

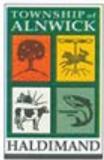
Grafton Drinking Water System

Drinking Water Quality Management System

Operational Plan

Prepared by the Operating Authority:
Lakefront Utility Services Inc.

On Behalf of the Owner:
The Corporation of the
Township of Alnwick/Haldimand



DWQMS Document – Grafton DWS D01 – Operational Plan

Table of Contents

Introduction

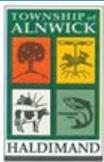
- [Purpose](#)
- [Scope](#)
- [References](#)
- [Definitions](#)
- [Reading This Document](#)
- [Document History](#)

Elemental Content

1. [Quality Management System](#)
2. [Quality Management System Policy](#)
3. [Commitment and Endorsement](#)
4. [Quality Management System Representative](#)
5. [Document and Records Control](#)
6. [Drinking-Water System](#)
7. [Risk Assessment](#)
8. [Risk Assessment Outcomes](#)
9. [Organizational Structure, Roles, Responsibilities and Authorities](#)
10. [Competencies](#)
11. [Personnel Coverage](#)
12. [Communications](#)
13. [Essential Supplies and Services](#)
14. [Review & Provision of Infrastructure](#)
15. [Infrastructure Maintenance, Rehabilitation & Renewal](#)
16. [Sampling and Monitoring](#)
17. [Measurement & Recording Equipment Calibration & Maintenance](#)
18. [Emergency Management](#)
19. [Internal Audits](#)
20. [Management Review](#)
21. [Continual Improvement](#)

Attachments

- [“A” – DWQMS Definitions](#)
- [“B” - DWQMS Requirement to LUSI Document Cross-Reference](#)
- [“C” - Director's Directions Schedule C](#)



DWQMS Document – Grafton DWS D01 – Operational Plan

INTRODUCTION TO THE OPERATIONAL PLAN

Purpose

The purpose of the Grafton Water System’s Operational Plan is to describe its’ comprehensive Drinking Water Quality Management System (DWQMS) developed and implemented by Lakefront Utility Services Inc. (LUSI) and owned by the Corporation of the Township of Alnwick/Haldimand.

Scope

The Operational Plan covers the activities and personnel associated with all operational aspects of the production of safe drinking water including the supply, treatment, storage and distribution to the Hamlet of Grafton.

This Operational Plan, the procedures, work instructions and other QMS documentation that are referenced herein are not intended to replace any of the prevailing regulations that govern the requirements for safe drinking water in the Province of Ontario.

References

Drinking Water Quality Management Standard
Safe Drinking Water Act, 2002

Definitions

A document has been prepared as guidance material to provide definitions for words, terms and acronyms that may be new to users of the DWQMS documentation.

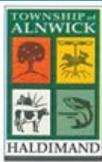
[*Attachment A - “Definitions”*](#)

Notes on Reading / Navigating This Document

This Operational Plan and related documentation is intended to be controlled and maintained in electronic format. Any printed copy is uncontrolled and is intended for “information purposes” only.

All documentation relating to the Operational Plan is available to all Operating Authority personnel on the LUSI Internal Network (Intranet). A hard copy of the Operational Plan and/or related documents is available to the owner and the public for viewing upon request.

[*D02 - “Master List of Documents”*](#)



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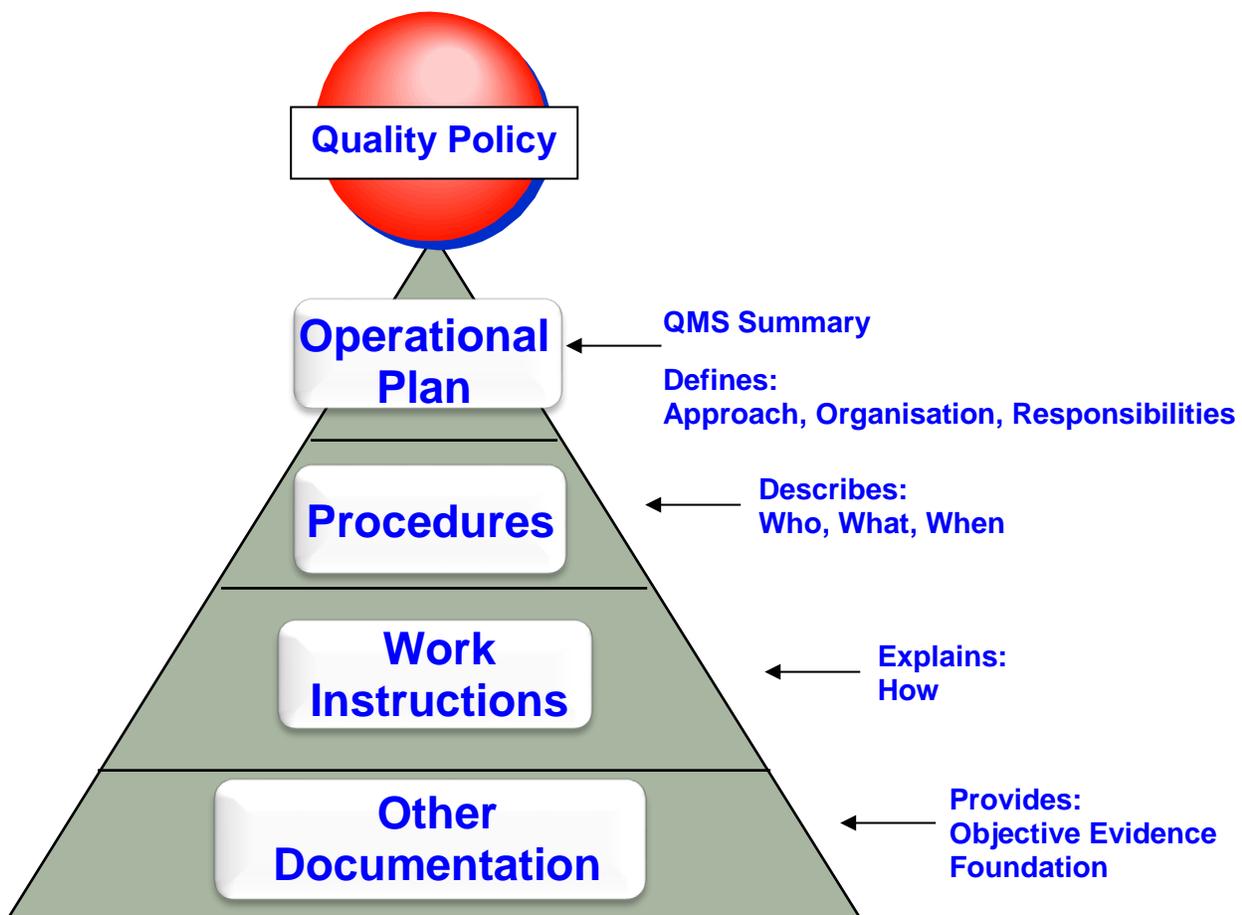
1.0 | Quality Management System – DWQMS Element 1

