

Pollution Prevention (P2) Assessment Report

September 2010

Ref: 3120-20

Prepared for:

**Orillia Water Filtration Plant
Orillia, Ontario**

Prepared by:



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1.0 INTRODUCTION

This Pollution Prevention (P2) Review for the Orillia Water Filtration Plant (WFP) in the City of Orillia is being implemented under the Ontario Source Protection Program, which is administered by the Canadian Centre for Pollution Prevention (C2P2) (a copy of the OWTP's application to the Source Protection Program is included in Appendix A).

According to the Canadian Council of Ministers of the Environment (CCME), pollution prevention is defined as:

"The use of processes, practices, materials, products or energy that avoids or minimizes the creation of pollutants and wastes at the source."

Thus, through the implementation of P2 principles, water filtration plants within prescribed areas of Ontario will be better equipped to conduct their operations in such a way as to protect the sources of municipal drinking water supply.

The scope of this review included a site visit to the premises; a review of pertinent background data; evaluation of current water treatment processes; evaluation of current operating practices; and an assessment of source protection and feasible pollution prevention options.

1.1 Project Objective

The primary objective of this report is to identify and assess, through the application of P2 principles, potential threats to municipal drinking water sources. This includes a comprehensive multimedia analysis of operational and non-operational activities and areas of interest including but not limited to: i) sanitary sewage, ii) waste water, iii) air emissions, iv) solid waste, v) fuels and solvents, vi) green house gases (GHGs) reduction opportunities, etc.

A secondary objective is to identify, whenever possible/feasible, potential opportunities for further reducing resource consumption (resources, electricity, etc.).

2.0 FACILITY VISIT AND ON-SITE ASSESSMENT

On February 3, 2010, Enviro-Stewards personnel performed an on-site assessment of the Orillia Water Filtration Plant located at 200 Bay Street in the City of Orillia, Ontario. Figure 1A shows a site plan of the water treatment plant and neighboring lands. Figure 1B shows the basic treatment process flow diagram for the facility. Photographs taken (with the permission of the plant superintendent) are located in the Photo log in Appendix B.

2.1 Water Treatment Plant Building -Basic Description

Existing Water Works

The Orillia Water Filtration Plant is located at 200 Bay Street (NAD 83: UTM Zone 17; 625 854.00 m E, 4941804 m N). Currently, the plant currently treats raw water from surface and groundwater sources as follows:

- i) Two direct surface intakes (new intake is currently active and old intake is in stand by mode) from Lake Couchiching, with gravity flow from the intake into the low lift wet well; and
- ii) Two operation groundwater wells (Wells 1 and 2).

The treatment plant building houses a solids screening and low-lift pumping station; a water chemical pre-conditioning station ; a wastewater management station; a dual media filtration area; a high lift pumping station equipped with ultraviolet disinfection; main offices and control room; and chemical storage area and metering equipment. Complementary facilities within the plant include treated-water clear wells and reservoirs; emergency generators; a chemical load-transfer and garage-storage area; and a small operator's laboratory for daily chemical analyses.

In addition, the plant is equipped with safety features for water backflow prevention and water cross contamination; a motor control centre and SCADA (supervisory control and data acquisition) and an air scrubber system for the removal of organic contaminants (tetra-chloro-ethylene & tri-chloro-ethylene) contained in the groundwater extracted from two adjacent water wells. These wells, and associated pumping stations, are housed in nearby buildings located at approximately 150 ft from the filtration plant. Groundwater extracted from these wells is routed to the filtration plant clear well, located downstream from the filter gallery.

2.2 Water Treatment Plant Background

The WFP original building was reportedly constructed in 1914 to provide potable water to the City of Orillia and neighboring townships. The most recent plant upgrades include:

- Clearwell and Disinfection System upgrades in 2003;
- New High Lift Pumps installed in 2005;
- New filter backwash pumping station installed in 2006;
- Filter Modifications with granular activated carbon in 2006;
- Replacing in 2007 the existing 200 mm venturi tube type flow meters in Well No. 1 & Well No. 2 with 200 mm electromagnetic flow sensors; an electromagnetic flow recorder and installation of pressure transducers in each of the two groundwater wells;
- A new groundwater treatment building in 2008 (NAD 83: UTM Zone 17; 625735 m E, 941759m N), housing two (2) air strippers, each rated at 37.8 L/s for the two wells, and all associated pumping, blowers, control system and gravity pipe work to connect to the existing chlorine contact chambers at the Orillia Water Filtration Plant;
- PACL pumping system upgrade in 2009; and
- Low Lift emergency generator removal in 2010.

2.3 Neighboring Properties

The Lands/Properties neighboring the water treatment plant are:

South: Crown Parklands;
 East: Couchiching Lake;
 North: Retirement Housing; and
 West: Roadway.

2.4 Applicable Certificates of Approval

The operation of the WFP is located at:

200 Bay Street
 Orillia, Ontario

The Orillia Water Filtration Plant is registered as a “Large Municipal Residential System” under Reg. 170/03, and is governed by the amended C of A # 7429-84YJHY issued by the Ministry of The Environment on June 4, 2010, pursuant to the Safe Drinking Water Act, 2002, S.O. 2002, c. 32, and the regulations made there under to:

The Corporation of the City of Orillia
 50 Andrew Street South
 Orillia, Ontario
 L3V 7T5

The WFP has also in effect an amended permit (# 91-P-3036) by the Ontario Ministry of the Environment to take surface water from Lake Couchiching (# 7638-84FNT2) dated April 21, 2010, and groundwater from wells 1 and 2, dated May 23, 2001.

2.5 On-Site Water Treatment Process

The plant exhibits an average operating capacity of approximately 10,000 m³/day. As per the current applicable permits, the maximum daily plant capacity is not to exceed 33,826 m³ (including both water sources). On occasions, and depending on seasonality and water demand, the plant water inflow peaks up to 18,000 m³/day. During week days, the plant operates 8 hours on a “manned” mode between 7:00 am to 4:00 pm, and on an “unmanned” mode between 4:00 pm and 7:00 am. During weekends the plant operates 24 hours on “unmanned” mode.

The following sections describe the main process units / areas currently utilized at the plant.

I) Raw Water Sources and Intake Works

Surface Water Source- Lake Couchiching Intakes

- A 374 m long, raw water intake pipe consisting of 364 m of 1000 mm diameter and 10 m of 800 mm raw water intake pipes, complete with flared elbow intake inside a 4850 mm x 4850 mm x 2750 mm deep concrete filled wooden cribbed structure located in approximately 5.4 m of water (at low lake level, the inlet is submerged by 3.3 m); with a capacity of 77,274m³/d (17 MIGD); and
- An 84.58 m long, 600 mm diameter raw water intake pipe (for emergency use), with a capacity of 29.32 m³/d (6.45 MIGD).

Groundwater Source

Well Number 1

- A 350 mm diameter, 16.44 m deep ground water production well #1, located at the north west corner of Bay and Jarvis Street in the city of Orillia (UTM coordinates: NAD 83; Zone 17; Easting 625 746; Northing 4941 807); equipped with a 200 mm diameter two stage vertical turbine pump having a capacity of 30.3 L/s at 17 m total dynamic head (TDH) and complete with pump control panel; electromagnetic flow monitoring system, pressure gauge, sampling tap, 200 mm diameter gate valve used for flushing to waste and check valve.

Well Number 2

- A 350 mm diameter, 21.97 m deep ground production water production well #2, located

about 170 m south of Well 1, in the City of Orillia (UTM Coordinates: NAD 83; Zone 17; Easting 625 761; Northing: 4941 634); equipped with a 250 mm diameter 2 stage vertical turbine pump having a capacity of 37.8 L/s at 21 m TDH complete with pump control panel; electromagnetic flow monitoring system, pressure gauge, sampling tap, 200 mm diameter gate valve used for flushing to waste and check valve.

II) Low Lift Pumping Station

- A low lift pumping station having a firm capacity of 27,280 m³/d, consisting of a 8.23 m long by 6.86 m wide by 3.35 m deep wet well with a heated superstructure, having an effective storage volume of 112.3 m³; equipped with two stationary screens (one duty, one bypass) and one traveling screen, with the channel after the screen measuring 7.21 m long by 1.98 m wide by 3.35 m deep, and providing additional storage to the wet well making the total available storage volume 125.3 m³;
- Three (3) vertical dry pit low lift pumps each rated at 105 L/s all at TDH of 7.6 m;
- A 450 mm venturi tube water meter located on the common discharge header in the pumping station; and
- One (1) turbidity analyzer and one (1) chlorine analyzer.

III) Flash Mixing

- A 450 mm diameter in-line mechanical flash mixer a capacity of 9,090 m³/d to 45,460 m³/d, providing a G value of 3900/s, located on the 450 mm diameter raw water header, driven by 1.49 kW motor.

IV) Flocculation Tanks

- Three (3) parallel concrete tanks comprising two cells in series each having dimensions of 3.81 m long by 3.81 m wide by 6.55 m deep, and having a hydraulic spiral flow flocculation with G value of 20-51/s for the flow ranges of 19,780 m³/d to 36,370 m³/d.

V) Dual Media Filtration System

The plant is equipped with four dual media filters; filter backwash and wastewater management capabilities as follows:

Filters 1 and 2

- Two (2) 8.53 m long by 4.27 m wide by 3.81 m deep dual media gravity filters (GAC, sand and four layers of filter supporting gravel media) having a total rated filtration capacity of 15,460 m³/d; with each filter equipped with an automatic and/or manual backwash system and a common storage tank, common backwash trough, surface wash and under drain system;
- Two (2) flow meters, one on each filter discharge; and
- Two (2) turbidity analyzers, one on each filter discharge.

