



RM of Hanover - Grunthal PWS  
ATTN: BARRY BROESKY  
Grunthal - PWS  
28 Westland Drive  
Mitchell MB R5G 2N9

Date Received: 28- AUG- 20  
Report Date: 04- SEP- 20 13:16 (MT)  
Version: FINAL

Client Phone: 204- 371- 0484

## Certificate of Analysis

Lab Work Order #: L2495655  
Project P.O. #: NOT SUBMITTED  
Job Reference: GRUNTHAL - PWS 86.00  
C of C Numbers:  
Legal Site Desc: 6700

Hua Wo  
Chemistry Laboratory Manager

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ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: + 1 204 255 9720 | Fax: + 1 204 255 9721  
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## Physical Tests (WATER)

		ALS ID		L2495655-1	L2495655-2
		Sampled Date		27-AUG-20	27-AUG-20
		Sampled Time		11:30	11:30
		Sample ID		GRUNTHAL 1 - RAW	GRUNTHAL 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Colour, True	CU	15	-	28.2	<5.0
Conductivity	umhos/cm	-	-	754	771
Hardness (as CaCO <sub>3</sub> )	mg/L	-	-	386 HTC	388 HTC
Langelier Index (4 C)	No Unit	-	-	0.79	0.82
Langelier Index (60 C)	No Unit	-	-	1.6	1.6
pH	pH units	7.00-10.5	-	8.00	8.03
Total Dissolved Solids	mg/L	500	-	431	458
Transmittance, UV (254 nm)	%T/cm	-	-	89.5	90.8
Turbidity	NTU	-	-	1.59	0.64

### Federal Guidelines for Canadian Drinking Water Quality (JAN, 2020)

#1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)

#2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)

## Anions and Nutrients (WATER)

		ALS ID		L2495655-1	L2495655-2
		Sampled Date		27-AUG-20	27-AUG-20
		Sampled Time		11:30	11:30
		Sample ID		GRUNTHAL 1 - RAW	GRUNTHAL 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Alkalinity, Total (as CaCO <sub>3</sub> )	mg/L	-	-	373	369
Ammonia, Total (as N)	mg/L	-	-	0.498	<0.010
Bicarbonate (HCO <sub>3</sub> )	mg/L	-	-	455	451
Bromide (Br)	mg/L	-	-	0.037	<0.010
Carbonate (CO <sub>3</sub> )	mg/L	-	-	<0.60	<0.60
Chloride (Cl)	mg/L	250	-	22.0	29.7
Fluoride (F)	mg/L	-	1.5	0.194	0.194
Hydroxide (OH)	mg/L	-	-	<0.34	<0.34
Nitrate (as N)	mg/L	-	10	0.0929	0.117
Nitrite (as N)	mg/L	-	1	<0.0010	<0.0010
Sulfate (SO <sub>4</sub> )	mg/L	500	-	40.8	40.8

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## Organic / Inorganic Carbon (WATER)

		ALS ID		L2495655-1	L2495655-2
		Sampled Date		27-AUG-20	27-AUG-20
		Sampled Time		11:30	11:30
		Sample ID		GRUNTHAL 1 - RAW	GRUNTHAL 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Dissolved Organic Carbon	mg/L	-	-	2.09	2.04
Total Organic Carbon	mg/L	-	-	2.04	1.97

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# ANALYTICAL REPORT

## Total Metals (WATER)

		ALS ID		L2495655-1	L2495655-2	L2495655-3
		Sampled Date		27-AUG-20	27-AUG-20	27-AUG-20
		Sampled Time		11:30	11:30	13:00
		Sample ID		GRUNTHAL 1 - RAW	GRUNTHAL 2 - TREATED	GRUNTHAL 3 - DISTRIBUTION MID-POINT
Analyte	Unit	Guide Limit #1	Guide Limit #2			
Aluminum (Al)-Total	mg/L	0.1	-	<0.0030	<0.0030	<0.0030
Antimony (Sb)-Total	mg/L	-	0.006	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	-	0.01	0.00038	0.00043	0.00038
Barium (Ba)-Total	mg/L	-	2	0.352	0.347	0.333
Beryllium (Be)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	-	5	0.088	0.084	0.085
Cadmium (Cd)-Total	mg/L	-	0.005	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	-	-	87.2	88.0	87.8
Cesium (Cs)-Total	mg/L	-	-	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Total	mg/L	-	0.05	<0.00010	<0.00010	0.00016
Cobalt (Co)-Total	mg/L	-	-	0.00022	0.00020	0.00014
Copper (Cu)-Total	mg/L	1	2	0.00227	0.00979	0.0106
Iron (Fe)-Total	mg/L	0.3	-	0.340	0.354	0.106
Lead (Pb)-Total	mg/L	-	0.005	0.000086	0.000065	0.000358
Lithium (Li)-Total	mg/L	-	-	0.0190	0.0192	0.0190
Magnesium (Mg)-Total	mg/L	-	-	40.8	40.8	41.3
Manganese (Mn)-Total	mg/L	0.02	0.12	0.0636	0.0565	0.0172
Molybdenum (Mo)-Total	mg/L	-	-	0.000744	0.000776	0.000780
Nickel (Ni)-Total	mg/L	-	-	<0.00050	<0.00050	0.00050
Phosphorus (P)-Total	mg/L	-	-	<0.050	0.540	0.420
Potassium (K)-Total	mg/L	-	-	4.28	4.26	4.39
Rubidium (Rb)-Total	mg/L	-	-	0.00195	0.00199	0.00191
Selenium (Se)-Total	mg/L	-	0.05	<0.000050	0.000056	0.000061
Silicon (Si)-Total	mg/L	-	-	9.43	9.45	9.42
Silver (Ag)-Total	mg/L	-	-	<0.000010	<0.000010 RRV	<0.000010
Sodium (Na)-Total	mg/L	200	-	21.6	28.2	28.2
Strontium (Sr)-Total	mg/L	-	7	0.479	0.479	0.472
Sulfur (S)-Total	mg/L	-	-			14.5
Tellurium (Te)-Total	mg/L	-	-	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	-	-	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010

