

Thames Water  
Draft Water Resources  
Management Plan 2019

Statement of Response

**Technical Appendices**

**Appendix K: Common Understanding of  
Teddington DRA**



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Appendix K.

# Common Understanding of Teddington DRA

## A. Introduction

K.1 This appendix gives a statement following a meeting between us (Thames Water) and the Environment Agency, recording a common understanding of the water environment effects of the Teddington Direct River Abstraction (DRA) option.

## B. The common understanding statement

**Thames Water and Environmental Agency: Common understanding of the water environment effects of the Teddington Direct River Abstraction (DRA) option. Statement following meeting with the Environment Agency on 13 July 2018.**

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### Thames Water's Draft Water Resources Management Plan 2019 position

Thames Water's draft Water Resources Management Plan 2019<sup>1</sup> (dWRMP) reported that Water Framework Directive (WFD) compliance of a Teddington DRA option was uncertain. The dWRMP reported that the uncertainty concerned the development and agreement of the extent and purpose of further mitigation to ensure compliance with WFD objectives for ecology, notably maintaining the current Good WFD status for fish and invertebrates in the estuarine Upper Tideway WFD water body.

Regarding uncertainty: Compliance with Habitats Regulations Assessment (HRA) and WFD requirements, paragraph 11.48 of the dWRMP Technical Report states:

*A significant programme of further work is currently under way to understand the potential for Teddington DRA to affect ecological status or potential, and to identify the design, operation and mitigation measures that would be required in order to make the scheme compliant with the WRPG. We fully expect this work to be concluded by the submission of our revised draft plan, and that the potential ecological issues raised to date can be resolved.*

Regarding the SEA impact of the preferred programme, paragraph 10.254 of the dWRMP Technical Report states:

*In deciding upon the preferred plan we have noted the potential concerns regarding the need to identify further mitigation measures associated with the DRA Teddington scheme to ensure no deterioration against WFD status of the Upper Tideway. With this uncertainty yet to be resolved we agree that it is prudent to defer the delivery of the scheme until 2030 to allow extra time for investigation.*



### **Thames Water position, 13 July 2018**

Further work has been undertaken by Thames Water since publication of the dWRMP<sup>2</sup> setting out both: 1) an ecological need for mitigation of temperature effects of a DRA option in the freshwater River Thames and estuarine Tideway; and 2) potential mitigation approaches. The findings were discussed at meetings with the Environment Agency on 1 May 2018 and consequently on 13 July 2018. Based on these further discussions since the dWRMP position, both parties agree that the compliance with WFD objectives of a Teddington DRA option remains uncertain.

Uncertainty remains, in a WFD context, around the required extent of temperature mitigation of a Teddington DRA option. Research to date has not been sufficient to satisfactorily determine the required extent of, or to identify, a viable mitigation option to deliver this. In consequence, a Teddington DRA option cannot be considered a feasible option<sup>3</sup> in a proposed WRMP programme at this time.

### **Background to the position, 13 July 2018**

WFD<sup>4</sup> standards for water temperature in rivers are listed as not greater than a 3°C temperature increase<sup>5</sup> compared with background<sup>6</sup>. Although the standards apply to discharges with environmental permit conditions relating to thermal discharge<sup>7</sup>, it is considered by Thames Water and the Environment Agency that these standards should be used as a guide to the thermal sensitivity of the Thames ecosystem to DRA discharges at all times of the year. This guide approach<sup>8</sup> is in acknowledgement of the following:

Neither Thames Water nor the Environment Agency have experience of this type of option given the magnitude of its size, either in its operation or its environmental effects.

The Environment Agency note that the standards are in the context of small discharges to large rivers. When considering the permitting of thermal discharges<sup>9</sup>, the Environment Agency advocates allowing for a mixing zone for the discharge across and along the river, within which targets may be exceeded. In line with international good practice, some 75% of the width of the river should be outside the mixing zone so that an unpolluted corridor remains for fish migration.

A DRA option is of larger scale than the standards are set for, with potential for whole river replacement<sup>10</sup> for several months<sup>11</sup>. In this case there would be no such limited mixing zone, just a step change from background conditions to impacted conditions, across the full width of the freshwater River Thames near the outfall<sup>12</sup>.

Indeed, a more precautionary objective may be appropriate in considering an ecologically acceptable temperature increase from a DRA option compared with background temperature in the freshwater River Thames and estuarine Tideway. The Environment Agency indicate that zero temperature increase would be such a precautionary objective. In regulatory and practical terms zero increase would need defining further<sup>13</sup>.

Mitigation approaches considered by Thames Water at present are based on either reducing/ temporarily suspending the rate of DRA operation, or cooling of treated effluent prior to discharge. At present the review of mitigation options and their effectiveness is not able to identify a robust temperature mitigation package that could be included in option design to meet the more precautionary objective. With further development of operational controls, a technically feasible cooling system could meet the guide standards, noting that the resulting temperature increases are



not confirmed as ecologically acceptable. As such the compliance with WFD objectives of a Teddington DRA option remains uncertain.

