for this surface water body, and therefore classification follows the pathway of flow conditions fail. Certain heavily modified waterbodies are no longer classified for hydrological regime where the hydrological regime test is not sufficient due to the nature of the waterbody. In this instance, ecological potential is based on the worst result of either the mitigation measures assessment or any of the quality elements.

Mitigation Measures – Hydrological Regime is currently at Moderate/Less, which is caused by the water industry by physical modification for the purpose of both drinking water supply and water regulation.

Physico-chemical - Physico-chemical is measured at Moderate at present. This is caused by phosphates, both from the water industry by confirmed point source pollution (continuous sewage discharge), and from the agricultural industry by probable diffuse source (poor nutrient management.

Chemical – The chemical status of this waterbody is Fail. This is due to Polybrominated diphenyl ethers (PBDE) (measures delivered to address the reason).

WFD objectives assessment:

- The objective for hydrology regime has not been set has the waterbody has not been assessed for flow.
- The objectives of Good by 2027 indicates the long-term ambition for the waterbodies as it is technically feasible to fix the issues, but these were not funded in the Cycle 2 plan. In the Cycle 3 plan these objectives will be revised and if the required fixes are still not funded the deadline could be extended again.
- Where we have a baseline (2015) status of 'Good' then our objective has been set as Good by 2015. This is because the waterbody is already meeting its default objectives, and nothing less than good can be predicted as this would go against the directive.
- Where we have an objective of 'Moderate by 2015' this particular waterbody cannot reach good status, only moderate. As the objective is already at moderate for physico-chemical it has an objective of 'Moderate by 2015'. This means the Ecological Potential and Overall Waterbody objectives are 'Moderate by 2015' as, because of the physico-chemical status, they cannot achieve higher than moderate.

Risk of deterioration of elements:

Denholme Beck 1 – Harden Beck from Source to River Aire, GB104027062870

Fish – There are multiple risks to the fish status due to this drought option. Reduced flow and wetted width in the reach could damage or destroy important habitats used for spawning, nurseries and resting. Reduced flows could also impact the migration of species, particularly to spawning and nursery areas. Increased stress and competition could result in decreased growth, morphological change and/or alteration to feeding and migration. There is also the risk of stranding events due to potential decreases in longitudinal connectivity. Increased predation due to lower flows could increase mortality of fish species. The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are predicted to present a moderate risk to the fish component of the WFD GB104027062870 Harden Beck from Source to River Aire (associated with Denholme Beck 1).

Invertebrates – YW's EAR explains that there are multiple ways this drought permit could impact upon invertebrates within this waterbody. Reductions in river flow will cause a reduction in wetted width and depth, reducing habitat availability for the invertebrates. Some species are sensitive to changes in velocity and a loss of flow

velocity could reduce habitats within the waterbody that require high flow velocities. Furthermore, invertebrates are sensitive to water quality pressures. The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are predicted to present a major risk to the macroinvertebrate component of the GB104027062870 Harden Beck from Source to River Aire waterbody (associated with Denholme Beck 1). The duration of impacts could be up to 6 months. However, the macroinvertebrate community recovery is expected to be relatively quick due to effective re-colonisation strategies in macroinvertebrates. Therefore, the risk to deterioration of the WFD status of the waterbody is considered to be minor.

Macrophytes and Phytobenthos – This element is screened out of the impact assessment as neither are deemed to be impacted by changes in flow. Wetted width reduction would not result in a deterioration of status due to the way monitoring is carried out. Reduced dilution of phosphate caused by drought option implementation may have an impact if P deterioration is predicted but would be temporary and unlikely to impact on either status. We don't believe this drought option poses any risk to the deterioration of macrophyte or phytobenthos status.

Hydrological Regime – Not assessed.

Mitigation Measures – The drought permit will not exacerbate this particular classification as it will not result in changes to the physical modification structures.

