LAKE WATER QUALITY MONITORING - PROCEDURE

Related Policy no:	N/A
Responsible Directorate	Infrastructure and Works
Responsible Section	Parks and Natural Environment
Responsible Officer	Natural Environment Officer

OBJECTIVE:

To provide instructions for volunteers on water quality testing and reporting of physical parameters, for Perry Lakes and Galup (Lake Monger), utilising the Town's test kits and in accordance with the Town of Cambridge Lake Water Quality Monitoring Framework.

SCOPE:

The Town hires the services of a qualified contractor to undertake water quality monitoring throughout the year. Friends group volunteers may utilise the Town's equipment to undertake additional water quality testing to complement contractor testing. Physical parameters are to be measured and recorded using the Town's Hanna HI9829 Multiparameter water test kits and results are to be provided to the Town. This procedure will provide guidance on using the equipment safely and effectively and reporting the data to the Town.

DETAILS OF PROCEDURE:

The Town of Cambridge has purchased two Hanna HI9829 Multiparameter water test kits for use by the Friends of Perry Lakes and Friends of Galup/Lake Monger to monitor water quality at their respective lakes.

This procedure outlines the process for the volunteers to follow when using the kits provided. A hard copy of this procedure, the Instruction Manual, Safety Data Sheets, a Job Safety Analysis (JSA) and Hanna Instruments A4 guides will be provided along with each test kit. A link to the pdf version of the instruction manual is also provided below.

INSTRUCTIONS:

Overview:
The water test kits remain the property of the Town of Cambridge and have been labelled for each of the Friends Groups. They are to be cleaned and stored correctly after each use to ensure longevity of the equipment.

The kits are to be stored in a secure location while not in use; if the Friends Group does not have a secure location to store the kits they may return them to the Town's Administration Office for storage between testing events. The Natural Environment Officer will undertake an annual inspection of the water test kit and maintain a record of its condition.

When parts or chemicals require replacement or if any damage occurs to the equipment, a representative from the Friends Group is to notify the Natural Environment Officer to order more.

OPERATING THE EQUIPMENT:

Prior to using the water testing equipment each person is required to read and understand the Hanna HI9829 Multiparameter Meter Instruction Manual (manual), available in the kit or online on the Hanna website. Scan the below barcode or enter https://manuals.hannainst.com/v/867408 into your search engine and search product code HI9829 to get a link to the pdf document.

Note: when referring to the instruction manual; the Town of Cambridge model of Multiparemeter Meter is the HI9829: Portable multiparameter meter (no GPS) and the Probe is the HI7609829: Standard multiparameter probe.

For instructions on each step required to undertake water quality testing and maintain the equipment refer to the corresponding pages in the instruction manual, listed in the Table of Contents and the supplied Hanna Instruments A4 guides. The below information will also assist you through this process.

Equipment Overview:

- Firstly, be gentle with the clips when opening and closing the water kit case to prevent deterioration of the clips.
- Refer to pages 5-7 of the manual for a general description of the equipment.
- Follow the instructions provided in Chapter 2 Quick Start from page 8 to ensure the equipment is correctly prepared prior to use.

Probe Installation:

- Refer to pages 20-25 of the manual - Probe Installation.
- The Town's kits contain EC/Turbidity (odd shape), pH/ORP (yellow and red) and Dissolved Oxygen (grey and black cap) probes.
- When installing the probes ensure they are lined up with the holes correctly, before gently positioning them in the appropriate location for each probe.

Calibration:

- Refer to pgs. 35 – 38 and 42 – 50 in the manual.
- After prolonged storage or cleaning, calibration of the probe sensors is required.
- You may undertake a quick calibration of all three probes using the Quick Cal solution and the supplied tube.
- The display on the monitor will guide you through the steps for calibrating the probes. It will read pH and EC together, then request the fluid be removed and the DO probe dried before calibrating DO.
- The quick calibration is easy to do in the field, however a complete calibration should also be carried out periodically using the calibration solutions specific to the individual probes. This requires the use of cups or beacons; one for each of the solutions.
- Note: the calibration fluid and pH solutions 4, 7 and 10 are safe to tip down the sink after use.

Reading Measurements:

- Refer to pages 26-30 in the manual - Reading measurements.
- When inserting the probe in the water to take the reading, ensure the water level is covering all probes and write down the reading when the numbers stop flashing on the screen of the monitor.
- Refer to *Testing Parameters* and *Testing Frequency and Locations* below for instructions on what, how and where to test.

Maintenance:

- Refer to pages 80-81 in the manual for Probe Maintenance.