In December of 2005, the Clean Water Act was introduced to promote water conservation and source water protection along with new regulations to initiate a Quality Management System (QMS) for all Operating Authorities. The Drinking Water Quality Management System (DWQMS) was implemented in 2007.

The Grafton Water System Operational Plan and related documents outline the processes and procedures for the QMS of the Grafton Water System.

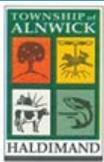
See Figure 1 – “QMS Architecture”

Figure 1: QMS Architecture



The Operational Plan and its associated documents were developed to meet all of the elements of the Ministry of Environment’s DWQMS and is structured to meet the order of those requirements. A cross-reference between the DWQMS and its conforming documents is attached.

Attachment B “DWQMS Cross-Reference”



DWQMS Document – Grafton DWS

D01 – Operational Plan

Most importantly, this document, when combined with the Quality Policy, serves as the foundation of the QMS.

This Operational Plan was developed and documented by the Operating Authority (LUSI) and has been reviewed and approved by the owner (Township of Alnwick/Haldimand) prior to issue.

A list of all DWQMS documentation is recorded in a Master List of Documents.

D02 “Master List of Documents”

Regulatory Requirements

LUSI has developed and implemented a procedure to address the reporting of regulatory requirements. This procedure does not address the compliance aspects of the Ontario Regulations covering Safe Drinking Water. It describes the method, for ensuring that the reporting of data to the Ontario Ministry of Environment is conducted per the frequency required by the regulations.

W07 “Regulatory Calendar”

2.0 | Quality Management System Policy – DWQMS Element 2

The Quality Management System Policy assures all stakeholders that the Operating Authority (LUSI) is committed to quality management in the management and operation of the Grafton Water Works. This Quality Policy applies to top management of Lakefront Utility Services Inc. (Operating Authority) and all employees of the LUSI Water Department.

The Quality Policy is displayed at the Township of Alnwick/Haldimand municipal building and at the Grafton Water Plant.

D03 “QMS Policy”

3.0 | Commitment and Endorsement – DWQMS Element 3

Commitment

This document signifies that top management is committed to quality and provides evidence that Top Management will support and endorse an effective Quality Management System.

D04 “Commitment to Quality”

Endorsement

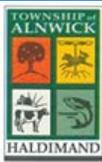
A written endorsement is contained provides assurance that the Top Management and Owner support and approve the contents of the Grafton Water System Operational Plan and its’ referenced documents.

D05 “Commitment & Endorsement”

4.0 | QMS Representative – DWQMS Element 4

This Operational Plan identifies the appointment by Top Management of a Quality Management System Representative and describes the specific requirements, responsibilities and authorities of this special role in the QMS as prescribed in the DWQMS. The QMS Representative is generally responsible for the QMS and channels important QMS information to Top Management

D06 “Appt. of Mgt. Rep”



DWQMS Document – Grafton DWS D01 – Operational Plan

5.0 | Document and Records Control – DWQMS Element 5

A procedure has been established to manage and control all documentation and records needed by the QMS.

P01 “Document Control”

P02 “Records Control”

The procedure describes how QMS documents and records are identified, kept legible, protected from damage or loss, retained, retrieved, stored, and disposed of. In addition, the procedure ensures that documents are kept up-to-date with the most current legislation and regulations as well as any changes in operations.

6.0 | Drinking Water System – DWQMS Element 6

Municipal Drinking Water Licence No. 238-101

The current Municipal Drinking Water Licence for the Grafton drinking water system was issued by the Province of Ontario on July 20, 2016. Licence Expiry Date: July 19, 2021.

D07 (a) “Municipal Drinking Water License”

Drinking Water Works Permit No. 238-201

The current Drinking Water Works Permit for the Grafton drinking water system was issued by the Province of Ontario on July 20, 2016.

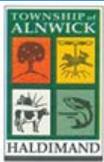
D07 (b) “Drinking Water Works Permit”

Permit to Take Water No. 5086-9BPM4A

The quantity of water allowed to be taken is governed by the Permit to Take Water, issued Sept 26, 2013 and valid to September 30, 2023. Under the terms of the permit, water can be taken from either of the two wells at any given time. The maximum rate per well shall be 870 l/min for a maximum taking of 1,252,800 l/day.

D08 “Permit to Take Water”

Summary of Water Consumption					
Year	Average Daily Flow	Maximum Daily Flow	% of Max. Allowable (1253 m ³)	Monthly Average	Yearly Total
2013	177 m ³	468 m ³	37%	5,422 m ³	65,058 m ³
2014	172 m ³	470 m ³	37%	5,266 m ³	62,713 m ³
2015	186 m ³	411 m ³	33%	5,673 m ³	68,080 m ³
2016	200 m ³	475 m ³	38%	6,098 m ³	73,175 m ³
2017	205 m ³	745 m ³	60%	6,242 m ³	74,908 m ³



DWQMS Document – Grafton DWS D01 – Operational Plan

The System is well within the consumption limits set out in the permit. The Operating Authority does not anticipate any problems with the supply of water in the near future.