Filters 3 and 4

- Two (2) 3.66 m long by 9.15 m wide by 3.50 m deep dual media (GAC and sand) gravity filters having a total rated capacity of 11,820 m³/d; with each filter equipped with an automatic and/or manual backwash system and a common storage tank, common backwash trough, and an air scour system, and under drain system;
- Two (2) flow meters, one on each filter discharge; and
- Two (2) turbidity analyzers, one on each filter discharge.

Backwash Pump

- Two (2) vertical turbines pump each having a capacity of 405 L/s at 12.7 m TDH.

Air Blower

- One (1) 2,448 m³/h capacity air blower.

Process Wastewater Management

- One (1) wastewater holding tank having net usable volume of 335 m³ discharging to sanitary sewer.

VI) Chlorine Chambers

The plant is equipped with two chlorine chambers as follows:

Chlorine Contact Chamber No. 1

- Baffled chlorine contact chamber No. 1 having dimensions of 9.75 m long by 12.5 m wide by 4.42 m deep, for section below filters and 4.57 m by 12.5 m by 2.75 m deep below filter pipe gallery, with usable volume is 620 m³.

Chlorine Contact Chamber No.2

- Chlorine contact chamber No. 2 having dimensions of 23.56 m long by 7.01 m wide by 3.13 m water depth, with usable volume is 490 m³; and
- One (1) chlorine analyzer on common discharge to Clearwell No. 1 and 2.

VII) Treated Water Clearwell

The plant is equipped with two treated water clear wells as follows:

Clearwell Cells No. 1 and No. 2/Cleawell

- Two (2) cell Clearwell, each cell having dimension of 30.4 m long by 13.05 m wide by 4 m water depth; with total net usable volume of 3000 m³; and
- Two (2) sump pumps, one in each cell.

VIII) High Lift Pumping Station

A high lift pump building approximately 24 m long by 14 wide housing high lift pumps, UV disinfection system and backwash pump and located above the Clearwell cell and another smaller common area structure linking the new extension to the original filtration building housing a new office, meeting/lunch room, washrooms, locker and vertical circulation facilities.

Two (2) separate high lift pumping systems, one each for Zone 1 and Zone 2 of the water distribution system, with a valved (normally closed) connection between the two system follows:

Zone 1 Pump System

- Three (3) vertical turbine pumps, each having capacity of 115.7 L/s at TDH of 72 m;
- A 300 mm flow meter on the discharge main Zone 1 pump system to the distribution system;
- One (1) turbidity analyzer on the discharge; and
- One (1) chlorine analyzer on the discharge.

Zone 2 Pump System

- Three (3) vertical turbine pumps, each having 92.6 L/s at TDH of 95.1 m;
- A flow meter on the discharge main of Zone 2 pump system to the distribution system;
- One (1) turbidity analyzer on the discharge; and
- One (1) chlorine analyzer the discharge.

IX) UV Disinfection System

- Three (3) flow through reactors (one for each of Zone 1 & Zone 2 and one for common standby), each having 21 ML/d maximum current design capacity and 35 ML/d maximum ultimate design flow, and with maximum 40 mJ/cm² and 85% UV transmittance;
- Electrical control panel per UV (ultraviolet) reactor, complete with PLC (process Logic Control) unit; and
- Three (3) UV monitor, UV intensity sensor and high temperature sensor.

X) Chlorine Disinfection System

- A gas chlorine disinfection system consisting of six (6) 0.909 tonne cylinder with two (2) vacuum regulators and one (1) automatic cylinder switchover system, including:
- One (1) chlorinator for pre-chlorination having a capacity of 96 kg/d;
- One (1) chlorinator for post chlorination having a capacity 96 kg/d;
- Post-post chlorination system, including two (2) chlorinators having a capacity of 48 kg/d each, ejectors, and water supply booster pumps, discharging to the one 1 and Zone 2 discharge header;
- One (1) standby chlorinator with full service for per, post and post-post chlorination having a capacity of 96 kg/d;

- Associated equipment, instrumentation and controls, including gas detector and alarm system, located in a separate room of the plant enclosure building;
- Chlorine solution feed lines to the chlorine solution diffusers located in the mouth of the intake pipe (for zebra mussel control), at the low lifting pumping station wet well, and upstream of Chlorine Contact Chambers; and
- One (1) emergency packed bed scrubber in the chlorine storage area with a fan rated at 660 L/s of exhaust gas, using a potassium hydroxide scrubber solution to neutralize chlorine gas, and equipped with a mist eliminator, discharging 10 m above grade a 3.5 m above roof.

XI) Chemical Storage and Feed Systems

- Coagulant feed system consisting of one (1) 22,730 L capacity coagulant storage tank; two (2) (one duty and one standby) chemical feed metering pumps, having a capacity of 0 L/h to 12 L/h with chemical applied at the in-line flash mixer.

XII) Stand-By Power Facilities

- One (1) 4-cylinder gasoline and generator set rated at 12.5 kW continuous service, to supply power for emergency lighting and instrumentation and control equipment (redundant); and
- One (1) standby/peak shaving diesel generator set, prime rated at 820 kW, to provide back up emergency power to the water treatment plant, enclosed in a generator building measuring 14.0 m long by 7.2 m wide by 5.4 m high, exhausting to atmosphere at a maximum volumetric flow rate of 3.47 actual cubic meters per second at a temperature of 552 degrees Celsius, through a stack having an exit diameter of 0.30 m, extending 6.6 m above the roof and 16.0 m above grade.

Including all piping, electrical and mechanical works, plumbing and ventilation, yard piping instrumentation and control and metering equipment.

Figure 2 shows the process flow diagram for the Orillia water treatment plant.

3.0 P2 ASSESSMENT: RECOMMENDATIONS & SOURCE PROTECTION OPPORTUNITIES

The following section describes Enviro-Stewards' P2 assessment of the various processes and source protection opportunities identified at the Orillia WTP. Each section below is divided into "Observations" and "Conclusions and Recommendations".

3.1 Chemical Feed Systems and On-Site Management of Chemicals

Observations

The chemicals currently used at the plant include:

- i) Chlorine Gas for pre-chlorination; post-chlorination; and post-post chlorination disinfection, complemented with the following associated chlorination system.

A gas chlorine disinfection system consisting of six (6) 0.909 tonne cylinder with two (2) vacuum regulators and one (1) automatic cylinder switchover system, including:

- One (1) chlorinator for pre-chlorination having a capacity of 96 kg/d;
- One (1) chlorinator for post chlorination having a capacity 96 kg/d;
- Post-post chlorination system, including two (2) chlorinators having a capacity of 48 kg/d each, ejectors, and water supply booster pumps, discharging to the one 1 and Zone 2 discharge header; and
- One (1) standby chlorinator with full service for per, post and post-post chlorination having a capacity of 96 kg/d.

- ii) Poly Aluminum Chloride (Coagulant) for enhanced solids removal.

The coagulant feed system consisting of one (1) 22,730 L capacity coagulant storage tank; two (2) (one duty and one standby) chemical feed metering pumps, having a capacity of 0 L/h to 12 L/h with chemical applied at the in-line flash mixer.

- iii) Potassium Hydroxide (Chlorine leaks neutralizer). This system is complemented with:

- One (1) emergency packed bed scrubber in the chlorine storage area with a fan rated at 660 L/s of exhaust gas, using a potassium hydroxide scrubber solution to neutralize chlorine gas, and equipped with a mist eliminator, discharging 10 m above grade a 3.5 m above roof.

The observation made included.

- i) All chemicals, except chlorine gas, which is delivered in 909 kgs steel containers, are delivered by tanker truck and placed into storage tanks following top discharge and fill up procedures in order to prevent spills. All storage and daily tanks are equipped with spill containment walls. Spill response kits are located and readily accessible across the chemicals storage area and transfer station.
- ii) Spill containment structures around chemical holding tanks are currently not equipped with spill containment detection probes/detectors.
- iii) All four filters exhibited a slight sheen on the water surface. This fact was discussed with the plant superintendent at the time of the inspection, and the appropriate chemical dosage for polymer addition was confirmed.
- iv) Jar testing for optimum polymer dose is not being carried out at the facility. According to the plant superintendent longer stabilization periods of the PACL (Poly Aluminum Chloride) dosing and metering system were experienced during alternating colder and warmer water conditions.
- v) The plant does not perform final ammonization of the treated water. Chlorine gas evaporators are not currently utilized at the OWFP.
- vi) The chlorine leak potassium hydroxide neutralization system was out of service and undergoing a major overhaul. Pumps were removed and are in the process of being replaced. According to information received from the plant personnel in June 2010, the system overhaul has already been completed and the system is fully operational.

Conclusions and Recommendations

- i) Polymer Overdose Minimization: During fluctuating weather conditions, it is recommended to implement periodic jar testing on samples of the raw water and reset accordingly, via PLC, the chemical metering pumps. Note that polymer overdose of the raw water will result in i) shorter filter runs; ii) increased overall filter head loss; iii) increased backwash requirements; iv) increased water wastage; v) filters operating under increased non-ripening conditions; and vi) increased overall plant energy consumption.
- ii) Potassium Hydroxide Neutralization System Optimization/Testing: It is recommended that this system be contained in a spill containment structure and that the system be tested at least twice per month by simulating chlorine leaks in the vicinity of the existing chlorine gas detection probes. According to information received by plant personnel the scrubber system is tested periodically every 90 days.

