East St. Paul Water System
2013 Annual Report

Prepared for:
R.M. of East St. Paul
3021 Bird's Hill Road
East St. Paul, MB R2E 1A7

Prepared by:
Stantec Consulting Ltd.
905 Waverly St.
Winnipeg, MB R3P 0A6

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Sign-off Sheet

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Prepared by 
(signature)

Jamie Brewster

Reviewed by 
(signature)

Brett Ransom

Stantec

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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 20 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Two meter chambers measure the groundwater withdrawn from each aquifer.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.

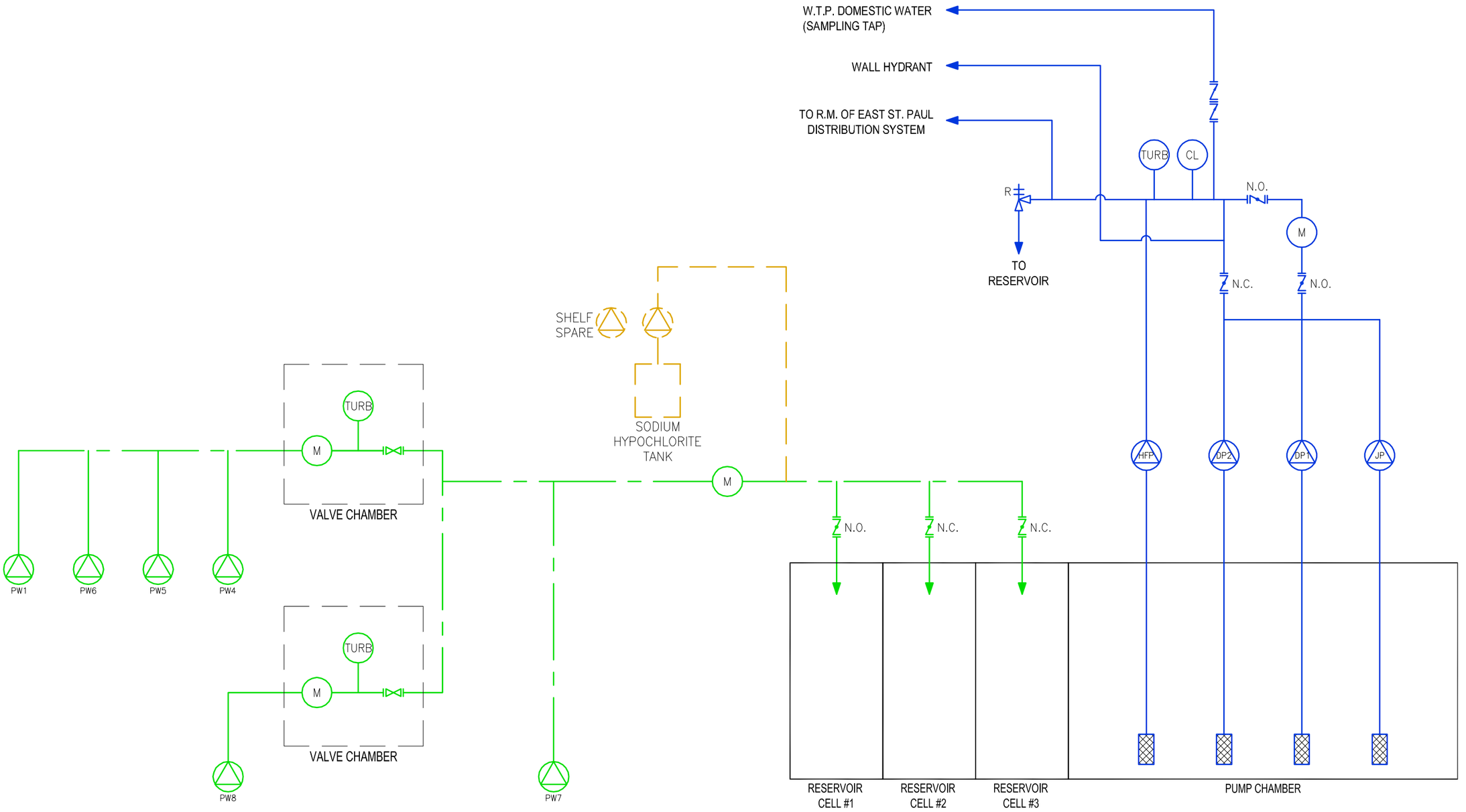
A sixth production well (PW7) is located adjacent the WTP off Wenzel Street in the R.M. of East St. Paul. PW7 withdraws groundwater from the bedrock aquifer and can provide 19 L/s to the WTP. Water Rights License 2009-030 was issued July 16, 2009 and authorizes the withdrawal of 612,000 m^3/yr. at a maximum rate of 11.4 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 fire protection. The total active storage volume is 2,523 m^3. The estimated retention time at peak flow is 6.1 hours.