Description of Water System

The Grafton Water System (supply, treatment plant and distribution) was designed by the Greer Galloway Group in 1994-95 to supply a population of 1,000. The water treatment plant is located in the Hamlet of Grafton in Lot 24, Concession 1 in the Township of Alnwick/Haldimand, County of Northumberland. The civic address is 434 Edwardson Road.

The Grafton water works is a Class III Distribution & Supply Subsystem managed under contract by Lakefront Utility Services Inc. and operated by Ontario Certified Operators who monitor operating parameters and sample water quality at various stages in accordance with the Ontario Regulations that govern the production of safe drinking-water.

D20 “Grafton Certificate of Classification”

The plant is inspected on a daily basis (365 days/yr.). To support the operations, the Township has installed a Supervisory Control and Data Acquisition (SCADA) system that continuously monitors process parameters and water quality characteristics at numerous points. The SCADA system has been programmed to detect changes in the operating (process) parameters at the plant and the characteristics of the water, so that operators can assure continuing water quality for customers and respond to system alarms during off-hours.

See Section 11.0 “Personnel Coverage”

In the event of an unplanned electrical shortage/outage, the water treatment plant is equipped with a standby Diesel engine driven generator set rated at 235 kW and 294 KVA, complete with two 1110 L storage tanks, to provide emergency power to the supply/treatment/storage works.

Introduction to Components of the Water System

This section provides a broad overview of the Grafton Water Works including its water source, treatment processes and distribution components so that a basic understanding of the water system will be fostered.

Note: *“The following components describe the Grafton Water System infrastructure in general terms and do not include volumes of tanks, dimensions of piping, pump capabilities, etc. For a detailed description please refer to the Drinking Water Works Permit, Process Schematic and system drawings”.*

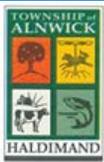
Ground Water Supply

Groundwater is collected from an underground aquifer into two sealed steel cased wells, each equipped with a submersible pump. The well water is pumped from one of the two wells to the raw water header in the treatment building.

Chemical Addition

Sodium Hypochlorite (liquid form of chlorine) is used as a disinfectant for both pre-chlorination (primary) and post-chlorination (secondary). The feed system consists of a day tank and two metering pumps (one duty, one standby).

Sodium Silicate is used to sequester iron found naturally in the ground water. This feed system consists of a day tank and one metering pump.



DWQMS Document – Grafton DWS D01 – Operational Plan

Hypochlorite for pre-chlorination and sodium silicate are fed to the raw water through two injectors in the raw water header prior to discharge to the clear wells. Hypochlorite for post chlorination is fed to the treated water through an injector into the discharge header prior to discharge to the distribution network.

Both primary and secondary hypochlorite systems are complete with controls to adjust dosing rates automatically, based on chlorine residuals. The pump rate for silicate is set manually with on/off control from the well pump relays.

On-site Storage

There are two interconnected underground clear wells (No. 1 & 2) complete with emergency overflow weir which feed two adjacent high lift pump wells.

High Lift Works

Two interconnected high lift pump wells (No. 1 & 2) feed the distribution system via various high lift pumps.

High lift well pump No. 1 is equipped with:

- Two vertical turbine high lift pumps complete with variable frequency drive
- One constant speed vertical turbine fire pump
- One submersible pump for recirculation from pump well to clear well No. 1

High lift well pump No. 2 is equipped with:

- Two vertical turbine high lift pumps complete with variable frequency drive.

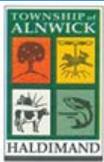
Instrumentation and Control

The instrumentation at the Grafton Water Treatment Plant consists of:

- One (1) on-line pre-chlorine residual analyzer with continuous sampling from the inlet of the clear wells, complete with high and low level alarms, data and signal outputs to control and monitor pre-chlorination.
- One (1) on-line post-chlorine residual analyzer with continuous sampling from the discharge header complete with high and low level alarms and signal outputs to control and monitor post-chlorination.
- Two (2) magnetic flow meters to record the influent flows from the wells and the plant effluent flows.
- 4One (1) water meter and associated keyed control system to record flows from bulk water haulers.

Distribution System

The water distribution system, constructed in 1994-95 consists of approximately 13 kilometres of water mains ranging in diameter sizes from 150mm to 300mm. Due to the difference in elevation between the water plant and the lower end of the distribution system, the distribution system is separated into four pressure zones, each with its own pressure-reducing valves to maintain the pressure between 40 and 90 pounds per square inch.



DWQMS Document – Grafton DWS

D01 – Operational Plan

Services connected to the distribution system generally incorporate a pressure-reducing valve, backflow preventer and meter to record the consumption. All one inch and larger backflow prevention valves should be tested and certified annually.

Distribution personnel maintain the underground system of mains and services, ensure that all hydrants are operational, and take water quality samples at designated locations throughout the distribution network.

D19 “Grafton Distribution Map”

Owner

The owner of the Grafton Water System is the Township of Alnwick/Haldimand and as the Owner, is responsible for monitoring all operational aspects of the system to ensure the provision of safe potable drinking water and to ensure a sufficient supply of water for other uses such as fire suppression, commercial and industrial operations.

Operating Authority

Incorporated in 2000, Lakefront Utility Services Inc. (LUSI) is the contracted operator (Operating Authority) of the Hamlet of Grafton’s water supply system and distribution network.

