DRINKING WATER QUALITY MANAGEMENT SYSTEM
Community information booklet
2018
DRINKING WATER QUALITY MANAGEMENT SYSTEM

As a local council responsible for the delivery of drinking water services, MidCoast Council is required to develop and adhere to a Drinking Water Quality Management System (DWQMS) in accordance with the Public Health Act 2010 and Public Health Regulation 2012. It is also agreed as part of our Memorandum of Understanding with NSW Health to ensure the quality system is adhered to.

MidCoast Water Services’ Drinking Water Quality Management System has recently undergone an internal annual review and a new version was adopted in June 2018. The most significant changes incorporated in the latest version of the DWQMS are the addition of Nabiac water treatment plant (part of the Manning supply) and MidCoast Water now integrated into MidCoast Council.

The Drinking Water Quality Management System contains a description of our quality assurance program and documents the processes used to deliver good quality drinking water to our customers. It is based on the Framework for Management of Drinking Water Quality under the Australian Drinking Water Guidelines (ADWG). An old practice of ensuring good quality drinking water by relying on testing water quality at the end of the system at customers’ taps is outdated and insufficient. The ADWG follow a risk based approach which includes anticipating potential problems and implementing preventive measures at all stages throughout the drinking water supply (including catchment, all stages of treatment, reservoirs and the reticulation system).

The figure shown gives an overview of the 12 elements of the framework.

Figure 1: Elements of the Framework for Management of Drinking Water Quality

1. Commitment to drinking water quality management
2. System analysis
3. Assessment of the drinking water quality management
4. Preventative measures for drinking water quality management
5. Operational procedures and process control
6. Verification of drinking water quality
7. Management of incidents and emergencies
8. Supporting requirements
9. Employee awareness and training
10. Community involvement and awareness
11. Research and development
12. Documentation and reporting

Supporting requirements

- System analysis
- Assessment of the drinking water quality management
- Preventative measures for drinking water quality management
- Operational procedures and process control
- Verification of drinking water quality
- Management of incidents and emergencies

Supporting requirements

- Employee awareness and training
- Community involvement and awareness
- Research and development
- Documentation and reporting

The figure shown gives an overview of the 12 elements of the framework.
The DWQMS is an overview document that:

- Documents our water supply systems
- Provides analysis of water quality monitoring requirements and assessment of drinking water quality
- Identifies management approaches to delivering good quality, reliable drinking water supplies
- Demonstrates MidCoast Council’s operational and monitoring practices that enable its adherence to community and regulatory standards.
MidCoast Council is responsible for the operation of five drinking water supply systems; Manning, Bulahdelah, Stroud, Tea Gardens and Gloucester. Bulk water is purchased from Hunter Water to supply a small reticulation scheme at North Karuah.

Each of the drinking water supply systems is described in detail including:

- General description and history
- Catchment management
- Water treatment plant process description
- Reservoirs, distribution system and pumping stations
- Hazard identification and risk assessment
- Preventive measures and multiple barriers
- Critical control points
- Operational plans and procedures
- Water quality monitoring programs and evaluation of results
- Equipment capabilities and maintenance
- Materials and chemicals
- Employee awareness and training
- Customer communication strategies
- Research and development
- Documentation and reporting
- Review and continual improvement
The largest of MidCoast Council’s drinking water supplies is the Manning water supply system, which supplies drinking water to 90% of our customers in the towns and villages of lower Manning River catchment. This includes towns from Crowdy Head to Tarbuck Bay such as Taree, Wingham, Forster and Pacific Palms.

Manning water supply has two water sources; Manning River treated at Bootawa water treatment plant, and Nabiac Inland Dune Aquifer treated at Nabiac water treatment plant.
Bootawa Water Treatment Plant

The first protective measures of water supply systems occur in the catchment. Rivers and creeks feeding into Manning catchment include Nowendoc River, Barnard River, Little Manning River, Gloucester River and Dingo Creek.

Council is actively involved in catchment management to protect water quality, not only for our customers, but also for its environmental, social and economic values. Actions include; erosion control (including fencing along rivers to exclude cattle, bank stabilisation, planting native, indigenous vegetation), environmental flow investigations (and other monitoring and research programs), land use for carbon sequestration and involvement in government reviews of mining operations and potential impacts to ensure the protection of drinking water catchments.

Water is pumped from Manning River upstream from Wingham to the off river storage at Bootawa Dam. It is then treated at Bootawa Water Treatment Plant. To protect the quality of water in Bootawa Dam, water is only pumped from the river to the dam under favourable conditions. After heavy rainfall, river water quality declines and is not extracted under normal operations. However, if it is required, water can be pumped from the river to a balance tank and directly to the treatment plant without going through Bootawa Dam.