Physico-chemical – There are no water quality monitoring points in Denholme Beck 1, as such the next location in the downstream reach (Harden Beck 1), Harden Beck at Harden (NE-49400457) has been used. There are no significant continuous or intermittent discharges into Denholme Beck 1. There are minor risks from drought options for total ammonia, oxygen and phosphates in this reach.

Chemical – The EAR has not assessed the specific chemical parameters that are the cause of failure in the EA's catchment planning system. However as there is a risk to physico-chemical parameters then it is reasonable to state there may be a risk to chemical parameters due to the same pathway. Although there is a risk of potential further deterioration to this element, it's considered that the mitigation measures will be sufficient to protect against this.

<u>Harden Beck 1 - Harden Beck from Source to River Aire, GB104027062870</u>

Fish – There are multiple risks to the fish status due to this drought option. Reduced flow and wetted width in the reach could damage or destroy important habitats used for spawning, nurseries and resting. Reduced flows could also impact the migration of species, particularly to spawning and nursery areas. Increased stress and competition could result in decreased growth, morphological change and/or alteration to feeding and migration. There is also the risk of stranding events due to potential decreases in longitudinal connectivity. Increased predation due to lower flows could increase mortality of fish species. The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are predicted to present a moderate risk to the WFD status in waterbody GB104027062870 Harden Beck from Source to River Aire (associated with Harden Beck 1). The duration of impacts could be up to 6 months. Therefore, the risk to deterioration of the WFD status of the waterbody is considered to be moderate.

Invertebrates – YW's EAR explains that there are multiple ways this drought permit could impact upon invertebrates within this waterbody. Reductions in river flow will cause a reduction in wetted width and depth, reducing habitat availability for the invertebrates. Some species are sensitive to changes in velocity and a loss of flow velocity could reduce habitats within the waterbody that require high flow velocities. Furthermore, invertebrates are sensitive to water quality pressures. Water quality deterioration as a result of the drought option may potentially have a medium-term chronic, regular, temporary water quality pressures downstream of Harecroft wastewater treatment works. The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are predicted to present a major risk to the macroinvertebrate component of the GB104027062870 Harden Beck from Source to River Aire waterbody (associated with Harden Beck 1). The duration of impacts could be up to 6 months. However, the macroinvertebrate community recovery is expected to be relatively quick due to effective re-colonisation strategies in macroinvertebrates. Therefore, the risk to deterioration of the WFD status of the waterbody is considered to be moderate.

Macrophytes and Phytobenthos – This element is screened out of the impact assessment as neither are deemed to be impacted by changes in flow. Wetted width reduction would not result in a deterioration of status due to the way monitoring is carried out. Reduced dilution of phosphate caused by drought option implementation may have an impact if P deterioration is predicted but would be temporary and unlikely to impact on either status. We don't believe this drought option poses any risk to the deterioration of macrophyte or phytobenthos status.

Hydrological Regime – Not assessed.

Mitigation Measures – The drought permit will not exacerbate this particular classification as it will not result in changes to the physical modification structures.

Physico-chemical – There are 3 water quality monitoring points in Harden Beck 1, as such the location with the highest data quality, Harden Beck at Harden has been used. There is one continuous discharge YWSL Harecroft WwTW, which could cause a significant risk to dissolved oxygen and total ammonia in this reach (acute toxicity of ammonia, suffocation from oxygen sags). There are no intermittent discharges in the reach. There is a moderate risk from drought options associated with reduction in dilution of WwTW. There is a minor risk from this drought option in relation to phosphates.

Chemical – The EAR has not assessed the specific chemical parameters that are the cause of failure in the EA's catchment planning system. However as there is a risk to physico-chemical parameters then it is reasonable to state there may be a risk to chemical parameters due to the same pathway. Although there is a risk of potential further deterioration to this element, it's considered that the mitigation measures will be sufficient to protect against this.