LUSI and its Board of Directors are responsible and have the authority for the operation and maintenance of the Grafton Water Works and the DWQMS. Top management of LUSI meets with representatives from the Township of Alnwick/Haldimand, through the “Hamlet of Grafton Communal Water System Public Liaison Committee”, to report upon the overall performance of the system and address any quality, capacity and production concerns.

The roles, responsibilities and authorities of both Lakefront Utility Services Inc. and the Township of Alnwick/Haldimand for the operation and maintenance of the water system are detailed in a written agreement between the two parties. Copies of the agreement are maintained at the LUSI Administration offices at 207 Division Street in the Town of Cobourg and at the Township of Alnwick/Haldimand municipal building, located at 10836 County Rd. 2 in Grafton. The agreement is renewable following a set term mutually agreed upon by both parties. The agreement may be terminated on 180 days’ notice by either party.

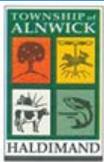
In 2007, the Drinking Water Licensing Program was initiated requiring all water system owners to have a valid Municipal Drinking Water Licence, Drinking Water Works Permit, Permit to Take Water, develop a Drinking Water Quality Management System (DWQMS), have an accredited operating authority and submit a financial plan.

LUSI has completed an accreditation process to become the “Accredited Operating Authority” for the Grafton Water System.

Process Flow Schematic

A Process Flow Schematic of the Grafton Water System is included for reference to depict the treatment infrastructure used for the production of safe drinking water.

D09 – “Process Flow Schematic”



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Water Source

General Characteristics

The raw water source for the Grafton Water Works is ground water taken from two production wells completed between 1993 and 1995 to depths of about 77.7 metres below ground level. The source water is considered secure, due to the proper development of the wells which provides adequate protection from surface water entering the wells and aquifer.

Significant land uses/features surrounding the production wells include:

- Cranberry Lake
- Residential
- Industrial
- Agricultural
- Vacant land
- Highway 401 & Cty Rd. 23

The County of Northumberland operated a small landfill site located about 3 km southwest of the wells, it was later converted into a waste transfer station that ceased operations in 1999.

A detailed description of the source water is available in the hydro-geological component of the Hamlet of Grafton Water Supply System First Engineer's Report (Jan. 2001) and subsequent annual hydro-geological reports. Copies of these reports are available at the LUSI Water Manager of Water Services' office and at the Alnwick/Haldimand municipal office. The reports identify the elevated iron and hardness levels in the ground water and surmises that with nitrate levels less than 1 mg/l, the influence of agricultural activity and septic tanks are not of significance at this time.

Event-driven Fluctuations

Common event-driven fluctuations due to changes of seasons, storms, spring run-off, etc. do not change the well water quality significantly.

Operational Challenges (Water Source)

Iron content

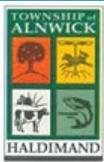
Due to the elevated levels of iron in the source water, sodium silicate is added after primary disinfection to sequester the iron. Problems normally associated with iron such as colour and taste have not been reported as a problem.

Hardness

Hardness concentrations exceed the Ontario Drinking Water Quality Standards guideline of 80 to 100 mg/L. This "operational guideline" is established to ensure efficient treatment of the water (predominantly in surface water treatment plants). Elevated hardness is common in groundwater supplies and is not considered a constraint.

Abandoned Landfill Site

An abandoned landfill site was located 3 kilometres north of the production wells which was converted into a waste transfer station that ceased operations in 1999. Groundwater movement is to the southwest, away



DWQMS Document – Grafton DWS D01 – Operational Plan

from the well areas. An ongoing program has been established to monitor for any potential long-term impacts from any landfill leachate.

Road Salt

Chloride and sodium are monitored to ensure that road salt is not impacting on production well quality. There has been no elevated readings indicating that road salt is not impacting on production well quality.

Future Development

The production wells within the zone of influence should be protected from possible contamination from future development. The Hamlet of Grafton may wish to consider land zoning within the zone of influence to limit land uses, which may present a risk to the quality of groundwater in the developed aquifer (such as landfills, septage disposal areas, gasoline stations, bulk petroleum storage facilities, waste treatment lagoons, feed lots and chemical storage).

Threats (Water Source)

Based on the information obtained to date, there appears to be no potential sources of contamination presently in the vicinity of the production wells, with the exception of leachate from the closed Grafton Landfill and road-salting activities from Highway #401.

As previously mentioned, these potential threats are being addressed through an ongoing annual hydrogeological program to monitor for any potential long-term impacts from any potential sources.

7.0 | Risk Assessment - DWQMS Element 7

Risk Assessment Procedure

LUSI has developed and implemented a risk assessment procedure that identifies:

- Potential hazardous events and associated hazards
- Risks associated with the hazards
- Ranking of hazards
- Control measures to address hazards
- Critical Control Points

P03 "Risk Assessment"

W08 "Risk Assessment Review"

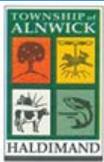
D10 "Risk Assessment Analysis"

Timetable for Risk Assessment

Risk assessment reviews are conducted to determine if the assumptions made during the current Risk Assessment are no longer valid or, if changes, additions or improvements have been made to the water system that may present a potential or actual risk to the production and delivery of safe drinking water. The currency of the information is verified through a annually document review and a full risk assessment will be completed every thirty-six months.

Typically, the review addresses changes, additions or improvement to:

- raw water source/chemistry
- process



DWQMS Document – Grafton DWS D01 – Operational Plan

- infrastructure
- technology
- personnel

8.0 | Risk Assessment Outcomes – Element 8

Steps

1. Identify Hazards

Each process / equipment is reviewed for potential problems

2. Access Risks

Likely causes or issues for problems are identified

Reliability and redundancy of equipment is considered

3. Rank Hazards

Hazards are ranked as per probability and severity

4. Control Measures

Existing mitigation measures are listed to address identified risks

5. Control Points

These are points within the works that are monitored, measured or sampled to ensure process control, but if or when their limits are exceeded, do not present a potential or actual immediate negative impact upon the end user.