- iii) Install leak detection probes in all spill containment tank floors.

3.2 Solid Waste On-Site Management

Observations

Solid waste generated at the OWFP includes:

- Plastic bags;
- Cardboard;
- Paper bags;
- Plastic containers;
- Cans; and
- Wooden Skids.

According to testimony from the plant superintendent, and observations made during the site inspection, these materials are neatly handled and placed in waste and recycling bins located throughout the plant and weekly removed off site by a local solid waste management company.

Conclusions and Recommendations

The current management of solid waste at the facility does not represent a threat to the water source or to the water distribution system in and around the facility.

3.3 On-Site Management of Miscellaneous Wastes Generated During the Water Treatment Process

Observations

Wastes generated as by-product of the water treatment process include:

- Filters backwash wastewater; and
- Residual sludge from coagulation-flocculation processes.

1. Filter Backwash Wastewater

Filters are backwashed based on preset parameters as indicated below:

- Time every 28 hours;

- Turbidity, by reaching 0.3 NTU level set point; and
- Head Loss by reaching 1.8 meters set point.

Whichever occurs first?

The automatic backwash program consists of the following sequence:

- i) Initial water spray of filter surface for 1 minute;
- ii) Low wash during 2 minutes;
- iii) High wash during six minutes (adjustable as required); and
- iv) Low wash during two minutes.

Filters 3 and 4 are also equipped with initial air scouring.

The Filters are equipped with the following system for filter backwash and air scouring:

- Two (2) vertical turbine pump each having a capacity of 405 L/s at 12.7 m TDH; and
- One (1) 2,448 m³/h capacity air blower.

The generated filter backwash wastewater is routed to a 335 m³ wastewater holding tank previous discharge to the sanitary sewer line.

2. Residual sludge from coagulation-flocculation processes.

Process tanks are cleaned every three to four years and settled sludge from the coagulation-flocculation process is removed and disposed via the sanitary sewer line.

Conclusions and Recommendations

- i) **Filter Backwash Rate Optimization:** It is recommended to investigate optimum backwash rates under fluctuating summer and winter conditions. Filter backwash rates may be lowered during winter conditions due to an increase water viscosity leading to a potential increase in filter media loss.
- ii) **Periodic Filter Inspection:** It is recommended to implement a daily visual inspection of the filter/filter gallery during filtration and backwashing modes. Polymer sheen on the water surface as well as non-uniform backwashing areas and flow channeling are potential indicators of the need for filter operation optimization.
- iii) **Filter Backwash Reclamation:** Information received from the plant superintendent indicates that the Orillia WFP is in the process of implementing a filter backwash reclamation program, whereby the last three minutes of the filter backwash sequence

would be diverted from the sewer line (current final disposal) and re-routed to the raw water intake well. It is estimated that approximately 4500 litres of filter backwash water could be recovered by the water reclamation program.

Enviro-Stewards are in agreement with investigating filter backwash reclamation opportunities such as the one mentioned above. The benefits of implementing such programs would be several fold including i) water savings; ii) chemical savings due to polymer residual in the backwash water; reduced hydraulic load to the sanitary sewer.

- iv) Tank Bottom Sludge Management: Regarding the management and final disposal of settled sludge from the coagulation-flocculation process, it is recommended investigating the use of tank bottom settled sludge in the raw water intake well to assist in the overall solids settling process.

3.4 On-Site Management of Fuels and Combustibles

Observations

- i) Three sources of fuel are currently used at the Orillia water filtration plant:
- Natural gas for general plant heating (the plant is connected to the city natural gas network system consuming on average 4,000 m³ of natural gas per month);
 - Diesel Oil for the 820 Kwatts emergency stand-by generator; and
 - Gasoline for the 75 Kwatts emergency stand by generator.

An indoor diesel oil feed tank of approximately 4.4 m³, located across Bay Street feeds fuel oil to an 820 Kwatts emergency generator. As can be seen in the photo log, the diesel oil feed tank is located inside a dedicated building across the street and it is equipped with a containment wall.

- ii) A small 25 liters gasoline feed tank supplies gasoline to a 75 Kwatts emergency generator located at the low lift station. This emergency unit operates during 8 to 12 minutes providing initial power back up to the control room PLC/computer system before the 820 Kwatts gen-set is fully fired up and operational.
- iii) A third diesel oil fed emergency generator, used for firing up the low lift pumps, was in place during the initial site visit. As reported by the plant superintendent on June 2, 2010, this unit has already been disconnected and all equipment and feed tank removed from the premises, as initially recommended by Enviro-Stewards.

- iv) As indicated by the plant superintendent, both plant emergency generators are run-tested bi-weekly for approximately one hour.

Conclusions and Recommendations

Due to its location in a dedicate building across Bay street and its vicinity to the existing and operational groundwater wells 1 and 2, the 4,400 liter diesel fuel tank and adjacent emergency generator could potentially represent, in the event of a major leak, a threat to the water source protection area. Therefore, periodic inspections of the system are recommended.

According to plant personnel, the diesel fuel tank spill containment is checked weekly; it is located in a full spill containment area (as confirmed by the plant superintendent).

3.5 On-Site Storage Room and Maintenance Station

Observations

- i) The plant is equipped with a large storage room. This room, located directly above the treated water clear well is currently used to store snow blowers; pumps and equipment spare parts. The storage room is also utilized to temporarily store chemicals; 20 litre grease containers; solid waste (plastics, skids, etc.) and small gasoline containers.
- ii) The plant is also equipped with a small O&M room. The maintenance shop is kept in an acceptable order and exhibits a neat layout. All liquids such as oils, cleaners, etc., are currently stored in safe conditions and in an orderly fashion. According to the plant superintendent, all cleaning solvents and used oil utilized in the operation and maintenance room are recycled and disposed of off-site on an as-needed basis by a local waste management company.
- iii) Floor drains in the storage room and the operation and maintenance room are currently not equipped with spill prevention devices.

Conclusions and Recommendations

It is recommended that spill prevention barriers be located around each floor drain in the storage and O&M rooms. It is also recommended that these barriers be inspected periodically to ensure at all times their structural integrity in the event of a spill. Also, given the fact that the storage room is located above the treated water clear well and in the vicinity of the ultraviolet system, it is recommend the removal from the storage room of all chemicals, cleaners, grease containers and solid wastes and their relocation to a more secured area.

3.6 Transformer Station

Observations

A 4,160 Kilovolt transformer station is located adjacent to the water treatment facility. It was not confirmed during the site investigation or by the plant superintendent whether or not the transformer station contained PCBs.

Conclusions and Recommendations

It is recommended that a periodic inspection of the transformer station be performed as part of routine O&M activities. This will ensure that potential leaks/risks from the transformer station are rapidly identified and addressed accordingly before they become a threat to the water source. The installation of accident prevention barrier/pillars and visible bollards around the structure is also recommended.

Finally, and as due diligence, plant personnel should ascertain whether or not the existing transformer station contains PCB oils.

3.7 Stand-by Energy Generator Set

Observations

The facility is currently equipped with two emergency generators as follows:

- One (1) 4-cylinder gasoline and generator set rated at 12.5 kW continuous service, to supply power for emergency lighting and instrumentation and control equipment (redundant); and
- One (1) standby/peak shaving diesel generator set, prime rated at 820 kW, to provide back up emergency power to the water treatment plant, enclosed in a generator building measuring 14.0 m long by 7.2 m wide by 5.4 m high, exhausting to atmosphere at a maximum volumetric flow rate of 3.47 actual cubic meters per second at a temperature of 552 degrees Celsius, through a stack having an exit diameter of 0.30 m, extending 6.6 m above the roof and 16.0 m above grade.

As indicated previously in the report, a third gen-set, 4-cylinder diesel engine on low lift pump 4 (standby) was recently removed following Enviro-Stewards recommendation.

Conclusions and Recommendations

12.5 kW Emergency Generator: Due to its location and vicinity to water sources in the low lift station, it is recommended that the generator be surrounded by an approved spill containment

wall and equipped with a spill prevention kit. It is also recommended the relocation of the fuel tank and the installation of a spill containment around the gen-set gasoline tank.

3.8 Parking Lot Area

Observations

- i) The parking lot is used to park vehicles and delivery trucks. No vehicle maintenance is performed on the parking lot. The paved parking lot floor has a rise at the entrance to prevent any surface water (rain or snowmelt) from entering the plant premises.
- ii) The asphalt floor is in good condition and no evidence of leaks on the floor was evident during the site inspection.

Conclusions and Recommendations

Although no leaks were observed on the parking lot area, the potential for oil, gasoline leaks from truck and cars could represent a risk to the source protection zone should these contaminants be allowed to enter the adjacent lake area. Therefore, it is recommended that simple floor absorbent barriers be installed and be readily available in the parking lot area.

