

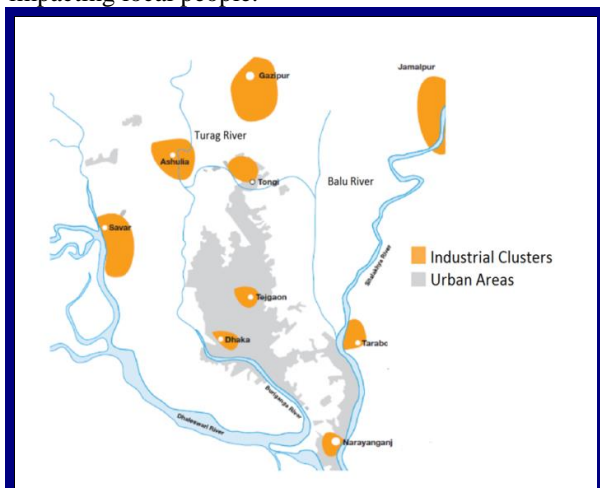
OVERSEAS WORK

Water pollution in the Turag River, Bangladesh



A typical water channel in central Dhaka

There is a serious problem of water pollution in the Turag River system in central Dhaka. Dissolved Oxygen levels are close to zero in the dry season, there is very high organic pollution loading, plus high ammonia levels and large numbers of pathogens in the water. Factories along the river discharge pollutants with dangerous contaminants, runoff from waste tips is a serious problem and there is agricultural nutrient pollution from the upper reaches of the river. People using the water for drinking, washing clothes, bathing and vegetable production are under constant threat and, in fact, there is wide scale evidence of high levels of disease, skin infections and more serious illnesses impacting local people.

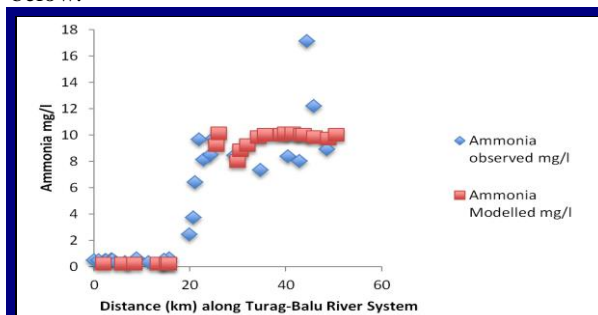


The Turag River system with major industrial and urban areas shown in Dhaka

In this study, a baseline survey of water chemistry and pathogens has been undertaken by WRA Partner Paul

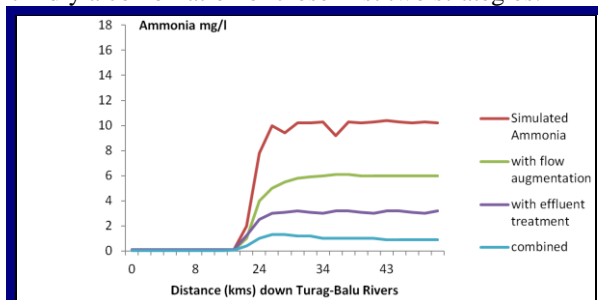
Whitehead, together with colleagues from four different universities. The study is funded by DFID through its REACH programme. The INCA (Integrated Catchment) Flow and Quality Model has been set up for the Turag River system, and then used to assess hydro-chemical processes in the river and evaluate alternative strategies for management of the flow and pollution issues.

The hydrology of the system is highly complex and special attention needs to be paid to the additional flood flows and runoff coming from the Brahmaputra River flowing into the upper Turag catchment. However, the hydrological cycle in the river systems can be modelled and then, by making various assumptions about effluent discharge rates and quality, the profiles of water quality can be simulated; the profile for ammonia is illustrated below.



