MINUTES OF MEETING TO DISCUSS LAKE CONJOLA SEWAGE SCHEME AND ANNUAL GROUNDWATER MONITORING REPORT

Monday 3rd June 2019 at 1.30pm
Shoalhaven Water, Flinders Depot Meeting Room, South Nowra

Andrew McVey	SCC - Section Manager Operations
Ivan Wady	SCC - Unit Manager Wastewater
Walter Moore	SCC – Environmental Project Officer
Shane Pickering	SCC – Environmental Health Officer
Dino Parisotto	E2W - Earth2Water
Bill Hackett	Conjola CCB - Technology Coordinator
Dirk Treloar	Conjola CCB - Vice President
Karen Gunthorp	SCC - Secretary

1. Opening of Meeting

SCC opened the meeting and explained that bringing everybody together is an opportunity to discuss the Conjola Scheme, the ex-filtration scheme and current Community concerns regarding *E2W Annual Groundwater Monitoring Report (2013-2017) Report E2W-0130(R001V2) 17th August 2017* comments on observed nutrient plume behaviour, conclusions and recommendations. Andrew asked that those present introduce themselves.

- **Andrew** –responsible for all Shoalhaven Water wastewater and water operations.
- **Ivan** –responsible for all Shoalhaven wastewater sewage treatment plants (STPs).
- **Walter** – responsible for environmental quality testing and monitoring.
- **Shane** – responsible for quarterly sampling around the lake and bores and water quality monitoring on a weekly basis.
- **Dino** – groundwater expert and site contamination specialist.
- **Bill** – currently retired and lives in Lake Conjola; he is the CCB Technology Coordinator. Prior to this he was employed at the steel works for 25 years.

- **Dirk** – also retired and a Lake Conjola resident. Purchased the Deepwater Tourist Park in 1987 and is Vice President of the CCB.

2. Lake Conjola STP

SCC discussed the Conjola/Bendalong Sewage Scheme and referenced the EIS that was prepared prior to the construction. Andrew noted that the entrance to the lake was shut or partially shut from 1994-1998 (Patterson Britton Partners 1999 Report). When the design for the new plant was in consultation, the Community wanted an ex-filtration system, the system was designed accordingly and bores were installed to monitor nutrients.

Conjola CCB asked E2W for a further explanation of *Figure 4 Inferred Hydrogeological Section (2017)* from the 2013-2017 Report and questioned how it works. Conjola CCB observed that the loads going through the STP have increased and questioned whether this was anticipated. He further noted that the typical seasonal highs and lows aren't there any more and that tourism is constant throughout the year and whether this has any implications on design life of both STPs. And if so, what plans are in place to improve load capacity into the future.

SCC advised that Lake Conjola and Bendalong STPs have a lot of capacity there is no concern with this plant regarding its' longevity. Andrew also noted that Bendalong is very seasonal compared to Lake Conjola further adding the Bendalong STP experiences occasional difficulties handling sharp increases (load spikes) in throughput during Peak Holiday times – typically 3 to 4 times from 200ML/day to 600ML/day. SCC also confirmed *Ingenia* were now connected to the reticulation system with a throughput of 2L/second.

3. Nutrient Plume

E2W explained how the ex-filtration system works and commented that the nutrient plume is migrating and operating as expected, it was noted that the plume hasn't entered the water despite the Report noting that it may have recently intersected the surface water receptors to the north, at the beach and estuary.
Conjola CCB provided a description of prevailing ground conditions (saturated) due to elevated lake water level (0.84mAHD) and posed the question if an open lake was of benefit to the overall system?
Walter replied that groundwater hydraulics are determined by available head. If lake water levels are elevated, there is no or low flushing occurring.

Conjola CCB questioned whether the plume is an issue and will it affect marine life and lake ecosystem. Noting that the E2W Report suggested that precautionary measures are required for the estuary and lagoon during high risk periods ie; summer and mouth closures indicated it would be better if the lake was open.

