

ANNEX 6

Water Quality Sampling Certificates of Analysis 2024

Table 1: Monthly Water Sample Code - COA

Month	Top Surface (Sand Mine)	Middle Surface	Bottom Surface	Middle Well
January 25, 2024	2	3	1	4
February 27, 2024	1	4	3	2
March 26, 2024	3	1	2	PW3
April 24, 2024	1	2	3	4
May 28, 2024	3	2	4	1
June 26, 2024	1	2	3	PW3
July 25, 2024	4	1	2	3
August 28, 2024	4	3	2	1
September 25, 2024	2	3	1	PW3
October 31, 2024	2	4	1	3
November 28, 2024	-	2	-	PW2
December 11, 2024	2	3	1	PW3

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ACCREDITED LABORATORY

7 Hillview Avenue,
Kingston 10, Jamaica
Tel: (876) 978-9519, 978-6297, 978-5902
Fax: (876) 946-3745
E-mail: envirsol@cwjamaica.com

Certificate of Sample Analysis

CSA#: CDL 24012532-35 & 37-39

Attention:

Ms. Flovia Riley
Clarendon Distillers Limited
10th Floor, The Towers
25 Dominica Drive
Kingston 5



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Sample(s) Information

Job Number: 24012532-39

SPN: -

Date of Report: 03/05/2024

Revision Date: Not Applicable

Sample(s) Collected: 25/01/2024

Sample(s) Submitted: 25/01/2024

Temperature on Arrival: 2.5°C

Number of Samples: 8

Analysis Started: 25/01/2024

Analysis Completed: 22/02/2024

Prepared By: Reena McKenzie, Quality Management Systems Manager

Verified By *R. Stephens*
Raheem Stephens,
Chemistry Analyst

Approved By *J. Jones*
Jaidene Webster-Jones,
Quality Control Officer



Results of Sample Analysis

Sample ID (Matrix) - Qualifier: 2 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	259 @ 24.5°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.04	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	4.8	P(P)	0.1 - 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.1		-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	25	E(M1), P(1)	3.0 - 10.0
Total Suspended Solids (mg/L)	SM-2540 D	3.9	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	21	P(P)	-
Chloride (mg Cl/L)	H-8206	40.1	P(1)	5.0 – 20.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.6	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	1229	P(P), P(1), D(C)	740-5000
Zinc (µg Zn/L)	EPA 200.7	<11.8	P(P), P(1), BDL	
Iron (µg Fe/L)	EPA 200.7	155	P(P), P(1)	
Lead (µg Pb/L)	EPA 200.7	28.2	P(P), P(1), D(I)	
Copper (µg Cu/L)	EPA 200.7	10.1	P(P), P(1)	

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: 3 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	22900 @ 24.0°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.04	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	6.6	E(M1), P(P)	0.1 - 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.5		-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	1200	E(M1), P(1), D(C)	3.0 - 10.0
Total Suspended Solids (mg/L)	SM-2540 D	12.9	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	20	P(P), D(I)	-
Chloride (mg Cl/L)	H-8206	11600.0	D(C), P(1)	5.0 – 20.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.3	E(M3)	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	236086	P(P), P(1), D(C)	740-5000
Zinc (µg Zn/L)	EPA 200.7	<11.8	P(P), P(1), E(M3), BDL	-
Iron (µg Fe/L)	EPA 200.7	156	P(P), P(1), E(M3)	-
Lead (µg Pb/L)	EPA 200.7	58.9	P(P), P(1), D(C)	-
Copper (µg Cu/L)	EPA 200.7	10.1	P(P), P(1), E(M3)	-

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Sample ID (Matrix) - Qualifier: 1 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	30400 @ 24.4°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.03	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	8.4	E(M1), P(P)	0.1 - 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.9		-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	1600	E(M1), P(1), D(C)	3.0 - 10.0
Total Suspended Solids (mg/L)	SM-2540 D	8.1	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	80	P(P), D(I)	-
Chloride (mg Cl ⁻ /L)	H-8206	16200.0	D(C), P(1)	5.0 – 20.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.6	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	337715	P(1), P(P), D(C)	740-5000
Zinc (µg Zn/L)	EPA 200.7	23.4	P(P), P(1), E(M3)	-
Iron (µg Fe/L)	EPA 200.7	125	P(P), P(1), E(M3)	-
Lead (µg Pb/L)	EPA 200.7	74.0	P(P), P(1), D(C)	-
Copper (µg Cu/L)	EPA 200.7	22.9	P(P), P(1), E(M3)	-

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Sample ID (Matrix) - Qualifier: 4 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	1252 @ 24.8°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.12	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	9.7	E(M1), D(C), P(P)	0.1 - 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.2		-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	73	E(M1), P(1), D(C)	3.0 - 10.0
Total Suspended Solids (mg/L)	SM-2540 D	<1.6	BDL	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	15	P(P)	-
Chloride (mg Cl ⁻ /L)	H-8206	356.0	D(C)	5.0 – 20.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	0.5	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	4144	P(P), P(1)	740-5000
Zinc (µg Zn/L)	EPA 200.7	<11.8	P(P), P(1), BDL	-
Iron (µg Fe/L)	EPA 200.7	<12.9	P(P), P(1), BDL	-
Lead (µg Pb/L)	EPA 200.7	7.9	P(P), P(1)	-
Copper (µg Cu/L)	EPA 200.7	<5.3	P(P), P(1), BDL	-

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Sample ID (Matrix) - Qualifier: D1 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	4.30 @ 23.1°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	71.60	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	6071.4	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	95750	D(C), P(P)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	8010	P(1), D(C), E(M3)	<30
Potassium (g K/L)	EPA 200.7	5.68	P(P), P(1), D(C)	-
Zinc (µg Zn/L)	EPA 200.7	1470	P(P), P(1), D(C)	-
Iron (µg Fe/L)	EPA 200.7	57170	P(P), P(1), D(C)	-
Lead (µg Pb/L)	EPA 200.7	2439	P(1), P(P), D(C)	-
Copper (µg Cu/L)	EPA 200.7	3564	P(P), P(1), D(C)	-

