Public Water System Annual Report

-2014-

Name of the Public Water System: **G3 Regional Water Co-op**

Name of the Legal Owner: **G3 Regional Water Co-operative Inc.**

Contact Person: **Susan Boyachek**

Phone: **(204) 548-2326**

Emergency number: **(204) 648-4714**

Name of Operator: **Mr. Lloyd Beckley**

Phone during business hours: **(204) 648-4714**

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Susan Boyachek
Secretary Treasurer
G3 Regional Water Co-op Inc.

Date Prepared: March 2015

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1. Introduction:

The 2014 G3 Regional Water Co-op Annual Report summarizes the water utility's ability to provide safe potable water and comply with provincial regulations.

2. Description of the Water System

The G3 Water Co-op provides potable drinking water to a population of approximately 2500 residents. No corrective actions or emergency reporting was required. Full results have been attached in section 3.

The G3 Regional Co-op water system consists of two wells, raw water pipeline, a water treatment plant (WTP), and a network of distribution pipelines.

2.1. Water Supply Source

The G3 Regional Water Co-op receives its raw water supply from two 300 mm groundwater wells. The wells are located approximately 1 km north of the WTP on municipal right-of-way west of the NW 26-26-23 W. One well can fully supply the system, however a fully equipped and redundant back-up well is provided to ensure supply can be maintained at all times.

The system provides treated water to the Towns of Gilbert Plains and Grandview and the Rural Municipality of Gilbert Plains.

2.2 Water Treatment Process

The treatment system is comprised of two parallel RO membrane filtration skids, a manganese greensand bypass filter and forced air degasifier for carbon dioxide (CO_2) removal and pH adjustment. The treatment system was designed with a membrane by-pass to produce a hardness of approximately 100 mg/L (as $CaCO_3$). Since membranes are capable of removing significant amount of hardness ions, a percentage of the raw water by-passes the membrane system and is filtered through a 2.1 m diameter manganese greensand pressure filter. Water passing through the pressure filter is blended with membrane permeate to produce the desired water hardness. The membranes reject approximately 20% concentrate to Sulfurspring Creek which is permitted by Environment Act Licence No. 2853. The treatment system ensures that the water meets the *Guidelines for Canadian Drinking Water Quality* and the *Drinking Water Safety Act.*

Antiscalant is injected in the membrane raw water supply to sequester dissolved minerals and prevent RO membrane fouling. Since membranes remove dissolved minerals, stabilization (pH adjustment) is required to produce a non-corrosive treated water supply. A forced air degasifier was designed and installed to stabilize

membrane permeate. The degasifier removes a significant portion of dissolved CO_2 therefore, minimizing sodium hydroxide chemical usage.

The raw water supply contains ammonia which interferes with chlorine disinfection capability unless removed in the treatment system. Ammonia is removed through membrane treatment but not typically through a manganese greensand filter. Using sodium hypochlorite (chlorine) before the manganese greensand filter consumes the ammonia. Additional chlorine for disinfection is provided to maintain an adequate chlorine residual concentration in the reservoir.

Treated water is stored in a 1.2 ML, 3 cell reinforced concrete reservoir. The reservoir is equipped with ultrasonic level control and monitored with a SCADA system. The SCADA system also has the capability of monitoring and controlling reservoir levels located in the Town of Grandview and Town of Gilbert Plains.

The water treatment process is designed to reduce iron and manganese concentrations, and reduce hardness to an acceptable level. A schematic of the water treatment process can be found in Appendix B.

Iron and manganese are metals that cause laundry and plumbing fixture staining problems, and can build up in the distribution pipes and cause reduced flow. Calcium carbonate causes hardness in water which diminishes the ability of the water to react with soap and form lather. Hardness also forms scale deposits in kettles and hot water tanks which can reduce the life expectancy of these appliances.

2.3 Classification and Certification

The G3 Treatment Plant is a Class 2 water treatment facility and the water distribution is classified as Class 1 water distribution. The facility classifications are used to determine certification requirements for the water system operators.

