

## **Management Plan for North Bore reconnection - Bellbrook Water supply**

### **Background**

In March 2005 routine water testing by Macleay Water (a business unit of Kempsey Shire Council) detected slightly elevated levels of arsenic in the Bellbrook water supply, which was being drawn from shallow bores in the bed of the Macleay River.

Part of Macleay Water's charter is to provide Shire residents with a water supply that meets The Australian Drinking Water Guidelines (ADWG) so it engages in a disciplined regime of water testing to ensure the required standards are met. Under the ADWG standards an acceptable level of arsenic in water is 0.007 mg/L. Macleay Water testing at Bellbrook in March revealed an arsenic concentration of 0.015 mg/L. Test results prior to this showed that arsenic levels contained in the Bellbrook supply fell within the recommended ADWG levels. Extensive testing of other town water supplies in the vicinity revealed that they were unaffected by the problem.

As a result, Macleay Water stopped pumping from the affected bores and made arrangements for an alternative the water supply delivery system. Daily monitoring of water quality determines whether water for Bellbrook is, either, drawn from the surface of the Macleay River, or, carted in by truck.

Since the initial discovery of the problem Council has continued to work with the Department of Health to seek lasting solutions and to protect the health and well-being of people drinking from Bellbrook's water supply.

### **Situational Analysis**

Management of the North Bore reconnection at Bellbrook is based on knowledge gathered over the two years of monitoring at the site. It must be noted that the period during which this monitoring has taken place has been relatively dry and there are many unknowns influencing the situation.

The data gathered so far has been valuable as it has enabled Council to take appropriate action promptly to ensure that the water supplied to Bellbrook is of sound quality. However, the patterns of contamination revealed by the data collected are not consistent. As a result, the factors which trigger the contamination remain difficult to define; as is the extent and intensity of the contamination period after a trigger event.

Monitoring is continuing so that these issues can be defined with more certainty. In the meantime, this conservative Operational Management Plan is being established by Council so that the community has a firm understanding of the systems in place to guarantee good water quality for Bellbrook.

Whilst this Management Plan details the short-term operational management of the Bellbrook water supply scheme (6-12 months) goals have been set, and work continues, for the medium and long-term management of this contamination. In 12 to 18 months it is hoped that the data gathered will give a clearer indication of how (and when) transportation of the contamination occurs. In addition, data collected over the next 18 months to 2 years will provide evidence for determining the need and type of Water Treatment Plant (WTP) required.

Research into suitable types of WTP is being conducted alongside the implementation of this short-term operational plan. If a suitable WTP is found it will be placed as soon as practically possible.

In addition to the operational management, the broader issue of contamination from the Hillgrove mine site is being tackled across various State Government agencies/departments. These bodies currently include Kempsey Shire Council, Catchment Management Authority (CMA), Department of Environment and Climate Change (DECC) predominantly EPA, Department of Mining and Minerals, NSW Food Authority (includes Foodsafe), Premiers Department, Department of Agriculture and NSW Health. Discussions between these parties are currently underway to determine the best way to proceed.

### **New Developments**

Between July and September 2007 several developments have occurred that have impacted upon the management of the Bellbrook water supply including the closure of the Council Laboratory, the introduction of new portable testing machines for daily testing, the availability of SMS messaging from the flood alert system, and the release on the market of a new testing machine that is equipped to carry out heavy metal assessments.

As a result of these developments Macleay Water staff has had to undergo extensive training to operate the new equipment and to understand the new systems and processes required for preparing water samples for independent Laboratories.

Prior to the commencement of this plan there are some items that still need to be investigated and finalised including:

- Implementation of the SMS alert system from flood warning system to water technical officer
- Identification of laboratories that provide a less than 7 day turnaround on chemical analysis results

- The suitability of the new MERCK testing machines for quick onsite heavy metal assessment
- The reporting format to record actions taken for each river event
- Development of an automatic electronic turbidity and chlorination testing system.

## **Operational Management Plan**

The operational plan for managing and maintaining water quality for Bellbrook is based on a traffic light system to ensure quick, clear communication of the current situation amongst all people involved including Council Management, Macleay Water Technical Officers and Water Operators, the Department of Health, Bellbrook water supply customers and the wider community.

The information below details what action will be taken when green, orange or red light status is triggered by the results of daily water monitoring tests at Bellbrook.