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Sample ID (Matrix) - Qualifier: D2 (Trade Effluent)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	4.35 @ 23.0°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	89.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	20666.7	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	148000	D(C), P(P)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	17326	P(1), D(C)	<30
Potassium (g K/L)	EPA 200.7	9.54	P(P), P(1), D(C)	-
Zinc (µg Zn/L)	EPA 200.7	1823	P(P), P(1), D(C)	-
Iron (µg Fe/L)	EPA 200.7	64366	P(P), P(1), D(C)	-
Lead (µg Pb/L)	EPA 200.7	2267	P(P), P(1), D(C)	-
Copper (µg Cu/L)	EPA 200.7	7395	P(P), P(1), D(C)	-

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Sample ID (Matrix) - Qualifier: D3 (Trade Effluent)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	4.17 @ 23.1°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	63.50	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	12000.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	92500	D(C), P(P)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	14256	P(1), D(C)	<30
Potassium (g K/L)	EPA 200.7	6.94	P(P), P(1), D(C)	-
Zinc (µg Zn/L)	EPA 200.7	1543	P(P), P(1), D(C)	-
Iron (µg Fe/L)	EPA 200.7	54548	P(P), P(1), D(C)	-
Lead (µg Pb/L)	EPA 200.7	2774	P(P), P(1), D(C), E(R)	-
Copper (µg Cu/L)	EPA 200.7	22391	P(P), P(1), D(C)	-

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Certificate of Quality

Parameter: Biochemical Oxygen Demand (H-8043)

QEHL Personnel: T. Thompson, J. Webster-Jones, S. Crooks Date of Analysis: 26/01/2024

Parameter: Total Dissolved Solids (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 25/01/2024

Standard (mg/L)	Instrument Reading (mg/L)	Temperature (°C)
909 – 928	918	24.7

Parameter: pH (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 25/01/2024

Standard (Buffer)	pH After Calibration	Temperature (°C)
3.96 – 4.04	4.02	22.7
6.90 – 7.10	7.02	22.7
9.96 – 10.04	10.04	22.9

Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: R. Stephens

Date of Analysis: 26/01/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		30.7	1.9
		31.3	
SRS	68.7-85.9	78.0	

Parameter: Orthophosphates (H-8048)

QEHL Personnel: J. Williams

Date of Analysis: 25/01/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		<0.02	
RB		<0.02	
BD		70.00	2.82
		72.00	
SRS	1.95-2.05	1.98	

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Parameter: Turbidity (EPA 180.1)

QEHL Personnel: J. Williams

Date of Analysis: 25/01/2024

	Standard Concentration (NTU)	Determined Concentration (NTU)	RPD (%)
BD		0.65	1.5
		0.66	
SRS	9.0 - 11.0	10.6	

Parameter: Sulfate (H-8051)

QEHL Personnel: R. Stephens

Date of Analysis: 26/01/2024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	1.5
BD		335	
		340	
SRS	62-66	63	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 31/01/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<11	0.4
BD		497	
		499	
SRS	488-512	503	

Parameter: Fats, Oil and Grease (EPA 1664B)

QEHL Personnel: S. Robinson

Date of Analysis: 30/01/2024

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 31/01/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<3	2.5
BD		40	
		41	
SRS	121-129	121	

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Parameter: Chloride (H-8206)

QEHL Personnel: R. Brown

Date of Analysis: 26/01/2024

	Standard Concentration (mg Cl ⁻ /L)	Determined Concentration (mg Cl ⁻ /L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		5.3	1.9
		5.2	
SRS	97.0-103.0	100.4	

Parameter: HR Nitrate (H-8039)

QEHL Personnel: R. Ford

Date of Analysis: 26/01/2024

	Standard Concentration (mg NO ₃ ⁻ -N/L)	Determined Concentration (mg NO ₃ ⁻ -N/L)	RPD (%)
MB		0.8	
RB		0.7	
BD		<0.3	-
		<0.3	
SRS	8.6-11.4	11.2	

Parameter: Total Coliform (SM-9221)

QEHL Personnel: K. Williams

Date of Analysis: 25/01/2024

Media/Test Item (Batch #)	DS LTB (23/01/2024)	BG (26/01/2024)
Sterile (Yes/No)	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical

Parameter: *E. coli* (SM 9221)

QEHL Personnel: K. Williams

Date of Analysis: 25/01/2024

Media/Test Item (Batch#)	DS LTB (23/01/2024)	EC MUG (11/01/2024)
Sterile (Yes/No)	Yes	Yes
Media performance (Typical, not typical)	Typical	-

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Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: R. Ford

Date of Analysis: 26/01/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#3	Standard addition checks*	1.1	2.5	1.7	68
			5.0	3.5	70
			7.5	5.3	71

*Equation of the line $y = 0.708x + 1.07$

Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: R. Ford

Date of Analysis: 26/01/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#1	Standard addition checks*	1.4	2.5	1.8	72
			5.0	3.7	74
			7.5	5.5	73

