Annexe 8 – Silsden Reservoir, DP2022-22715149

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 on licence 2/27/15/149. The licence permits abstraction of water from Silsden Reservoir at Silsden, West Yorkshire.

Figure 1: Silsden Reservoir (Compensation Water Source) and Silsden Reservoir (Receiving Watercourse)

The terms of the licence include a prescribed flow condition of 2.409 Ml/d to be discharged to Silsden Beck. No water is authorised for abstraction if the compensation flow is less than this. The compensation release is only required when abstraction from Silsden Reservoir is taking place under licence 2/27/15/149. YW do not currently abstract from Silsden Reservoir and therefore no compensation release is being made.

The proposed drought permit application is to reduce the compensation release to 1.20 Ml/d. There would be a further reduction to 0.80 Ml/d if regional reservoir stocks were below the regional Drought Control Line for four consecutive weeks or more. Currently, this proposed reduction does not require a drought permit unless

YW are abstracting from the reservoir. YW have confirmed that they would only abstract from the Silsden Reservoir for public water supply if they implemented a long-term drought action, which requires additional infrastructure to be installed.

YW have advised that they are not currently implementing this drought action therefore do not require a drought permit to reduce the compensation releases, however the advertising notice includes reference to this permit in case it is required.

B. Details of proposal

Abstraction details	Existing licence	Drought permit application changes
Location of abstraction	Silsden, West Yorkshire	No change
Duration of drought permit		
Source of supply	Silsden Beck, West Yorkshire	
Point of abstraction	SE 045 479	No change
Purpose of abstraction	Public Water Supply	No change
Period of abstraction	All year	No change
Quantities and rates	95 cubic metres per hour 2,273 cubic metres per day 10,000 cubic metres per year	No change
Aggregate conditions	N/A	No change
Means of abstraction	Pump	No change
Measurement of abstraction	Meter	No change
Further conditions	No water shall be abstracted from the stilling – basin when the flow over the notch or weir is less than 2,409.42 cubic metres per day.	Reduce prescribed flow to to 1.20 Ml/d with a further reduction to 0.80 Ml/d if regional reservoir stocks were below the regional Drought Control Line for four consecutive weeks or more.

Drought permit further conditions
See section G for recommendations of the drought permit.

C. Quantities

There will be no change to the existing abstraction quantities, but the compensation release will reduce as part of the drought permit (see sections A and B for details).

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.

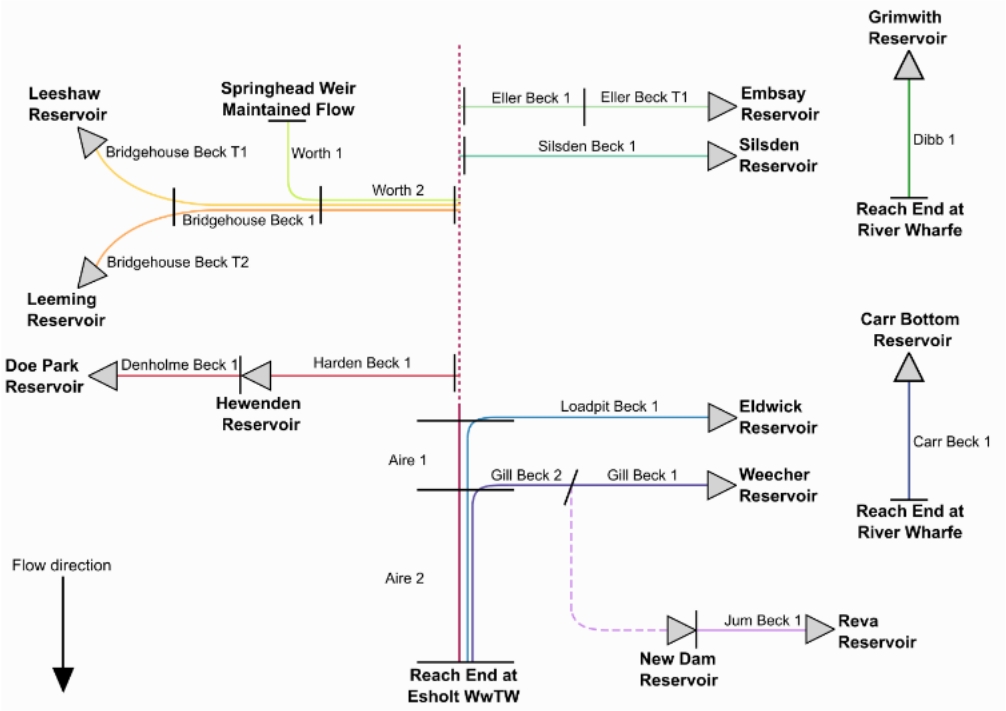

Figure 2: North West Area reservoirs drought permits reach schematic

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

- Silsden Beck 1 - Silsden Beck from Source to River Aire, GB104027062990 (Heavily Modified)

The corresponding WFD waterbody has therefore been assessed in relation to the Silsden Reservoir drought option.

Although Aire 1 and Aire 2 have been assessed with some of the reservoirs, we have followed Table 4.2 in YW's EAR which states that this drought permit does not significantly influence flow in those reaches.