- Clean the equipment after use and if necessary, between lakes if there is a risk of cross-contamination. The cleaning fluid will remove more grime than regular tap water will.
- The pH sensor is to be kept moist with 4.01 buffer when not in use. As this dries up you will notice salt crystals forming. Clean this off and top up with the buffer monthly.
- The DO sensor also needs to be kept moist. Take off the black and grey cap every month or so and add a few drops (up to O ring) of H170425, tap gently to remove air bubbles, then screw back on to the probe – there should be no air bubbles visible when you look at the top of the black and grey cap.
- Every 3 months (or every new use, if testing less often) replace the grey and black cap, O ring and electrolyte for the DO probe.

See **Further Resources** below for QR code links to YouTube videos for further information and visual demonstrations e.g. *How to change the probe sensors on a Hanna Instruments Multiparameter Meter*

The Town can arrange for a representative from Hannah Instruments to visit and demonstrate the use and maintenance of the equipment if required. In this instance the Town will film the demonstration and make the video footage available to volunteers for future reference.

Testing parameters:
The Hannah HI 9829 Multiparameter is capable of testing the below physical parameters:

1. Dissolved Oxygen (DO)
2. Electrical Conductivity (EC)
3. pH
4. Temperature (Temp)
5. Total Dissolved Solids
6. Turbidity
7. ORP (or Eh or Redox potential)

Volunteers are not expected or required to take all the above readings. It is sufficient to take readings of DO, EC, pH and Temp. Depending on capacity volunteers may take fewer or more than the suggested readings. If volunteers would like to take more than the suggested four readings, please advise the Natural Environment Officer so an expanded version of the *Physical Water Quality Parameters* spreadsheet can be provided.

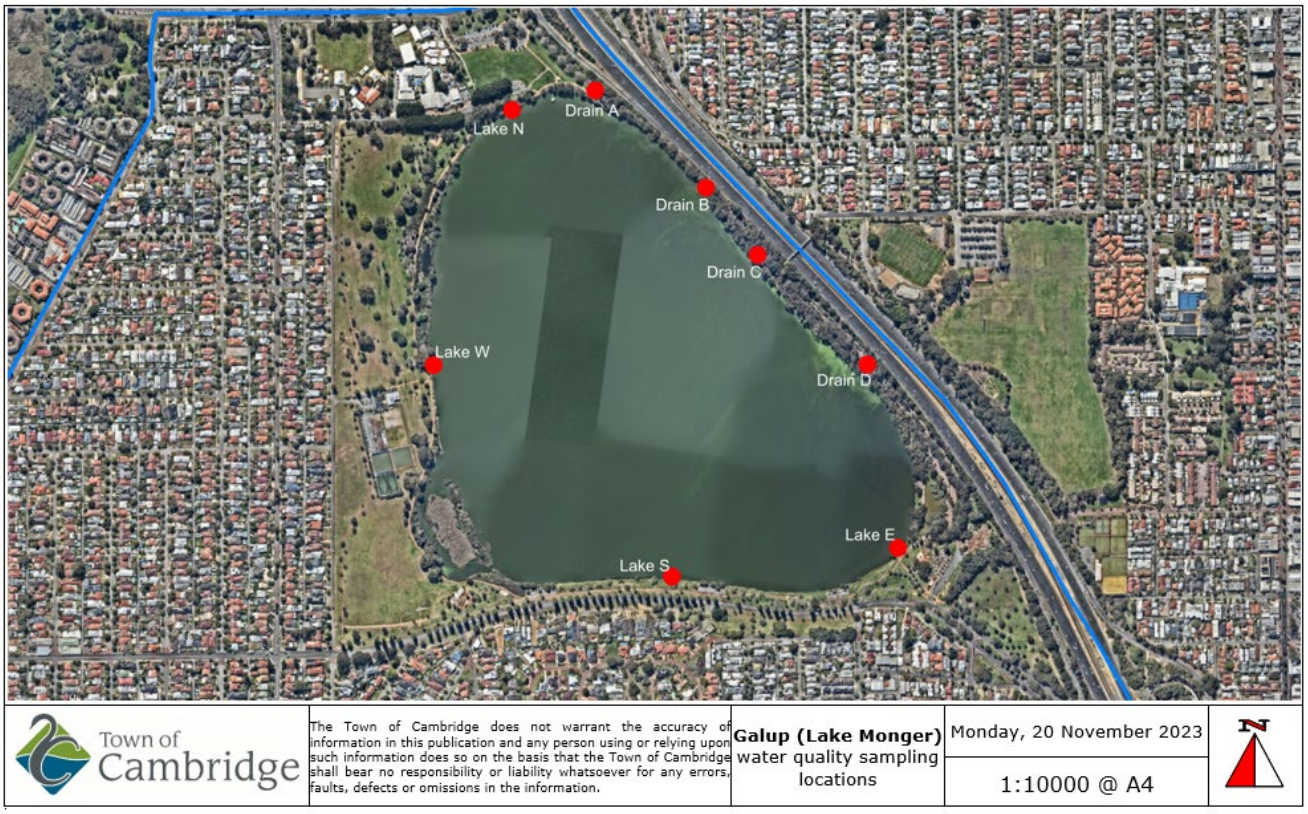
Testing Frequency and Locations:
Samples are to be taken from the locations detailed in Maps 1, 2 & 3 and Tables 1 & 2 and from the edge of the lake body; it is not necessary to go into the water.