*Equation of the line $y = 0.736x + 1.39$

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 31/01/2024

**Additional Quality Control Information can be provided upon request.*

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 20/02/2024

**Additional Quality Control Information can be provided upon request.*



Glossary

%	Percentage
µg/L	microgram per litre
µS/cm	Micro siemens per centimetre
a	Parameter subcontracted
ADB	Azide Dextrose Broth
AIM	The Aquaculture, Inland & Marine Products & By-Products Act (Regulations)
AOAC	American Organization of Analytical Chemists
b (1)	Parameter analysed outside of hold-time; samples submitted outside of the analysis hold-time
b (2)	Parameter analysed outside of hold-time; analysis authorised by Client
BAM	Bacteriological Analytical Manual
BD	Batch Duplicate
BDL	Analyte concentration below laboratory determined limit of detection
BDLS	Analyte detected below method detection limit (MDL). MDL greater than standard value.
BEA	Bile Esculin Azide Agar
BG	Brilliant Green Bile Broth
BGSA	Brilliant Green Sulfa Agar
BHI	Brain Heart Infusion Broth
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BSA	Bismuth Sulfite Agar
c	parameter analysed in the field
C(B)	Samples collected by the client and picked up by an ESL bearer
C(C)	Samples collected by the client and delivered to ESL
C(H)	Analytical sample submitted in incorrect container. This may affect data quality.
C(L)	Samples collected by ESL
C(S)	Sample collected by the client then sub-sampled and delivered by ESL.
CFU	Colony Forming Units
CMMEF	Compendium of Methods for the Microbiological Examination of Foods
Col	Colourimetry
CVAAS	Cold Vapour Atomic Absorption Spectroscopy
D(I)	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference
D(C)	Sample diluted due to high concentration of target analyte
DR	Direct Reading
DS ADB	Double Strength Azide Dextrose Broth
DS LTB	Double Strength Lauryl Tryptose Broth
DS PAB	Double Strength Pseudomonas Asparagine Broth
EB	Equipment Blank
E(E1)	Estimated Value. Data acquisition affected by equipment malfunction.
E(L1)	Estimated Value. Analyte recovery in the laboratory control sample (LCS) was outside of QC limits. Results for this may be affected by same bias.
E(L2)	Estimated Value due to the nature of the sample matrix.
E(M1)	Estimated Value. Result calculated using calibration curve.
E(M2)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
E(M3)	Estimated Value. Sample performance indicate presence of interference
E(R)	Estimated Value. RPD value was outside control limits.
EC	<i>E. coli</i> Media
E(V)	Estimated Value. Count(s) obtained is/are outside of the method counting range.
EC-MUG	<i>E. coli</i> Media with 4-methylumbelliferyl-β-D-glucuronide
EHU	Environmental Health Unit
EPA	(US) Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectroscopy
FAES	Flame Atomic Emission Spectroscopy
FB	Field Blank
FD	Field Duplicate
FL-PRO	Florida Petroleum Range Organic Method
GC-MS	Gas Chromatography Mass Spectrometry
H	Hach Water Analysis Workbook
H(A)	Off-scale high data obtained. Actual value may be greater than value given.
ICP	Inductively Coupled Plasma
ISE	Ion Selective Electrode

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LCA	Listeria Chromogenic Agar
LE	Data not available due to laboratory error
LIA	Lysine Iron Agar
MAC	MacConkey Agar
MB	Method Blank
mEndo	mEndo Agar/Broth
MFHPB	Microbiology Food Health Protection Branch, Government of Canada
mmhos/cm	Millimhos per centimetre
mg/kg	milligram per kilogram
mg/L	milligrams per litre
MPN	Most Probable Number
mS/cm	millisiemens per centimetre
N/A (1)	Data not yet Available. Analysis not complete.
N/A (2)	Data not Available. Sample matrix interferences prevented data acquisition.
N/A (3)	Data not Available. Insufficient sample submitted.
N/A (4)	Data not Available. Equipment malfunction prevented data acquisition.
N/A (5)	Data not Available. Analysis not complete due to force majeure.
N/A (6)	Data not available due to issues with the shipment of the sample(s).
N/A (7)	Data not available. Technical difficulties experienced by subcontractor.
NA	Nutrient Agar
NB	Nutrient Broth
NEPA	National Environment and Planning Agency
NRCA	Natural Resources Conservation Authority
NTU	Nephelometric Turbidity Units
NWC	National Water Commission (Jamaica)
NST	No Time given for collection of samples
P(P)	Sample preserved prior to analysis
P(1)	Non-routine sample pre-treatment required
PAB	Pseudomonas Asparagine Broth
PCA	Plate Count Agar
PDA + C	Potato Dextrose Agar with Chloramphenicol
Pep Water	Peptone Water
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
RED	Parameter Non-compliant
RPD	Relative Percentage Difference
RSD	Relative Standard Deviation
SM	Standard Methods for the Examination of Water and Wastewater 23 rd Edition
SRS	Standard Reference Solution
SS	Sample Submerged upon receipt at the laboratory
SS ADB	Single Strength Azide Dextrose Broth
SS LTB	Single Strength Lauryl Tryptose Broth
SS PAB	Single Strength Pseudomonas Asparagine Broth
T(H)	Samples arrived at ESL-QEHL outside holding temperature ($\leq 4.0^{\circ}\text{C}$).
TIT	Titrimetry
TPH	Total Petroleum Hydrocarbon
TSA	Tryptic Soy Agar
TSB	Tryptic Soy Broth
TSA + YE	Tryptic Soy Agar + Yeast Extract
TTC	2,3,5 Triphenyl-2H-Tetrazolium Chloride
UMR	Analyte detection was below the measuring range of instrument. This is indicative of possible matrix interference within the sample.
WHO	World Health Organization
XLD	Xylose Lysine Deoxycholate

End of Report

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ISO 17025
ACCREDITED LABORATORY

7 Hillview Avenue,
Kingston 10, Jamaica
Tel: (876) 978-9519, 978-6297, 978-5902
Fax: (876) 946-3745
E-mail: envirsol@cwjamaica.com

Certificate of Sample Analysis

CSA#: CDL 24022707-11 & 13-15

Attention:

Ms. Flovia Riley
Clarendon Distillers Limited
10th Floor, The Towers
25 Dominica Drive
Kingston 5