Bootawa Water Treatment Plant includes membrane filtration, ozone treatment, biologically activated carbon filters and chlorination for disinfection. This advanced technology has the ability to treat water to a very high standard. Fluoride is added for dental hygiene. Water is tested at each stage of the treatment process (including river and dam) by on line analysers or collecting samples and testing water quality at the operator’s lab on site. This is to ensure the treatment plant is operating effectively. Results are also confirmed at MidCoast Water Services’ NATA (National Association of Testing Authorities) accredited laboratory at Bootawa.

As water leaves the treatment plant it travels through a long reticulation system including reservoirs and pumping stations to customers’ taps. Chlorine levels are measured and boosted along the way to ensure quality remains high as it travels long distances. As a final check to confirm water quality, testing is conducted at MidCoast Water Services’ laboratory on samples collected at reservoirs, public areas and customers’ taps in each town or village.
Nabiac Water Treatment Plant

To secure the long term supply for an increasing population and diversify the supply, Council is in the final stages of constructing a new water treatment plant at Nabiac Inland Dune Aquifer to supplement Manning water supply. Ground water will be extracted from 14 individual bores and treated at a newly constructed water treatment plant before being pumped to the reticulation system.

Ground water will be pumped via a header main to Nabiac Water Treatment Plant (WTP) which includes an aeration tower, membrane filtration and chlorination for disinfection. Fluoride will be added for dental hygiene. Water will be tested at various stages of the treatment process (including header main) by on line analysers or collecting a sample and testing water quality at the operator’s lab on site. Results will also be confirmed at MidCoast Water Services’ laboratory at Bootawa.

As water leaves the plant it will be pumped to Darawank balance tank and into the southern part of the existing Manning reticulation system. Chlorine levels are measured at reservoirs and the reticulation system. As a final check to confirm water quality, testing is conducted at MidCoast Water Services’ laboratory on samples collected at reservoirs, public areas and customers’ taps.
Bulahdelah Water Supply System

Bulahdelah water supply scheme supplies drinking water to residents of Bulahdelah. Water is sourced from Crawford River and treated at a conventional water treatment plant.

As part of MidCoast Water Services’ Integrated Water Cycle Management Strategy, Crawford catchment has been identified as a priority area for research and on-ground work to improve water quality in the catchment. A collaborative approach has been taken to ensure the best possible outcomes for the projects. Stakeholders include; MidCoast Council, Local Land Services, Forests NSW, National Parks and Wildlife Services, private landholders and Karuah Great Lakes Landcare. These stakeholders have developed and implemented management tools such as catchment management plans, catchment models, water quality improvement plans and codes of practice. On-ground works include erosion control, weeds management, fencing (focusing on the weir pool where water is extracted for treatment), off stream stock watering systems and road works to improve crossings resulting in erosion and sediment control.

Water is extracted from Crawford River weir pool and pumped directly to the treatment plant. The conventional treatment plant includes clarifier, sand filters and chlorine disinfection which treat water to a good quality standard. Fluoride is added for dental hygiene. Online monitoring, collecting and testing samples throughout the treatment process (including Crawford River) ensure the plant is operating effectively. Results are also confirmed at MidCoast Water Services’ laboratory at Bootawa.

As water leaves the treatment plant it is pumped to three reservoirs before being distributed to the reticulation system and customers’ taps. Chlorine levels are measured at reservoirs and the reticulation system. As a final check to confirm water quality, testing is conducted at MidCoast Water Services’ laboratory on samples collected at reservoirs, public areas and customers’ taps.
Stroud Water Supply System

Stroud water supply system provides drinking water to residents of Stroud and Stroud Road. Water is sourced from Karuah River and treated at a conventional water treatment plant at Stroud.

MidCoast Council developed a catchment management plan for Karuah River catchment with the aim of maintaining and improving the health of the catchment. A collaborative approach was taken to develop the plan with input from relevant agencies and stakeholders.

The conventional treatment plant at Stroud includes a flocculation tank, settling lagoons, sand filters and chlorination for disinfection. Fluoride is added for dental hygiene. There is also an off-river storage at the treatment plant which provides some water security during periods of low flow in Karuah River. Water is tested at various stages of treatment (including Karuah River and off-river storage) to ensure the treatment plant is running effectively. Results are also confirmed at MidCoast Water Services’ laboratory at Bootawa.

As water leaves the treatment plant it is pumped to reservoirs and reticulation systems at Stroud and Stroud Road. Chlorine levels are measured at reservoirs and the reticulation system. As a final check to confirm water quality, testing is conducted at MidCoast Water Services’ laboratory on samples collected at reservoirs, public areas and customers’ taps.
Tea Gardens Water Supply System

Tea Gardens water supply system provides drinking water to residents of Tea Gardens and Hawks Nest. Water is sourced from Viney Creek Aquifer and treated at Tea Gardens water treatment plant.

