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Date: Thursday, December 3, 2020 at 4:30 PM

To: Linda Heron <lindah@ontarioriversalliance.ca>

Subject: RE: Town of Erin Wastewater Plant

Ms. Heron:

On page 148, Section 14.8 of the ESR and further in Appendix D, the issue of thermal effects to the receiver were documented. Also, because of the concerns raised as to the potential impacts particularly to Brook Trout spawning habitat and life cycle, Ministry staff undertook a comprehensive review of this issue.

Accordingly, we have concluded that temperature effects have been adequately assessed using field data, a nearby wastewater treatment plant's effluent temperature data, and CORMIX - a state-of-the art mixing zone model. The details of the assessment can be found in Ainley's April 10, 2018 response to the MECP where we asked for further consideration of thermal impacts. According to the ministry's evaluation of the information, the proposed discharge is not expected to cause any adverse effects on the survival, growth, and reproduction of the Brook Trout population.

Furthermore, the proposed effluent outfall diffuser will be placed approximately 2 m upstream of the large culvert that transmits river flows beneath Winston Churchill Blvd. The culvert is approximately 45 m long and represents degraded habitat because it is permanently shaded, does not permit macrophyte growth and limits the form of the stream bed and width of the channel.

According to modelling, Brook Trout's upper tolerance threshold temperatures are met at the diffuser from January to June. During July, background 75th percentile West Credit River water temperatures exceed the upper tolerance threshold value of 19° C, therefore the threshold will not be met downstream in that month. From August to December the distance to the point where effluent temperature declines to the upper tolerance threshold ranges from -2.5 m (backflow from the diffuser) to 32 m. These distances are in the degraded habitat within the culvert.

During a full build out scenario when effluent flows will be at their highest volumes, the upper tolerance threshold temperatures are expected to be met at the diffuser in January, February, April, and June. Again, in July, background 75th percentile West Credit River water temperatures exceed the upper tolerance threshold value of 19° C, therefore the threshold will not be met downstream. In March, September, November, and December, the distance for temperature to decrease to the upper tolerance threshold ranges are less than 40 m. In August and October, the distance to upper tolerance threshold temperatures are 84 and 715 m respectively. The large increase in October is an artifact that relates to the transition from a growth tolerance temperature of 19° C to a spawning tolerance of 16° C, which will not occur on October 1 but will depend on when fish spawn. The actual affected distance in the river in October will be much less than the 715 m predicted. At 35 m downstream of the diffuser, water temperatures are predicted to be 19.2° C and 16.2° C for August and October respectively. This is only 0.2° C greater than the upper tolerance thresholds for spawning and egg development.

All these predictions are conservative as they were made using the river flow of 7Q20 (which are exceeded 99.5 to 99.9% of the time) and the 75th percentile ambient water temperatures. Probability of occurrence of that low flow in the receiving water is 5% in any given year. The receiving water flow would be higher than the 7Q20 95% of the time in any given year, resulting in low environmental risk to these waste loads.

Also, the reach of the West Credit River between 10th Line and Winston Churchill Blvd. contains a cold-water thermal regime and aquatic habitat that supports a robust population of sensitive cold-water fish species and critical Brook Trout spawning habitat. To protect this sensitive reach, the proposed outfall location has been selected downstream of the reach at Winston Churchill Blvd. As well, groundwater inputs will not be impacted by the WWTP effluent and therefore water temperatures near the spawning and egg development areas and within the interstitial spaces between rocky substrates are not likely to change. Water temperature modelling is focused on the assimilation of effluent throughout the water column and not on water temperatures within or adjacent to sediments, so the prediction of impacts on spawning habitat represents a very conservative assessment of the change to water temperatures.

In response to your concern that temperature is not specified in the agreed-upon effluent criteria as per the EA, please note that in 2014, B.M.Ross, in their preliminary Assimilative Capacity Study (ACS) report recommended a temperature effluent criterion of 17° C as the objective and a compliance limit that should not be less than 8° C and not greater than 19° C. In line with that recommendation, ministry in their August 3, 2017 review, recommended temperature be included in the effluent criteria. In December 6, 2017, Hutchinson Environmental Inc. suggested that there was no economically feasible means to adjust effluent temperature to meet the objective and limit proposed by B. M. Ross.

This argument has been validated by ministry staff. An in-depth review of all existing and past municipal ECAs was undertaken to determine whether any previously issued approvals had included 'temperature' as an effluent parameter. No such ECA was found. However, all treatment plants are required to monitor temperature as a condition of the ECA, and operators also monitor temperature to maintain it within a certain range for optimal performance of the sewage treatment works.

According to ministry data and other literature, temperature in the municipal sewage effluent varies in the range of 10 – 21^o C with an average value of 15.5^o C to attain optimum performance of the biological and chemical treatments of the sewage. This temperature range is within the optimal preference and upper tolerance range for successful reproduction, growth and survival of Brook Trout.

Considering all these facts, the ministry decided temperature did not need to be regulated as an effluent parameter. However, the consultant was asked to undertake an in-depth assessment month by month to evaluate thermal effects on Brook Trout. Accordingly, Hutchinson undertook a thermal assessment on April 4, 2018 and concluded no adverse effect would occur due to this discharge on Brook Trout population. It is worth mentioning that treated effluent will travel via an approximately 2-km long buried pipe to the outfall, which would reduce the effluent temperature to some extent prior to discharge to the receiving water. Climate change impact was considered in the assimilative capacity analysis by considering a 10% reduction of the receiving water's 7Q20 flow. The 7Q20 flow was calculated by Credit Valley Conservation (CVC) and corrected for climate change with a 10% reduction of the annual 7Q20 estimate, and used as input into the models. Based on the data and analysis presented, ministry staff are satisfied that:

1. The effluent criteria agreed upon to date, will be protective of all forms of aquatic life and all aspects of the aquatic life cycles during indefinite exposure.
1. A detailed design of the outfall pipe or diffuser will be carried out prior to construction activities to satisfy mixing zone dimensions. During CORMIX modeling, a 10 ports diffuser in phase 1 and a 15 ports diffuser in phase 2, with each port having a 0.05 m diameter was considered, and this will be revisited during detail design stage to confirm its appropriateness prior to construction.
2. The mixing zone would be non-toxic, and the maximum dimension of the mixing zone for all other parameters would be 152 m long and would occupy 40% of the channel width of that distance without causing any barrier to fish movement.
3. The discharge location has been selected considering greater dilution, better receiving water quality, least impact to active brook trout spawning habitat between 10th Line and Winston Churchill Blvd, and low risk of damage the receiving water biota in the event of an emergency spill. The selection of the outfall location has been supported by extensive field data and analysis. Local conservation authority does not have any concern for that discharge location and effluent criteria.

The Town has asked and given the Ministry's approval role, staff will continue being involved in the detailed design stage to ensure that all of the commitments made during the EA will be met. We expect to receive a further update and information from the Town's consultant later this month.

I hope that the preceding addresses your concerns.

With regards,

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