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Sample(s) Information

Job Number: 24022707-15

SPN: -

Date of Report: 02/05/2024

Revision Date: Not Applicable

Sample(s) Collected: 27/02/2024

Sample(s) Submitted: 27/02/2024

Temperature on Arrival: 2.2°C

Number of Samples: 8

Analysis Started: 27/02/2024

Analysis Completed: 22/03/2024

Prepared By: Reena McKenzie, Quality Management Systems Manager

Verified By
Travis Garnett,
Senior Analyst

Approved By
Jaidene Webster-Jones,
Quality Control Officer



Results of Sample Analysis

Sample ID (Matrix) - Qualifier: #1 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	244 @ 23.1°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	<0.02	UMR	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	<1.3	BDL, P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		<0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	40.0	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	31	P(1), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	2.1	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	10	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.8	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	1093	P(P), P(1)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: #4 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	29100 @ 23.6°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	<0.02	BDL	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	10.1	E(M1), P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.3		-
Chloride (mg Cl ⁻ /L)	H-8206	16400.0	D(C), P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	2425	D(C), P(1), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	15.8	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	105	P(P), D(I)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.3	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	337861	P(P), P(1), D(C)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: #3 (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	32600 @ 24.0°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.02	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	13.6	E(M1), P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		3.1		-
Chloride (mg Cl ⁻ /L)	H-8206	18500.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	2650	D(C), P(1), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	17.8	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	135	P(P), D(I)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.4	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664 B	7.5	P(P)	-
Potassium (µg K/L)	EPA 200.7	389315	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: #2 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	1233 @ 24.1°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.12	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	7.7	D(I), P(P), E(M1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.8		-
Chloride (mg Cl ⁻ /L)	H-8206	348.0	D(C), P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	68	D(C), P(1), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	2.0	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	14	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	0.6	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	4299	P(P), P(1)	740 – 5000

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Sample ID (Matrix) - Qualifier: AH (Groundwater)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	6.98 @ 23.2°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	2340 @ 23.5°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1519 @ 23.5°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	7.6	E(M1), D(I), P(P)	0.1 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.7		-
Total Coliform (MPN/100mL)	SM-9221	2.0	-	-
Faecal Coliform (MPN/100mL)	SM-9221	<1.8	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	74	D(C), E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	508.0	D(C)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	773.9	P(1), P(P)	127.0 – 381.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.4	-	0.8 – 1.7
Sodium (µg Na/L)	EPA 200.7	147825	P(P), P(1), D(C)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	83.8	P(P), P(1), D(C)	-
Magnesium (µg Mg/L)	EPA 200.7	39293	P(P), P(1), D(C)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	3874	P(1), P(P), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: D1 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	4.15 @ 23.1°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	89.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	11350.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	136000	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	25954	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	8.09	P(1), P(P), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: D2 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	4.08 @ 22.6°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	128.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	7500.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	66500	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	23227	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	3.52	P(1), P(P), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: D3 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	4.10 @ 23.9°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	51.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	15466.7	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	101500	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	21006	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	5.68	P(P), P(1), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.



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Parameter: Biochemical Oxygen Demand (H-8043)

QEHL Personnel: T. Thompson, J. Webster-Jones, S. Crooks Date of Analysis: 28/02/2024

Parameter: pH (DR)

QEHL Personnel: C. Davis

Date of Analysis: 27/02/2024

Standard (Buffer)	pH After Calibration	Temperature (°C)
3.96 – 4.04	4.04	24.9
6.90 – 7.10	7.07	24.8
9.96 – 10.04	10.01	25.0

Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: R. Stephens

Date of Analysis: 29/02/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		2528.6	4.6
		2414.3	
SRS	68.7-85.9	81.5	

Parameter: Orthophosphates (H-8048)

QEHL Personnel: J. Williams

Date of Analysis: 27/02/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		0.02	
RB		<0.02	
BD		51.00	0.0
		51.00	
SRS	1.95-2.05	1.99	

Parameter: Sulfate (H-8051)

QEHL Personnel: R. Stephens

Date of Analysis: 04/03/2024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	
BD		2650	0.0
		2650	
SRS	49-59	56	

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Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 05/03/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<11	
BD		13700	1.5
		13500	
SRS	488-512	502	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 05/03/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<3	
BD		56	1.8
		57	
SRS	121-129	126	

Parameter: Chloride (H-8206)

QEHL Personnel: R. Brown

Date of Analysis: 29/02/2024

	Standard Concentration (mg Cl ⁻ /L)	Determined Concentration (mg Cl ⁻ /L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		18600	1.1
		18400	
SRS	90.0-110.0	99.6	

Parameter: Total Hardness (SM-2340 C)

QEHL Personnel: J. Williams

Date of Analysis: 08/03/2024

	Standard Concentration (mg CaCO ₃ /L)	Determined Concentration (mg CaCO ₃ /L)	RPD (%)
Duplicates		768.0	1.5
		779.7	
SRS	0.91 – 1.09	1.01	

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Parameter: HR Nitrate (H-8039)

QEHL Personnel: R. Ford

Date of Analysis: 28/02/2024

	Standard Concentration (mg NO ₃ ⁻ -N/L)	Determined Concentration (mg NO ₃ ⁻ -N/L)	RPD (%)
MB		0.7	
RB		0.7	
BD		6.7	0.0
		6.7	
SRS	8.6-11.4	11.2	

Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: R. Ford

Date of Analysis: 28/02/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#4	Standard addition checks*	1.4	2.5	1.5	60
			5.0	3.0	60
			7.5	4.5	60

*Equation of the line $y = 0.6x + 1.4$

Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: R. Ford

Date of Analysis: 28/02/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#3	Standard addition checks*	1.7	2.5	1.4	56
			5.0	2.7	54
			7.5	4.1	55

*Equation of the line $y = 0.544x + 1.71$

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Parameter: Conductivity (DR)