3.9 General Housekeeping, Salt and Pesticide Use

Observations

The following observations were made during the site visit:

- i) **Water Accumulation on the Floor:** Water accumulation was observed at several locations across the filtration plant (low lift; high lift; etc.). This accumulation, mainly caused by water condensation and dripping, has in some cases, caused piping corrosion (see photolog). The puddles of rusty coloured water observed during the site visit not only represent unsafe working conditions, but also could become a source of contamination, especially near the high lift station;
- ii) **Dust/rust accumulation in the High Lift Area:** Limited housekeeping was noted in some corners of the storage room just above the treated water clear well;

- iii) Salt containers on the Filter Gallery Floor: Several salt containers were observed near filters 1 and 2 during the site investigation. In the event of an accident the contents of these containers could easily reach the filters;
- v) Salt containers were located at the rear building entrance to prevent slip hazards near the doorways. Minimal salt is used on the pavement areas throughout the property. No pesticides and/or fertilizers are currently used at the facility;

Pictures of these observations can be found in Appendix B.

Conclusions and Recommendations

Salt containers should be removed from the filter gallery and operators be instructed accordingly. This practice will avoid unexpected accidents and potential filtered water contamination.

Based on the observation performed during the site tour in February 18, 2010, the plant seems to be in the process of improving its overall housekeeping practices. A great deal of effort was placed by the plant superintendent to ensure that all the above-mentioned noted observations were promptly and satisfactorily addressed.

3.10 Cross-Connection Control and Backflow Prevention

A backflow prevention device is used to protect the water quality in the plant from several levels of contamination or pollution in areas where potential water cross-connection and water backflow might occur.

Areas prone to this type of occurrences include:

- Pump discharge pipelines into reservoirs and clear wells;
- Pipe connections allowing for outside tanker water refill;
- Chemical addition systems across the water plant; and
- Water piping connecting into the general service piping and sewerage system; etc.

Observations

The Orillia water filtration plant is equipped with five devices for cross-connection control and backflow prevention. The devices utilized at the facility include:

- Air gap (AG);
- Atmospheric vacuum breakers;
- Double check-valve assembly (DCVA);

- Pressure vacuum breaker assembly (PVB); and
- Reduced pressure zone device (RPZ).

According to information received from the plant superintendent during the onsite investigation, all cross-control, anti-syphon, and backflow prevention devices at the Orillia water filtration plant were installed by certified personnel in accordance with the Ontario building code. As required by the Ontario Water Regulations, these devices are subject to periodic inspections by certified installers every 12 months.

Refer to Appendix C for inspection certificates of the main BFP devices at the plant.

3.11 Current Operating Practices for Air Scouring During Filter Backwash

Presently, filters 3 and 4 are equipped with an air scouring system (distribution piping and 2,448 m³/h capacity air blower).

These filters are automatically backwashed following a sequence outlined in section 3.3 based on time; turbidity or head loss, whichever comes first. The backwashing is preceded by a 60 second air scouring (approximately 1500 CFM air supply) intended to release the solids from the filter media.

Opportunities for Water Quality Improvement

Filter backwashing operations are not only energy consuming but also, when performed with unnecessary frequency, could compromise the quality of the filtered water by allowing turbidity breakouts through the still unsettled filter media. Thus, it is recommended that filter backwashing operations at the Orillia WFP be optimized.

By optimizing the current air scouring program and reducing the filter's ripening period after each backwash, the possibility of turbidity breakthrough in the filters and the likelihood of THMs generation is also reduced. All in all, a better filtration performance of the filters would have a direct impact on the likelihood of a potential generation of THMs (tri-halo-methanes) at the plant.

3.12 Neighboring Lands and Their Effect on Water Quality

As indicated in section 2.3, the lands/properties neighboring the water treatment plant are:

South: Crown Parklands;

East: Couchiching Lake;

North: Retirement Housing; and

West: Roadway.

Observations

During the site visit, Enviro-Stewards performed a brief visit of the lands around the treatment plant and documented testimony provided by the water plant personnel regarding the current use of the neighboring lands, as well as the potential effect of these lands on the raw water quality.

Based on the information received and observation made, no visible effect in the form of surface runoff, spills, and/or surface water management features located at the neighboring premises were identified as affecting the water quality and or the operation of the Orillia WFP.

3.13 Sanitary Sewage

Observations

The facility is equipped with two bathrooms. All sanitary sewage generated by the plant's daily operation (5 operators during day shift) is directly discharged to the local sanitary sewer line.

Conclusions and Recommendations

Overall, the current management of sanitary sewage at the facility does not represent a threat to the source of potable water or to the water distribution system in and around the facility and to other environmental media.

3.14 Wastes from On-Site Laboratory Facilities

Observations

- i) The plant is equipped with a small laboratory for the analysis of chlorine residual; turbidity and temperature. All other analysis are performed off-site. All waste stream samples from the water quality control area as well as wastes generated by operators during routine testing is sent to the sanitary sewer line.
- ii) Chemicals Stored on the Laboratory Floor: Plastic containers containing distilled water and vinegar were noted on the laboratory floor under the working counter.

Conclusions and Recommendations

Improved Chemical Storage Practices: It is recommended implementing improved chemical storage practices in the daily laboratory. This will minimize not only the occurrence of small chemical spills but also reduce the risk of chemicals reaching the floor drains. The installation of a spill containment kit in the laboratory is also recommended.

3.15 Toxic Substances

Chemicals identified as toxic/corrosive were chlorine gas and potassium hydroxide. These chemicals are delivered by truck into final storage areas. KOH transfer practices are performed following top discharge and fill up procedures in order to prevent spills. All storage and daily tanks are equipped with spill containment walls.

3.16 TCE Air Scrubber System

As indicated previously, the plant also receives water from two adjacent wells 1 and 2 at an average rate of 400 m³/day and 360 m³/day respectively. Water from these wells exhibit minor PCE & TCE contamination, which is removed by the use of a parallel air scrubbing system. Treated waste flows by gravity to the WFP and combines with the filter's effluent, previous entering the treated water clear well.

Conclusions and Recommendations

Inspection of the well houses as well as of the scrubbing system showed the system operating under normal conditions and all existing infrastructure in place to be in orderly fashion.

3.17 GHG Reduction Opportunities

Two separate sources for GHG reduction have been identified during the site visit:

- i) Improvement to the current lighting system.

The plant built originally in 1914 has two levels and a covered floor area of approximately 4500 m². The plant consumes approximately 160,000 kWh/month of hydro. The installed capacity of the existing lighting system is approximately 15 kW. The plant has mostly F32T8 fluorescent lamps fixtures with double lamps/fixture in its process rooms, filter gallery; storage rooms, and office rooms. Enviro-Stewards recommends following a phased approach, replacing the existing lighting system by a new lighting system including T5 fluorescent lamps for office and process areas, LED lamps in exit signs, and utilizing day light where possible. By installing efficient

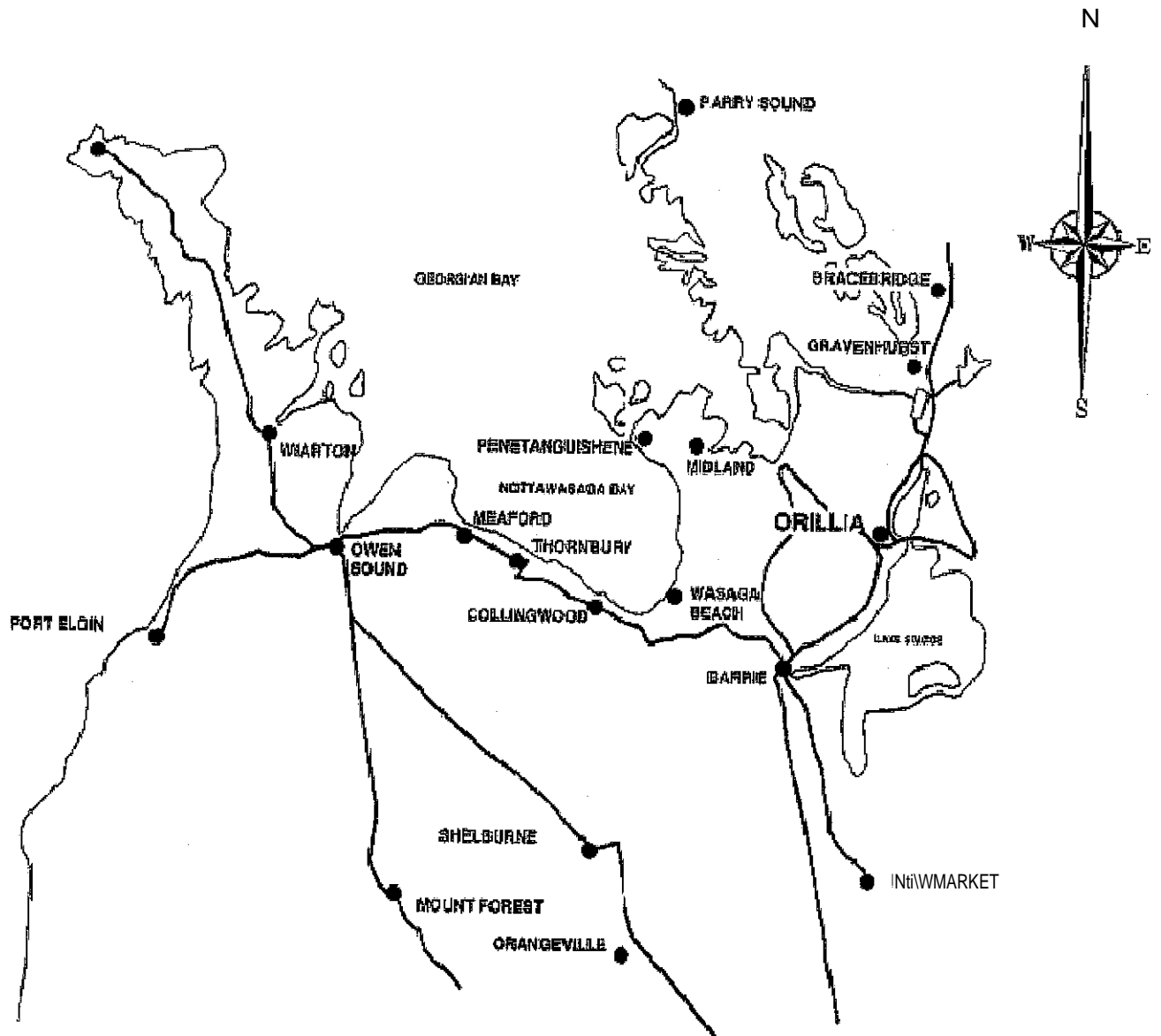
lamps, up to 10% of electricity consumed by current lighting system could potentially be saved (13,000 kWh/yr) corresponding to an approximate GHG reduction of 4 tonne of carbon dioxide equivalent (CO₂-eq) per year.

ii) Improvement to the current filter backwash system.

