East St. Paul Water System
2011 Annual Report

Prepared for:
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1.0 Water System

1.1 DESCRIPTION OF WATER SYSTEM

The Rural Municipality of East St. Paul (R.M.) Water System consists of groundwater pumping, chlorination, treated water storage, distribution pumping and distribution piping. Refer to Figure 1.0 for a process flow diagram of the water system.

1.1.1 Groundwater Source

Groundwater is conveyed to the water treatment plant (WTP) using a series wells. Five (5) production wells are located east of the Floodway off Oasis Road in the R.M. of Springfield. Four of these production wells (PW1, PW4, PW5 and PW6) withdraw groundwater from a sand and gravel aquifer at a depth of approximately 24 meters below the existing grade and can provide a combined 18 L/s to the WTP. Water Rights License No. 2007-074 authorizes the withdrawal of 358,000 m^3/yr. at a maximum rate of 11.4 L/s from these four wells.

The fifth production well (PW8) withdraws groundwater from a bedrock carbonate aquifer at a depth of approximately 43 meters below grade and can provide 20 L/s to the WTP. Water Rights License No. 2005-060 authorizes the withdrawal of 195,000 m^3/yr. at a maximum rate of 20 L/s from this well.

Two meter chambers measure the groundwater withdrawn from each aquifer. There is also a turbidity meter in each meter chamber to monitor the turbidity of the groundwater.

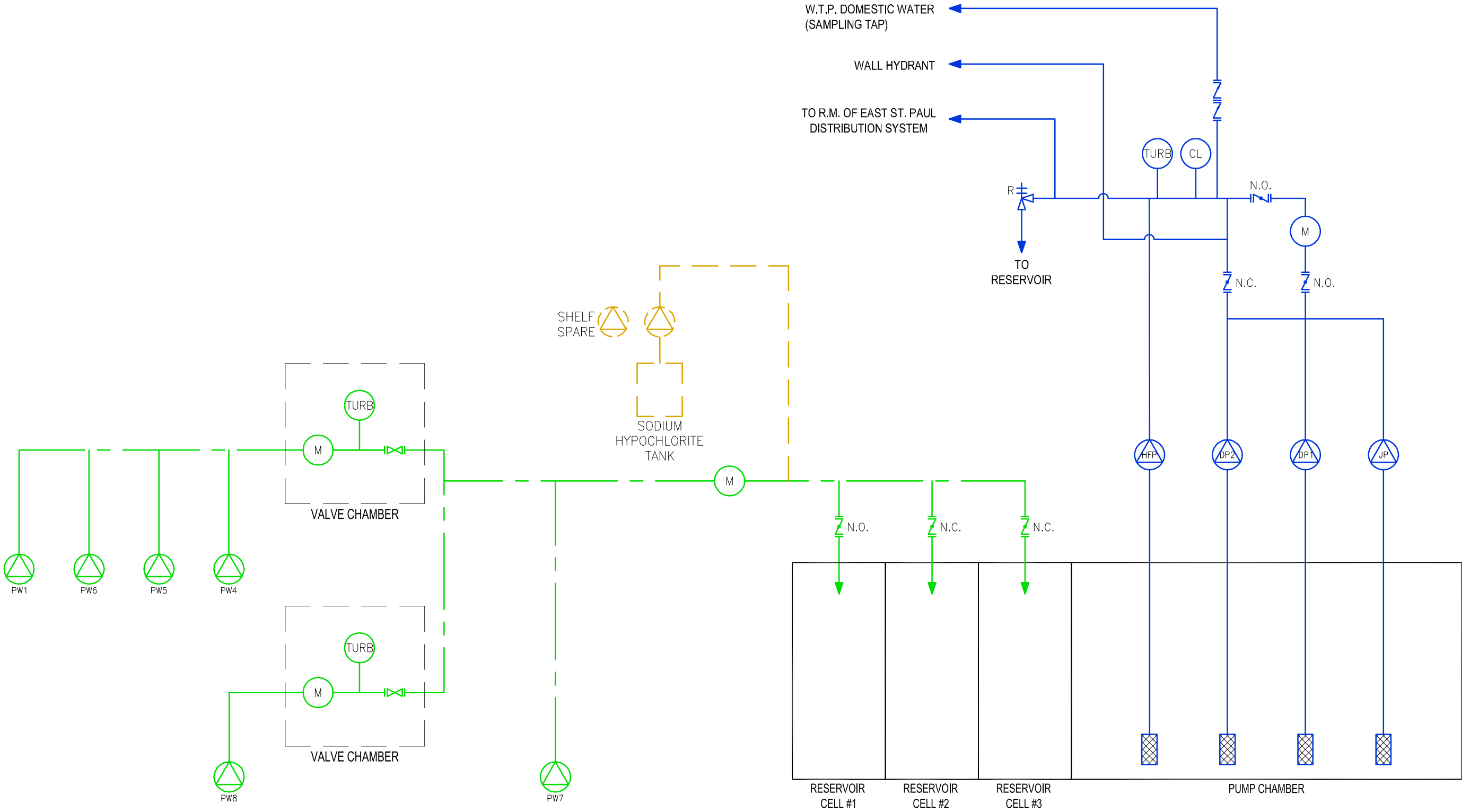
A sixth production well (PW7) is located adjacent the WTP off Wenzel Street in the R.M. of East St. Paul. PW7 withdraws groundwater from the bedrock aquifer and can provide 19 L/s to the WTP. Water Rights License 2009-030 was issued July 16, 2009 and authorizes the withdrawal of 612,000 m^3/yr. at a maximum rate of 19 L/s from this well.