QEHL Personnel: C. Davis

Date of Analysis: 27/02/2024

Standard (µS/cm)	Instrument Reading (µS/cm)	Temperature (°C)
1399-1427	1418	23.8

Parameter: Total Dissolved Solids (DR)

QEHL Personnel: C. Davis

Date of Analysis: 27/02/2024

Standard (mg/L)	Instrument Reading (mg/L)	Temperature (°C)
909-928	920	23.8

Parameter: Faecal and Total Coliform (SM-9221)

QEHL Personnel: T. Russell

Date of Analysis: 27/02/2024

Media/Test Item (Batch #)	DS LTB (23/02/2024)	SS LTB (23/02/2024)	BGB (06/02/2024)	EC (28/02/2024)
Sterile (Yes/No)	Yes	Yes	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical	Typical	Typical

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 22/03/2024

**Additional Quality Control Information can be provided upon request.*

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 21/03/2024

**Additional Quality Control Information can be provided upon request.*



Glossary

%	Percentage
µg/L	microgram per litre
µS/cm	Micro siemens per centimetre
a	Parameter subcontracted
ADB	Azide Dextrose Broth
AIM	The Aquaculture, Inland & Marine Products & By-Products Act (Regulations)
AOAC	American Organization of Analytical Chemists
b (1)	Parameter analysed outside of hold-time; samples submitted outside of the analysis hold-time
b (2)	Parameter analysed outside of hold-time; analysis authorised by Client
BAM	Bacteriological Analytical Manual
BD	Batch Duplicate
BDL	Analyte concentration below laboratory determined limit of detection
BDLS	Analyte detected below method detection limit (MDL). MDL greater than standard value.
BEA	Bile Esculin Azide Agar
BG	Brilliant Green Bile Broth
BGSA	Brilliant Green Sulfa Agar
BHI	Brain Heart Infusion Broth
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BSA	Bismuth Sulfite Agar
c	parameter analysed in the field
C(B)	Samples collected by the client and picked up by an ESL bearer
C(C)	Samples collected by the client and delivered to ESL
C(H)	Analytical sample submitted in incorrect container. This may affect data quality.
C(L)	Samples collected by ESL
C(S)	Sample collected by the client then sub-sampled and delivered by ESL.
CFU	Colony Forming Units
CMMEF	Compendium of Methods for the Microbiological Examination of Foods
Col	Colourimetry
CVAAS	Cold Vapour Atomic Absorption Spectroscopy
D(I)	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference
D(C)	Sample diluted due to high concentration of target analyte
DR	Direct Reading
DS ADB	Double Strength Azide Dextrose Broth
DS LTB	Double Strength Lauryl Tryptose Broth
DS PAB	Double Strength Pseudomonas Asparagine Broth
EB	Equipment Blank
E(E1)	Estimated Value. Data acquisition affected by equipment malfunction.
E(L1)	Estimated Value. Analyte recovery in the laboratory control sample (LCS) was outside of QC limits. Results for this may be affected by same bias.
E(L2)	Estimated Value due to the nature of the sample matrix.
E(M1)	Estimated Value. Result calculated using calibration curve.
E(M2)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
E(M3)	Estimated Value. Sample performance indicate presence of interference
E(R)	Estimated Value. RPD value was outside control limits.
EC	<i>E. coli</i> Media
E(V)	Estimated Value. Count(s) obtained is/are outside of the method counting range.
EC-MUG	<i>E. coli</i> Media with 4-methylumbelliferyl-β-D-glucuronide
EHU	Environmental Health Unit
EPA	(US) Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectroscopy
FAES	Flame Atomic Emission Spectroscopy
FB	Field Blank
FD	Field Duplicate
FL-PRO	Florida Petroleum Range Organic Method
GC-MS	Gas Chromatography Mass Spectrometry
H	Hach Water Analysis Workbook
H(A)	Off-scale high data obtained. Actual value may be greater than value given.

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ICP	Inductively Coupled Plasma
ISE	Ion Selective Electrode
LCA	Listeria Chromogenic Agar
LE	Data not available due to laboratory error
LIA	Lysine Iron Agar
MAC	MacConkey Agar
MB	Method Blank
mEndo	mEndo Agar/Broth
MFHPB	Microbiology Food Health Protection Branch, Government of Canada
mmhos/cm	Millimhos per centimetre
mg/kg	milligram per kilogram
mg/L	milligrams per litre
MPN	Most Probable Number
mS/cm	millisiemens per centimetre
N/A (1)	Data not yet Available. Analysis not complete.
N/A (2)	Data not Available. Sample matrix interferences prevented data acquisition.
N/A (3)	Data not Available. Insufficient sample submitted.
N/A (4)	Data not Available. Equipment malfunction prevented data acquisition.
N/A (5)	Data not Available. Analysis not complete due to force majeure.
N/A (6)	Data not available due to issues with the shipment of the sample(s).
N/A (7)	Data not available. Technical difficulties experienced by subcontractor.
NA	Nutrient Agar
NB	Nutrient Broth
NEPA	National Environment and Planning Agency
NRCA	Natural Resources Conservation Authority
NTU	Nephelometric Turbidity Units
NWC	National Water Commission (Jamaica)
NST	No Time given for collection of samples
P(P)	Sample preserved prior to analysis
P(1)	Non-routine sample pre-treatment required
PAB	Pseudomonas Asparagine Broth
PCA	Plate Count Agar
PDA + C	Potato Dextrose Agar with Chloramphenicol
Pep Water	Peptone Water
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
RED	Parameter Non-compliant
RPD	Relative Percentage Difference
RSD	Relative Standard Deviation
SM	Standard Methods for the Examination of Water and Wastewater 23 rd Edition
SRS	Standard Reference Solution
SS	Sample Submerged upon receipt at the laboratory
SS ADB	Single Strength Azide Dextrose Broth
SS LTB	Single Strength Lauryl Tryptose Broth
SS PAB	Single Strength Pseudomonas Asparagine Broth
T(H)	Samples arrived at ESL-QEHL outside holding temperature ($\leq 4.0^{\circ}\text{C}$).
TIT	Titrimetry
TPH	Total Petroleum Hydrocarbon
TSA	Tryptic Soy Agar
TSB	Tryptic Soy Broth
TSA + YE	Tryptic Soy Agar + Yeast Extract
TTC	2,3,5 Triphenyl-2H-Tetrazolium Chloride
UMR	Analyte detection was below the measuring range of instrument. This is indicative of possible matrix interference within the sample.
WHO	World Health Organization
XLD	Xylose Lysine Deoxycholate