3. List of Water Quality Standards

The Province of Manitoba has adopted a number of water quality standards from the Health Canada *Guidelines for Canadian Drinking Water Quality*. The health-based parameters express the maximum acceptable concentrations for drinking water. Concentration values in excess of the guidelines constitute a health-related issue and require corrective actions. All health based parameters were within the limits for 2014 for the G3 Regional Water System. Public water systems are required to monitor chlorine levels and undertake regular bacterial testing. The G3 system met all requirements for water

quality standards and monitoring requirements in 2014 and is fulfilling the requirements of their Operating Licence.

4. **Water System Incidents and Corrective Actions**

   There were no major water system incidents in 2014. There were no corrective actions or emergency reporting required.

5. **Drinking Water Safety Orders, Warnings, and Charges**

   There were no Drinking Water Safety Orders or warnings issued, nor were any charges laid on the system.

6. **Major Expenses Incurred**

   There were no major expenses for the G3 Regional Water System in 2014.

7. **Future System Expansion**

   There are no immediate plans for expansion of the system.

Appendix A

Results of Water Chemistry, Bacterial and Chlorine Residual Analysis[1]

[1] Obtained from Office of Drinking Water

Collection Date	Location	Sample Identification	TC	EC	CL2 Free	CL2 Total
30-Dec-13	G3 PWS	G3 1 - RAW	0	0		
30-Dec-13	G3 PWS	G3 2 - TREATED	0	0	0.910	1.14
13-Jan-14	G3 PWS	G3 1 - RAW	0	0		
13-Jan-14	G3 PWS	G3 2 - TREATED	0	0	0.850	1.10
27-Jan-14	G3 PWS	G3 1 - RAW	0	0		
27-Jan-14	G3 PWS	G3 2 - TREATED	0	0	0.860	1.08
10-Feb-14	G3 PWS	G3 1 - RAW	0	0		
10-Feb-14	G3 PWS	G3 2 - TREATED	0	0	0.830	1.06
24-Feb-14	G3 PWS	G3 1 - RAW	0	0		
24-Feb-14	G3 PWS	G3 2 - TREATED	0	0	0.760	0.950
10-Mar-14	G3 PWS	G3 1 - RAW	0	0		
10-Mar-14	G3 PWS	G3 2 - TREATED	0	0	0.870	1.13
24-Mar-14	G3 PWS	G3 1 - RAW	0	0		
24-Mar-14	G3 PWS	G3 2 - TREATED	0	0	0.920	1.13
07-Apr-14	G3 PWS	G3 1 - RAW	0	0		
07-Apr-14	G3 PWS	G3 2 - TREATED (LARGE BOTTLE)	0	0	0.880	1.11
22-Apr-14	G3 PWS	G3 1 - RAW	0	0		
22-Apr-14	G3 PWS	G3 2 - TREATED	0	0	0.750	0.920
05-May-14	G3 PWS	G3 1 - RAW	0	0		
05-May-14	G3 PWS	G3 2 - TREATED	0	0	0.980	1.21
20-May-14	G3 PWS	G3 1 - RAW	0	0		
20-May-14	G3 PWS	G3 2 - TREATED	0	0	0.780	1.05
02-Jun-14	G3 PWS	G3 1 - RAW	0	0		
02-Jun-14	G3 PWS	G3 2 - TREATED	0	0	0.960	1.13
16-Jun-14	G3 PWS	G3 1 - RAW	0	0		
16-Jun-14	G3 PWS	G3 2 - TREATED (LARGE BOTTLE)	0	0	0.870	1.10
02-Jul-14	G3 PWS	G3 1 - RAW	0	0		
02-Jul-14	G3 PWS	G3 2 - TREATED	0	0	0.760	0.940
14-Jul-14	G3 PWS	G3 1 - RAW	0	0		
14-Jul-14	G3 PWS	G3 2 - TREATED	0	0	0.910	1.11
28-Jul-14	G3 PWS	G3 1 - RAW	0	0		
28-Jul-14	G3 PWS	G3 2 - TREATED	0	0	0.900	1.06
28-Jul-14	G3 PWS	G3 3 - DISTRIBUTION GP	0	0	0.760	0.910
11-Aug-14	G3 PWS	G3 1 - RAW	0	0		
11-Aug-14	G3 PWS	G3 2 - TREATED	0	0	0.900	1.15
11-Aug-14	G3 PWS	G3 3 - DISTRIBUTION GP	0	0	0.800	0.860
25-Aug-14	G3 PWS	G3 1 - RAW	0	0		
25-Aug-14	G3 PWS	G3 2 - TREATED	0	0	0.870	1.10
25-Aug-14	G3 PWS	G3 3 - DISTRIBUTION GP	0	0	0.850	1.03