It is assumed that approximately 80 horsepower in total are necessary during every filter backwash. Assuming that each filter is backwashed for approximately 15 minutes every 28 hours, the yearly backwashing time is approximately 45 hours per year (365 operating days/year). Based on the above, the estimated yearly electrical consumption for each filter backwash system is 2,700 kWh per year, which represents approximately 0.81 tonnes of CO₂-eq per year per filter or 3.24 tonnes of CO₂-eq for the 4 filters per year (assuming a 0.3 kg CO₂-eq/kWh carbon dioxide emission factor for electricity generated in Ontario).

Finally, a suggestion rather than a recommendation is made regarding evaluating and assessing the current pumping efficiency of the low- and high-lift pumps. Over time, pump impellers gradually tend to drift away from their intended operating performance curve due to corrosion, scaling, and other factors affecting the metal surface. Re-conditioning impellers is not a difficult task; however, it is a time-consuming one. Pumping efficiencies of retrofitted impellers could increase, depending on the initial condition of the impeller, up to 10%, which would decrease the overall operating costs. Should this be the case, and based on a total usable daily power of approximately 200 HP on a continuous basis, the estimated annual electricity saving would be 131,000 kWh. Hence, the corresponding GHG reductions associated with a potential overhaul of the existing low- and high-lift pump impellers would be 40 tonnes of CO₂-eq/yr.

Finally, Table 1 presents and prioritizes a summary of the water source protection opportunities identified during the investigation.



MAP LEGEND

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110T TO SCALE

Enviro-Stewards Inc.
 Engineers & Scientists
 www.enviro-stewards.com

3120-20 June 03, 2010, Rev. (0)

