

# WR332 Section C5.3

## Calculation of Extra Water to be abstracted at peak

The current and proposed peak abstraction licences at [REDACTED] and [REDACTED] are summarised in table 1 below.

Table 1 - Proposed Licence Increase Values for HS2 related activities

Site	Max Daily Licence (MI/d)	Proposed Peak Licence (MI/d)
[REDACTED]	20.46	28.00
[REDACTED]	20.46	22.46
[REDACTED]	21.28	29.77

Please note Affinity Water are only proposing to increase the peak licence, with the average daily group licence remaining the same for HS2 related activities. This means that should the new proposed peak values be used due to HS2 activities, they will be compensated for throughout the year, ensuring the overall average daily output remains the same (88 MI/d for the [REDACTED]). This 88MI/d annual average licensed volume for the [REDACTED] is also requested to be extended to the end of AMP7.

The new peak licence values requested were determined by assessing the impacts HS2 is likely to incur upon Affinity Water's supply capability. [REDACTED] source, which has a peak licence of 20 MI/d, will be offline but the other sites within close proximity to the HS2 construction works are also at risk of being unusable for certain periods, should the water quality experienced there be worse than predicted (and thus worse than the turbidity treatment will be designed for). Therefore, even in the best case scenario, at least 20 MI/d will need replacing.

As part of the solution to the loss of [REDACTED] up to 10 MI/d is being sought from Thames Water as an import to be used as required. There is still however a large amount of uncertainty surrounding the imported water, namely whether it will be available at all times or whether it will be subject to restrictions. Additionally, it is unknown whether the water would be available as soon as required, or if there will be a delay whilst communications occur with Thames Water.

The combination of risks from other sites going offline and the uncertainty surrounding the Thames Water import means it is critical for Affinity Water's resilience that the peak licences are increased to above 10MI/d. This in conjunction with the maximum 10 MI/d import would only cover the best case scenario, leaving a high residual risk to Affinity Water and its customers as a direct result of HS2.

The total additional extra peak licence being applied for, accounts for 18.03 MI/d, which in combination with the Thames Water import, enables Affinity Water to maintain current resilience and levels of service. However, there will always be a residual risk due to the unpredictability of the works.

Critical to Affinity Water, the additional licences being sought must be proven to have no adverse impact on the local environment. Pumping tests at each site with the peak licence amended were

conducted, in which the outputs were increased to as near as the proposed peak licence as operational constraints would permit. No significant groundwater or surface water impacts were detected during the pumping tests, which lasted a comparable or even greater period than the likely peak demand period in which these quantities would be required. The data behind this conclusion has already been shared with the Environment Agency. Whilst the tests did not quite reach the values being applied for, the pumping test results showed no reason to suggest that non-linear responses would occur at the proposed rates. Due to the proposed rates not being significantly different to the proven rates, and the fact it is unlikely a non-linear relationship would occur, it is highly unlikely that any significant environmental concerns would occur as a result of the stations operating at the proposed peak licences. Affinity Water is therefore confident that upon removal of the operational constraints experienced during the tests, the peak licences being applied for will be achievable. Additionally, the peak licences are only likely to be required during the summer period (due to increased demand) when the groundwater levels are typically stable. **Although, the water may be needed during peak demand or emergencies outside of the summer peak.**

As well as analysing the pumping tests in terms of the local environment, it was also crucial to understand the potential impact of the the new licence values on the wider catchment area. The following reasons demonstrate why the new proposed licences are unlikely to have any significant effect on the water catchment (as taken from the technical supporting note submitted with this application).

- [REDACTED] is the confluence of three rivers (Colne, Gade, and Chess), which provide a high volume of surface water that greatly exceeds the volume of water possible to pump under the proposed licence.
- Across the three pumping test locations, the integrated river and canal system is designed to provide a high degree of resilience to drought conditions, ensuring that water is retained in the system;
- The rivers Colne, Gade and Chess receive large sewage treatment works (STW) effluent inputs at a number of locations [REDACTED] on the Chess, [REDACTED] on the Colne, [REDACTED] on the Grand Union Canal/Bulbourne/Gade system) again much larger than the proposed additional groundwater abstraction. [REDACTED] is located downstream of a large discharge from [REDACTED]
- The Canal and River Trust provide additional discharges to the Bulbourne/Gade catchment from their groundwater abstractions at [REDACTED] and [REDACTED] along with surface water from their reservoirs in the Tring summit to ensure drought resilience. The effluent from [REDACTED] is also discharged to the Grand Union Canal in the Bulbourne catchment;
- These river valley locations are areas of high transmissivity within the Chalk aquifer, meaning additional abstraction at the scale of the proposals generates little discernible drawdown. In addition, natural seasonal fluctuation in groundwater level is low (typically <1m).

Therefore, overall, the proposed peak licences applied for are designed to minimise the risk to Affinity Water and its customers as a direct result of HS2 works. The values aim to account for

any additional outages due to HS2 works and the unpredictability of the Thames Water import source. Even with the peak licence flow rates applied for, there will always be a residual risk to Affinity Water should the HS2 works affect the aquifer to a greater degree than expected (and thus designed for). The pumping tests conducted at each site demonstrated no adverse environmental impact in the local area, and there is unlikely to be any effects within the wider catchment due to the properties/locations of each site. The pumping tests were unable to reach the proposed licence. However, this was solely due to operational constraints which will be resolved prior to the commencement of HS2 construction works. Finally, Affinity Water would like to emphasise that this is only a **peak** licence increase, meaning the average daily licence will be maintained through periods of lower abstraction at times where demand is not excessive.

