



# Ballina Shire Council

## Drinking Water Management System





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## Operational and Verification Monitoring Plan

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Viridis Consultants Pty Ltd  
ABN 49 129 185 271  
GPO Box 135  
Brisbane QLD 4001 Australia  
Tel: 1300 799 310  
Fax: 1300 799 350  
Web: [www.viridis.net.au](http://www.viridis.net.au)

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<b>Author:</b>	Karen Pither
<b>Project manager:</b>	Viridis Consultants
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# 1 Introduction

## 1.1 Purpose

This *Operational and Verification Monitoring Plan* is a supporting document within the Ballina Shire Council *Drinking Water Management System* (DWMS).

## 1.2 Scope

This plan covers the monitoring of the Ballina Shire Councils drinking water treatment system from the raw water source at Marom Creek and the Ellis and Lindendale Roads Bores, through treatment at Marom Creek WTP and within the distribution systems for Ballina Shire.

## 1.3 Objectives

The plan aims to:

- identify parameters for operational, verification and event based monitoring
- identify locations and frequencies for monitoring
- identify operational limits (where appropriate)

## 2 Operational Monitoring

The Marom Creek WTP operational monitoring requirements are identified below:

Type	Parameter	Marom Creek Weir	Treated Water Filtered	Reservoirs
Chemical	Acrylamide		Q	
Chemical	Carbon tetrachloride		Q	
Chemical	Fluoride	M	W	
Chemical	Iron	M	W	
Chemical	Manganese	M	W	
Chemical	Sulphate		Q	
Disinfection residual	Chlorine (free)		D	W
Gas	Hydrogen Sulphide		M	
Metal	Aluminium	M	W	W
Microbiological	Algal count and ID	M		
Microbiological	Total Coliforms	M	W	
Microbiological	Faecal coliforms	M	W	
Microbiological	<i>E. coli</i>	M	W	
Physical	Alkalinity (as CaCO <sub>3</sub> )	M	M	
Physical	Colour	W	W	
Physical	Conductivity	W	W	W
Physical	Dissolved Oxygen	M		
Physical	Hardness	M	M	
Physical	pH	W	D	W
Physical	Taste and Odour	M		
Physical	Temperature	W	W	W
Physical	Total Dissolved Solids		Q	
Physical	Total Organic Carbon	M		
Physical	Turbidity	D	D	W
Salt	Chloride		Q	
Salt	Sodium		Q	

The operational limits for the monitoring at Marom Creek WTP are identified below

Type	Parameter	Marom Creek Weir	Treated Water Filtered	Reservoirs
Chemical	Acrylamide		0.0002 mg/L	
Chemical	Carbon tetrachloride		0.003 mg/L	
Chemical	Fluoride	N/A	1.5 mg/ L *	
Chemical	Iron	0.3 mg/L	0.3 mg/L	
Chemical	Manganese	0.5 mg/L	0.1 mg/L.	
Chemical	Sulphate		500 mg/L	
Disinfection residual	Chlorine (free)		1.5 mg/L	1.5 mg/L
Gas	Hydrogen Sulphide		0.05 mg/L	
Metal	Aluminium	N/A	< 0.2 mg/L	< 0.2 mg/L
Microbiological	Algal count and ID	as per protocols		
Microbiological	Total Coliforms	N/A	Nil	
Microbiological	Faecal coliforms	N/A	Nil	
Microbiological	<i>E. coli</i>	N/A	Nil	
Physical	Alkalinity (as CaCO <sub>3</sub> )	N/A	100 mg/L	
Physical	Colour	N/A	5 Pt Co	
Physical	Conductivity	<800 µS/cm	<800 µS/cm	-
Physical	Dissolved Oxygen	N/A		
Physical	Hardness	-	-	
Physical	pH	-	6.5 - 8.5	-
Physical	Taste and Odour	-		
Physical	Temperature	-	-	-
Physical	Total Dissolved Solids		-	
Physical	Total Organic Carbon	-		
Physical	Turbidity	-	-	-
Salt	Chloride		-	
Salt	Sodium		-	

Key:

D = Daily

W = Weekly

O = Online

M-F = Monday to Friday

Ellis Road and Lindendale Road bores offline

### 3 Verification Monitoring

Drinking water quality monitoring is a wide-ranging assessment of the quality of water in the distribution system and importantly, as supplied to the consumer. It includes regular sampling and testing to assess whether water quality is complying with guideline values, any regulatory requirements or agreed levels of service.

Ballina Shire Council participate in the *NSW Health Drinking Water Monitoring Program*, the monitoring locations are identified below **Error! Reference source not found.** The results from the NSW Health monitoring program are recorded on the NSW Health Drinking Water Database, which Ballina Shire Council can access and review. Review of the NSW Database results are undertaken by the operations engineer and the water treatment plant operator:

- after the result of each microbiological sample is reported
- monthly for trends and water quality implications