08-Sep-14	G3 PWS	G3 1 - RAW	0	0		
08-Sep-14	G3 PWS	G3 2 - TREATED	0	0	0.880	1.10
08-Sep-14	G3 PWS	G3 3 - DISTRIBUTION GP	0	0	0.870	1.03
22-Sep-14	G3 PWS	G3 1 - RAW	0	0		
22-Sep-14	G3 PWS	G3 2 - TREATED (LARGE BOTTLE)	0	0	0.890	1.14
22-Sep-14	G3 PWS	G3 3 - DISTRIBUTION GP	0	0	0.840	0.950
06-Oct-14	G3 PWS	G3 1 - RAW (LARGE BOTTLE)	0	0		
06-Oct-14	G3 PWS	G3 2 - TREATED	0	0	0.930	1.16
06-Oct-14	G3 PWS	G3 3 - DISTRIBUTION GP INCOMING FROM G3	0	0	0.960	1.08
20-Oct-14	G3 PWS	G3 1 - RAW	0	0		
20-Oct-14	G3 PWS	G3 2 - TREATED	0	0	0.790	0.990
20-Oct-14	G3 PWS	G3 3 - DISTRIBUTION GP INCOMING	0	0	0.780	0.930
03-Nov-14	G3 PWS	G3 1 - RAW	0	0		
03-Nov-14	G3 PWS	G3 2 - TREATED	0	0	0.880	1.12
03-Nov-14	G3 PWS	G3 3 - DISTRIBUTION GP G3 INCOMING	0	0	0.830	0.940
17-Nov-14	G3 PWS	G3 1 - RAW	0	0		
17-Nov-14	G3 PWS	G3 2 - TREATED	0	0	0.830	1.08
17-Nov-14	G3 PWS	G3 3 - DISTRIBUTION GP INCOMING	0	0	0.800	0.920
01-Dec-14	G3 PWS	G3 1 - RAW	0	0		
01-Dec-14	G3 PWS	G3 2 - TREATED (LARGE BOTTLE)	0	0	0.900	1.19
01-Dec-14	G3 PWS	G3 3 - DISTRIBUTION GP G3 INCOMING L89	0	0	0.810	0.970
15-Dec-14	G3 PWS	G3 1 - RAW (LARGE BOTTLE)	0	0		
15-Dec-14	G3 PWS	G3 2 - TREATED	0	0	0.910	1.14
15-Dec-14	G3 PWS	G3 3 - DISTRIBUTION GP G3 INCOMING	0	0	0.850	1.02
29-Dec-14	G3 PWS	G3 2 - TREATED	0	0	0.980	1.27
29-Dec-14	G3 PWS	G3 1 - RAW	0	0		
29-Dec-14	G3 PWS	G3 3 - DISTRIBUTION GP	0	0	0.820	0.980

Water Chemistry

ALS Environmental

ANALYTICAL REPORT

Physical Tests (WATER)