1.1.2 Chlorination

The groundwater is chlorinated prior to being discharged to a reservoir for storage. Liquid chlorine (sodium hypochlorite – 12%) is dosed to the groundwater using a chemical feed pump based on flow. The chlorine dose is manually adjusted based on the chlorine residual entering the distribution system.

1.1.3 Treated Water Storage

Treated water is stored in a three cell reservoir. The reservoir buffers the peak instantaneous demands in the distribution system and provides storage for Class 3 fire protection. The total effective storage volume is 2,415,000 L. The estimated retention time at peak flow is 6.1 hours.



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Legend

	RAW WATER
	TREATED WATER
	CHEMICAL FEED

	PUMP
PW	WELL PUMP
JP	JOCKEY PUMP
HFP	HIGH FLOW PUMP
DP	DOMESTIC PUMP

R	RELIEF VALVE
	BUTTERFLY VALVE
	GATE VALVE
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN

M	METER
TURB	TURBIDIMETER
CL	CHLORINE ANALYZER
	BACKFLOW PREVENTER

Client/Project
R.M. OF EAST ST. PAUL
WATER SYSTEM

Figure No.
1.0

Title
PROCESS FLOW DIAGRAM

1.1.4 Distribution Pumping

The distribution pumping system is made up of four (4) vertical turbine pumps. Two (2) domestic pumps (DP1 & DP2) each rated at 27 L/s operate based on pressure to meet the varying demands in the distribution system. The jockey pump (JP) rated at 3 L/s is turned on if the distribution system pressure drops below 55 psi, while the high flow pump (HFP) rated at 53 L/s turns on if the pressure drops below 50 psi.

1.1.5 Distribution System

The distribution system is comprised of approximately 33,000 meters of PVC pipe. There are approximately 908 services in the distribution system.

1.2 DISINFECTION

Chlorine is used as the primary disinfectant. The Drinking Water Safety Act (DWSA) requires a minimum free chlorine residual entering the distribution system of 0.5 mg/L and a minimum free chlorine residual of 0.1 mg/L in the distribution system. The R.M. continuously measures the chlorine level entering the distribution system using an online analyzer. They also manually measure the chlorine level entering the distribution system on a daily basis and the chlorine level in the distribution system on a weekly basis. There were no occurrences where there was no daily chlorine residual sample taken.