Water Supply	Location	Details
Wardell	Richmond Street, Wardell	Tap at opposite end of Richmond Street to the pub in a grass reserve
Wardell	Corner Wardell and Marom Creek Roads, Meerschaum Vale	Meerschaum Vale Hall
Wardell	Cabbage Tree Island	Left hand side of bridge leading to the Island
Bulk water distribution (Lismore pipeline)	Mellis Circuit, Alstonville	Public Reserve next to No. 35 Mellis Circuit
Bulk water distribution (Lismore pipeline)	Alstonville	Not Defined
Bulk water distribution (Lismore pipeline)	Simpson Avenue, Wollongbar	Located at Hill Park Oval Toilets
Bulk water distribution (Knockrow reservoir)	Ross Lane, Lennox Head	Lake Ainsworth Caravan Park, opposite the entrance to the beach carpark
Bulk water distribution (Knockrow reservoir)	Riverina Street, Ballina	Tap is located in the garden area to the right of the entrance of the Ballina Central Caravan Park
Bulk water distribution (Knockrow reservoir)	Shelley Beach Road, Ballina	Tap attached to pump station opposite Shelley Beach
Bulk water distribution (Knockrow reservoir)	Riverside Drive, West Ballina	Tap attached to pump station in Falks Reserve
Bulk water distribution (Knockrow reservoir)	Bentick St, Ballina (Ballina Island)	Ballina Public High School Oval

The verification monitoring requirements are identified below:



Type	Parameter	Minimum Guideline Requirement	Raw	Reservoirs	Meerschauvale Hall	Richmond Street, Wardell	Cabbage Tree Island	Hillpark Oval Simpson Avenue, Wollongbar	Old Works Depot	Mellis Circuit, Alstonville	Bentick Street, Ballina	Riverina Street, Ballina	Faulks Reserve, West Ballina	Shelley Beach Road, East Ballina	Lake Ainsworth Caravan Park Ross Lane, Lennox Head	Headlands Drive, Skennars Head
Gas	Hydrogen Sulphide		Y	M												
General	Nitrate	12/year		M		Q				Q	Q					
General	Nitrite	12/year		M		Q				Q	Q					
General	Ammonia			M												
Metals	Tin		Y													
Metals	Antimony	12/year				Q				Q	Q					
Metals	Arsenic	12/year	Q			Q				Q	Q					
Metals	Barium		Q			Q				Q	Q					
Metals	Beryllium		Y													
Metals	Boron		Q			6M				6M	6M					
Metals	Cadmium	12/year				Q				Q	Q					
Metals	Calcium					6M				6M	6M					
Metals	Chromium	12/year		Q		Q				Q	Q					
Metals	Copper	12/year				Q				Q	Q					
Metals	Iodine		Y			6M				6M	6M					
Metals	Iron			FN		6M				6M	6M					
Metals	Lead	12/year				Q				Q	Q					
Metals	Magnesium					6M				6M	6M					
Metals	Manganese	12/year		FN		Q				Q	Q					
Metals	Mercury		Q			6M				6M	6M					
Metals	Molybdenum		Q			6M				6M	6M					

Metals	Nickel	12/year				Q				Q	Q					
Metals	Selenium		Q			6M				6M	6M					
Metals	Silver		Y			6M				6M	6M					
Metals	Zinc					6M				6M	6M					
Microbiological	<i>E. coli</i>			M	W	W	W	W	W	W	W	W	W	W	W	W
Microbiological	Thermotolerant coliforms			M	W	W	W	W	W	W	W	W	W	W	W	W
Microbiological	Total coliforms			M	W	W	W	W	W	W	W	W	W	W	W	W
Mineral	Sulphate	12/year				Q				Q	Q					
Organic Disinfection Byproducts	THMs			M												
Pesticides	Organochlorides		Y													
Pesticides	Organophosphates		Y													
Physical	Colour			M												
Physical	Conductivity			W	W	W	W	W	W	W	W	W	W	W	W	W
Physical	Dissolved oxygen			M												
Physical	Hardness (as CaCO3)					6M				6M	6M					
Physical	pH			W	W	W	W	W	W	W	W	W	W	W	W	W
Physical	TDS					6M				6M	6M					
Physical	Temperature			W	W	W	W	W	W	W	W	W	W	W	W	W
Physical	Turbidity			W	W	W	W	W	W	W	W	W	W	W	W	W
Radionuclides	Radionuclides															
Salt	Chloride					6M				6M	6M					
Salt	Sodium					6M				6M	6M					
Water Treatment Chemical	Aluminium		M	W		6M				6M	6M					
Water Treatment Chemical	Chlorine (free)			W	W	W	W	W	W	W	W	W	W	W	W	W
Water Treatment Chemical	Fluoride	12/year				Q				Q	Q					

\* When dosed  
 Key:  
 W - weekly  
 M - monthly

Q - quarterly  
 Y - yearly  
 5Y - five yearly

## 4 Event Based Monitoring

The event based monitoring requirements for Ballina Shire Council are identified below:

Event	Parameters	Frequency	Location
Major inflow event	pH Conductivity Turbidity Colour TDS Faecal coliforms <i>E. coli</i> Aluminium Lead Tin Zinc Arsenic Iron Manganese TOC <i>Cryptosporidium</i>	Twice weekly during flow periods  Manganese daily	Marom Creek Weir
Bushfire	Turbidity Colour TOC	As required	Marom Creek Weir
Blue-green algae bloom	Blue Green algae count & ID pH DO  Cyanotoxins as required	Weekly during bloom	Marom Creek Weir

## **5 References**

NHMRC & NRMMC 2011, National Water Quality Management Strategy: Australian Drinking Water Guidelines. 6th Ed., National Health and Medical Research Council and Natural Resource Management Ministerial Council, Australian Government, Canberra.