### **Green Light - All clear**

- Regular water monitoring
  - Daily testing
    - Visual assessment of river & environment (river height/clarity/form, temperature, wind direction/speed rainfall recent and likelihood), checks turbidity (muddiness), Ph (acidity/alkalinity) and chlorine residual (effectiveness of the water disinfection process).
  - Weekly testing
    - checks microbiological content of water, offsite web assessment (river flows, weather predictions), review of daily tests by Coordinator
  - Monthly testing
    - full chemical analysis – examines chemical & mineral content of water

No abnormal readings shown –  
Water quality falls within Australian Drinking Water Guidelines.

- No immediate action required on water quality or river flow
- Monitoring continues as normal

### **Communication Plan**

None required. A green light means all systems are operating within the set parameters.



### **Orange Light - Potential Contamination**

The alert for potential contamination is triggered when a 1 metre river event (a rise or fresh in the river) occurs at Bellbrook Bridge. An Orange Alert means that the water supply still meets Australian Drinking Water Guidelines but monitoring is stepped up as a precautionary measure to investigate the impact of the river event.

This trigger was established using river event data gathered during the four project monitoring programmes supported by NSW Health. The current pattern of dryer weather did not produce the usual range of river events. Macleay Water was not able to gather enough accurate information to be certain about the type of river event responsible for the transportation of the contamination. In these circumstances Macleay Water has elected to set the Orange Alert, conservatively, at the low level of 1 metre so that more evidence can be gathered over time to allow this level to be adjusted upwards to a more accurate figure.

The Alert will be triggered using river flows monitored by the automated flood warning telemetry system.

The automated telemetry system will inform Macleay Water's Technical Officer (via SMS) when an Orange Alert is imminent (monitoring of Georges Creek river levels will provide this early warning). When the 1 metre level is reached at Bellbrook action will be taken as required under an Orange Alert.

The Macleay Water Technical Officer will direct Macleay Water Operators for Bellbrook to use the appropriate response depending on water test results.

The Orange Alert '1 metre' trigger will be reviewed every 3 months to make sure it is set at the right level to maintain water quality for Bellbrook.

This conservative approach is responsible management of the water supply for Bellbrook and reflects the wishes of the Bellbrook community (as discussed at the community meeting and subsequently with Progress Association representatives), Macleay Water and NSW Health.

### ***Response Actions for Orange Alert***

Once an Orange Alert is triggered, water monitoring is stepped up with full chemical analysis testing carried out on the North Bore water on a weekly rather than monthly basis. Specific attention will be focussed on the levels of Arsenic (As), Antimony (Sb), Iron (Fe) and Manganese (Mn) to determine if Australian Drinking Water guidelines are being maintained. If breached at any time, a Red Alert is triggered.

Water testing stepped up – full chemical analysis is performed on a weekly basis rather than monthly.

Assessment of river flows and weather patterns is also increased and occurs on a daily basis with the results double-checked at supervisor level twice weekly for added security. During this period the Technical Officer is informed of progress on a daily basis and the Coordinator will inform the Manager of any significant changes.

If the river event passes with no breach of the ADW Guidelines and the river height returns to normal the situation will resume a green light status.

### ***Communication Plan***

Once Orange Light status is activated the following steps will be taken to communicate this situation to the community and the relevant authorities:

- 1) Manager Macleay Water notifies Council's Communication Officer, Director Shire Services, Department of Health, Doctor Appleton and designated person from the Bellbrook Progress Association.
- 2) News items detailing Orange Light status (and what it means for Bellbrook water supply) prepared for inclusion in the Bellbrook Upriver Newsletter, the Macleay Argus Upriver News. These articles will be placed as soon as possible after notification.
- 3) Council's Website updated to reflect Orange Light status.



### **Red Light - Breach of Australian Drinking Water Guidelines**

A red light status is triggered if, at any time, monitoring shows that the water used for the Bellbrook water supply does not meet the Australian Drinking Water Guidelines.

### ***Response Actions for Red Alert***

In a Red Light situation the North Bore will be taken off line immediately and alternative sources of water will be used to meet the water supply needs of Bellbrook. Water will be either drawn from the river surface or carted in by truck. The determining factor will, as always, be the quality of the water meeting the Australian Drinking Water Guidelines.

When alternative water supplies (*see page 6*) have been brought on-line full chemical testing will continue on the North Bore water to monitor and record data as it returns to levels within ADW Guidelines. Each river event which causes a Red Alert to be triggered will be recorded in a standard reporting format. These reports will include the results of testing, actions taken and will be the basis of subsequent analysis.