				ALS ID	L1337808-1	L1337808-2
				Sampled Date	24-JUL-13	24-JUL-13
				Sampled Time	11:00	11:00
				Sample ID	G3 1 - RAW	G3 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2			
Colour, True	CU	15	-		42.3	<5.0
Conductivity	umhos/cm	-	-		979	238
Hardness (as CaCO3)	mg/L	-	-		478	89.2
Langelier Index (4 C)	No Unit	-	-		0.63	-0.56
Langelier Index (60 C)	No Unit	-	-		1.4	0.22
pH	pH units	6.5-8.5	-		7.75	7.81
Total Dissolved Solids	mg/L	500	-		669	140
Transmittance, UV (254 nm)	% T	-	-		92.4	99.6
Turbidity	NTU	-	-		32.1	0.39

Federal Guidelines for Canadian Drinking Water Quality (AUG, 2012)
#1: GCDWQ - Aesthetic Objective
#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Anions and Nutrients (WATER)

				ALS ID	L1337808-1	L1337808-2
				Sampled Date	24-JUL-13	24-JUL-13
				Sampled Time	11:00	11:00
				Sample ID	G3 1 - RAW	G3 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2			
Alkalinity, Total (as CaCO3)	mg/L	-	-		377	79
Ammonia, Total (as N)	mg/L	-	-		0.86 DLA	<0.010
Bicarbonate (HCO3)	mg/L	-	-		460	96
Bromide (Br)	mg/L	-	-		<0.10	<0.10
Carbonate (CO3)	mg/L	-	-		<12	<12
Chloride	mg/L	250	-		6.13	4.39
Fluoride	mg/L	-	1.5		0.240	0.044
Hydroxide (OH)	mg/L	-	-		<6.8	<6.8
Iodide (I)	mg/L	-	-		<2.0	<2.0
Nitrate and Nitrite as N	mg/L	-	10		<0.0051	0.0075
Nitrate-N	mg/L	-	10		<0.0050	0.0075
Nitrite-N	mg/L	-	1		<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	-		0.94	<0.20
Total Nitrogen	mg/L	-	-		0.94	<0.20
Sulfate	mg/L	500	-		206	38.9
Anion Sum	me/L	-	-		12.0	2.51
Cation Sum	me/L	-	-		11.9	2.51
Cation - Anion Balance	%	-	-		-0.3	0.0

Federal Guidelines for Canadian Drinking Water Quality (AUG, 2012)
#1: GCDWQ - Aesthetic Objective
#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
Analytical result for this parameter exceeds Guide Limit listed on this report.
* Please refer to the Reference Information section for an explanation of any qualifiers noted.

ANALYTICAL REPORT

Organic / Inorganic Carbon (WATER)

				L1337808-1	L1337808-2
			ALS ID		
			Sampled Date	24-JUL-13	24-JUL-13
			Sampled Time	11:00	11:00
			Sample ID	G3 1 - RAW	G3 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Dissolved Organic Carbon	mg/L	-	-	2.6	2.0
Total Inorganic Carbon	mg/L	-	-	97.7	19.0
Total Organic Carbon	mg/L	-	-	2.3	2.1

Federal Guidelines for Canadian Drinking Water Quality (AUG, 2012)
#1: GCDWQ - Aesthetic Objective
#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
Analytical result for this parameter exceeds Guide Limit listed on this report.
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ANALYTICAL REPORT

Total Metals (WATER)

