

APPENDIX E

**ARCHIBALD OUTFALL – 2011 SEWER SAMPLE
INFORMATION**



KGS Group Consultants (Winnipeg)
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Date Received: 08-FEB-11
Report Date: 10-FEB-11 12:47 (MT)
Version: FINAL

Certificate of Analysis

Lab Work Order #: L976608
Project P.O. #: NOT SUBMITTED
Job Reference: 10-0107-24
Legal Site Desc: MISSION FLOOD PUMPING STATION
C of C Numbers:

Paul Nicolas

Paul Nicolas
Account Manager

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ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L976608-1 MISSION TRUNK SEWER SAMPLE 1							
Sampled By: CLIENT on 08-FEB-11 @ 08:56							
Matrix: SEWAGE							
Routine total							
Alkalinity							
Alkalinity, Total (as CaCO3)	434		1.0	mg/L		08-FEB-11	R1926843
Bicarbonate (HCO3)	530		2.0	mg/L		08-FEB-11	R1926843
Carbonate (CO3)	<0.60		0.60	mg/L		08-FEB-11	R1926843
Hydroxide (OH)	<0.40		0.40	mg/L		08-FEB-11	R1926843
Anions scan (IC)							
Chloride	439		2.5	mg/L		08-FEB-11	R1930024
Nitrite-N	<0.25		0.25	mg/L		08-FEB-11	R1930024
Nitrate-N	0.27		0.25	mg/L		08-FEB-11	R1930024
Sulfate	163		2.5	mg/L		08-FEB-11	R1930024
Conductivity							
Conductivity	2770		0.40	umhos/cm		08-FEB-11	R1926843
Hardness Calculated							
Hardness (as CaCO3)	272		0.30	mg/L		10-FEB-11	
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		09-FEB-11	
TDS calculated							
TDS (Calculated)	1380		5.0	mg/L		10-FEB-11	
Total Metals by ICP-MS							
Calcium (Ca)-Total	52.5		0.20	mg/L	09-FEB-11	09-FEB-11	R1931643
Magnesium (Mg)-Total	34.1		0.050	mg/L	09-FEB-11	09-FEB-11	R1931643
Potassium (K)-Total	64.6		0.10	mg/L	09-FEB-11	09-FEB-11	R1931643
Sodium (Na)-Total	367		0.050	mg/L	09-FEB-11	09-FEB-11	R1931643
pH							
pH	7.45		0.10	pH units		08-FEB-11	R1926843
L976608-2 MISSION TRUNK SEWER SAMPLE 2							
Sampled By: CLIENT on 08-FEB-11 @ 08:56							
Matrix: SEWAGE							
Routine total							
Alkalinity							
Alkalinity, Total (as CaCO3)	431		1.0	mg/L		08-FEB-11	R1926843
Bicarbonate (HCO3)	526		2.0	mg/L		08-FEB-11	R1926843
Carbonate (CO3)	<0.60		0.60	mg/L		08-FEB-11	R1926843
Hydroxide (OH)	<0.40		0.40	mg/L		08-FEB-11	R1926843
Anions scan (IC)							
Chloride	435		2.5	mg/L		08-FEB-11	R1930024
Nitrite-N	<0.25		0.25	mg/L		08-FEB-11	R1930024
Nitrate-N	0.27		0.25	mg/L		08-FEB-11	R1930024
Sulfate	160		2.5	mg/L		08-FEB-11	R1930024
Conductivity							
Conductivity	2710		0.40	umhos/cm		08-FEB-11	R1926843
Hardness Calculated							
Hardness (as CaCO3)	325		0.30	mg/L		10-FEB-11	
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.35		0.35	mg/L		09-FEB-11	
TDS calculated							
TDS (Calculated)	1360		5.0	mg/L		10-FEB-11	
Total Metals by ICP-MS							
Calcium (Ca)-Total	66.7		0.20	mg/L	09-FEB-11	09-FEB-11	R1931643
Magnesium (Mg)-Total	38.6		0.050	mg/L	09-FEB-11	09-FEB-11	R1931643

