

# Memo

To: Downstream Users

Re: June 11, 2021 Rain Event – Sampling Results

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On June 11, 2021, Regina experienced a major rainstorm event where the city received 50mm to 75mm of rain over 24 hours, with heavy rain between 7:00 a.m. and 9:00 a.m. This caused overland flooding and sewer backups in some areas of Regina. The amount of rain received over a short period of time resulted in approximately 5.24ML (2.08 Olympic-sized swimming pools) of combined stormwater and wastewater to be released into Wascana Creek due to bypass events at the Harbour Landing lift station and the Garnet Street overflow structure. The Wastewater Treatment Plant did not bypass during the rainstorm event.

It is estimated that approximately 25 per cent (0.52 Olympic-sized swimming pools) of the release was wastewater. The City of Regina (City) values its neighbouring communities and only releases wastewater when necessary to protect public health and infrastructure. The City has made significant investments in our wastewater and stormwater system. Further upgrades are required and are part of our capital plans.

As a result of the wastewater release and in conformance with the City's Permit to Operate a Sewage Works, the City undertook additional water quality testing to better understand any impact on the waterway and neighbouring communities. The City completed testing within Regina during the June 11 event. On June 14 and 15, the City expanded testing to include downstream locations as far as Lumsden and Pasqua Lake.

The vast majority of flows (98 per cent) are estimated to have gone in the direction of Lumsden and the Last Mountain Lake with minimal flows reaching Pasqua Lake. The following assessment considers all sampling locations downstream of Regina. While the sampling results are appended, the Water Security Agency (WSA) has reviewed the results, the City has completed an assessment and a summary is provided below.

- E. coli levels detected downstream were less than historic sampling averages between 2018 and 2020 (during no bypass event). They were also below the limit for recreational water use set out by the Guidelines for Canadian Recreational Water Quality.
- Levels of dissolved oxygen appear slightly lower than historic sampling averages.
- Concentrations of ammonia are above the limit set by the Surface Water Quality Objectives at seven of the nine sampling locations. This is not unexpected during high flow events as a result of agricultural runoff (fertilizers), animals, plant decay, etc.
- Concentrations of total aluminum exceed the limit set by the Surface Water Quality Objectives. While historic sampling averages between 2018 and 2020 also exceed the limit, the recorded concentrations during the June 2021 sampling were slightly higher than the historic average. Concentrations exceeding guidelines are often observed when significant amounts of suspended sediment is part of the sample.

- Several other parameters were above the limit set out by the Surface Water Quality Objectives and are typical of historic sampling averages between 2018 and 2020. This is indicative of normal conditions in the waterway.

The City is committed to contacting downstream users during any event resulting in unexpected flows leaving the city. The delay in sending this letter out to downstream users was due to the time required to receive the analytical results and to allow the WSA and the City to review them. The City wanted to ensure we provided accurate data and discussed next steps. The City is continually investing in our wastewater and stormwater system to reduce the risk of future wastewater bypasses.

