Sampling Report:

Staveley Water Quality Workshop 25/02/20

Overview:

Four samples were taken before, during and after the event on the 25th February at two locations on the River Kent Staveley they were upstream and downstream of the WwTW, and one location on the River Gowan Staveley just before it meets the Kent (see Fig 1.). The samples were tested in-situ using the LaMotte FIO presence or absence testing kits at the time of sampling and for Total Coliforms, E-coli and Enterococci (T, E and Ent) at the United Utilities Laboratories where they were dropped off the next day after being stored overnight at the recommended temperatures.

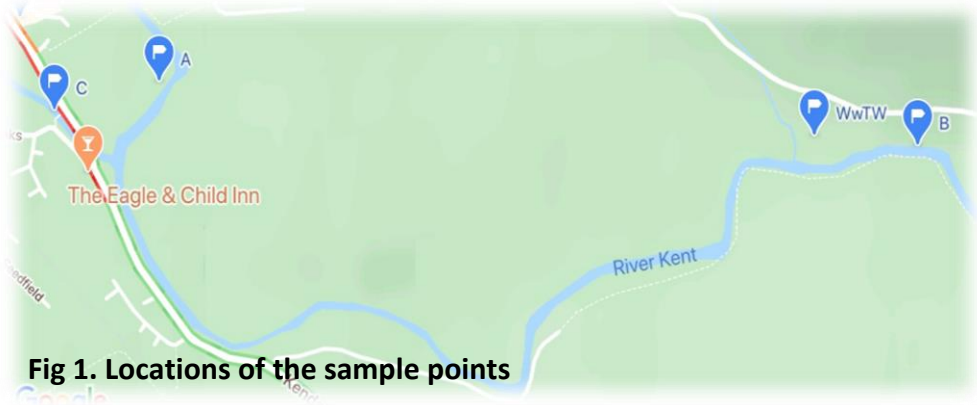

Fig 1. Locations of the sample points

Results

Sample	Date/Time	Total coliforms	E-coli	Enterococci
A-Kent U/S	25/02/2020 12:24	55	19	56
B-Kent D/S	25/02/2020 17:20	>100	>100	>200
C1-Gowan	25/02/2020 08:30	>100	89	>200
C2-Gowan	25/02/2020 11:14	>100	60	>200

Table 1. Lab results count/100ml

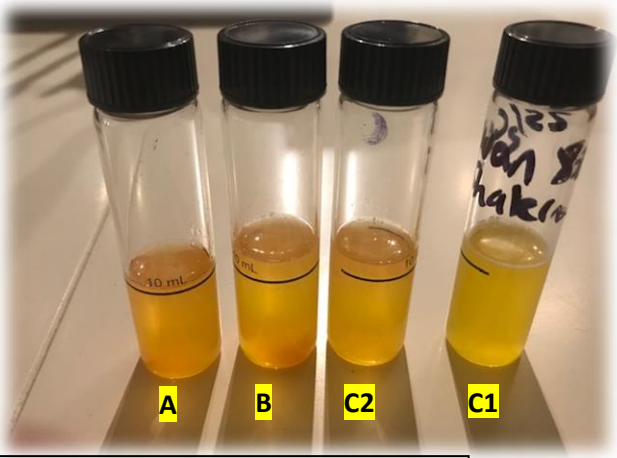

Fig 2. LaMotte vials all positive

Conclusion

Unfortunately due to a breakdown in communication between the Labs client team and the Microbiology Lab all samples were analysed using the Colilert method (T, E and Ent). Due to the error we only obtained a small proportion of viable results with as explained in my presentation a number of results being reported as a greater than figure.

With the results we obtained we can still clearly see that there is an increase in FIO's after the influence of the WwTW discharges on the River Kent. At the time of sampling I was able to assess the condition of the WwTW in relation to the extreme weather experienced in the few days before the event, there was significant evidence of flooding on the site and the storm tanks were at capacity from this I can conclude that there would be a loss or decrease in treatment on the site this could significantly impact the FIO levels but it is not viable to draw a conclusion from one sampling event. Visually the river looked as clean as the U/S stretch there was no significant solids loss coming from the WwTW also the sample was as clear as the U/S sample with no significant suspended solids variation. This could be caused by the flooding seen on the WwTW that the level of the river was at an equilibrium with the final effluent outfall so the blankets were held within the site, this could mean that the solids would be lost as the level of the river dropped but there should mitigation for this on the works.

The River Gowan also showed anthropogenic impacts with regards to FIO's but to a lesser extent as the E-coli result is not of a significant level so as to indicate continuous contamination. I would conclude that this is more than likely caused by a number of misconnections within the village but it could also be caused by network release via a CSO's but without seeing a network map this is an experience based assumption. Road run off due to the weather extremes in the week leading up to the event could also be a contributing factor.

The LaMotte vials all came back positive for the presence of Total Coliforms (see Fig 2.) after 48hrs at room temperature, as I mentioned at the event I suspected this could be the case due to the presence in watercourses of environmental Coliforms of both faecal and non-faecal origin. My preference for this method would be to use them as a tool to pin-point hotspots during a catchment walkover prior to a sampling event but my recommendation though would be to use the fluorescence LaMotte kits as this would give you a positive E-coli presence which can only be caused by faecal contamination of the watercourse.

Summary

This was a good exercise as it purposely and inadvertently (due to errors by the Lab) proved some of the topics covered during the day. Communication with your testing Lab as Tom outlined is key but also where viable a set of pre project samples should be sent into the Labs to allow them to get their dilutions correct, this would mitigate the risk of repeated > results throughout the project. Colilert although a viable and affordable method can have increased issues with > results and I still have a concern over the errors of the method when dilutions are required I would still recommend membrane filtration as the best method for River catchment FIO investigations.

The LaMotte kits can be an affordable and useful tool for the pin pointing of hotspots but only the fluorescence kits as this will remove the false positives caused by environmental coliforms that are present in most watercourses. Key though to the use of this method is the disposal of the contents of the vials after the reaction my recommendation from a Health and Safety point of view would be to follow the simple 5 step procedure below.

1. Flush the contents of the vials after reaction down your toilet
2. Fill the vials with approximately 20ml of normal household bleach and leave to soak for 24hrs
3. Empty the bleach and rinse the vials with tap water and allow to dry in direct daylight
4. Dispose of them in your normal glass recycling or return to the manufacturer if viable for re-use.
5. Where rubber gloves and follow normal hygiene practices throughout this procedure.