Risk of Deterioration: A summary for all Reaches

Although YW EAR identifies that there is a possible moderate or major risk to certain WFD elements as a result of this drought option (Fish, Invertebrates, Physico-chemical, Chemical), we are satisfied that the monitoring and mitigation conditions included within the drought permit mitigates any possible risk of deterioration in the status of WFD elements (Fish, Invertebrates, Physico-chemical, Chemical). If the monitoring schedule identifies any impacts to the WFD elements

as a result of this drought permit, then reactive mitigation will be carried out, dependent on the problems identified. Additionally, should any environmental problems be identified, YW will increase their compensation flows as laid out in the relevant permit.

E. Impact on ecology and conservation sites

Conservation sites

The sites, species and habitats listed in the table below are within the 8 km reach from the point of the compensation release at Doe Park Reservoir to the cumulative reach of the River Aire.

The River Aire downstream of that confluence has potential to be cumulatively affected by reservoirs in YW's North West area reservoir group. Please refer to the main determination report for this group of reservoirs for further details.

Nearest conservation sites (distance searched – 8 km downstream)			
Designation types	**Name of site**	**Distance downstream**	**Potential Impact**
Special Areas of Conservation (SACs)	None	N/A	N/A
Ramsar sites	None	N/A	N/A
Special Protection Areas (SPAs)	None	N/A	N/A
Sites of Special Scientific Interest (SSSIs)	None	N/A	N/A
Groundwater Dependent Terrestrial Ecosystems (GWDTEs) that are not designated as SSSIs	None	N/A	N/A
National Nature Reserves (NNRs)	None	N/A	N/A
Local Nature Reserves (LNRs)	None	N/A	N/A
Ancient Woodland	Goitstock Crag, Lt and Gt Ridge Woods	2.8 km	Unlikely to be in connectivity with impacted reach or support aquatic receptors
Scheduled Ancient Monuments (SAMs)	None	N/A	N/A

Local Wildlife Sites	Doe Park Reservoir	At site	Doe Park Reservoir unlikely to be in connectivity with impacted reach (see Environmental Assessment Report [EAR] Table B2.49)
	Milking Hole Beck and Hewenden Reservoir	1.3 km	Milking Hole Beck and Hewenden Reservoir unlikely to be in connectivity with impacted reach (see EAR Table B2.49)
	Hewenden Wood, Cullingworth	2.7 km	Unlikely to be in hydrological connectivity with impacted reach or support aquatic receptors.
	Goistock Wood and Grassland	3.1 km	Unlikely to be in hydrological connectivity with impacted reach or support aquatic receptors.
	Cottingley Woods – Black Hills	6.1 km	Unlikely to be in hydrological connectivity with impacted reach or support aquatic receptors.
National Parks	None	N/A	N/A
Areas of Outstanding Natural Beauty (AONBs)	None	N/A	N/A
Heritage Coast	None	N/A	N/A
Restoring Sustainable Abstraction (RSA) Programmes	None	N/A	N/A
Protected Species	Bullhead *	5.1 km	Impact on this species has been assessed in YW's EAR and appropriate monitoring and mitigation has been included in Appendix A.2.
	Brown/sea trout *	7.6 km	Impact on this species has been assessed in YW's EAR and appropriate monitoring and mitigation has

			been included in Appendix A.2.
Protected Habitats	Deciduous woodland	1.0 km	Unlikely to be in connectivity with impacted reach or support aquatic receptors
Invasive Non-native Species	Himalayan Balsam *	At site	The implementation of this drought option is not anticipated to increase the spread of Invasive non-native species.
	Japanese knotweed *	3.3 km	
	Rhododendron ponticum ponticum *	3.8 km	
	Monkeyflower	7.9 km	

Table 3: Conservation screening results
* There are several records of this feature within the screening distance, but only the closest record to the discharge point has been included in this table.

Protected fish species
There is a pathway for the drought permit to impact on fish species in the identified impacted reach. This has been assessed in YWs EAR and we agree with this assessment and the proposed monitoring and mitigation plan. Mitigation is set out in YW's EAR Appendix A.2 and this will be included on the drought permit.