DRAWN BY: JBP Mechanical Technologies

LOCATION AREA MAP
 ORILLIA WATER TREATMENT PLANT
 ORILLIA, ONTARIO

Figure 1/

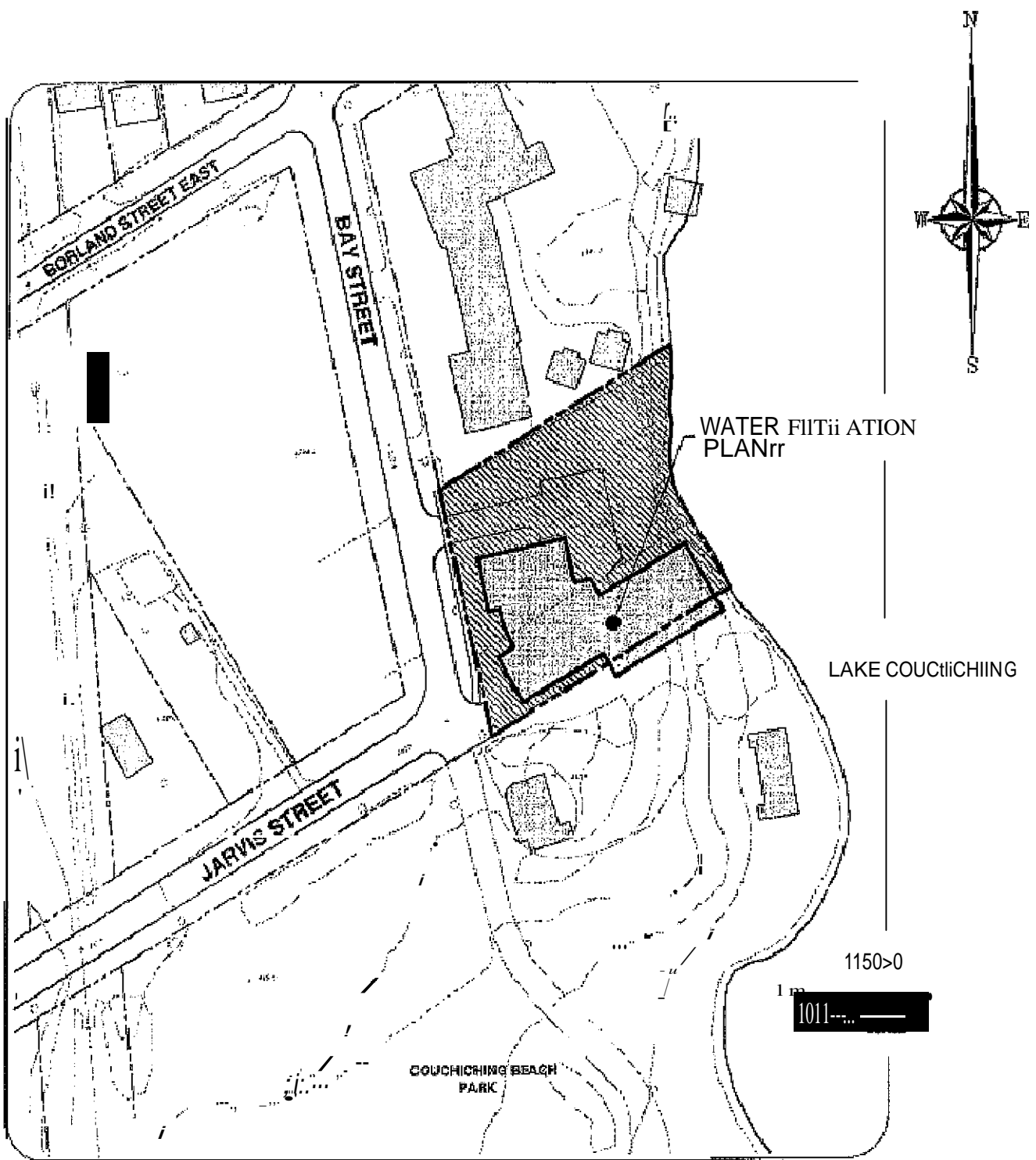


Figure 111



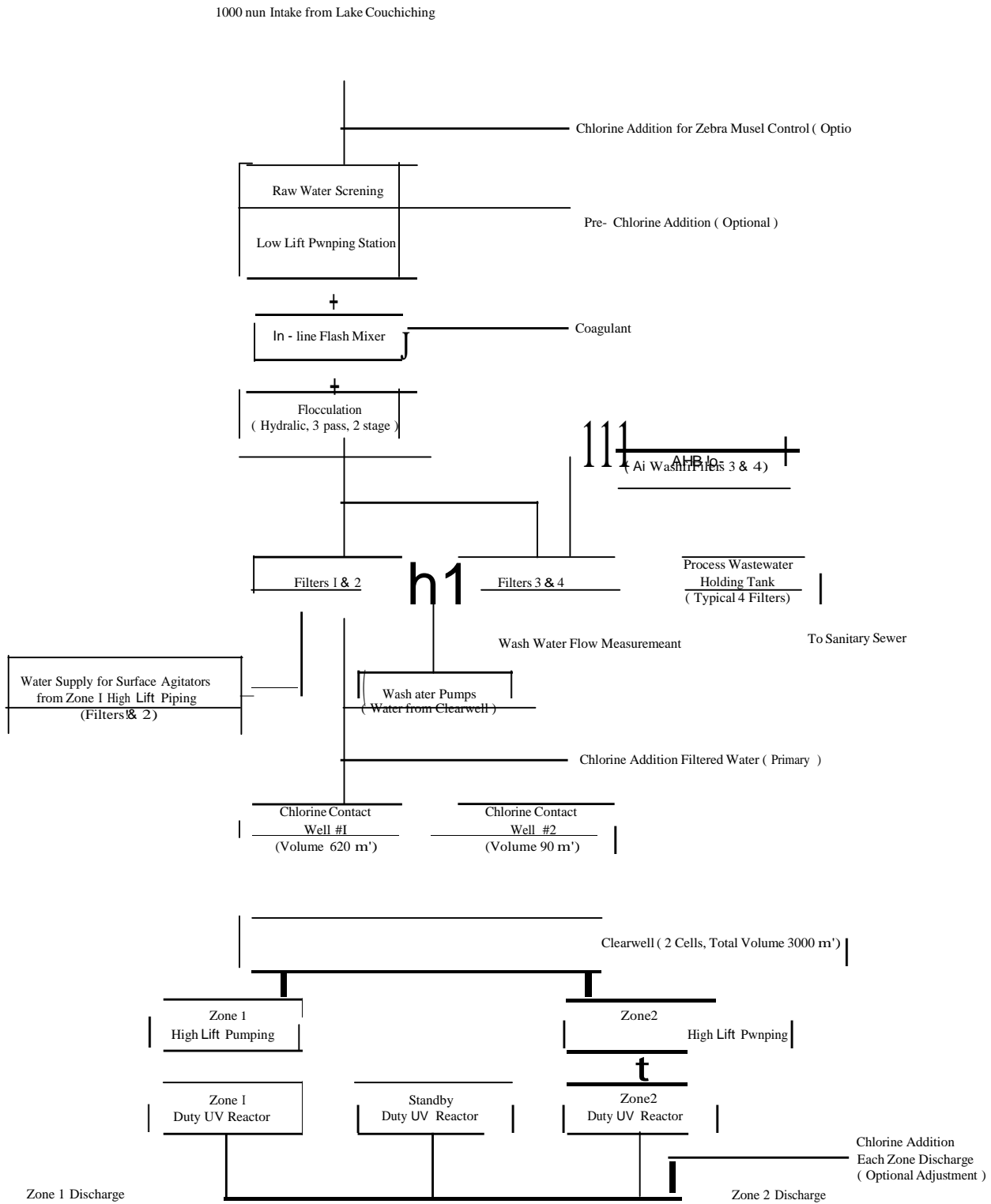





























Figure 2

Table 1
Summary of P2 and Source Protection Opportunities
Orillia Water Filtration Plant
Orillia, Ontario

Item	Potential Risk Source		Description of P2/Source Protection Opportunity ¹	Source Protection and Business Risk Reduction	
	Type	Risk-Level		Cost	
Chemicals transfer from supplier-tanker to bulk storage tanks and to day tanks	Chemical		▶ Ensure availability of spill containment features near transfer area Inspect area after each chemical transfer Install spill detection probes on main containment structure floors		Source Protection
Transformer	PCB/Oil		▶ Install accident prevention barriers and visible bollards around the structures Inspect transformer station periodically		Source Protection
Stand-by Generators	Diesel/Gasoline		▶ Equip gen-set with a spill containment/response kit Inspect gen-set system periodically to ensure their structural integrity		Source Protection
Parking Lot and Garage	Oils/Fluids		▶ Equip parking lot with a spill containment/response kit Inspect lot periodically to ensure their structural integrity		Source Protection
Diesel/gasoline fuel tanks	Diesel		▶ Equip fuel tank with a spill containment/response kit Periodically inspect the tank to ensure structural integrity of the tank		Source Protection
Daily Laboratory			▶ Equip room with a spill containment/response kit Re-place chemicals in secured area away from lab floor		Source Protection
Floor Drain in Maintenance Room	Used oil		▶ Equip room with a spill containment/response kit Inspect barriers periodically to ensure their structural integrity		Source Protection
Storage Room	Misc. Chemicals		Reorganize misc. stored materials and install spill containment kit for small leaks		Source Protection
General General Housekeeping	Misc.		▶ Improve Housekeeping in selected areas near high lift Prevent floor water puddling. Relocate chemicals/fuel tanks, etc. to secure location		Source Protection
Salt/De-icing Products Storage	Salt		Remove all salt containers from the filter gallery		
Filter Backwash	N/A		▶ Optimize filter backwash schedule to improve overall water quality Investigate filter backwash water reclamation opportunities		Source Protection
Lighting system	N/A		▶ Replace existing lighting system by energy efficient lighting system		- Electricity saving: 13,000 kWh/yr - GHG Reduction: 4 tCO _{2-e} /yr
High and Low Lift Pumps	N/A	N/A	▶ Impellers efficiency investigation		- Electricity saving: 131,000 kWh/yr - GHG Reduction: 40 tCO _{2-e} /yr

Notes:

-  - High
-  - Medium
-  - Low

¹ Items in **bold** recommended for implementation.

N/A Not applicable.

APPENDIX A

COPY OF SOURCE WATER PROTECTION APPLICATION

Ontario Drinking Water Stewardship Program 2009-10
Pollution Prevention Review Application Form

CONTACT INFORMATION

Legal Name of Business: The Corporation of the City of Orillia

Applicant Name: Peter Dance

Title: Director of Public Works

Phone (Business): (705) 325-2314 Phone (alternate) (705) 325 2314

Fax: (705) 325-2314 - Email: pdance@city.orillia.on.ca

Business Address: 200 Bay Street Postal Code: L3V 3W8

City/Town: Orillia Province: Ontario

Mailing Address (if different): 50 Andrew Street South, Suite 300 Orillia, Ontario. L3V 7T5

Legal Address: Twp.: _____ Lot(s): _____ Cone.: _____

FACILITY INFORMATION

Type of Business: Orillia Water Filtration Plant {WFP}
Ownership (i.e. sole owner or multi-site company; Canadian only or international parent company): Municipality
Total number of employees: 15
Number of employees on-site: 15
Business activities: The WFP treats raw water from Lake Couchiching and provides potable water to the residential and businesses in the City of Orillia. Raw water is also drawn from two groundwater wells {Wells No. 1 & 2} and introduced into the chlorine contact chambers at the plant.

**Ontario Drinking Water Stewardship Program 2009-10
Pollution Prevention Review Application Form**

<p>Facility description: The Orillia WFP is located at 200 Bay St. in Orillia and it is also within the 100m Capture Zone of the Wellhead Protection Area for the groundwater Wells No. 1 and 2 of the Orillia Drinking Water System. There are a number of chemicals used in the treatment process and in the laboratory attached to the WFP. Some of the chemicals used and/or stored at the plant include: Chlorine, Poly Aluminum Chloride Potassium Hydroxide, Potassium iodide, Nitric Acid = Sulphuric Acid and cleaning products. Diesel fuel is also stored for the low lift standby pump at the WFP. In addition, the standby diesel generator for the WFP located across the road has a fuel tank of capacity 4000 litres and is located within the 100m Capture Zone of the Municipal Wells. WFP also utilizes UV disinfection. Currently waste produced from the treatment processes is discharged to the sanitary sewer system.</p>	
<p>Are there current environmental policies/programs in place within the business?</p>	<p><input type="radio"/> Yes <input type="radio"/> No</p>
<p>If yes, please provide a brief description:</p> <p align="center">N/A</p>	

POLLUTION PREVENTION REVIEW PROJECT AGREEMENT

I have read, understood, and agree to the guidelines and the terms of funding assistance for the **Ontario Stewardship's Pollution Prevention** program.

Signature of Applicant

Date

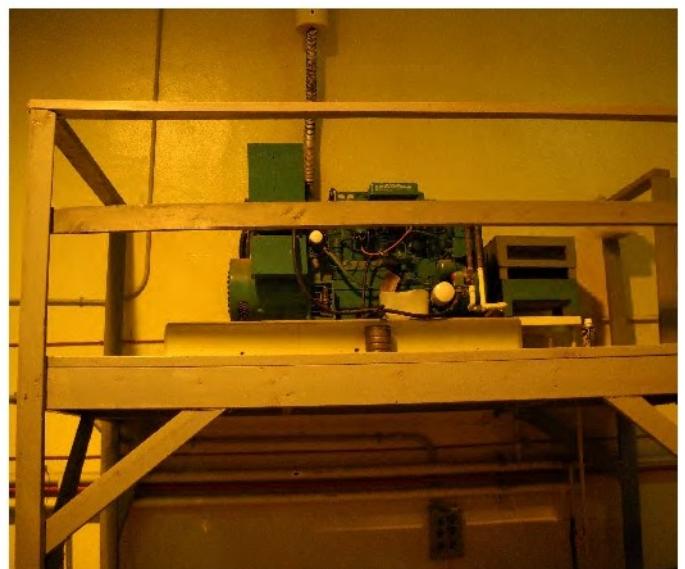
APPENDIX B

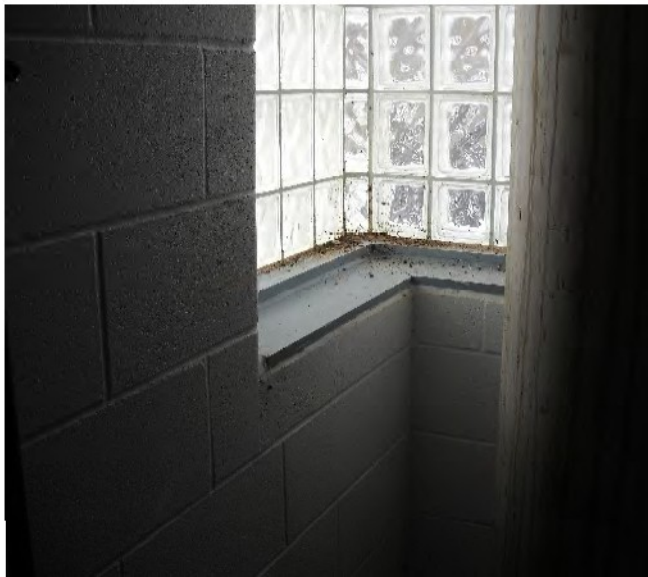
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APPENDIX C