				L1337808-1	L1337808-2
		ALS ID		L1337808-1	L1337808-2
		Sampled Date		24-JUL-13	24-JUL-13
		Sampled Time		11:00	11:00
		Sample ID		G3 1 - RAW	G3 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Aluminum (Al)-Total	mg/L	0.1	-	<0.0050	<0.0050
Antimony (Sb)-Total	mg/L	-	0.006	<0.00020	<0.00020
Arsenic (As)-Total	mg/L	-	0.01	0.00779	0.00190
Barium (Ba)-Total	mg/L	-	1	0.0227	0.00287
Beryllium (Be)-Total	mg/L	-	-	<0.00020	<0.00020
Bismuth (Bi)-Total	mg/L	-	-	<0.00020	<0.00020
Boron (B)-Total	mg/L	-	5	0.167	0.137
Cadmium (Cd)-Total	mg/L	-	0.005	<0.000010	<0.000010
Calcium (Ca)-Total	mg/L	-	-	117 DLA	22.6
Cesium (Cs)-Total	mg/L	-	-	<0.00010	<0.00010
Chromium (Cr)-Total	mg/L	-	0.05	<0.0010	<0.0010
Cobalt (Co)-Total	mg/L	-	-	<0.00020	<0.00020
Copper (Cu)-Total	mg/L	1	-	<0.00020	0.00552
Iron (Fe)-Total	mg/L	0.3	-	3.86	0.015
Lead (Pb)-Total	mg/L	-	0.01	<0.000090	<0.000090
Lithium (Li)-Total	mg/L	-	-	0.0488	0.0129
Magnesium (Mg)-Total	mg/L	-	-	45.0	7.95
Manganese (Mn)-Total	mg/L	0.05	-	0.167	0.00120
Molybdenum (Mo)-Total	mg/L	-	-	0.00396	0.00065
Nickel (Ni)-Total	mg/L	-	-	<0.0020	<0.0020
Phosphorus (P)-Total	mg/L	-	-	0.16	<0.10
Potassium (K)-Total	mg/L	-	-	6.87	1.58
Rubidium (Rb)-Total	mg/L	-	-	0.00167	0.00047
Selenium (Se)-Total	mg/L	-	0.01	<0.0010	<0.0010
Silicon (Si)-Total	mg/L	-	-	13.8	2.54
Silver (Ag)-Total	mg/L	-	-	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	200	-	37.3	11.7
Strontium (Sr)-Total	mg/L	-	-	0.551	0.0964
Tellurium (Te)-Total	mg/L	-	-	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	-	-	<0.00010	<0.00010
Thorium (Th)-Total	mg/L	-	-	<0.00010	<0.00010
Tin (Sn)-Total	mg/L	-	-	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L	-	-	0.00324	0.00063

Federal Guidelines for Canadian Drinking Water Quality (AUG, 2012)
#1: GCDWQ - Aesthetic Objective
#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
Analytical result for this parameter exceeds Guide Limit listed on this report.
* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Total Metals (WATER)

Analyte	Unit	Guide Limit #1	Guide Limit #2	ALS ID: L1337808-1 Sampled Date: 24-JUL-13 Sampled Time: 11:00 Sample ID: G3 1 - RAW	ALS ID: L1337808-2 Sampled Date: 24-JUL-13 Sampled Time: 11:00 Sample ID: G3 2 - TREATED
Tungsten (W)-Total	mg/L	-	-	<0.00010	<0.00010
Uranium (U)-Total	mg/L	-	0.02	0.00020	<0.00010
Vanadium (V)-Total	mg/L	-	-	<0.00020	<0.00020
Zinc (Zn)-Total	mg/L	5	-	<0.0020	<0.0020
Zirconium (Zr)-Total	mg/L	-	-	<0.00040	<0.00040

Federal Guidelines for Canadian Drinking Water Quality (AUG, 2012)
#1: GCDWQ - Aesthetic Objective
#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Dissolved Metals (WATER)

Analyte	Unit	Guide Limit #1	Guide Limit #2	ALS ID: L1337808-1 Sampled Date: 24-JUL-13 Sampled Time: 11:00 Sample ID: G3 1 - RAW	ALS ID: L1337808-2 Sampled Date: 24-JUL-13 Sampled Time: 11:00 Sample ID: G3 2 - TREATED
Aluminum (Al)-Dissolved	mg/L	0.1	-	<0.0020	<0.0020

Federal Guidelines for Canadian Drinking Water Quality (AUG, 2012)
#1: GCDWQ - Aesthetic Objective
#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
Analytical result for this parameter exceeds Guide Limit listed on this report.
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Volatile Organic Compounds (WATER)