Thames Water will continue to undertake research on both: 1) the sensitivity of the Thames ecosystem to DRA discharges at all times of the year; and 2) potentially viable mitigation approaches. The climate change sensitivity and resilience of these will be included in the research. This research will be a bespoke work package scoped with stakeholders<sup>14</sup> and undertaken by Thames Water in AMP7 in support of WRMP 2024. Further work may become required as this work package is undertaken.

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- <sup>1</sup> <https://corporate.thameswater.co.uk/About-us/Our-strategies-and-plans/Water-resources/Our-draft-Water-Resources-Management-Plan-2019>
- <sup>2</sup> HR Wallingford (2018) Thames Tideway Impacts of DRA (WRMP Option 3) Modelling and analysis of impacts in the Upper Thames Tideway. Ref DER5714-RT001-R04-00. Report to Thames Water 15 March 2018  
HR Wallingford (2018) Thames Tideway Impacts of WRMP Task 2: Modelling and analysis in the lower freshwater River Thames. Ref DER5714-RT002-R04-00. Report to Thames Water 15 March 2018
- <sup>3</sup> Environment Agency and Natural Resources Wales (2017) Water Resources Planning Guideline Section 6.11 states: *You should confirm that there is no risk of deterioration from a potential new abstraction or from increased abstraction at an existing source before you consider it as a feasible option.*
- <sup>4</sup> UK transposition of the WFD: Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. <http://www.legislation.gov.uk/ukxi/2017/407/contents/made>  
Defra's Direction to the Environment Agency: The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 (see Table 6 for temperature standards for rivers): [http://www.legislation.gov.uk/ukxi/2015/1623/pdfs/ukxi0d\\_20151623\\_en\\_auto.pdf](http://www.legislation.gov.uk/ukxi/2015/1623/pdfs/ukxi0d_20151623_en_auto.pdf)
- <sup>5</sup> Up to 3°C increase (or decrease) is applicable to both Cyprinid and Salmonid rivers at Good WFD status
- <sup>6</sup> Expressed as an annual 98th percentile, i.e. 98 values out of 100 must comply with this standard and only 2 out of 100 can exceed it for compliance to be retained, with all values across a year considered relevant.
- <sup>7</sup> It is noted that the current Mogden STW environmental permit does not include thermal conditions for discharge of treated effluent into the estuarine Thames Tideway at Isleworth Ait, and that in permitting in general, thermal conditions relate typically to power station or large industrial cooling discharges.
- <sup>8</sup> Noting this may become a requirement should the Environment Agency include thermal discharge conditions in the environmental permit for a DRA scheme at the time of permitting.
- <sup>9</sup> BEEMS-SAR-008, Thermal standards for cooling water from new build nuclear power stations
- <sup>10</sup> 300MI/d DRA abstraction and discharge operating at times of a 300MI/d Teddington Target Flow through the Lower Thames Operating Agreement
- <sup>11</sup> On a low return frequency of 1:50 years or more rarely
- <sup>12</sup> As identified through 2D hydrodynamic modelling of the outfall undertaken for Thames Water for indicative DRA outfall designs to date.
- <sup>13</sup> For example this could relate to an agreed temperature variance as measured at a continuous water temperature monitoring sonde in the River Thames downstream of a DRA outfall upstream of Teddington Weir, in comparison with a partner sonde continuously measuring background freshwater river temperature located in the River Thames upstream of the Hogsmill River confluence, with data collected for compliance assessment every 15 minutes. Of these 15 minute data at the downstream sonde, 98% could need to be within plus or minus of an agreed temperature variance of the background sonde at times of operation of a DRA option.
- <sup>14</sup> Potential ecological effects require further research including: risk of enhanced establishment for invasive non-native species; risk of enhanced growth conditions for invasive non-native plants ; enhancing environmental resilience.  
Potential chemical effects require further research including: insoluble vs soluble concentrations of mercury and zinc in Mogden STW effluent; risk from reduction in dilution of chemicals present in the freshwater river within the estuarine Tideway; risk of elevated phosphate concentrations on plant growth; concentrations of olfactory inhibitors relevant to adult upstream salmonid migration.  
Potential additional evidence required through data collection by Thames Water including: pentachlorobenzene using lower detection limit methodology; continuous water temperature measurement in



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the freshwater River Thames both upstream of Hogsmill River and at Teddington Weir to establish baseline; continuous dissolved oxygen monitoring at Teddington Weir; real-time European eel elver run event recording.

Potential environmental mitigation (in addition to water temperature) including: smelt spawning habitat and conditions in the estuarine Upper Tideway; DRA outfall design (including location) leading to minimal velocity increases and maintaining normal circulation patterns in the freshwater River Thames to maintain fish passage; operational mitigation to reduce early commencement of saline ingress in the estuary in spring for successful smelt spawning; treatment solution to match discharged dissolved oxygen to at least that of the receiving water; multi-species fish pass at Teddington Weir.

Potential navigation effects require further research including: leakage through Richmond Sluice and navigation impacts below Richmond.