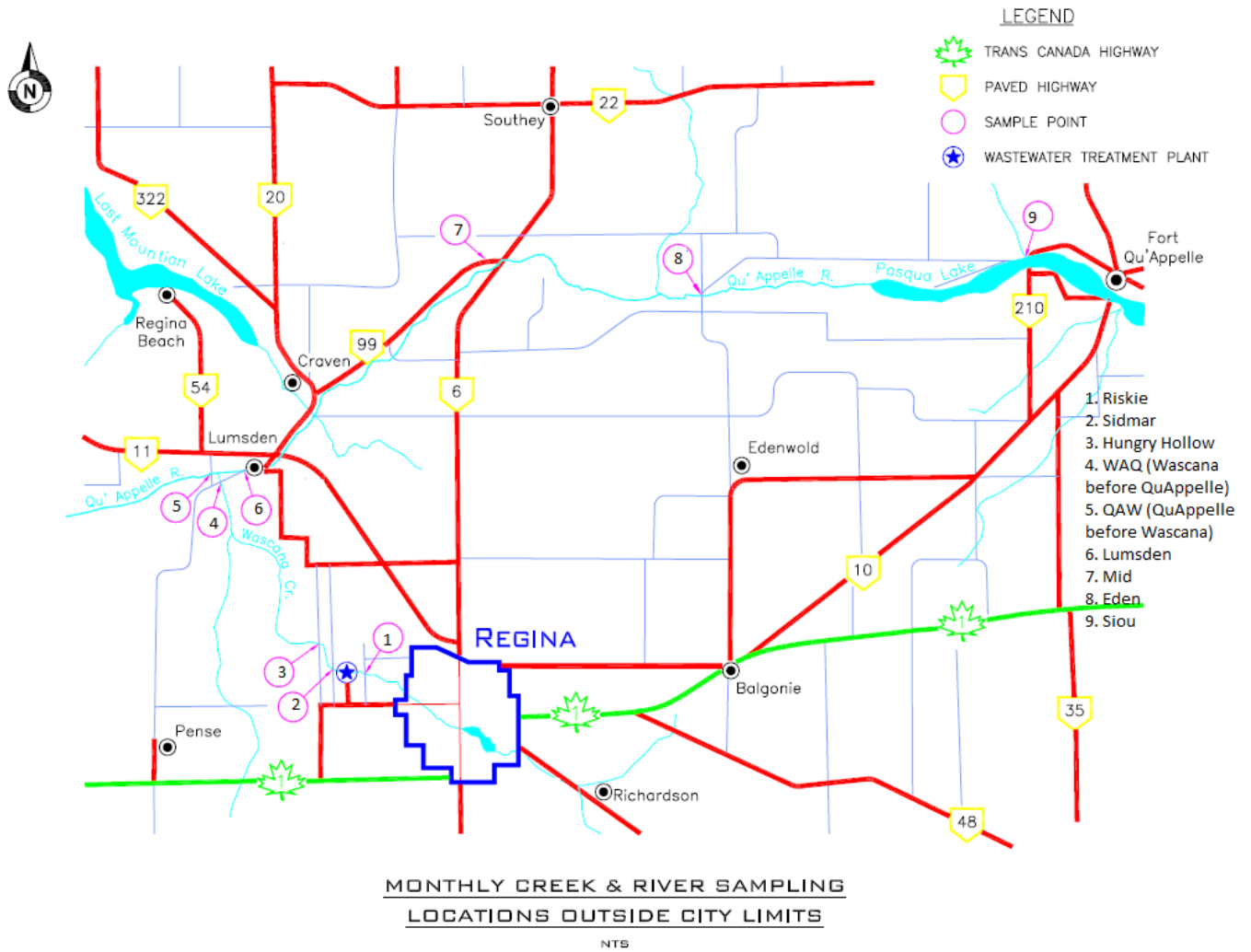
Should you have any questions or concerns, please feel free to contact us. We look forward to continuing to build our relationship with you.



Kurtis Doney, P.Eng., MSc.  
Director, Water, Waste & Environment

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### Appendix A – Map of Downstream Testing Locations