				ALS ID	L1337808-1
				Sampled Date	24-JUL-13
				Sampled Time	11:00
				Sample ID	**G3 1 - RAW**
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Benzene	ug/L	-	5		<0.50
1,1-Dichloroethylene	ug/L	-	14		<0.50
Dichloromethane	ug/L	-	50		<0.50
Ethyl Benzene	ug/L	2.4	-		<0.50
MTBE	ug/L	15	-		<0.50
1,1,1,2-Tetrachloroethane	ug/L	-	-		<0.50
1,1,2,2-Tetrachloroethane	ug/L	-	-		<0.50
Tetrachloroethylene	ug/L	-	30		<0.50
Toluene	ug/L	24	-		<0.50
1,1,1-Trichloroethane	ug/L	-	-		<0.50
1,1,2-Trichloroethane	ug/L	-	-		<0.50
Trichloroethylene	ug/L	-	5		<0.50
o-Xylene	ug/L	-	-		<0.50
m+p-Xylenes	ug/L	-	-		<1.0
Surrogate: 4-Bromofluorobenzene	%	-	-		110.9
Surrogate: 1,2-Dichloroethane d4	%	-	-		115.8
Surrogate: Toluene-d8	%	-	-		105.0

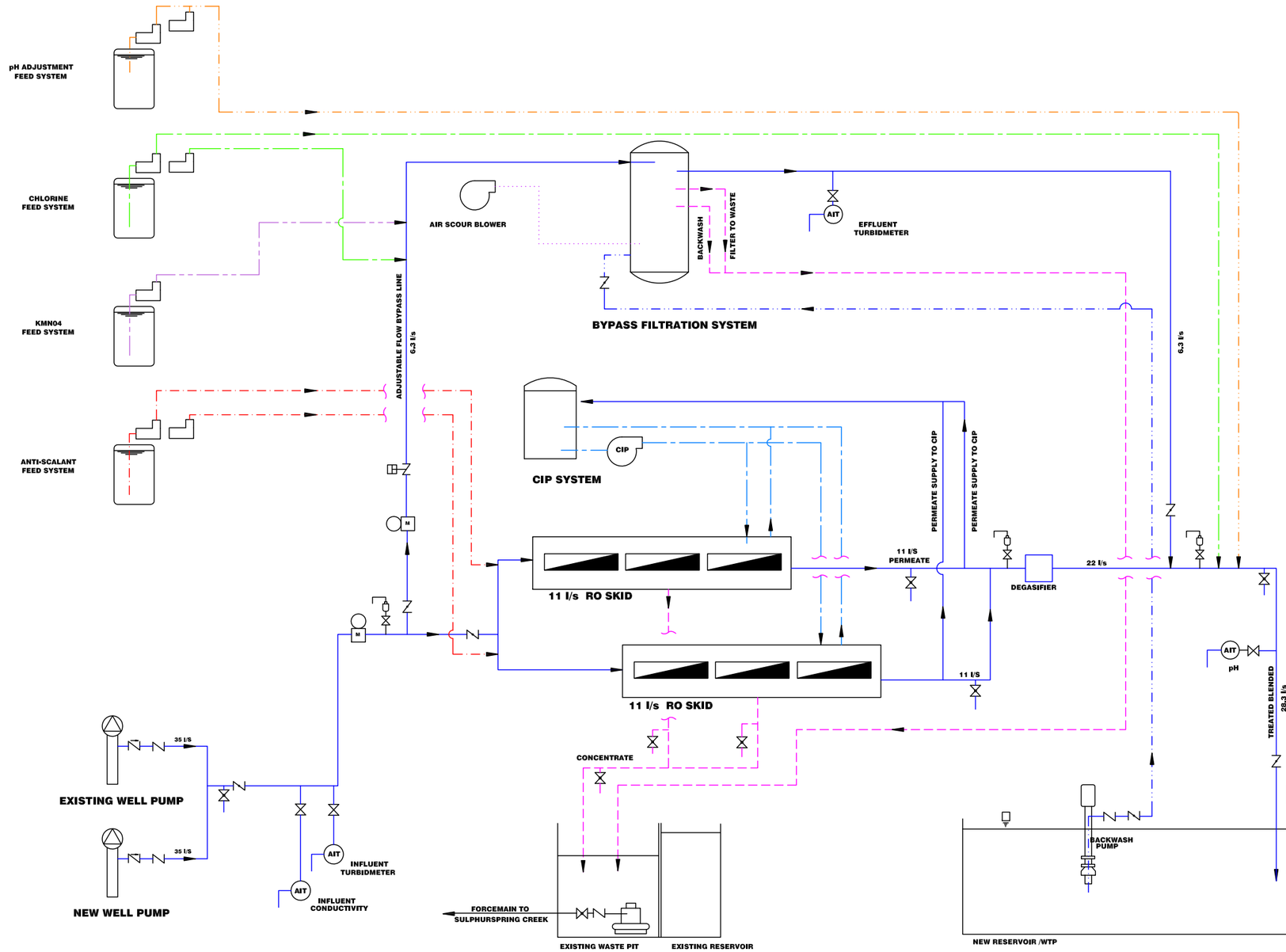
Federal Guidelines for Canadian Drinking Water Quality (AUG, 2012)
#1: GCDWQ - Aesthetic Objective
#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
Analytical result for this parameter exceeds Guide Limit listed on this report.
* Please refer to the Reference Information section for an explanation of any qualifiers noted.