CROSS CONTAMINATION PREVENTION DEVICES LOG

t 1.C.Jtf:E TYD

705-325-8138

P.O. BOX 307, ORILLIA, ON L3V 6J8

Testing & Inspection Report

Double Check Valve Assembly / Pressure Vacuum Breaker

Address Location a.n.J) s Street		Municipality Orillia	Postal Code!!
Occupant	Party Contacted		Telephone
Owner City of Orillia			Tele-phone
Address of Owner 50 Andrew St. S.		Orillia	Postal Code
Name of Certified Tester Corby Schell		Tester Certification Number 9058	Telephone 705-325-8138
Business Name Orillia Hydrants & Mech		Business Address P.O. Box 307 Orillia	Postal Code L3V 6J8
Make of TEST KIT Watts	Model Number TK-99E	Serial Number 238888	Date of Last Calibration 09/07/09

DOUBLE CHECK VALVE ASSEMBLY / PRESSURE VACUUM BREAKER

Make of ASSEMB DCVAM PVBO	Model Number Wilkins 950XL	Serial Number 2626074	Size 3/4"
INSTALL DATE YY MM DD	Location of Assembly (ie: building, room number, installed on what system) Stripper building		
TYPE of TEST Initial <input type="checkbox"/> Annual <input checked="" type="checkbox"/>	Date of Test 09/12/09	Line pressure at time of test 92 Psi	!cPa

TEST	Check Valve No. 1		Check Valve No. 2		Pressure Vacuum Breaker	TEST RESULTS Failed <input checked="" type="checkbox"/>
	With Flow <input type="radio"/> Leaked <input checked="" type="radio"/> Closed Tight Pressure drop across check	Against Flow <input type="radio"/> Leaked <input checked="" type="radio"/> Closed Tight kPa/Psi	With Flow <input type="radio"/> Leaked <input checked="" type="radio"/> Closed Tight Pressure drop across check	Against Flow <input type="radio"/> Leaked <input checked="" type="radio"/> Closed Tight kPa/Psi	Air Inlet Valve <input type="radio"/> Failed to Open <input checked="" type="radio"/> Opened at	

IF THE ASSEMBLY FAILS THE INITIAL TEST FOR ANY REASON, COMPLETE THIS SECTION AND NOTE REPAIR BELOW:

REPAIRS:

PAIR	DOUBLE CHECK VALVE ASSEMBLY						DATE OF RE-TEST YY MM DD
	Check Valve No. 1		Check Valve No. 2		Pressure Vacuum Breaker		
	CL:INBD REPLACED <input type="radio"/> Disc <input type="radio"/> Spring <input type="radio"/> Guide <input type="radio"/> Pin Retainer <input type="radio"/> Hinged Pin <input type="radio"/> Seat <input type="radio"/> Diaphragm <input type="radio"/> Other (describe)	CL:MEII REPLACED <input type="radio"/> Disc <input type="radio"/> Spring <input type="radio"/> Guide <input type="radio"/> Pin Retainer <input type="radio"/> Hinged Pin <input type="radio"/> Seal <input type="radio"/> Diaphragm <input type="radio"/> Other (describe)	CL:INBD REPLACED <input type="radio"/> Vent Disc <input type="radio"/> Vent Spring <input type="radio"/> Poppet <input type="radio"/> Retainer <input checked="" type="radio"/> sg g <input type="radio"/> Guide <input type="radio"/> Other (describe)	CL:MEII REPLACED <input type="radio"/> Vent Disc <input type="radio"/> Vent Spring <input type="radio"/> Poppet <input type="radio"/> Retainer <input checked="" type="radio"/> sg g <input type="radio"/> Guide <input type="radio"/> Other (describe)	Air Inlet Valve <input type="radio"/> Failed to Open <input checked="" type="radio"/> Opened at	Check Valve <input type="radio"/> Leaked <input checked="" type="radio"/> Closed tight Pressure drop across check	RE-TEST RESULTS <input type="radio"/> Passed <input checked="" type="radio"/> Failed
RE-TEST	With Flow <input type="radio"/> Leaked <input checked="" type="radio"/> Closed Tight Pressure drop across check	Against Flow <input type="radio"/> Leaked <input checked="" type="radio"/> Closed Tight kPa/Psi	With Flow <input type="radio"/> Leaked <input checked="" type="radio"/> Closed Tight Pressure drop across check	Against Flow <input type="radio"/> Leaked <input checked="" type="radio"/> Closed tight kPa/Psi	Air Inlet Valve <input type="radio"/> Failed to Open <input checked="" type="radio"/> Opened at	Check Valve <input type="radio"/> Leaked <input checked="" type="radio"/> Closed tight Pressure drop across check	RE-TEST RESULTS <input type="radio"/> Passed <input checked="" type="radio"/> Failed

Remarks:

-----OFFICE-USE-ON-----

I certify that I have tested the above assembly

Signature of Certified Tester: Corby Schell Date: 2009 12 09

Orillia Hydrant & MECHANICAL SERVICES

705-325-8138
P.O. BOX 307, ORILLIA, ON L3V 6J8

Testing &: Inspection Report

Reduced Pressure Principle Backflow Prevention Assembly

Address Location 128 Jarvis Street		Municipality Orillia	Post. Code
Occupant	Party Contacted		Telephone
Owner City of Orillia			Telephone
Address of Owner 50 Andrew St. S.		Municipality Orillia	Postal Code
Name of Certified Tester Corby Schell	Tester Certification Number 9058		Telephone 705-325-8138
Business Name Orillia Hydrant & Mech.	Business Address P.O. Box 307 Orillia		Postal Code L3V 6J8
Make of TEST KIT Watts	Model Number TK-99E	Serial Number 238888	Date of Last Calibration 019/017/019

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY

Make of ASSEMBLY Watts	Model Number 009M201RP	Serial Number 156096	Size 2"
INSTALL DATE YY MM DD	Location of Assembly (ie: building, room number, installed on what system) generator building		
TYPE of TEST: Initial <input type="checkbox"/> Annual <input checked="" type="checkbox"/>	Date of Test YY MM DD 09 12 09	SHUT OFF VALVE NO. 2 Leaked <input type="checkbox"/> Closed Tight <input checked="" type="checkbox"/>	Pressure at time of test 5 Psi _____ kPa

TEST	Diaphragm Pressure Relief Valve	Check Valve No. 1	Check Valve No. 2	TEST RESULTS <input checked="" type="checkbox"/> Passed <input type="checkbox"/> Failed
	<input type="checkbox"/> Failed to Open Opened at: _____ Psi _____ kPa	<input type="checkbox"/> Leaked <input type="checkbox"/> Closed Tight Pressure differential across first check valve (no flow): _____ Psi	<input type="checkbox"/> Leaked <input type="checkbox"/> Closed Tight Pressure differential across 2nd check valve (no flow) Psi	

(f THE ASSEMBLY FAILS THE INITIAL TEST FOR ANY REASON, COMPLETE THIS SECTION AND NOTE REPAIR BELOW:

REPAIR NOTES: _____

REPAIR	Diaphragm Pressure Relief Valve CLEANED REPLACED: <input type="radio"/> Disc Upper <input type="radio"/> <input type="radio"/> Disc lower <input type="radio"/> <input type="radio"/> Spring <input type="radio"/> <input type="radio"/> Diaphragm Large <input type="radio"/> <input type="radio"/> Upper <input type="radio"/> Lower <input type="radio"/> <input type="radio"/> Diaphragm Sml <input type="radio"/> <input type="radio"/> Upper <input type="radio"/> Lower <input type="radio"/> <input type="radio"/> Spacer Lower <input type="radio"/> <input type="radio"/> Seat <input type="radio"/> <input type="radio"/> Other (describe) <input type="radio"/>	Check Valve No. 1 CLEANED REPLACED: <input type="radio"/> Disc <input type="radio"/> D <input type="radio"/> Spring <input type="radio"/> D <input type="radio"/> Guide <input type="radio"/> <input type="radio"/> Pin Ret/Jncr <input type="radio"/> <input type="radio"/> <input type="radio"/> Hinged Pin <input type="radio"/> <input type="radio"/> Seat <input type="radio"/> <input type="radio"/> Diaphragm <input type="radio"/> <input type="radio"/> Other (describe) <input type="radio"/>	Check Valve No. 2 CLEANED REPLACED: <input type="radio"/> Disc <input type="radio"/> <input type="radio"/> Spring <input type="radio"/> <input type="radio"/> Guide <input type="radio"/> <input type="radio"/> Pin Retainer <input type="radio"/> <input type="radio"/> Hinged Pin <input type="radio"/> <input type="radio"/> Seat <input type="radio"/> <input type="radio"/> Diaphragm <input type="radio"/> <input type="radio"/> Other (describe) <input type="radio"/>	Shut Off Valve No. 2 CLEANED REPLACED: <input type="radio"/> Disc <input type="radio"/> <input type="radio"/> Seat <input type="radio"/> <input type="radio"/> Other (describe) <input type="radio"/>
	RE-TEST	<input type="checkbox"/> Failed to Open <input type="checkbox"/> Opened at: _____ Psi _____ kPa	<input type="checkbox"/> Leaked <input type="checkbox"/> Closed tight Pressure differential across first check valve (no flow); _____ Psi	<input type="checkbox"/> Leaked <input type="checkbox"/> Closed light Pressure differential across 2nd check valve (no flow); _____ Psi

Remarks _____

(... USE-ONLY ...)