<u>Silsden Beck from Source to River Aire, GB104027062990 (Heavily Modified)</u>

Consideration	Status		
	Baseline status (2015)	**Cycle 2 current status (2019)**	**Cycle 2 Objective**
Overall WB status	Moderate (Very Certain)	Moderate	Good by 2027
Ecological potential	Moderate (Very Certain)	Moderate (Very Certain)	Good by 2027
Fish	Poor (Very Certain)	Poor (Very Certain)	Good by 2027

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

Table 1: Silsden Beck from Source to River Aire, GB104027062990 (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.

Fish – The status for fish in this waterbody is Poor. This is due to a range of pressures. Dissolved oxygen due to water level management in impounded waterbodies (physical modification) is a probable cause of this Poor status which can be attributed to the water industry. Morphology is also a pressure that impacts the fish status. This is due to probable physical modification for ubanisation by both the urban and transport industry and also due to Industry, Manufacturing and other Business. There is also probable diffuse source pollution that is negatively impacting dissolved oxygen, caused by poor nutrient management in the agricultural industry. Finally, the fish status has been impacted by temperature pressures, likely brought about by water level management in impounded water bodies in the water industry.

Macrophytes and Phytobenthos – Macrophytes are currently at Poor (Very Certain) in this waterbody and phytobenthos are at Moderate. The reasons for not achieving good for macrophytes and phytobenthos have been assessed together giving an overall status of Moderate for the pair. This is due to nutrient and phosphate inputs. There is probable diffuse source pollution from poor nutrient management by the agricultural sector.

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 – Mitigation measures are currently at Moderate. This is due to confirmed physical modification for the purpose of water regulation by the water industry and the urban and transport industry.

Physico-chemical – The physico-chemical status is at Moderate for this waterbody. This is because of phosphate inputs (diffuse source) by the agricultural industry as a result of poor nutrient management.

Chemical – The chemical status of this waterbody is Fail. This is due to Polybrominated diphenyl ethers (PBDE) and Mercury and its compounds (measures delivered to address the reason). It is also due to Perfluorooctane sulphonate (PFOS) for reasons that are unknown and pending investigation.

WFD objectives assessment:

- The objective for hydrology regime has not been set as 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.

Risk of deterioration of elements:

Silsden Beck 1 - Silsden Beck from Source to River Aire, GB104027062990

Fish – Considering the hydrological impacts and the risk of water quality deterioration in the reach, the risk to the WFD status the fish elements of GB104027062990, Silsden Beck from Source to River Aire (associated with Silsden Beck 1) is considered to be major.

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 community is considered to be sensitive to changes in 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 GB104027062990, Silsden Beck from Source to River Aire (associated with Silsden 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 is one water quality monitoring point is present in Silsden Beck 1. For this assessment the first sample in the reach which is Silsden Beck (NE-49400835). There are no significant continuous discharges or intermittent discharges either within Silsden Beck 1 or at risk from changes in flow in the reach. There is minor risk to total ammonia, oxygen and phosphates as a result of this drought option.

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 3.6 km reach from the point of the compensation release at Silsden 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 – 3.6 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	None	N/A	N/A
Scheduled Ancient Monuments (SAMs)	None	N/A	N/A
Local Wildlife Sites (LWSs)	Silsden Reservoir Woodland	2.0 km	Unlikely to be in connectivity with impacted reach or support aquatic receptors. Not sensitive.
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	European eel European eel migratory route	0.7 km 0.7 km	This is based on the historic capture of one eel in our surveys of Silsden Beck. Habitat

			downstream of the reservoir is not suitable for eel and therefore does not need further consideration in the EAR.
Protected Habitats	Deciduous woodland	0.1 km	Unlikely to be in connectivity with impacted reach or support aquatic receptors. Mapped grazing marsh is to the east of Silsden Beck. The beck is unlikely to directly feed grazing marsh wetland features. Unlikely to have significant impact.
	Coastal and floodplain grazing marsh	3.4 km	
Invasive Non-native Species	Japanese knotweed	1.5 km	The implementation of this drought option is not anticipated to increase the spread of Invasive non-native species.
	Himalayan balsam	2.7 km	
	Signal crayfish	2.7 km	

Table 2: Conservation screening output

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 Drought Permit):

Monitoring:

- IDMON_1: Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems at:
  - Silsden Beck between SE 04007 45679 to SE 03940 45232.
- If the monitoring identifies signs of environmental distress, the following actions shall be undertaken by the water company:
  - 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;
  - 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, the water company shall, if abstracting from Silsden Reservoir, increase the prescribed flow from Silsden Reservoir to the Silsden Beck National Grid Reference SE 04449 47482 to a rate of not less than 2,409 cubic metres per day, or a lesser quantity if agreed in writing by the Agency.
- The increase in compensation flow to the Silsden 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 conditions 1.1, 1.2 and 2.2.2 of 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.

- ***Freshet flows condition:***
  If, upon being notified by the Agency, or upon discovering by environmental monitoring or other evidence, that an increase in compensation flow is needed to support riverine ecology and trout and salmon species, as identified in the Water Company Environmental Monitoring Plan North West Area Appendix termed IDMIT_9 and IDMIT_17, the Water Company shall, while abstraction authorised under the licence is taking place, increase the compensation flow at a time, to a rate and for a duration as agreed in writing by the Agency, and release from Silsden Reservoir to Silsden Beck at National Grid Reference SE 04449 47482 (or such other location as may be agreed in writing by the Agency).

F. Measurement

The discharge from Silsden Reservoir is required under licence 2/27/15/149. 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 the abstraction licence 2/27/15/149 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 Compensation Flow	Compensation flow reduced. Condition has been legally approved.
1.2 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.