Appendix B

Water Treatment Plant Process Diagram

Pipeline Schematic



LEGEND

PIPING AND MISCELLANEOUS EQUIPMENT

- WATER FLOW WITH DIRECTION
- PROCESS WASTE WITH DIRECTION
- CHLORINE LINE
- ANTI SCALANT LINE
- KMnO4 LINE
- pH ADJUSTMENT LINE
- AIR

- GATE VALVE
- GLOBE VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- BACKFLOW PREVENTER
- METERING PUMP
- MAGNETIC WATER METER
- LEVEL DETECTOR
- AIR/VACUUM c/w ISOLATION VALVE
- GENERIC ACTUATOR

PROVINCE OF MANITOBA

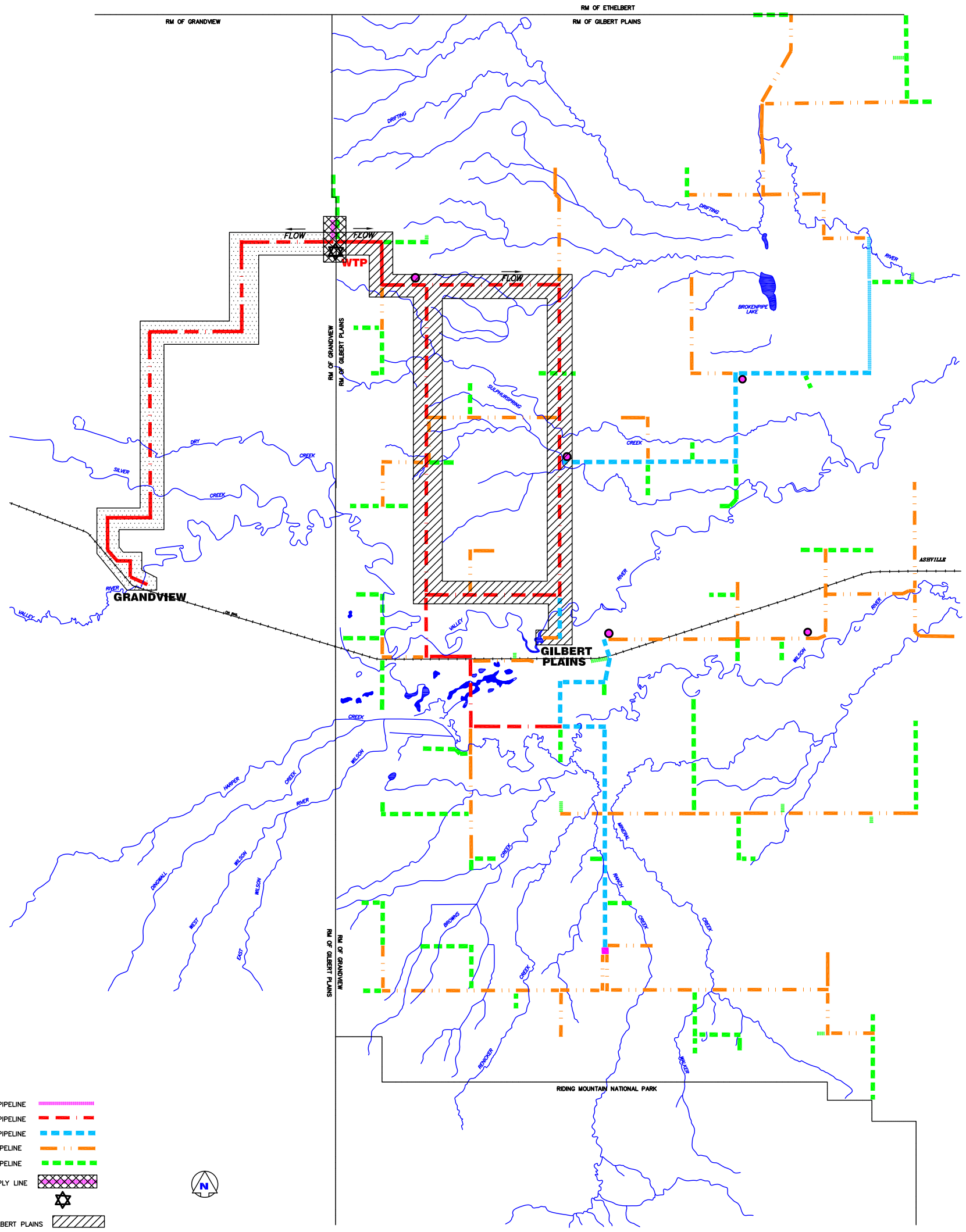
THE MANITOBA WATER SERVICES BOARD

MANITOBA INFRASTRUCTURE & TRANSPORTATION

G3 WATER TREATMENT PLANT

WTP SCHEMATIC

DRAWN	CHECKED	DATE	SCALE	DRAWING NO.	FILE NO.
R. NASON	T. PARSONS	10-12-12	NTS	1 OF 1	



LEGEND

- 200 mm WATER PIPELINE
- 150 mm WATER PIPELINE
- 100 mm WATER PIPELINE
- 75 mm WATER PIPELINE
- 50 mm WATER PIPELINE
- G3 WELL & SUPPLY LINE
- G3 RESERVOIR
- SUPPLY LINE RM/TOWN OF GILBERT PLAINS
- SUPPLY LINE TOWN OF GRANDVIEW
- PRESSURE REDUCING STATION

N

1 .5 0 1 2 3 4 5 6 7 KILOMETERS

1 0 1 2 3 4 5 MILES

SURVEYED	BOOK NUMBER
DRAWN	R. NASON
DESIGNED	
CHECKED	R. FOREMAN
REVIEWED	

PROVINCE OF MANITOBA

THE MANITOBA WATER SERVICES BOARD

MANITOBA INFRASTRUCTURE & TRANSPORTATION

SUBMITTED — CHIEF ENGINEER — DATE

APPROVED — GENERAL MANAGER — DATE

G3 REGIONAL

WATER PIPELINES

OCTOBER 2009

SCALE	DATE	PROJECT NUMBER	REVISION	SHEET
	09-10-27			1 OF 1