End of Report

ESL QUALITY & ENVIRONMENTAL HEALTH LABORATORY

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ISO  **17025**
ACCREDITED LABORATORY

7 Hillview Avenue,
Kingston 10, Jamaica
Tel: (876) 978-9519, 978-6297, 978-5902
Fax: (876) 946-3745
E-mail: envirsol@cwjamaica.com

Certificate of Sample Analysis

CSA#: CDL 24032644-49 & 51-53

Attention:

Ms. Flovia Riley
Clarendon Distillers Limited
10th Floor, The Towers
25 Dominica Drive
Kingston 5



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Sample(s) Information

Job Number: 24032644-53

SPN: -

Date of Report: 05/06/2024

Revision Date: Not Applicable

Sample(s) Collected: 26/03/2024

Sample(s) Submitted: 26/03/2024

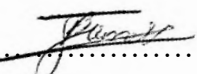
Temperature on Arrival: 3.2°C

Number of Samples: 9

Analysis Started: 26/03/2024

Analysis Completed: 23/04/2024

Prepared By: Reena McKenzie, Quality Management Systems Manager

Verified By 
Travis Garnett,
Senior Analyst.

Approved By 
Jaidene Webster-Jones,
Quality Control Officer



Results of Sample Analysis

Sample ID (Matrix) - Qualifier: #3 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	284 @ 23.1°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.02	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	1.3	P(P), P(1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	56.4	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	28	P(1), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	4.2	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	<3	UMR, P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.5	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	1012	P(P), P(1)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: #1 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	24500 @ 22.9°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	<0.02	UMR	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	8.8	E(M1), P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.0		-
Chloride (mg Cl ⁻ /L)	H-8206	13800.0	D(C), P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	2350	P(1), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	7.6	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	85	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	9.3	E(M3)	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	262004	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: #2 (Groundwater)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	32800 @ 23.4°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.02	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	10.1	E(M1), P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.3		-
Chloride (mg Cl ⁻ /L)	H-8206	18600.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	3200	D(C), P(1), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	8.1	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	270	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	13.3	E(M3)	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	381979	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: PW3 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	7.63 @ 23.9°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	1917 @ 22.5°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1246 @ 22.6°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	10.1	E(M1), D(I), P(P)	0.1 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.3		-
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.10	-	0.01 – 0.8
Total Coliform (MPN/100mL)	SM-9221	<1.8	-	-
Faecal Coliform (MPN/100mL)	SM-9221	<1.8	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	84	D(C), P(1) E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	408.0	D(C), P(1)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	509.5	P(1), P(P)	127.0 – 381.0
Total Suspended Solids (mg/L)	SM-2540 D	2.4	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	<3	UMR, BDL	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	0.9	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Sodium (µg Na/L)	EPA 200.7	181048	P(P), P(1)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	141	P(P), P(1)	-
Magnesium (µg Mg/L)	EPA 200.7	20479	P(P), P(1)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	4167	P(1), P(P)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: CH (Groundwater)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	7.55 @ 23.4°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	2400 @ 23.0°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1560 @ 22.8°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	13.3	E(M1), D(I), P(P)	0.2 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		3.0		-
Total Coliform (MPN/100mL)	SM-9221	<1.8	-	-
Faecal Coliform (MPN/100mL)	SM-9221	<1.8	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	88	D(C), E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	552.0	D(C), P(1)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	692.4	P(1), P(P)	127.0 – 381.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	0.8	-	0.8 – 1.7
Sodium (µg Na/L)	EPA 200.7	193001	P(P), P(1), D(C)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	234	P(P), P(1), D(I)	-
Magnesium (µg Mg/L)	EPA 200.7	52629	P(P), P(1), D(C)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	3849	P(1), P(P), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: PW2 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	7.19 @ 23.8°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	2100 @ 24.8°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1365 @ 24.8°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	12.7	E(M1), D(I), P(P)	0.1 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.9		-
Total Coliform (MPN/100mL)	SM-9221	<1.8	-	-
Faecal Coliform (MPN/100mL)	SM-9221	<1.8	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	71	E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	480.0	D(C)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	653.1	P(1), P(P)	127.0 – 381.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.0	-	0.8 – 1.7
Sodium (µg Na/L)	EPA 200.7	142156	P(P), P(1), D(C)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	62.0	P(P), P(1), D(I)	-
Magnesium (µg Mg/L)	EPA 200.7	34446	P(P), P(1), D(C)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	2930	P(1), P(P), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: D1 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	3.93 @ 23.7°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	34.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	2142.8	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	76500	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	11828	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	3.64	P(1), P(P), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: D2 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	3.88 @ 23.2°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	31.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	7640.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	101000	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	13629	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	5.04	P(1), P(P), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: D3 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	3.88 @ 23.6°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	60.50	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	4100.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	76750	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	12930	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	4.54	P(P), P(1), D(C)	-

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Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.