Volunteers may decide how often they wish to sample the water quality of the lake/s depending on what benefit is to be gained by the frequency e.g. twice annually, seasonally, quarterly or monthly.

Initially and on occasion, volunteer testing should coincide with contractor testing to enable comparison between the results of the Town's equipment and the results of the contractors equipment. Contractor testing is undertaken in May or June, following the first heavy rainfall for the season (approx. 25mm) and again in Spring, around November. The Natural Environment Officer can advise the specific dates on request.

Note: it is **not** expected that the Friends of Perry Lakes undertake sampling from the Herdsman Main Drain unless they express an interest in gaining approval for access to Hale School. The location for testing at Hale School is provided in Map 3.

Galup (Lake Monger) Locations:
Four surface water samples may be taken from each of the North, South, East and West ends of the lake, and four from the stormwater drains (total 8 samples), as per the below locations. Volunteers may choose to take samples from all or a selection of these locations.

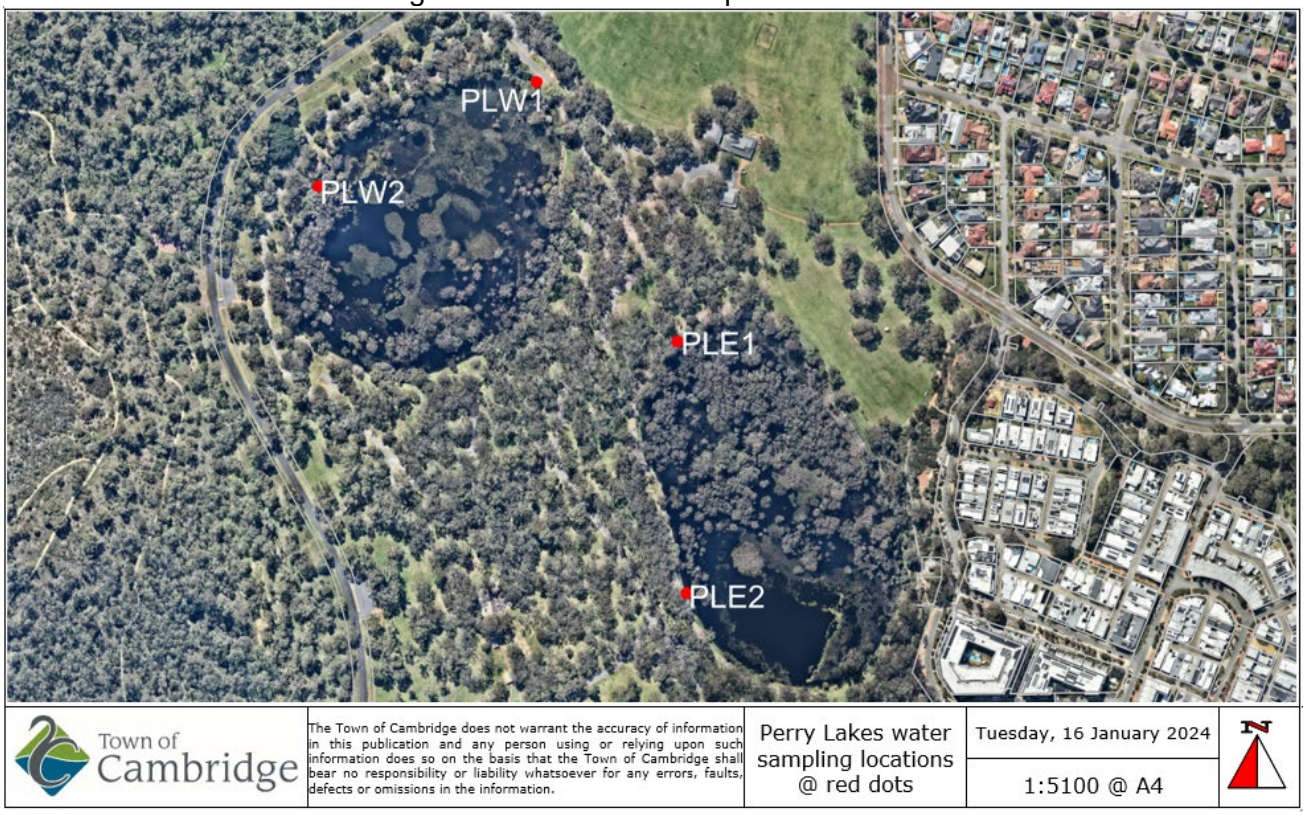


Map 1. Galup (Lake Monger) water quality sampling locations

Table 1. GPS coordinates of sampling locations Galup (Lake Monger):