### **Communication Plan**

Once Red Light status is activated the following steps will be taken to communicate this situation to the community and the relevant authorities:

- 1) Manager Macleay Water notifies Council's Communication Officer, Director Shire Services and General Manager, Department of Health, Department Natural Resources, Catchment Management Authority, Doctor Appleton and designated person from the Bellbrook Progress Association.
- 2) News items detailing Red Light status (and what it means for Bellbrook water supply) prepared for inclusion in the Bellbrook Upriver Newsletter, the Macleay Argus Upriver News, the Mayoral Column in the Macleay Argus and Macleay Valley Happynings. These articles to be placed as soon as possible after notification.
- 3) Direct mail-out to all residents connected to the Bellbrook water supply
- 4) Council's website will be updated to reflect Red light status.
- 5) Macleay Water will distribute a community service announcement to local radio and place information in Council's weekly notices in the Macleay Argus and Macleay Valley Happynings.
- 6) In the event of a prolonged Red Light situation (more than 3 months) Macleay Water will organise a community meeting for Bellbrook to keep them up to date with latest developments.

### **Testing**

Macleay Water Operators physically take samples, complete a range of tests on-site with specialist equipment and ensure the samples are appropriately packaged where testing is required at external laboratories.

The Macleay Water Technical Officer looks after the coordination of testing and the review of the test results. Where on-site testing is not possible, he is responsible for notifying the appropriate laboratory of the incoming sample, overseeing the sample packaging, organising couriers, the chain of custody for the samples to the laboratory and review of the test results.

- **Figure 1** on page 8 shows a flowchart of Alert system

- **Figure 2** on page 9 shows a Flowchart of water monitoring operations)
- **Figure 3** on page 10 provides a summary of the actions to be taken in Green, Orange and Red light alerts as they relate to the safe supply of water to Bellbrook which meets the Australian Drinking Water Guidelines.

### **Alternative sources**

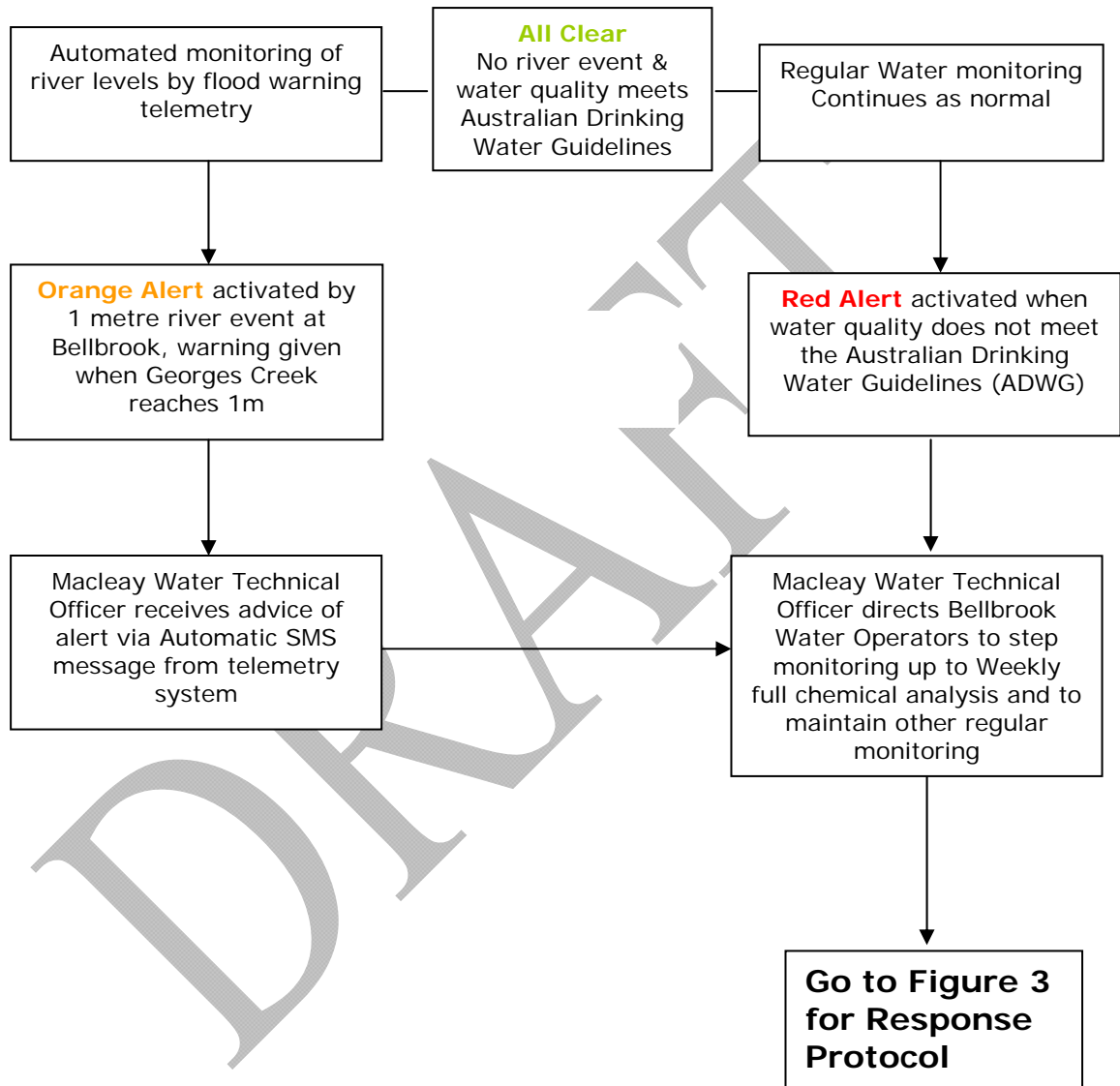
Before surface water is determined to be an appropriate source for the alternate water supply the following assessments will be undertaken:

- **Prior to connecting:**
  - full chemical analysis to determine if surface water meets ADW Guidelines
  - Assessment of physical quality, hazards and operational position of the surface bore (particularly after a large river event)
- **Once connected**
  - Turbidity (muddiness) - daily testing required
  - Normal monthly reticulation testing as per drinking water monitoring programme (NSW Health)
  - Weekly microbiological testing

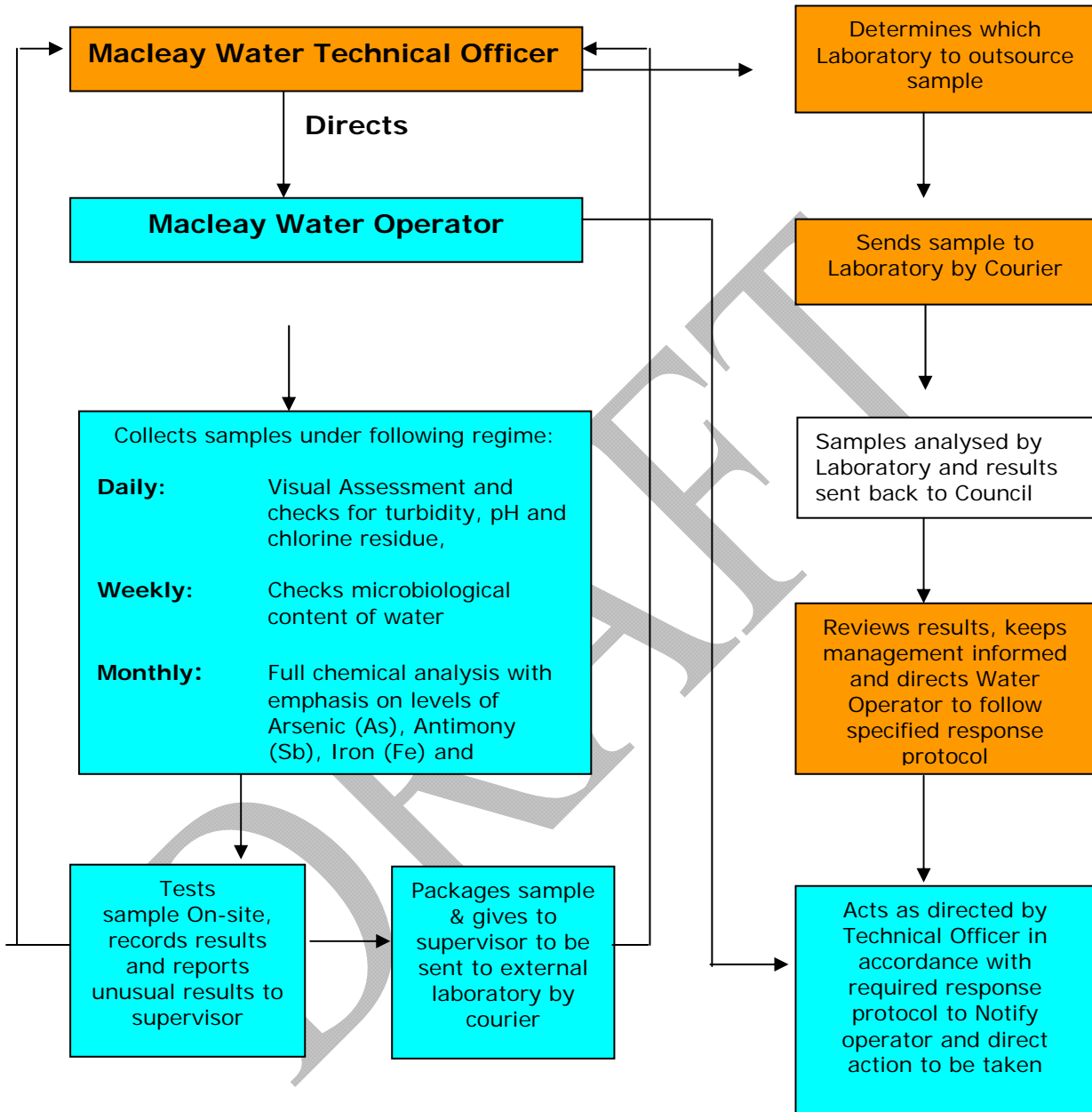
Before water carting is determined to be the appropriate source for the alternate water supply the following assessments will be undertaken:

- Chlorination assessment after each load (dosing as required)
- Normal monthly reticulation testing as per drinking water monitoring programme (NSW Health)
- Impact on water supply scheme from which the water is carted water

**Figure 1: Flowchart of Alert system**



**Figure 2: Flowchart of water monitoring operations**



## SUMMARY: RESPONSE PROTOCOL FOR MANAGING BELLBROOK WATER SUPPLY QUALITY FROM THE NORTH BORE



### All Clear

\*Water Quality meets ADWG

Green Light

#### Monitoring

- Daily (Turbidity, pH, Chlorine Residual and Visual Assessment)
- Weekly (Micros, River Flows & Weather Predictions)
- Monthly (Full Chemical Analysis)

#### Response Actions:

- None required.

#### Communication Plan:

- None instigated.

All clear, NO river events, NO breach of ADWG. **MAINTAIN GREEN LIGHT STATUS**



### Potential Contamination

\*Water Quality meets ADWG

Orange Light

#### River Event (1m) at Bellbrook

#### Monitoring

- Full Chemical Analysis steps up to weekly
- Regular Daily & Weekly monitoring continues

#### Response Actions:

- Investigate most appropriate alternative water source (ready for red light status if required)
- River volume assessment & Rainfall predictions to estimate potential duration of alert
- **Technical Officer to use available data to assess risk & notify Co-ordinator & Manager**

#### Communication Plan:

- Manager Macleay Water notifies Council's communication Officer & Director Shire Services, Dept of Health, Dept Water & Energy, Dr Appleton and designated person from Bellbrook Progress Association.
- Details placed in Bellbrook Upriver newsletter and Macleay Argus Upriver news.
- Website update

River Levels return to normal with NO breach of ADWG. **RETURN TO GREEN LIGHT STATUS**



### Breach of ADWG

\*Water Quality does NOT meet ADWG

Red Light

#### Monitoring

- Full Chemical Analysis steps up to weekly
- Regular Daily & Weekly monitoring continues

#### Response Actions:

- Alternate water supply instigated immediately (**water carting in the first instance, or surface water if deemed suitable**).
- Situation discussed with Dept of Health & Dept Water & Energy
- Catchment Management Authority to notify other Bore operators of situation.

#### Communication Plan:

- Manager Macleay Water notifies Council's communication Officer, Director Shire Services & General Manager, Dept of Health, Dept Water & Energy, Dept Natural Resources, Catchment Management Authority, Dr Appleton and designated person from Bellbrook Progress Association advised.
- Details placed in Bellbrook Upriver newsletter, Macleay Argus Upriver news, Mayoral column in Argus & Happynings
- Direct Mail-out to Bellbrook residents
- Website update
- Community Service announcements - radio & Council notices in Argus & Happynings.
- Community Meeting (if required)

Full Chemical Analysis show Water Quality meeting ADWG for a minimum of 2 weeks **RETURN TO GREEN LIGHT STATUS**



If River Level still above 1 metre trigger **RETURN INSTEAD TO ORANGE LIGHT STATUS**