Certificate of Quality

Parameter: pH (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 27/03/2024

Standard (Buffer)	pH After Calibration	Temperature (°C)
3.96 – 4.04	4.02	23.8
6.90 – 7.10	7.08	24.2
9.96 – 10.04	10.04	23.8

Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: R. Brown

Date of Analysis: 29/03/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		34.4	1.2
		34.8	
SRS	68.7-85.9	81.5	

Parameter: Orthophosphates (H-8048)

QEHL Personnel: R. Stephens

Date of Analysis: 27/03/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		<0.02	
RB		<0.02	
BD		5.20	2.0
		5.30	
SRS	1.95-2.05	1.95	

Parameter: Sulfate (H-8051)

QEHL Personnel: R. Brown

Date of Analysis: 05/04/2024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	
BD		36	0.0
		36	
SRS	49-59	59	

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Parameter: Sulfate (H-8051)

QEHL Personnel: R. Brown

Date of Analysis: 15/04/2024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	
BD		24	0.0
		24	
SRS	49-59	59	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 30/03/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<3	
BD		32	0.0
		32	
SRS	121-129	124	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 30/03/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<11	
BD		78000	0.6
		77500	
SRS	488-512	501	

Parameter: Chloride (H-8206)

QEHL Personnel: J. Williams, T. Thompson

Date of Analysis: 27/03/2024

	Standard Concentration (mg Cl ⁻ /L)	Determined Concentration (mg Cl ⁻ /L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		992.0	0.0
		992.0	
SRS	90.0-110.0	101.2	

Parameter: Biochemical Oxygen Demand (H-8043)

QEHL Personnel: T. Thompson, J. Webster-Jones, S. Crooks

Date of Analysis: 28/03/2024

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Parameter: Total Hardness (SM-2340 C)

QEHL Personnel: J. Williams

Date of Analysis: 10/04/2024

	Standard Concentration (mg CaCO ₃ /L)	Determined Concentration (mg CaCO ₃ /L)	RPD (%)
Duplicates		<18.3	-
		<18.3	
SRS	0.91 – 1.09	1.00	

Parameter: Conductivity (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 27/03/2024

Standard (µS/cm)	Instrument Reading (µS/cm)	Temperature (°C)
1399-1427	1419	24.9

Parameter: HR Nitrate (H-8039)

QEHL Personnel: R. Ford

Date of Analysis: 27/03/2024

	Standard Concentration (mg NO ₃ ⁻ -N/L)	Determined Concentration (mg NO ₃ ⁻ -N/L)	RPD (%)
MB		0.6	
RB		0.5	
BD		3.0	0.0
		3.0	
SRS	8.6-11.4	9.3	

Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: R. Ford

Date of Analysis: 27/03/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#1	Standard addition checks*	1.1	2.5	1.5	60
			5.0	2.9	58
			7.5	4.5	60

*Equation of the line $y = 0.596x + 1.09$

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Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: R. Ford

Date of Analysis: 27/03/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#3	Standard addition checks*	1.3	2.5	1.6	64
			5.0	3.2	64
			7.5	5.0	67

*Equation of the line $y = 0.664x + 1.26$

Parameter: Total Dissolved Solids (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 27/03/2024

Standard (mg/L)	Instrument Reading (mg/L)	Temperature (°C)
909-928	921	24.8

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 23/04/2024

*Additional Quality Control Information can be provided upon request.

Parameter: Fats, Oil and Grease (EPA 1664 B)

QEHL Personnel: S. Robinson

Date of Analysis: 10/04/2024

Parameter: Faecal and Total Coliform (SM-9221)

QEHL Personnel: T. Russell

Date of Analysis: 26/03/2024

Media/Test Item (Batch #)	DS LTB (26/03/2024)	SS LTB (26/03/2024)	BG (03/04/2024)	EC (03/04/2024)
Sterile (Yes/No)	Yes	Yes	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical	Typical	Typical



Glossary

%	Percentage
µg/L	microgram per litre
µS/cm	Micro siemens per centimetre
a	Parameter subcontracted
ADB	Azide Dextrose Broth
AIM	The Aquaculture, Inland & Marine Products & By-Products Act (Regulations)
AOAC	American Organization of Analytical Chemists
b (1)	Parameter analysed outside of hold-time; samples submitted outside of the analysis hold-time
b (2)	Parameter analysed outside of hold-time; analysis authorised by Client
BAM	Bacteriological Analytical Manual
BD	Batch Duplicate
BDL	Analyte concentration below laboratory determined limit of detection
BDLS	Analyte detected below method detection limit (MDL). MDL greater than standard value.
BEA	Bile Esculin Azide Agar
BG	Brilliant Green Bile Broth
BGSA	Brilliant Green Sulfa Agar
BHI	Brain Heart Infusion Broth
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BSA	Bismuth Sulfite Agar
c	parameter analysed in the field
C(B)	Samples collected by the client and picked up by an ESL bearer
C(C)	Samples collected by the client and delivered to ESL
C(H)	Analytical sample submitted in incorrect container. This may affect data quality.
C(L)	Samples collected by ESL
C(S)	Sample collected by the client then sub-sampled and delivered by ESL.
CFU	Colony Forming Units
CMMEF	Compendium of Methods for the Microbiological Examination of Foods
Col	Colourimetry
CVAAS	Cold Vapour Atomic Absorption Spectroscopy
D(I)	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference
D(C)	Sample diluted due to high concentration of target analyte
DR	Direct Reading
DS ADB	Double Strength Azide Dextrose Broth
DS LTB	Double Strength Lauryl Tryptose Broth
DS PAB	Double Strength Pseudomonas Asparagine Broth
EB	Equipment Blank
E(E1)	Estimated Value. Data acquisition affected by equipment malfunction.
E(L1)	Estimated Value. Analyte recovery in the laboratory control sample (LCS) was outside of QC limits. Results for this may be affected by same bias.
E(L2)	Estimated Value due to the nature of the sample matrix.
E(M1)	Estimated Value. Result calculated using calibration curve.
E(M2)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
E(M3)	Estimated Value. Sample performance indicate presence of interference
E(R)	Estimated Value. RPD value was outside control limits.
EC	<i>E. coli</i> Media
E(V)	Estimated Value. Count(s) obtained is/are outside of the method counting range.
EC-MUG	<i>E. coli</i> Media with 4-methylumbelliferyl-β-D-glucuronide
EHU	Environmental Health Unit
EPA	(US) Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectroscopy
FAES	Flame Atomic Emission Spectroscopy
FB	Field Blank
FD	Field Duplicate
FL-PRO	Florida Petroleum Range Organic Method
GC-MS	Gas Chromatography Mass Spectrometry
H	Hach Water Analysis Workbook
H(A)	Off-scale high data obtained. Actual value may be greater than value given.