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Stantec Consulting Ltd.
905 Waverley St.
Winnipeg MB Canada
R3T 5P4
Tel. 204.489.5900
Fax. 204.453.9012
www.stantec.com

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 35,000 meters of PVC and HDPE pipe on Henderson Highway between Eagle Creek Drive and Dr. Hamilton School north of Hoddinott Road. There are approximately 940 service connection 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 biweekly basis. There were no occurrences where there was no daily chlorine residual sample taken.

Table 1.1 – Disinfection Testing Performance

Description	Requirement	Compliance
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	biweekly	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 for Total Coliform and E. Coli sampling. A positive total coliform and E. coli result was noted on December 18th and a positive total coliform result was noted on August 28th. Follow up sampling on the subsequent day noted negative results in both instances. As such, the Office of Drinking Water does not deem the results as non-compliance, as it is likely a result of laboratory error or sampling contamination. Sampling results are summarized as follows:

Table 1.2 – Bacteriological Testing Performance

Description	Requirement	Compliance
Sampling Frequency	Bi-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. The R.M. undertook a complete chemical analysis of the treated water in 2011. In 2013, the R.M. tested each raw water production well for the chemical and radiological parameters. The sampling results for key parameters related to the Guideline for Canadian Drinking Water Quality (GCDWQ) aesthetic objectives (AO) and the DWSA maximum acceptable concentration (MAC) are summarized in Table 1.3.

Table 1.3 – Raw Water Quality Data Relevant to the DWSA

Parameter	PW 1 (mg/L)	PW 4 (mg/L)	PW 5 (mg/L)	PW 6 (mg/L)	PW 7 (mg/L)	PW 8 (mg/L)	[MAC] / AO (mg/L)
Arsenic	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	[0.01]
Fluoride	0.16	0.16	0.17	0.16	0.16	0.16	[1.5]
Lead	0.0019	< 0.001	0.0033	< 0.001	0.0058	0.0089	[0.01]
Nitrate-N	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	[10]
Uranium	0.00177	0.00191	0.00205	0.00186	0.00291	0.00172	[0.02]
Iron	< 0.1	< 0.1	0.28	< 0.1	0.14	<0.1	0.3
Manganese	0.018	0.0149	0.0091	0.0294	0.0013	0.0168	0.05
Hardness	274	260	262	257	310	256	200/500
TDS	288	276	277	273	332	270	500

While not a requirement for a groundwater source not under the direct influence of surface water, the R.M. also undertook quarterly disinfection byproduct testing at the WTP and in the distribution system. Total trihalomethane (TTHM) and bromo-dichloromethane (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 Disinfection Byproduct Sampling Results

Parameter	WTP (mg/L)	Distribution System (mg/L)	DWSA MAC (mg/L)
Bromo-dichloromethane (BDCM)	0.0029	0.004	0.016
Total Trihalomethanes (TTHM)	0.012	0.012	0.1

1.4.1 Physical Parameters

There are no physical limits specified in the R.M's operating license.

1.4.2 Microbial 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.

The R.M is required to meet the DWSA minimum chlorine contact time of 20 minutes. The "Assessment of Water Supply Infrastructure and Water Supply Sources for the R.M. of East St. Paul Public Water System" (Stantec, 2011) identified that the reservoir provided sufficient contact time.

1.5 RECORD KEEPING

The R.M. retains all the testing data and stores one copy at the WTP. Copies of the chlorination data are submitted to the ODW on a monthly basis. Bacteriological testing results are also copied to the regional drinking water officer.

1.6 DRINKING WATER SAFETY ORDERS

There were no drinking water safety orders issued to the R.M. in 2013.

1.7 BOIL WATER ADVISORIES

There were no boil water advisories issued to the R.M. in 2013.

1.8 MAJOR EXPENSES INCURRED

The R.M. completed the following water system related projects in 2013:

Distribution System

The R.M. tendered and constructed the extension of a 250 mm watermain down Henderson Highway from Eagle Creek Drive to just north of Hoddinott Road. The purpose of the watermain extension is to complete a loop in the distribution. The watermain was completed in 2013, while a service from the watermain to the existing Wastewater Treatment Plant is still underway.

Country Side Crossing Phase 2 was also completed in 2013. This included the extension of 200 mm watermain on Maxwell King Drive, Saddleridge Drive and Fox Pointe and 150 mm dia. watermain on Winsome Row and Jordanas Run. Phase 2 included servicing of 78 lots.

Planning

The R.M. retained Stantec Consulting Ltd. in 2012 to undertake a Water Treatment Master Plan to assist with planning for future water treatment projects required to accommodate growth in the R.M. The Water Treatment Master Plan was completed in 2013 and presented to council.

A new development (By the Park) is planned for construction in 2014. This development includes watermain extensions down Gateway Road and servicing of 73 new lots in the development.