I certify that I have tested the above assembly

Signature: _____ Date: YY MM DD

Orillia Hydrant & MECHANICAL SERVICES

705-325-8138

P.O. BOX 307, ORILLIA, ON L3V 6J8

Testing & Inspection Report

Reduced Pressure Principle Backflow Prevention Assembly

Address Location 188 Jarvis St.		Municipality Orillia	Postal Code
Occupant	Party Contacted		Telephone
Owner City of Orillia			Telephone
Address of Owner 50 Andrew St.S.		Orillia	Postal Code
Name of Certified Tester Corby Schell	Tester Certification Number 9058		Telephone 705-325-8138
Business Name Orillia Hydrants Mechanical	Business Address P.O. Box 307 Orillia		Postal Code L3V 6J8
Make of TEST KIT Watts	Model Number TK-99E	Serial Number 238888	Date of Last Calibration 09/07/09

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY

Make of ASSEMBLY Wilkins	Model Number 975 XL	Serial Number 2807218	Size 3/4"
INSTALL DATE YY MM DD	Location of Assembly (ie: building, room number, installed on what system) Stripper building		
TEST: Initial <input type="checkbox"/> Annual <input checked="" type="checkbox"/>	Date of Test 09/12/09	SH OFF VALVE NO. 2 Leaked <input type="checkbox"/> Closed Tight <input checked="" type="checkbox"/>	Line Pressure at time of test S Psi kPa

TEST	Differential Pressure Relief Valve	Check Valve No. 1	Check Valve No. 2	TEST RESULTS
	<input type="checkbox"/> Failed to Open LL opened at: _____ Psi _____ kPa	<input type="checkbox"/> Leaked <input checked="" type="checkbox"/> Closed Tight Pressure differential across first check valve (no flow): _____ kPa	<input type="checkbox"/> Leaked <input checked="" type="checkbox"/> Closed Tight Pressure differential across 2nd check valve (no flow): _____ Psi	<> Passed Failed <input checked="" type="checkbox"/>

IF THE ASSEMBLY FAILS THE INITIAL TEST FOR ANY REASON, COMPLETE THIS SECTION AND NOTE REPAIR BEIDW:

REPAIR	Differential Pressure Relief Valve	Check Valve No. 1	Check Valve No. 2	Shut Off Valve
	CLIWJED REPIJIC11 <input type="checkbox"/> Disc Upper <input type="checkbox"/> <input type="checkbox"/> Disc tower <input type="checkbox"/> <input type="checkbox"/> Spring <input type="checkbox"/> <input type="checkbox"/> Diaphragm large <input type="checkbox"/> <input type="checkbox"/> Upper <input type="checkbox"/> <input type="checkbox"/> Lower <input type="checkbox"/> <input type="checkbox"/> Diaphragm Sml <input type="checkbox"/> <input type="checkbox"/> Upper <input type="checkbox"/> <input type="checkbox"/> lower <input type="checkbox"/> <input type="checkbox"/> Spacer Lower <input type="checkbox"/> <input type="checkbox"/> Seat <input type="checkbox"/> <input type="checkbox"/> Other (describe) <input type="checkbox"/>	CLEANJD BEPJIC1D <input type="checkbox"/> Disc <input type="checkbox"/> <input type="checkbox"/> Sprng <input type="checkbox"/> <input type="checkbox"/> Guide <input type="checkbox"/> <input type="checkbox"/> Pin Retainer <input type="checkbox"/> <input type="checkbox"/> Hinged Pin <input type="checkbox"/> <input type="checkbox"/> Seat <input type="checkbox"/> <input type="checkbox"/> Diaphragm <input type="checkbox"/> <input type="checkbox"/> Other (describe) <input type="checkbox"/>	CLEANED BEPLAriD <input type="checkbox"/> Disc <input type="checkbox"/> <input type="checkbox"/> Spring <input type="checkbox"/> <input type="checkbox"/> Guide <input type="checkbox"/> <input type="checkbox"/> Pin Retainer <input type="checkbox"/> <input type="checkbox"/> Hinged Pin <input type="checkbox"/> <input type="checkbox"/> Seat <input type="checkbox"/> <input type="checkbox"/> Diaphragm <input type="checkbox"/> <input type="checkbox"/> Other (describe) <input type="checkbox"/>	cr.&IINED IIEPL-"c:llt <input type="checkbox"/> Disc <input type="checkbox"/> <input type="checkbox"/> Seat <input type="checkbox"/> <input type="checkbox"/> Other (describe) <input type="checkbox"/> DATE OF RE-TEST YEAR MONTH DAY
RE-TEST	<input type="checkbox"/> Failed to Open <input type="checkbox"/> Opened at: _____ Psi _____ kPa	<input type="checkbox"/> Leaked <input checked="" type="checkbox"/> Closed Tight Pressure differential across first check valve (no flow): _____ Psi	<input type="checkbox"/> Leaked <input checked="" type="checkbox"/> Closed Tight Pressure differential across 2nd check valve (no flow): _____ Psi	<input type="checkbox"/> Passed <input checked="" type="checkbox"/> Failed

Remarks

I certify that I have tested the above assembly

1 -----0-FF-ICE-USE-ON----- J

Signature of Certified Tester: Corby Schell Date: 2009 12 09

YY MM DD

Orillia Hydrant & MECHANICAL SERVICES

705-325-8138

P.O. BOX 307, ORILLIA, ON L3V 6J8

Testing & Inspection Report

Reduced Pressure Principle Backflow Prevention Assembly

Address Location 200 Bay Street		Municipality Orillia	Postal Code T
Occupant Water Treatment Plant	Party Contacted		Telephone
Owner City of Orillia	Address of Owner 50 Andrew St. S.		Postal Code T
Name of Certified Tester Corby Schell	Tester Certification Number D.58	Telephone 705-325-8138	
Business Name Orillia Hydrants Mech	Business Address P.O. Box 307 Orillia	Postal Code L3V 6J8	
Make of TEST KIT Watts	Model Number TK-CIC-11	Serial Number 238888	Date of Last Calibration 09/07/09

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY

Make of ASSEMBLY Watts	Model Number RPZ 909	Serial Number 120208	Size 2 1/2"
INSTALL DATE YY MM DD	Location of Assembly (ie: building, room number, installed on what system) Water Treatment Plant		
TVPI: of TEST Initial <input type="checkbox"/> Annual <input checked="" type="checkbox"/>	Date of Test 09/12/09	SHUT OFF VALVE NO. 2 Leaked <input type="checkbox"/> Closed Tight <input checked="" type="checkbox"/>	Line pressure at time of test 2.0 Psi kPa

TBST	Differential Pressure Relief Valve <input type="radio"/> Failed to Open <input checked="" type="radio"/> Opened at: 0.6 Psi kPa	Check Valve No. 1 <input type="radio"/> Leaked <input checked="" type="radio"/> Closed Tight Pressure differential across first check valve (no flow): 2 Psi	Check Valve No. 2 <input type="radio"/> Leaked <input checked="" type="radio"/> Closed Tight Pressure differential across 2nd check valve (no flow): 2 Psi	TEST RESULTS Passed <input type="radio"/> Failed <input checked="" type="radio"/>
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IF THE ASSEMBLY FAILS THE INITIAL TEST FOR ANY REASON, COMPLETE THIS SECTION AND NOTE REPAIR BELOW:

- Jr.!!! P.Piff.!!

REPAIR	Differential Pressure Relief Valve CLEANED BEPIJCCD <input type="radio"/> Disc Upper <input type="radio"/> <input type="radio"/> Disc lower <input type="radio"/> <input type="radio"/> Spring <input type="radio"/> <input type="radio"/> Diaphragm Large <input type="radio"/> <input type="radio"/> Upper <input type="radio"/> <input type="radio"/> lower <input type="radio"/> <input type="radio"/> Diaphragm Small <input type="radio"/> <input type="radio"/> Upper <input type="radio"/> <input type="radio"/> lower <input type="radio"/> <input type="radio"/> Spacer Lower <input type="radio"/> <input type="radio"/> Seat <input type="radio"/> <input type="radio"/> Other (describe) <input type="radio"/>	Check Valve No. 1 a.t.atn:D BEPLJ.ctJ) <input type="radio"/> Disc <input type="radio"/> <input type="radio"/> Spring <input type="radio"/> <input type="radio"/> Guide <input type="radio"/> <input type="radio"/> Pin Retainer <input type="radio"/> <input type="radio"/> Hinged Pin <input type="radio"/> <input type="radio"/> Seat <input type="radio"/> <input type="radio"/> Diaphragm <input type="radio"/> <input type="radio"/> Other (describe) <input type="radio"/>	Check Valve No. 2 CILCANC> REPLJICHID' <input type="radio"/> Disc <input type="radio"/> <input type="radio"/> Spring <input type="radio"/> <input type="radio"/> Guide <input type="radio"/> <input type="radio"/> Pin Retainer <input type="radio"/> <input type="radio"/> Hinged Pin <input type="radio"/> <input type="radio"/> Seat <input type="radio"/> <input type="radio"/> Diaphragm <input type="radio"/> <input type="radio"/> Other (describe) <input type="radio"/>	DATE OF REPAIR YEAR MONTH DAY
	RETEST <input type="radio"/> Failed to Open <input type="radio"/> Opened at: _____ Psi kPa	<input type="radio"/> Leaked <input type="radio"/> Closed Tight Pressure differential across first check valve (no flow): _____ Psi	<input type="radio"/> Leaked <input type="radio"/> Closed Tight Pressure differential across 2nd check valve (no flow): _____ Psi	Results Passed <input type="radio"/> Failed <input type="radio"/>

Remarks

OFFICE USE ONLY

Q III
nature of Certifi Tester Date: YY MM DO