Each of the identified Control Points has an associated upper and lower alarm limits contained within and monitored by the SCADA system.

6. Critical Control Points (CCP's)

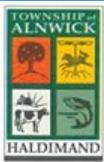
A Critical Control point is defined as a step or point in a drinking water system at which control can be applied by the operating authority to prevent or eliminate a drinking water health hazard or deduce it to an acceptable level.

Upper and Lower Control limits have been established that are within the regulatory requirements for turbidity, disinfection and distribution system pressures. These limits have been programmed into the SCADA system to alert the operator that action needs to be taken prior to exceeding regulatory limits.

P04 “Critical Control Points”

**The following have been identified by LUSI personnel as actual or potential* Critical Control Points and their limits which include MOECC suggested minimum CCP's.*

Critical Control Point		Critical Control Point Limits	
Process	Source	Upper	Lower
1.	Primary Disinfection	Contact Chamber	1.7 mg/l Cl ₂ FR
2.	System Pressure	Distribution System	515 kpa
			210 kpa



DWQMS Document – Grafton DWS D01 – Operational Plan

7. CCP Response Procedures

The following procedures have been implemented to identify action(s) to be taken in response to any deviation(s) from the CCP limits:

✓ CRP 01 “Primary Disinfection”

✓ CRP 02 “System Pressure”

8. Reporting and Recording Changes

Changes made to Control Point limits are recorded in the Daily Log Book and reported using FR211 “Operational Occurrence” for DWQMS tracking purposes.

FR211 “Operational Occurrence”

9.0 | Organizational Structure, Roles, Responsibilities & Authorities - Element 9

Organizational Structure

The organizational structure of LUSI, the Operating Authority to which this operational plan applies, and the LUSI Water Department who oversee the day-to-day operations of the Grafton Water System are illustrated in an Organizational Chart.

D11 “Organizational Chart”

Roles

Township of Alnwick/Haldimand – Owner of Water Supply System
Lakefront Utility Services Inc. – Operating Authority
Manager of Water Services – DWQMS Representative
Compliance Coordinator – DWQMS Coordinator

Top Management

The President and the Manager of Water Systems make up the top management of LUSI.

Management Review

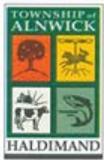
Persons within Top Management, the DWQMS Representative and Coordinator are generally responsible for undertaking Management Reviews. Participants may also include, but is not limited to Water Department Supervisors.

P18 “Management Review”

Standard of Care Drinking Water Policy

This policy serves to advise municipal boards, committees and Council, as to the Statutory Standard of Care requirements under the Safe Drinking Water Act. The policy is applicable to all individuals who have oversight responsibilities for this drinking water system.

D23 “Standard of Care Policy”



DWQMS Document – Grafton DWS

D01 – Operational Plan

Responsibilities and Authorities

A procedure describing the responsibilities and authorities of all personnel within the Organizational Structure has been developed and implemented.

Water Department Managers may also maintain responsibilities of Operators in the form of Job Descriptions. These documents may also include information regarding competencies – in combination with required proficiencies.

Responsibilities and authorities are also defined within the text of the procedures referred to in this Operational Plan and by the prevailing Ontario Regulations. A review of each employee's responsibilities and authorities is conducted upon initial hire, and during each subsequent performance review as appropriate.

Every employee of the LUSI Water Department has the responsibility to maintain a safe workplace and to report adverse conditions to management.

D12 "Responsibilities & Authorities and Competencies"

10.0 | Competencies – DWQMS Element 10

Competencies

LUSI has developed a list of Competencies that identifies the required competencies for personnel performing duties directly affecting water quality. A review is conducted to ensure that the competencies of Operating Authority personnel are in line with the requirements for the safe and effective operation of the Grafton Water System.

D12 "Responsibilities, Authorities & Competencies"

Certification – Distribution & Supply Operators

All water department operators shall, at a minimum, attain and maintain a Class II Water Distribution and Supply certificate as per the requirements of Ontario Regulations 128/04.

Overall Responsible Operator

A procedure has been developed and implemented to ensure that the designation of the Overall Responsible Operator (ORO) is clearly defined and documented for all operating personnel to quickly identify.

P30 "Overall Responsible Operator"

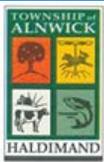
Training

LUSI has developed and implemented a training procedure that identifies the training requirements for water department operators whose duties directly affect drinking water quality.

Training is provided on both an annual and as required basis to meet and maintain competencies and to ensure that personnel meet or exceed minimum training requirements for maintaining operator certification in accordance with O. Reg. 128/04.

Operators are responsible for maintaining their certification by meeting the required training hours as set out in O. Reg. 128/04.

P05 "Competencies and Training"



DWQMS Document – Grafton DWS

D01 – Operational Plan

Records

A record of operator training and copies of certificates are maintained by the Manager of Water Services. Supervisors should also keep records of operator training and certificates. Operator certification certificates are displayed as per regulations.

11.0 | Personnel Coverage – DWQMS Element 11

The Operating Authority has developed and implemented a procedure to ensure that sufficient personnel LUSI has developed and implemented a procedure to ensure that sufficient personnel meeting the identified competencies are available for duties that directly affect drinking water quality. Ontario Regulations and the contractual agreement between the Township of Alnwick/Haldimand (owner) LUSI (operating authority) govern coverage.

P06 “Personnel Coverage”

The Grafton Water System is attended daily by a licensed operator to monitor the process, perform operational duties and to deal with any maintenance and customer concerns as assigned.

At all other times the water treatment plant is monitored by the SCADA system, which incorporates an auto-dialler that has been programmed to contact the answering service or LUSI personnel whenever conditions deviate from the program settings.