Table 1.1 – Disinfection Testing Performance

Description	Requirement	Performance
Free Chlorine residual entering the distribution system	≥ 0.5 mg/L	100 %
Frequency of testing daily at WTP	Daily	100 %
Free Chlorine residual in the distribution system	≥ 0.1 mg/L	100 %
Frequency of testing in the distribution system	Weekly	100 %
Report Submission	Monthly	100 %

1.3 SAMPLING, TESTING AND REPORTING

1.3.1 Bacteriological Sampling

While the R.M. is required to sample the raw water entering the WTP, treated water leaving the WTP and treated water in the distribution system on a biweekly basis, the R.M. samples weekly in an effort to be proactive. Samples are sent to ALS Laboratory Group and Maxxam Analytics for Total Coliform and E. Coli sampling. Sampling results are summarized as follows:

Table 1.2 – Bacteriological Testing Performance

Description	Requirement	Performance
Sampling Frequency	Weekly	100%
Total Coliform	< 1 MPN / 100 mL	100%
E. Coli	< 1 MPN / 100 mL	100%

1.4 CHEMICAL AND RADIOLOGICAL PARAMETERS

The R.M. is required to sample and test for chemical and radiological parameters once every three years. In 2011, the R.M. tested the treated water for the chemical and radiological parameters, as well as for hydrocarbon. The sampling results and the DWSA requirements are summarized in Table 1.3.

Table 1.3 – Treated Water Quality Data Relevant to the DWSA

Parameter	Sampling Result (mg/L)	DWSA MAC (mg/L)
Arsenic	< 0.0002	0.01
Benzene	< 0.0005	0.005
Fluoride	0.119	1.5
Lead	0.00015	0.01
Nitrate-N *	< 0.071	10
Tetrachloroethylene	< 0.0005	0.03
Trichloroethylene	< 0.0005	0.005
Uranium	0.00181	0.02

* Sampling result is for Nitrate + Nitrite – Nitrogen, while the DWSA requirement is only for Nitrate – Nitrogen

While not a requirement for a groundwater source not under the direct influence of surface water, the R.M. also conducted total trihalomethane (TTHM) testing at the WTP and in the distribution system twice during the year. TTHM and BDCM results were less than the DWSA maximum acceptable concentration. The average sampling results at the WTP and at a location in the distribution system are summarized in Table 1.4.

Table 1.4 – Average TTHM Sampling Results

Parameter	WTP (mg/L)	Distribution System (mg/L)	DWSA MAC (mg/L)
Bromo-dichloromethane (BDCM)	0.0050	0.0054	0.016
Total Trihalomethanes (TTHM)	0.016	0.016	0.1

1.4.1 Physical Parameter

The R.M. is currently not required to meet any physical limits prescribed in the DWSA.

1.4.2 Microbiological Parameters

As the R.M. uses a groundwater source not under the influence of surface water they are not required to achieve the DWSA prescribed reductions for *Giardia*, *Cryptosproidium*, and viruses.

1.5 RECORD KEEPING

The R.M. retains all the testing data and stores one copy at the WTP. Copies of the chlorination data is submitted to the ODW on a monthly basis. Maxxam Analytics also copies the ODW on the bacteriological sampling results on a bi-weekly basis.

1.6 DRINKING WATER SAFETY ORDERS

There were no drinking water safety orders issued to the R.M. in 2011.

1.7 BOIL WATER ADVISORIES

There was no boil water advisories issued to the R.M. in 2011.

1.8 MAJOR EXPENSES INCURRED

The R.M. installed 1100 meters of 300 mm dia. watermain from the Water Treatment Plant on Wenzel St. to the corner of Camsell Ave. and Bird's Hill Road. The purpose of the project was to install a second feed from the Water Treatment Plant to provide redundancy for the potable water supply to the Community. The project was publicly tendered and awarded to Outdoor Solutions for $609,640. The work was substantially completed January 27th, 2012 with deficiency work to be completed in the spring of 2012.

The R.M. also made modifications to the distribution pumping control system. The jockey pump is now programmed to operate in conjunction with the domestic pumps if the pressure drops below 55 psi and the high flow pump has been programmed to turn on automatically if the pressure drops below 50 psi. The on-line chlorine and turbidity meters were replaced with new instruments.