Monitoring and mitigation
YW will be required to carry out the following monitoring and mitigation measures (which will be included in Appendix 1 and 2 of the permit):

Monitoring:

- IDMON_1: Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems at site 1: 500m located within SE 07612 34330 to SE 07435 34742.
- If the monitoring identifies signs of environmental distress, the following actions shall be undertaken by the water company:
    i. upon finding any signs of environmental problems the water company shall notify the Agency in writing and by telephone on 0800 80 70 60 and shall provide details of the signs of distress and the location;
    ii. the water company shall undertake a remedial course of action to address the signs of environmental problems, as directed in writing by the Agency.

Mitigation:

- If, upon being notified of any signs of environmental problems, the Agency gives written notice that there is a disruption to the ecology and reservoir stock levels are above a specified control line agreed with the Environment Agency, the water company shall increase compensation flow from Doe Park Reservoir to Denholme Beck at National Grid Reference SE 07685 34191 to a rate of not less than 3,600 cubic metres per day, or a lesser quantity if agreed in writing by the Agency.
- The increase in compensation flow to the Denholme Beck shall continue until the Agency serves a subsequent written notice stating that the reduction in compensation flow in accordance with conditions of this drought permit may be resumed.

- The changes to the compensation water specified in this drought permit shall be made in a steady and controlled manner at a rate so as not to cause any flooding of land or disturbance to water users downstream or any adverse effects on the quality of water in the inland water or any adverse impacts on the ecology of the inland water or dependent ecosystems, as specified in measures IDMIT_6 and IDMIT_7 in the water company's "EMP North West Area Appendix"
- ***Freshet flows condition***:
  The water company shall make a release of compensation water for 24 continuous hours each week if the Agency notifies them in writing that additional flow is needed to support spawning for trout and salmon species. These releases of compensation water are referred to here as "freshet flows" IDMIT_9 in the water company's "EMP North West Area Appendix". The freshet flows shall take place between 1 October 2022 and 27 March 2022 inclusive or shorter period if notified in writing by the Agency. The Agency may agree a lesser duration and frequency for each freshet flow. The freshet flow shall be not less than 3,600 cubic metres per day, to from Doe Park Reservoir to Denholme Beck at National Grid Reference SE 07685 34191.

F. Measurement

The impoundment and discharge from Doe Park Reservoir is authorised under licence NE/027/0016/021. There will be no change to the way the discharge is measured as part of this drought permit.

G. Recommendations

Based on the conclusions of the main determination report (section 14), the Agency has decided to grant a drought permit under section 79A of the Water Resources Act 1991 subject to conditions, as drafted and attached to this report. The drought permit will suspend the provisions of licence NE/027/0016/021 during any period in which YW can abstract under the conditions of the drought permit.

The drought permit will be time limited to 31 March 2023 and will include the following conditions along with appendices detailing the monitoring and mitigation requirements.

Condition	**Source of the condition wording**
1.1 (i) Compensation Flow	Compensation flow reduced. Condition has been legally approved.
1.2 (ii) Compensation Flow	Compensation flow when regional reservoir stocks are below the Drought Control Line (as defined in YW Drought Plan 2022) for more than four consecutive weeks. Condition has been legally approved.
The following conditions will be included for environmental monitoring and mitigation. They have all been legally approved.	
2.1	Condition requiring YW to follow the monitoring set out in Appendix 1 of drought permit.

2.2	Mitigation actions to be undertaken by YW if environmental problems identified.
2.2.1 (i)	YW must notify Agency of any environmental problems.
2.2.1 (ii)	YW must formulate remedial course of action to address problems.
2.2.2	YW must increase compensation flow.
2.3	All changes to compensation flow must be made in a steady and controlled manner.
2.4	Freshet flows condition.
3.1	Drought permit only relied upon if Temporary Use Ban restrictions imposed and in force.

Table 3. Recommendations of drought permit