There is an assigned on-call operator covering both the treatment and the distribution system during off-hours. The on-call operator shall conduct a physical verification of conditions at the site once per day during weekends and statutory holidays or any other times as may be required. The normal on-call schedule for water department operators shall be from quitting time on Friday to start time the following Friday. The time of all visits and the details of any related actions taken are recorded in the on-site daily log.

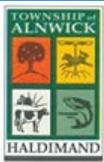
12.0 | Communications – DWQMS Element 12

A communication procedure has been established and maintained that describes how the relevant aspects of the DWQMS are communicated between top management and:

- a) The Township of Alnwick/Haldimand
- b) Operating Authority Personnel
- c) Suppliers
- d) General Public

The procedure makes reference to Water Committee meetings between LUSI and the Township of Alnwick/Haldimand, employee DWQMS awareness sessions, supplier DWQMS awareness materials as well as the methods (website and inserts) used to communicate the activities of LUSI with respect to the DWQMS to the consumer, as necessary.

P07 “Communication”



DWQMS Document – Grafton DWS D01 – Operational Plan

13.0 | Essential Supplies and Services – DWQMS Element 13

A procedure to identify and ensure procurement of all supplies and services essential for the delivery of safe drinking has been implemented.

D24 “Essential Supplies & Services”

Quality of Essential Supplies & Services

There are a small number of suppliers that provide goods or services that may affect drinking water Quality. These suppliers provide chemicals, equipment and equipment maintenance, parts, consulting, engineering, calibration and construction services.

A procedure has been established, implemented and maintained that addresses the quality of supplier products and services as well as the internal process for procurement.

P08 “Essential Supplies & Services”

14.0 | Review & Provision of Infrastructure – Element 14

The Owner and the Operating Authority meet on a regular basis to review the condition of the works and to discuss and plan any major improvements or additions to the infrastructure. Consideration is given as to the water systems’ current and future ability to service the needs/demands of the municipality.

P09 “Review & Provision of Infrastructure”

15.0 | Infrastructure Maintenance, Rehabilitation and Renewal - Element 15

LUSI maintains a program of inspection and maintenance for System machinery, equipment and distribution components (including hydrants and metering equipment). When appropriate, upgrades and system rehabilitation (e.g. replacing distribution piping and mains) are considered. Typically, the condition of the system is assessed on an ongoing basis for the scheduling of upgrades and rehabilitation. Consideration is also given to potential and projected residential, commercial and industrial growth and demand.

Hydrants & Flushing Program – Hydrants are flushed at least once annually. Areas known to have older mains are directionally flushed to achieve optimal results. All hydrants have been flow tested and colour coded based on fire flows as per NFPA.

Valve Exercising Program – A valve exercising program is being completed on a three-year rotational basis at minimum; valve exercising ensures proper operation of valves during emergencies.

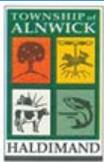
P10 “Infrastructure Monitoring”

W06 “Well Inspection & Maintenance”

16.0 | Sampling and Monitoring – DWQMS Element 16

Procedures have been established to describe the sampling and monitoring activities for process control and finished drinking water quality in accordance with Element 16 of the DWQMS, and of the applicable Ontario Regulations.

All monitoring and sampling activities are conducted by trained and certified operators, and where required the testing of samples for bacteriological and microbial content is completed by certified laboratories. The



DWQMS Document – Grafton DWS D01 – Operational Plan

procedures describe how sampling and monitoring results are recorded and shared between LUSI and the Owner where applicable.

P12 “Sampling”

P13 “Monitoring”

Adverse Water Quality

Reporting of adverse water Quality is in compliance with the Safe Drinking Water Act, 2002, 18. (1), 1. (2), (3). Procedures for reporting and correcting adverse water quality results have been developed and implemented.

P23 “AWQI Reporting”

17.0 | Measuring & Recording Equipment Calibration & Maintenance - Element 17

All calibration activities, per the manufacturer’s recommendations, are conducted by qualified personnel. In some cases (e.g. selected Flow meters and transmitters) calibrations are conducted by an outside source with the result being traceable to a recognized National or International Standard.

Records and certificates (where required) of calibration are maintained by LUSI.

P14 “Calibration”

D15 “Process Equipment Calibration”

18.0 | Emergency Management – Element 18

To prepare for emergency situations that could result in the loss of the Operating Authority’s ability to maintain the supply of safe drinking water to consumers, LUSI has established, implemented and maintained an Emergency Plan, a list of Emergency Contacts and contingency procedures to maintain a state of emergency preparedness in accordance with Element 18 of the DWQMS.

P15 “Emergency Management”

Emergency Plan

The Emergency Plan is evaluated for suitability and applicability on an annual basis, or when there are changes to the organizations requirements or related emergency response regulations or techniques/technologies.

D16 “Emergency Plan”

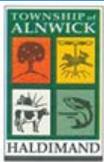
Emergency Contacts

The list of “Emergency Contacts” for responding to emergencies is updated as required and reviewed annually.

D17 “Emergency Contact List”

Emergency Response Procedures

In addition to the above, specific emergency situations that could arise at the Grafton Water System have been identified and Emergency Response Procedures (ERP) are in place to prepare and respond to



DWQMS Document – Grafton DWS

D01 – Operational Plan

emergencies such as weather, water quality, power failure, malfunctions, leaks/spills and terrorism/vandalism.

ERP's - Emergency Response Procedures

19.0 | Internal Audits – Element 19

In accordance with Element 19 of the DWQMS, LUSI has documented a procedure for conducting internal audits of the QMS, and to verify conformity that the organization continues to conform to the requirements of the DWQMS.

P16 “Internal Audits”

An annual internal audit is conducted within 12 months of the previous internal audit. Audits are conducted by trained Internal Auditors.