Observed and simulated ammonia concentration levels compared along the Turag River system

Having established the model, a series of management alternatives to assess potential pollution clean-up were evaluated. Three management strategies were considered initially; the introduction of effluent clean up technologies for key discharges along the river; the alteration of water flows in the upper Turag so as to increase the flows of water in low flow conditions; and thirdly a combination of these first two strategies.



Simulated ammonia concentration levels under three different policy initiatives, compared with under existing conditions, along the Turag River system

The results show that clean-up of the effluents will significantly improve the water quality, and that the dilution effects of extra flows in low flow months will also improve the water quality. The best solution is to combine these policies, and this would reduce the ammonia levels to safe concentrations. These potential strategies are currently being discussed with the Bangladesh Department of the Environment, stakeholders and other policy makers.

UK WORK

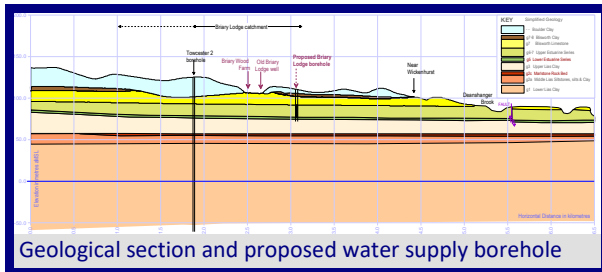
Private Water Supply, near Milton Keynes

Paul Holmes carried out the three individual tasks of design, cost estimation and tendering for construction of a new private water supply scheme at a farm located 12 km NE of Milton Keynes, at the head of Deanshanger Brook. The project was then handed over to the client to build. The Briary Lodge property lies close to the junction of the Blisworth Clay and Blisworth Limestone Formations, used locally as a Cotswold building stone.



The Briary Lodge farmstead

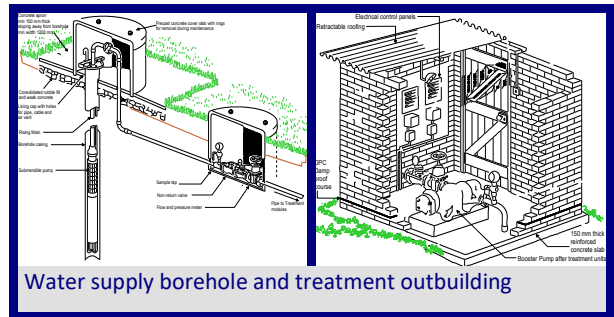
The target water supply aquifers are the Blisworth and Estuarine Series limestones which lie between depths of 6 and 35 mbgl in the area, where there is a history of groundwater usage including spring-fed sources and old wells in the Blisworth Limestone. The water supply borehole would be drilled to the top of the Upper Lias Clay at a depth of 40 mbgl, to allow 250 mm casing and 150 mm stainless steel wellscreen.



Geological section and proposed water supply borehole

The water supply would use a pressurised distribution network, where the treated water from the borehole is pumped directly into the pipe network serving the

buildings and includes a storage tank containing a 24-hour supply of water.



Water supply borehole and treatment outbuilding

TRAINING COURSE

Water Quality Modelling and Management Training Course, Dhaka

On 11th April 2018 Paul Whitehead gave a training course on Water Quality Modelling at the Bangladesh University of Engineering and Technology (BUET) in Dhaka. 25 people attended with 14 students from BUET and other Universities in Dhaka and 11 stakeholders from different government departments including water, environment and health. Copies of the INCA training model for flow, nitrate, ammonia and pathogens were distributed and attendees were shown how to use the model using case studies from the UK and from the Turag River system in Dhaka.



Paul Whitehead giving the INCA training course in Dhaka

WRA Board Meetings

Monday 23th July 2018, Benson

The WRA Bulletin is a quarterly publication, and relies on contributions submitted by Partners, Associates and Consultants. The document is circulated by email, and published on the WRA web-site, aiming to keep the WRA network up-to-date with respect to current activities. Please email contributions for future issues to Nick Mandeville: nick@wates.com

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