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## Total Metals (WATER)

		ALS ID		L2495655-1	L2495655-2	L2495655-3
		Sampled Date		27-AUG-20	27-AUG-20	27-AUG-20
		Sampled Time		11:30	11:30	13:00
		Sample ID		GRUNTHAL 1 - RAW	GRUNTHAL 2 - TREATED	GRUNTHAL 3 - DISTRIBUTION MID-POINT
Analyte	Unit	Guide Limit #1	Guide Limit #2			
Titanium (Ti)-Total	mg/L	-	-	<0.00030	<0.00030	<0.00030
Tungsten (W)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Uranium (U)-Total	mg/L	-	0.02	0.000752	0.000750	0.000758
Vanadium (V)-Total	mg/L	-	-	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	5	-	0.0059 RRV	0.0095 RRV	0.0067 RRV
Zirconium (Zr)-Total	mg/L	-	-	<0.00020	<0.00020	<0.00020

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## Volatile Organic Compounds (WATER)

		ALS ID		L2495655-1
		Sampled Date		27-AUG-20
		Sampled Time		11:30
		Sample ID		GRUNTHAL 1 - RAW
Analyte	Unit	Guide Limit #1	Guide Limit #2	
Benzene	mg/L	-	0.005	<0.00050
1,1-dichloroethene	mg/L	-	0.014	<0.00050
Dichloromethane	mg/L	-	0.05	<0.0050
Ethylbenzene	mg/L	0.0016	0.14	<0.00050
MTBE	mg/L	0.015	-	<0.00050
Tetrachloroethene	mg/L	-	0.01	<0.00050
Toluene	mg/L	0.024	0.06	<0.00050
Trichloroethene	mg/L	-	0.005	<0.00050
o-Xylene	mg/L	-	-	<0.00050
m+p-Xylenes	mg/L	-	-	<0.00040
Xylenes (Total)	mg/L	0.02	0.09	<0.00064
Surrogate: 4-Bromofluorobenzene (SS)	%	-	-	92.7
Surrogate: 1,4-Difluorobenzene (SS) %		-	-	96.8

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## Reference Information

### Qualifiers for Individual Parameters Listed:

Qualifier	Description
RRV	Reported Result Verified By Repeat Analysis
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).

### Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
<b>ALK-CO3CO3-CALC-WP</b>	Water	Alkalinity, Carbonate	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by carbonate is calculated and reported as mg CO <sub>3</sub> 2-/L.			
<b>ALK-HCO3HCO3-CALC-WP</b>	Water	Alkalinity, Bicarbonate	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by bicarbonate is calculated and reported as mg HCO <sub>3</sub> -/L.			
<b>ALK-OH-OH-CALC-WP</b>	Water	Alkalinity, Hydroxide	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by hydroxide is calculated and reported as mg OH-/L.			
<b>ALK-TITR-WP</b>	Water	Alkalinity, Total (as CaCO <sub>3</sub> )	APHA 2320B
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. Total alkalinity is determined by titration with a strong standard mineral acid to the successive HCO <sub>3</sub> - and H <sub>2</sub> CO <sub>3</sub> endpoints indicated electrometrically.			
<b>BR-L-IC-N-WP</b>	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)-LR
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>C-DOC-HTC-WP</b>	Water	Dissolved Organic Carbon by Combustion	APHA 5310 B-WP
Filtered (0.45 um) sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO <sub>2</sub> which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
<b>C-TOC-HTC-WP</b>	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP
Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO <sub>2</sub> which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
<b>CL-L-IC-N-WP</b>	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>COLOUR-TRUE-WP</b>	Water	Colour, True	APHA 2120C
True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
<b>EC-SCREEN-WP</b>	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other test eg. IC, TDS, TSS, etc			
<b>EC-WP</b>	Water	Conductivity	APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.			
<b>ETL-LANGELIER-4-WP</b>	Water	Langelier Index 4C	Calculated
<b>ETL-LANGELIER-60-WP</b>	Water	Langelier Index 60C	Calculated
<b>F-IC-N-WP</b>	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>HARDNESS-CALC-WP</b>	Water	Hardness Calculated	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO<sub>3</sub> equivalents.