

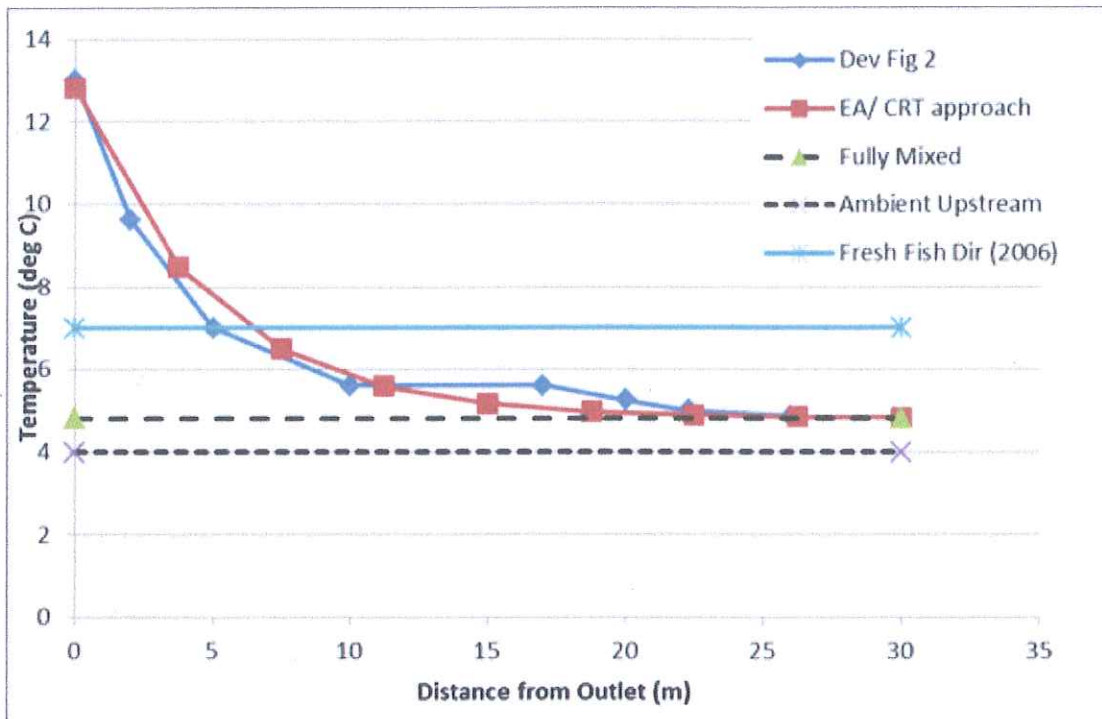
## Comparison Note for Thermal Discharges

### i) Beyond the mixing zone (Far field)

For the 30% water return scenario the applicant discusses in App 6.1, they estimate a temperature increase in the canal of 1-2deg C. The applicant does stress that this is based on very limited canal flow data (measured during a single spring visit). For this scenario, CRT have also undertaken an analysis using the methods agreed with the EA (2012), but with more refined canal flow estimates. For the canal Q95 flow the fully mixed temperature increase is derived to be 2.1deg C and for the Q98 flow this was 2.6deg C. We conclude that the results from the two approaches are consistent, given the Applicants limited knowledge of the flows in the canal.

### ii) In the mixing Zone (Near Field)

The applicant also presents results of the heat plume dilution for 1 winter scenario, this was produced by a CORMIX model (App 6.1). CRT ran this scenario through the agreed EA/ CRT methodology and the results are compared below:



The near field temperature results from the applicants analysis and the EA/ CRT approach are in close agreement. The illustration above also highlights the Freshwater Fisheries Directive (1996) temperature increase threshold for cyprinid water (which the Aire Canal is classified as). For this scenario it is clear that the majority of the canal width would be below the permissible temperature increase of 3 deg C, beyond a distance of about 5m from the outlet. Other scenarios were tested by CRT using the EA/ CRT approach and are given CRT (2014: Appendix C). These results similarly demonstrate that the plume dispersion allows ample space for fish to pass the discharge point. We conclude that the results for within the mixing zone are also consistent between the Applicant's and CRT's analysis. The key differences appear to be in the interpretation of the results in terms of the potential environment impacts. CRT maintain that their results demonstrate that the discharge to the canal would comply with the requirements of the Freshwater Fish Directive (1996).

### A Note

The Q95 was applied as is stated in the Environment Agency\ CRT methodology (2012). The detailed reasons for this is given in EA (2012), this is essentially due to the joint inclusion of other factors that may impact on heat dispersion in canals (e.g. ambient canal and air temperature, wind speed, ambient flow). In any case the 30% return flow scenario has been tested for Q98 also (see above pt(i)) and also shown to comply with the Freshwater Fish Directive (2006).