### Appendix B – Testing Results for Downstream Locations

Location Name	Limits			Test Results									2018-2020 Average
	Guidelines for Canadian Recreational Water Quality			Riske 1	Sidmar 2	Hungry Hollow 3	WAQ (Wascana before Qu'Appelle) 4	QAW (Qu'Appelle before Wascana) 5	Lumsden 6	Mid 7	Eden 8	Siou 9	
E. coli (MPN/100mL)	400			41	173	256	189	41	171	41	20	41	
Previous 2018 - 2020 Average E. coli	400			114	128	93	578	99	226	31	129	10	
	Surface Water Quality Objectives			Test Results									
	Aquatic Life	Irrigation	Livestock										
Temperature (oC)				19.1	17.7	18.6	21.6	21.0	21.9	23.3	22.1	21.8	19.5
Field pH	6.5 - 9			7.87	7.66	7.89	7.99	8.38	8.18	7.98	7.29	8.82	8.68
Field Conductivity (µS/cm)				1327	1438	1415	1347	664	885	945	695	1622	1174
DO (mg/L)	5.5 - 9.5	0.500-3.500	3	6.05	6.82	8.02	6.78	7.61	7.31	6.93	5.39	9.81	8.96
Turbidity (NTU)				31.2	19.6	22.2	109.0	116.0	135.0	182.0	331.0	6.5	54.4
TSS (mg/L)				6	27	17	120	140	230	170	260	6	94
TDS (mg/L)				780	860	850	810	370	510	580	620	1000	723
Dissolved Sulfates (mg/L)				290	310	300	290	130	180	250	300	450	284
Chlorides (mg/L)				120	150	140	140	26	59	41	32	110	96
DOC (mg/L)				13	11	12	11	6	9	10	10	12	7
BOD (mg/L)				2.4	2.6	3.1	5.2	3.1	4.2	3.3	3.1	3.4	5.2
CBOD (mg/L)				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.9	3.6
Total Phosphorus (mg/L)				0.31	0.34	0.31	0.53	0.21	0.25	0.24	0.32	0.14	0.22
Phenols (mg/L)	0.0040		0.002	0.0021	0.0028	0.0041	0.0021	0.0015	0.0015	0.0023	0.0016	0.0015	0.0019
Total Nitrogen (mg/L)				2.0	4.8	5.0	4.5	1.3	2.2	2.1	2.5	1.3	1.6
Total Sulphide (mg/L)				0.0140	0.0150	0.0110	0.0340	0.0330	0.0370	0.0490	0.0610	0.0040	0.0033
Sulphide-H2S (mg/L)				0.0140	0.0150	0.0110	0.0360	0.0350	0.0390	0.0520	0.0650	0.0043	0.0035
Ammonia-N (mg/L)	0.021 - 231			0.72	0.66	0.81	0.47	0.02	0.14	0.53	0.41	0.15	0.13
Nitrite-N (mg/L)	0.060			0.069	0.110	0.150	0.160	0.010	0.048	0.073	0.060	0.010	0.052
Nitrate-N (mg/L)	2.90			0.29	2.90	2.80	2.30	0.01	0.65	0.75	0.92	0.05	0.70
TKN (mg/L)				1.62	1.72	2.09	2.04	1.27	1.50	1.29	1.54	1.35	1.43
Nitrate-NO3 (mg/L)				1.30	13.00	12.00	10.00	0.04	2.90	3.30	4.10	0.22	2.99
Nitrate+Nitrite-N (mg/L)			100	0.36	3.00	2.90	2.50	0.01	0.70	0.83	0.98	0.05	0.72
Nitrite-NO2 (mg/L)				0.23	0.35	0.49	0.53	0.03	0.16	0.24	0.20	0.03	0.17
Alkalinity (PP as CaCO3) (mg/L)				1	1	1	1	1	1	1	1	10	3
Alkalinity (Total as CaCO3) (mg/L)				180	170	180	180	150	160	150	150	230	180

	Surface Water Quality Objectives			Test Results									
	Aquatic Life	Irrigation	Livestock	Riske 1	Sidmar 2	Hungry Hollow 3	WAQ (Wascana before Qu'Appelle) 4	QAW (Qu'Appelle before Wascana) 5	Lumsden 6	Mid 7	Eden 8	Siou 9	
Bicarbonate-HCO <sub>3</sub> (mg/L)				220	210	210	210	180	200	180	180	260	219
Carbonate-CO <sub>3</sub> (mg/L)				1	1	1	1	1	1	1	1	12	15
Hydroxide-OH (mg/L)				1	1	1	1	1	1	1	1	1	1
Fecal Strep (CFU/100)		100 per 100mL		220	460	380	800	390	900	600	320	40	175
Total Coliforms (MPN/100mL)		1000 per 100mL		7701	8164	11199	14136	3448	14136	6867	4106	1421	6883
Chlor A (mg/L)				0.79	3.06	3.74	7.11	9.85	12.88	43.28	62.83	0.79	1.9
Dissolved Calcium (Ca) (mg/L)				77	88	90	85	43	59	65	71	75	63
Dissolved Iron (Fe) (mg/L)				0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07
Dissolved Magnesium (Mg) (mg/L)				51	49	51	45	25	33	45	48	69	36
Dissolved Manganese (Mn) (mg/L)				0.11	0.12	0.08	0.02	0.00	0.00	0.00	0.00	0.04	0.03
Dissolved Potassium (K) (mg/L)				14	15	15	15	5	9	11	10	17	11
Dissolved Sodium (Na) (mg/L)				120	130	130	120	47	75	70	63	170	98
Total Cadmium (Cd) (mg/L)	0.0001	0.0051	0.08	0.055	0.029	0.037	0.110	0.068	0.086	0.084	0.140	0.020	0.051
Total Aluminum (Al) (mg/L)	0.100	5	5	1.200	0.480	1.800	4.300	2.900	4.300	6.500	5.400	0.061	1.168
Total Antimony (Sb) (mg/L)				0.00073	0.00180	0.00092	0.00120	0.00060	0.00096	0.00092	0.00130	0.00067	0.00060
Total Arsenic (As) (mg/L)	0.005	0.1	0.025	0.0043	0.0032	0.0035	0.0059	0.0038	0.0043	0.0049	0.0062	0.0050	0.0040
Total Barium (Ba) (mg/L)	1.5 - 29			0.150	0.060	0.069	0.130	0.098	0.120	0.110	0.150	0.054	0.072
Total Beryllium (Be) (mg/L)		0.1	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Total Boron (B) (mg/L)	1.5 - 29	0.5 - 6	5	0.12	0.15	0.15	0.14	0.08	0.10	0.12	0.12	0.23	0.14
Total Calcium (Ca) (mg/L)				74	75	78	82	43	57	62	74	71	66
Total Chromium (Cr) (mg/L)				0.0038	0.0017	0.0018	0.0068	0.0042	0.0061	0.0077	0.0090	0.0010	0.0038
Total Cobalt (Co) (mg/L)		0.05	1	0.00100	0.00074	0.00079	0.00320	0.00160	0.00220	0.00220	0.00350	0.00030	0.00133
Total Copper (Cu) (mg/L)	0.004	0.2 - 1	0.5 - 5	0.00430	0.00320	0.00310	0.00890	0.00480	0.00590	0.00700	0.01000	0.00064	0.00336
Total Iron (Fe) (mg/L)	0.3	5		8.0	0.7	0.9	5.0	3.0	4.3	4.5	7.8	0.1	1.7
Total Lead (Pb) (mg/L)	0.0070	0.2	0.1	0.0024	0.0013	0.0014	0.0039	0.0021	0.0027	0.0027	0.0041	0.0002	0.0016
Total Lithium (Li) (mg/L)		2.5		0.0580	0.0680	0.0720	0.0780	0.0290	0.0470	0.0530	0.0580	0.0890	0.0479