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TOT-WP	Water	Alkalinity	APHA 2320B
Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. It is determined by titration with a standard solution of strong mineral acid to the successive HCO ₃ ⁻ and H ₂ CO ₃ endpoints indicated electrometrically.			
ANIONS5-IC-WP	Water	Anions scan (IC)	EPA 300.1 IC
This analysis is carried out using procedures adapted from EPA Method 300.1 "Determination of Inorganic Anions in Drinking Water by Ion Chromatography".			
EC-WP	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.			
ETL-HARDNESS-TOT-WP	Water	Hardness Calculated	HARDNESS CALCULATED
ETL-SOLIDS-CALC-WP	Water	TDS calculated	CALCULATION
IONBALANCE-OP05-WP	Water	Ion Balance Calculation No Reporting	APHA 1030E
MET-T-MS-WP	Water	Total Metals by ICP-MS	U.S. EPA 200.8-T
Total Metals by ICP-MS: This analysis is carried out using sample preparation procedures adapted from Standard Methods for the examination of Water and Wastewater Method 3030E and analytical procedures adapted from U.S EPA Method 200.8 for analysis of metals by inductively coupled-mass spectrometry.			
NO2+NO3-CALC-WP	Water	Nitrate+Nitrite	CALCULATION
PH-WP	Water	pH	APHA 4500H

pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS LABORATORY GROUP - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Quality Control Report

Workorder: L976608

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Contact: RAY OFFMAN

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TOT-WP		Water						
Batch	R1926843							
WG1238215-5	CVS							
Alkalinity, Total (as CaCO3)			102		%		85-115	08-FEB-11
ANIONS5-IC-WP		Water						
Batch	R1930024							
WG1238558-2	LCS							
Chloride			99		%		85-115	08-FEB-11
Nitrite-N			103		%		85-115	08-FEB-11
Nitrate-N			99		%		85-115	08-FEB-11
Sulfate			99		%		85-115	08-FEB-11
WG1238558-1	MB							
Chloride			<0.50		mg/L		0.5	08-FEB-11
Nitrite-N			<0.050		mg/L		0.05	08-FEB-11
Nitrate-N			<0.050		mg/L		0.05	08-FEB-11
Sulfate			<0.50		mg/L		0.5	08-FEB-11
EC-WP		Water						
Batch	R1926843							
WG1238215-2	CCV							
Conductivity			102		%		95-105	08-FEB-11
WG1238215-1	CVS							
Conductivity			99		%		90-110	08-FEB-11
MET-T-MS-WP		Water						
Batch	R1931643							
WG1238736-3	CCV							
Calcium (Ca)-Total			99		%		90-110	09-FEB-11
Magnesium (Mg)-Total			98		%		90-110	09-FEB-11
Potassium (K)-Total			100		%		90-110	09-FEB-11
Sodium (Na)-Total			98		%		90-110	09-FEB-11
WG1238736-1	CVS							
Calcium (Ca)-Total			100		%		70-130	09-FEB-11
Magnesium (Mg)-Total			97		%		70-130	09-FEB-11
Potassium (K)-Total			101		%		70-130	09-FEB-11
Sodium (Na)-Total			95		%		70-130	09-FEB-11
WG1238736-2	CVS							
Calcium (Ca)-Total			100		%		70-130	09-FEB-11
Magnesium (Mg)-Total			97		%		70-130	09-FEB-11



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-MS-WP		Water						
Batch	R1931643							
WG1238736-2		LCS						
Potassium (K)-Total			102		%		70-130	09-FEB-11
Sodium (Na)-Total			98		%		70-130	09-FEB-11
WG1238354-2		LCS						
Calcium (Ca)-Total			97		%		80-120	09-FEB-11
Magnesium (Mg)-Total			102		%		80-120	09-FEB-11
Potassium (K)-Total			100		%		80-120	09-FEB-11
Sodium (Na)-Total			104		%		80-120	09-FEB-11
WG1238354-1		MB						
Calcium (Ca)-Total			<0.20		mg/L		0.2	09-FEB-11
Magnesium (Mg)-Total			<0.050		mg/L		0.05	09-FEB-11
Potassium (K)-Total			<0.10		mg/L		0.1	09-FEB-11
Sodium (Na)-Total			<0.050		mg/L		0.05	09-FEB-11
PH-WP		Water						
Batch	R1926843							
WG1238215-4		CCV						
pH			101		%		90-110	08-FEB-11
WG1238215-3		LCS						
pH			7.40		pH units		7.3-7.5	08-FEB-11

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Legend:

Limit	99% Confidence Interval (Laboratory Control Limits)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