Sampling Location	GPS Coordinate/Link
Lake N (North)	-31.924585, 115.825039
Lake W (West)	-31.929179, 115.823326
Lake S (South)	-31.933004, 115.828134
Lake E (East)	-31.932605, 115.833024
Drain A	-31.924244, 115.826790
Drain B	-31.925936, 115.828982
Drain C	-31.927223, 115.830137
Drain D	-31.929282, 115.832428

Perry Lakes and Herdsman Main Drain (optional):
Two surface water samples may be taken from each lake (west and east) at Perry Lakes, and one from the Herdsman Main Drain (optional), as per the below locations. Note: permission will be required from Hale School to enter their grounds and take a sample from Herdsman Main Drain.



Map 2. Perry Lakes water quality sampling locations

Table 2. GPS coordinates of sampling locations Perry Lakes and Herdsman Main Drain (within Hale School grounds)

Sampling location	GPS Coordinate/Link
PLW1	-31.941110, 115.783167
PLW2	-31.941979, 115.780791
PLE1	-31.943505, 115.784557
PLE2	-31.945810, 115.784755
HMD	-31.922760, 115.788948

Map 3. Herdsman Main Drain water quality sampling location

Recording and Reporting Results:
Friends groups are to maintain a register of people who use the equipment. This can be a simple A4 page with a column each for the volunteer's name, date and signature – to be signed when the equipment is cleaned and packed away after use.

While in the field volunteers may record the results for each parameter (as displayed on the screen of the meter when testing) on the 'field observation form' (see Appendix 1.), or directly into the spreadsheet as per below.

Results of each parameter are to be entered into a new column, with the date, in the *Physical Water Quality Parameters* spreadsheet for the respective lake, and emailed to the Natural Environment Officer, after each testing event.

Officers at the Town will review the findings, alongside the annual contractor water quality monitoring data and implement appropriate management responses where necessary. Feedback from Friends Groups is encouraged and welcomed throughout this process.

PC Software (optional):
It is not required to download the data from the equipment to a PC, however if volunteers wish to do so the current version of Hanna Instruments PC compatible software, is available for download at https://pages.hannainst.com/software-downloads. To install the software on your computer go to the software downloads web page, locate the product code HI929829, click on the DOWNLOAD NOW button and follow the prompts.

Volunteer Safety:
Prior to using the monitoring equipment all users are required to read and understand the Job Safety Analysis (JSA) provided in the kit.

Prior to handling any of the chemicals – read and understand the Safety Data Sheet (SDS) provided in the kit, relevant to the chemical you will be using. Chemicals and SDS's provided along with the kit are listed below:

- pH 4.01 Buffer Solution
- pH 7.01 Buffer Solution
- pH 10.01 Buffer Solution
- Quick Cal Calibration Solution
- Electrolyte Fill Solution
- 200 FNU – Turbidity Calibration Solution
- 20 FNU – Turbidity Calibration Solution
- 0 FNU – Turbidity Calibration Solution

Further Resources:
For further information about the parameters or how to use or troubleshoot issues with the equipment go to https://hannainst.com.au/knowledge-base

The below videos are available to view on YouTube and may assist you to understand the use of the equipment:

Scan the QR code on the right to watch a short video - **How to change the probe sensors on a Hanna Instruments Multiparameter Meter**

Scan the QR code on the right to watch a short video overview of the equipment - HI9829 Multiparameter pH/ISE/EC/DO/Turbidity Waterproof Meter with GPS option. This video does not provide instructions on how to use the equipment.

Scan the QR code to watch a 9 ½ minute video on YouTube explaining what comes in the kit, how to attach the probes and how to calibrate for pH, Conductivity and Dissolved Oxygen scan the QR code on the right. IMPORTANT NOTE: this is not an official instruction video for the HI9829 multiparameter and may not cover every required step so must not be used as instruction on it's own, however it can be used, as a visual aid, in conjunction with the instructions in the manual.

Note: if further information or training is required the Town can arrange for a representative from Hanna Instruments to provide a demonstration of the equipment to volunteers.

Appendix 1.

Field Observation Form

Location (Lake) _____ Date _____

Name of sampler _____

Sampling location	pH	Temp (°C)	EC (uScm)	DO %	Samplers Comments
e.g. PLE1					

Weather conditions:

General Comments:

Related Documents/Legislation	Town of Cambridge Lake Water Quality Monitoring Framework August 2024
Endorsement Date	February 2025
Date Reviewed/Amended	
Next Review Date	February 2027