Conjola CCB raised questions on TN and TP background levels reported in the aquifer, enquiring as to whether rainfall is the main contributor to recharging the aquifer, which may in turn influence plume behaviour. Further to this, can elevated lake water levels (particularly above 0.6m AHD) during

periodic mouth closures and low rainfall influence the radial dispersal of treated effluent and hence, behaviour of the nutrient plume. Future flow going through ex-filtration trench, elevated levels, aquifer is main filtration vehicle, trench 5m deep, water filters through unsaturated zone and then on to further filtration when plume goes into aquifer. TNs / TPs – Tables 21 onwards
Heavy rainfall – water doesn't go anywhere, elevated water table.

4. Entrance Management Policy

Conjola CCB outlined community concerns regarding the present entrance management policy and SCC's intention to replace this Policy with a new CMP by 2020. Given this, Conjola CCB explained it would like to see entrance management actions/practices that might assist with Conjola STP operations, incorporated into the new CMP.

E2W advised that when the lake is open there is no movement into the water body once it has settled down. Conjola CCB sought clarification on whether the aquifer is affected by a drop in lake level (ie; open entrance).

SCC advised that discharge occurs mostly at low tide as there is a hydraulic difference (hydraulic head) and water from the aquifer could discharge to the surface water.
It was noted from the report that nitrogen is more mobile than phosphorus. Conjola CCB mentioned an anomaly in the report that BH19 or BH20 suggested a possible leak from STP operations. It was noted that the result looked strange and could be getting influence from another source but unlikely to be from the STP.
E2W referred to readings, noting mostly nitrate and little ammonia, which indicates another source.

Some results are anomalous due to sceptic tanks and residue from trenches that could last a number of years (and as much as 10 years), depending on the sources, if there were solids, rain flushes through.

SCC advised that some residents don't want to connect to the sewer system and are still on sceptic tanks/pump outs.

Conjola CCB suggested a moratorium on fertilizers being used in the HH Caravan Park for a couple of years. SCC advised this was not feasible as fertilisers consist of nitrogen and phosphorus which are essential to plant nutrition and regrowth of damaged grassed areas in the camping grounds. There is no suitable alternative to these nutrient based fertilisers.

E2W further advised that ground well V5 readings may appear to be worse than they are. Concentrations can fluctuate up and down with each round of data sampling and that sampling techniques may influence TP results ie. Phosphorus difficult to obtain reliable results.
Fig 3e reliable as phosphorus level is 0.

Nitrogen level can be affected by grassland.

5. Pattimores Lagoon

Conjola CCB commented that the current surface water sampling location E748 is too far removed from Pattimores Lagoon and that an additional sampling location should be considered on or around the eastern side of the lagoon.

Action: ***Investigate possible additional surface water sampling point in Pattimores Lagoon on eastern side.***

6. Interim Report

Conjola CCB suggested there might be a possible correlation between plume behaviour noted in E2W Report 03.11.2014 (Figure 3A); 08.02.2016 (Figure 3C) and 20.02.2017 (Figure 3E) and prevailing entrance conditions during these times. Conjola CCB proceeded to demonstrate this possible correlation, using an analysis of lake water levels, tidal range and rainfall volumes between 2013 and 2019.

Action: ***Conjola CCB agreed to forward data to SCC for E2W.***

SCC suggested that an interim report should be carried out by E2W, looking at current trends, bores and overall nutrient levels. General agreement with the need to look at the data when the lake is open compared to when it is closed.

Action: ***SCC analysis of trends from when they started to current day. Simultaneously overlay with entrance opening and closing. Report to include July / Aug bore results.***

Conjola CCB sought clarification as to whether natural attenuation processes were limited to rainfall and tidal flushing. SCC advised this was the case.

SCC will continue to monitor bore holes to assess the migration of nutrients. As the lake is currently closed and due to proximity of the nutrient plume, samples will be taken in the surface water near the boat ramp to ensure water quality is not adversely affected.

Conjola CCB reiterated the importance and value of monitoring prevailing conditions for the purpose of benchmarking and comparing results with those associated with an open entrance and tidal flushing. Conjola CCB agreed to assist with data capturing and provide this additional information as required by SCC.