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Total Magnesium (Mg) (mg/L)				47	42	43	42	23	31	42	47	63	37
Total Manganese (Mn) (mg/L)		0.2		0.36	0.25	0.27	0.37	0.12	0.23	0.24	0.36	0.13	0.23
Total Molybdenum (Mo) (mg/L)	0.0730	0.01 - 0.05	0.5	0.0041	0.0110	0.0110	0.0094	0.0021	0.0045	0.0068	0.0049	0.0057	0.0070
Total Nickel (Ni) (mg/L)	0.1500	0.2	1	0.0043	0.0044	0.0046	0.0110	0.0058	0.0078	0.0097	0.0130	0.0028	0.0059
Total Phosphorus (P) (mg/L)				0.27	0.29	0.26	0.36	0.20	0.20	0.18	0.26	0.11	0.20
Total Potassium (K) (mg/L)				11	12	13	14	5	9	11	11	16	11
Total Selenium (Se) (mg/L)	0.001	0.02 - 0.05	0.05	0.00083	0.00220	0.00210	0.00230	0.000690	0.00130	0.00140	0.00160	0.00059	0.00083
Total Silicon (Si) (mg/L)				21	4	5	12	7	9	14	19	1	4
Total Silver (Ag) (mg/L)	0.0001			0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Total Sodium (Na) (mg/L)				60	120	120	110	43	71	66	60	170	98
Total Strontium (Sr) (mg/L)				0.40	0.40	0.41	0.40	0.28	0.33	0.34	0.40	0.49	0.36
Total Sulphur (S) (mg/L)				93	92	95	88	38	57	83	93	140	77
Total Thallium (Tl) (mg/L)				0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0338
Total Tin (Sn) (mg/L)				0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Total Titanium (Ti) (mg/L)	0.0008			0.0320	0.0200	0.0230	0.1500	0.0990	0.1500	0.2000	0.1300	0.0021	0.0338
Total Uranium (U) (mg/L)	0.015 - 0.033	0.01	0.2	0.0043	0.0038	0.0040	0.0042	0.0023	0.0029	0.0037	0.0042	0.0029	0.0029
Total Vanadium (V) (mg/L)		0.1	0.1	0.0069	0.0110	0.0120	0.0270	0.0100	0.0180	0.0230	0.0220	0.0028	0.0140
Total Zinc (Zn) (mg/L)	0.0300	1-5	50	0.0160	0.0120	0.0110	0.0310	0.0130	0.0190	0.0160	0.1200	0.0030	0.0146