D21 “Qualified Internal Auditors”

D18 “QMS Schedule”

Corrective action procedures have been established to address any non-conformances resulting from customer complaints and internal or third party audits of the DWQMS and for any reports of Adverse Water Quality

P17 “Corrective Action”

FR201 “Water Quality Complaint Form”

20.0 | Management Review – Element 20

A Management Review Procedure has been established, implemented and maintained that evaluates the continuing suitability, adequacy and effectiveness of the Quality Management System in accordance with element 20 of the DWQMS.

P18 “Management Review”

Management Reviews must be completed once per calendar year.

D18 “QMS Schedule”

Annual Management Reviews include topics such as compliance, consumer, performance, audit information, etc. and any actions that may be initiated as a result of Management Review are supported by the Corrective Action, Preventive Action and Continual Improvement Procedures.

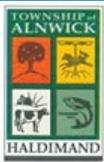
Top Management of the Water Department are responsible for undertaking Management Reviews, identifying any deficiencies and reporting the results to the owner.

21.0 | Continual Improvement – Element 21

A Continual Improvement Procedure has been established, implemented and maintained in accordance with Element 21 of the DWQMS, to continuously improve the effectiveness of the QMS through the use of corrective actions.

P19 “Continual Improvement”

Continual Improvement, for the purposes of this Operational Plan and the DWQMS is defined as...
The methods and processes employed by the organisation (LUSI) to improve the effectiveness of the Quality Management System.



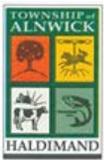
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At a minimum, LUSI shall improve the effectiveness of the QMS through the application of knowledge gained from the risk assessment, owner and end user input, audit results, analysis of data, preventive and corrective actions and management reviews.

The Continual Improvement Procedure identifies several methods that may be employed by LUSI personnel to provide improvements to drinking water quality (within the scope of existing regulations), or drinking water operational processes and QMS processes.

Change History

Rev. Level	Date	Change(s)	By
Drafts	Sept/08 to Sept/09	Several successive draft versions issued as the system was developed	J. Nowee
Revision 1	Dec. 07, 2009	Approved	J. MacFarlane
Revision 2	August 11, 2010	Notes on Reading/Navigating This Document	J. Nowee
Revision 3	Sept. 28, 2011	Replaced Certificate of Approvals with Municipal License and Drinking Water System Permit	J. Nowee
Revision 4	April 27, 2012	Reviewed and updated	J. Nowee
Revision 5	Jan. 31, 2013	Revised documents as per NSF CAR's # J0335878-1 to 5	J. Nowee
Revision 6	Oct. 16, 2014	Reviewed, Revised and Updated	J. Nowee
Revision 7	July 13, 2015	Updated style format, updated titles to reflect current organizational structure, added 2014 data to tables along with data from previous years.	A. Finlay
Revision 8	October 19, 2015	Information amendments per council review.	A. Finlay
Revision 9	March 21, 2016	Added Schedule C to attached documents. Updated operational data.	AF
Revision 10	Nov. 29, 2017	Updated format and titles and dates. Corrected typo's and updated operational data.	AF
Revision 11	Apr 17, 2018	Added schedule of valve exercising and hydrant flushing program to Sec 15 as per NSF CAR. Updated water consumption data.	SW
Revision 12	Aug 16, 2018	Updated references to current documents.	SW



DWQMS Definitions

Audit - a systematic and documented verification process that involves objectively obtaining and evaluating evidence to determine whether an operating authority's activities conform to the requirements of this Standard, including the assessment of an operating authority's implementation of a quality management system.

Auditee - Individual or group of individuals performing or owning the activities and/or requirements being audited.

CAR – Corrective Action Request

Compliance – fulfillment of a specified regulatory or other legal requirement. i.e.: "LUSI drinking water operations "comply" with all applicable Ontario Ministry of Environment Regulations".

Conformance – fulfillment of a specified non-regulatory/non-legal requirement. i.e.: "LUSI Drinking Water Quality Management System (DWQMS) "conforms" to the requirements of the ISO 9001:2000 Standard and the DWQMS Standard".

Consumer - drinking water end-users.

Continual improvement – a recurring process of enhancing the DWQMS in order to achieve improvements in overall performance consistent with the LUSI Quality policy.

Corrective action – action taken to eliminate the cause of detected non-conformance.

Critical control point (CCP) - a step or point in the drinking water system at which control can be applied by the operating authority and is essential to prevent or eliminate a drinking water health hazard or reduce it to an acceptable level.

Critical limit - the criterion that separates acceptability from unacceptability of an identified operational parameter of a CCP.

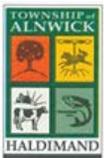
DCR – Document Change Request

Document - information and its supporting medium (e.g., procedure, specification, drawing, report, record, form).

Drinking water quality management standard (the Standard) - this Standard and the collective requirements for a quality management system listed therein.

Drinking water system - a system of System, excluding plumbing, that is established for the purpose of providing consumers of the system with drinking water and that includes:

- a) any thing used for the collection, transport, production, treatment, storage, supply or distribution of water,



- b) any thing related to the management of residue from the treatment process or the management of the discharge of a substance into the natural environment from the treatment system, and
- c) a well or intake that serves as the source or entry point of raw water supply for the system. (Ontario Safe Drinking Water Act, 2002, S.O. 2002, c. 32)

Drinking water System (the “System”) - a component of a connected municipal treatment or distribution System as defined by an associated Drinking Water System Permit, under the Safe Drinking Water Act and as operated by an operating authority

DWQMS – Drinking Water Quality Management Standard

Internal Audit – an assessment of the effectiveness of the DWQMS by LUSI employees who do not perform the tasks/processes being audited

MOECC or MOE – The Ministry of the Environment and Climate Change or any other regulatory body governing drinking water in the province of Ontario.

Municipal drinking water system - a drinking water system or part of a drinking water system:

- a) that is owned by a municipality or by a municipal service board established under section 195 of the Municipal Act, 2001,
- b) that is owned by a corporation established under section 203 of the Municipal Act, 2001,
- c) from which a municipality obtains or will obtain water under the terms of a contract between the municipality and the owner of the system, or
- d) that is in a prescribed class.