Ground water typically has high microbiological quality and Viney Creek aquifer is no exception. There are however, dissolved metals present in raw water including iron and aluminium. While not of a health concern, presence of these metals in drinking water can lead to staining of appliances and laundry. In 2013 a membrane filtration water treatment plant was commissioned which replaced a very basic treatment plant. This advanced technology has the ability to remove dissolved metals and produce water of very high quality.

Water is extracted from ten ground water bores which tap the aquifer between 17 and 20 metres below the surface. Ground water is pumped via a header main to the treatment plant which consists of aeration towers, membrane filtration and chlorination for disinfection. Fluoride is added for dental hygiene. Water is tested at various stages of the treatment process (including header main) by on line analysers or collecting a sample and testing water quality at the operator’s lab on site. Results are also confirmed at MidCoast Water Services’ laboratory at Bootawa.

As water leaves the treatment plant it is pumped to three reservoirs and into reticulation systems to customers at Tea Gardens and Hawks Nest. Chlorine levels are measured at reservoirs and the reticulation system. As a final check to confirm water quality, testing is conducted at MidCoast Water Services’ laboratory on samples collected at reservoirs, public areas and customers’ taps.
Gloucester Water Supply System

Residents of Gloucester and Barrington are supplied with drinking water from Gloucester water supply system. Water is sourced from Barrington River, upstream of its confluence with Gloucester River and treated at a conventional treatment plant at Gloucester.

MidCoast Council has been working with Hunter Local Land Services and private landholders on catchment management projects in Barrington catchment upstream of the intake to the water treatment plant with the aim of improving water quality. The main types of works are; erosion control by bank stabilisation and revegetation, fencing to exclude cattle from the river and improving dairy effluent management systems. This is an adaptive management approach which requires ongoing work to ensure improvements and benefits can be seen in the long term.

Water is pumped from Barrington River directly to Gloucester water treatment plant. The conventional treatment plant includes a flocculation tank, clarifier, sand filters and chlorination for disinfection. Fluoride is added for dental hygiene. Operators monitor water quality at various stages of treatment (including Barrington River) by collecting samples and testing them at the laboratory on site. Results are also confirmed at MidCoast Water Services’ laboratory at Bootawa.

As water leaves the treatment plant it travels to Barrington and Gloucester reticulation systems and three reservoirs in Gloucester. Chlorine levels are measured at reservoirs and the reticulation system. As a final check to confirm water quality, testing is conducted at MidCoast Water Services’ laboratory on samples collected at reservoirs, public areas and customers’ taps.
North Karuah reticulation system

MidCoast Council purchases bulk water from Hunter Water to supply residents of North Karuah with reticulated drinking water.

Drinking water for this scheme is sourced from Tomago borefields and treated at Lemon Tree Passage water treatment plant. Water is then supplied to Karuah zone reticulation system. Water extraction, treatment and operational monitoring at the water treatment plant, and water quality monitoring of Karuah zone is the responsibility of Hunter Water. MidCoast Council is responsible for water quality monitoring in North Karuah reticulation system, including the water main on the bridge over Karuah River (Tarean Rd) and reticulation system north of the bridge.

A notification protocol between MidCoast Water Services and Hunter Water enables good communication between the two organisations to ensure the continued supply of high quality drinking water to residents of North Karuah.
HAZARD ANALYSIS & RISK ASSESSMENT

One of the processes of developing and reviewing the quality system included undertaking a full hazard analysis and risk assessment on each water supply system. Risk assessment review workshops were conducted for each water supply scheme in 2016 with participants from MidCoast Council and NSW Health including; engineers, scientists, water treatment plant operators, maintenance and response crew, executive and environmental officers with various water quality management expertise and roles in water supply operations, planning and regulatory compliance.

All potential hazards were documented throughout each stage of water supply systems, including catchments, treatment plants, reservoirs, reticulation systems through to customers’ taps. Preventive measures were assessed and risk was calculated for each hazard. A review of existing controls was undertaken to ensure the delivery of good quality drinking water.

This is a common approach for drinking water quality management, and is required by the framework in ADWG. It is a proactive rather than reactive approach and involves anticipating potential problems before they occur and ensuring effective and adequate preventive measures and barriers are in place throughout all steps of the water supply system.
Critical Control Points
From the hazard analysis and risk assessment process, critical control points were identified for each water supply system. These are points, steps or procedures at which controls can be applied to ensure drinking water quality standards are met in the most effective and efficient way. These are also steps in the water supply system where intensive water quality testing is undertaken using online methods. Good performance of the water supply system is then confirmed by testing water at sites throughout the reticulation system including customers’ taps. Critical control points were reviewed, updated and approved by NSW Health for all Council’s schemes in 2016.

Review and Audits
The water industry is dynamic and continually evolving. New technologies are being developed and regulatory requirements change. Due to this and the nature of the quality system, it is reviewed regularly and updated as required to ensure it remains current. This review process includes Council employees, NSW Health and suitably qualified independent auditors.