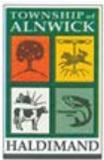
(Ontario Safe Drinking Water Act, 2002, S.O. 2002, c. 32)

Non-conformance (nonconformity) – non-fulfillment of, or failure to meet a specified requirement

Organization – a company, corporation, firm, enterprise, authority or institution, or part of combination thereof, whether incorporated or not, public or private, that has its own functions and administration.

Operator – means a person who conducts operational checks of or who adjusts, tests or evaluates a process that controls the effectiveness or efficiency of a subsystem and who meets the requirements of O. Reg. 128/04.

Operating authority - a person or entity that is given responsibility by the owner of a drinking water System for operating the System, regardless of its structure, or affiliation to the owner.



DWQMS Document – Grafton DWS

D01 – Operational Plan

Attachment - A

Operational Plan (the Plan) - the documentation of an operating authority's quality management system, relevant to operating a subject System

Owner – Municipal Drinking Water Licence Holder

Procedure – specified way to carry out an activity or process. Identifies who does what and when. Typically, cross-functional

Public - consumers and other stakeholders of the drinking water system.

Quality Management System (QMS) - a system of management controls and information flows intended to achieve the quality conditions, as required in this document.

Record - document stating results achieved or providing evidence of activities performed.

Soft Copy – an electronic version of a DWQMS document

SOP – Standard Operating Procedure, see Work Instruction below.

Supplier – an organization or person that supplies a product, including water, or a service to the operating authority

Top management - the person or group of persons who directs and controls the Operating Authority

Work instruction – specified way to carry out an individual task related to an activity or process (procedure). Defines how a specific task is carried out. Not cross-functional.

WTP – Water Treatment Plant



D01 – Operational Plan Attachment - B

DWQMS CROSS REFERENCE

DWQMS Element	Document Procedure Work Instruction
1. Quality Management System (QMS)	D02 Master List of Documents
2. Quality Management System Policy	D03 LUSI Quality Policy
3. Commitment and Endorsement	D04 Commitment to Quality D05 Commitment and Endorsement
4. QMS Representative	D06 Appointment of Mgt. Rep.
5. Document and Records Control	P01 Document Control P02 Records Control
6. Drinking-Water System	D07a) Municipal Licence D07b) Drinking Water Works Permit D08 Permit to Take Water D09 Process Flow Chart D19 Distribution Schematic D20 Certificate of Classification
7. Risk Assessment	D10 Risk Assessment Analysis P03 Risk Assessment W08 Risk Assessment Review
8. Risk Assessment Outcomes	D10 Risk Assessment Analysis P04 Critical Control Points CRP01 Primary Disinfection CRP02 System Pressure
9. Organisational Structure, Roles, Responsibilities and Authorities	D11 Organizational Chart D12 Responsibilities, Authorities and Competencies P18 Management Review D23 Standard of Care
10. Competencies	D12 Responsibilities, Authorities and Competencies P30 Overall Responsible Operator
11. Personnel Coverage	P06 Personnel Coverage P30 Overall Responsible Operator
12. Communications	P07 Communication



DWQMS Document – Grafton DWS

**D01 – Operational Plan
Attachment - B**

DWQMS Element	Document Procedure Work Instruction
13. Essential Supplies & Services	D24 Essential Supplies & Services P08 Essential Supplies & Services
14. Review & Provision of Infrastructure	P09 Review & Provision of Infrastructure
15. Infrastructure Maintenance, Rehabilitation and Renewal	P10 Infrastructure Monitoring W06 Well Inspection & Maintenance
16. Sampling, Testing & Monitoring	P12 Sampling P13 Monitoring P23 AWQI Reporting W03 Water Quality Complaints
17. Measurement and Recording Equipment Calibration and Maintenance	D15 Process Equipment Calibration P14 Calibration
18. Emergency Management	D16 Emergency Plan D17 Emergency Contacts P15 Emergency Management ERP01 Weather Hazards ERP02 Source Water Contamination ERP03 Treated Water Contamination ERP04 Prolonged Power Failures ERP05 Treated Process Malfunction ERP06 Distribution System Malfunction ERP07 Chemical Leaks / Spills ERP08 Sodium Hypochlorite Leak /Spill ERP09 Sodium Silicate Leak/ Spill ERP10 Terrorism / Vandalism ERP11 Well Inspection Risk
19. Internal Audits	D18 QMS Schedule D21 Qualified Internal Auditors P16 Internal Audit P17 Corrective Action FR201 Water Quality Complaint Form
20. Management Review	P18 Management Review D18 QMS Schedule
21. Continual Improvement	P19 Continual Improvement



DWQMS Document – Grafton DWS
D01 – Operational Plan
Attachment - C

Subject System Description Form			
Municipal Residential Drinking Water			
Owner of Municipal Residential Drinking Water System:	The Corporation of The Township of Alnwick/Haldimand		
Name of Municipal Drinking Water System:	Grafton Drinking Water System		
Subject Systems			
	Name of Operational Subsystems	Name of Operating Authority	DWS Number(s)
<input checked="" type="checkbox"/> Check here if the Municipal Residential Drinking Water System is operated by one Operating Authority. Enter the name of the Operating Authority in adjacent column.		Lakefront Utility Services Inc.	220009158
Operational Subsystem 1:			
Operational Subsystem 2:			
Operational Subsystem 3:			
Operational Subsystem 4:			
Add attachments if there are additional "Operational Systems"			
Contact Information			
Name	Title	Phone Number	Email Address
Primary: Larry Spyrka	Manager of Water Systems	905-372-2193 x 5238	lspyrka@lusi.on.ca
Alternate: Sarah Whitton	Compliance Coordinator	905-372-2193 x 5228	swhitton@lusi.on.ca