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ICP	Inductively Coupled Plasma
ISE	Ion Selective Electrode
LCA	Listeria Chromogenic Agar
LE	Data not available due to laboratory error
LIA	Lysine Iron Agar
MAC	MacConkey Agar
MB	Method Blank
mEndo	mEndo Agar/Broth
MFHPB	Microbiology Food Health Protection Branch, Government of Canada
mmhos/cm	Millimhos per centimetre
mg/kg	milligram per kilogram
mg/L	milligrams per litre
MPN	Most Probable Number
mS/cm	millisiemens per centimetre
N/A (1)	Data not yet Available. Analysis not complete.
N/A (2)	Data not Available. Sample matrix interferences prevented data acquisition.
N/A (3)	Data not Available. Insufficient sample submitted.
N/A (4)	Data not Available. Equipment malfunction prevented data acquisition.
N/A (5)	Data not Available. Analysis not complete due to force majeure.
N/A (6)	Data not available due to issues with the shipment of the sample(s).
N/A (7)	Data not available. Technical difficulties experienced by subcontractor.
NA	Nutrient Agar
NB	Nutrient Broth
NEPA	National Environment and Planning Agency
NRCA	Natural Resources Conservation Authority
NTU	Nephelometric Turbidity Units
NWC	National Water Commission (Jamaica)
NST	No Time given for collection of samples
P(P)	Sample preserved prior to analysis
P(1)	Non-routine sample pre-treatment required
PAB	Pseudomonas Asparagine Broth
PCA	Plate Count Agar
PDA + C	Potato Dextrose Agar with Chloramphenicol
Pep Water	Peptone Water
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
RED	Parameter Non-compliant
RPD	Relative Percentage Difference
RSD	Relative Standard Deviation
SM	Standard Methods for the Examination of Water and Wastewater 23 rd Edition
SRS	Standard Reference Solution
SS	Sample Submerged upon receipt at the laboratory
SS ADB	Single Strength Azide Dextrose Broth
SS LTB	Single Strength Lauryl Tryptose Broth
SS PAB	Single Strength Pseudomonas Asparagine Broth
T(H)	Samples arrived at ESL-QEHL outside holding temperature ($\leq 4.0^{\circ}\text{C}$).
TIT	Titrimetry
TPH	Total Petroleum Hydrocarbon
TSA	Tryptic Soy Agar
TSB	Tryptic Soy Broth
TSA + YE	Tryptic Soy Agar + Yeast Extract
TTC	2,3,5 Triphenyl-2H-Tetrazolium Chloride
UMR	Analyte detection was below the measuring range of instrument. This is indicative of possible matrix interference within the sample.
WHO	World Health Organization
XLD	Xylose Lysine Deoxycholate

End of Report

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ISO 17025
ACCREDITED LABORATORY

7 Hillview Avenue,
Kingston 10, Jamaica
Tel: (876) 978-9519, 978-6297, 978-5902
Fax: (876) 946-3745
E-mail: envirsol@cwjamaica.com

Certificate of Sample Analysis

CSA#: CDL 24042430-33 & 35-38 Rev

Attention:

Ms. Flovia Riley
Clarendon Distillers Limited
10th Floor, The Towers
25 Dominica Drive
Kingston 5



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Sample(s) Information

Job Number: 24042430-38

SPN: -

Date of Report: 25/06/2024

Revision Date: 15/07/2024

Sample(s) Collected: 24/04/2024

Sample(s) Submitted: 24/04/2024

Temperature on Arrival: 0.4°C

Number of Samples: 9

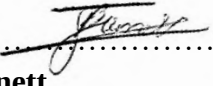
Analysis Started: 24/04/2024

Analysis Completed: 06/06/2024

Prepared By: Rushell Hart, Technical Assistant

Revision Notice

As per the client's request, the matrix for samples "3 (Groundwater)", "4 (Surface Water)", and "PW2 (Surface Water)" were adjusted to (Surface Water); (Groundwater); and (Groundwater) respectively.

Verified By 
Travis Garnett,
Senior Analyst

Approved By 
Jaidene Webster-Jones,
Quality Control Officer



Results of Sample Analysis

Sample ID (Matrix) - Qualifier: #1 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	261 @ 23.5°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.03	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	5.7	P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.3		-
Chloride (mg Cl ⁻ /L)	H-8206	40.3	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	23	E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	2.6	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	12	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	3.4	E(M3)	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	1969	P(P), P(1), D(C)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: #2 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	28800 @ 23.0°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.02	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	7.5	E(M1), P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.7		-
Chloride (mg Cl ⁻ /L)	H-8206	16080.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	2000	D(C), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	11.2	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	65	D(C), P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.2	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	277977	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: #3 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	34300 @ 24.0°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.02	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	10.6	E(M1), P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.4		-
Chloride (mg Cl ⁻ /L)	H-8206	15760.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	2800	D(C), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	7.5	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	90	D(C), P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.1	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	393368	P(), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: #4 (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	1244 @ 23.9°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.13	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	17.5	P(P), D(I), E(M1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		4.0		-
Chloride (mg Cl ⁻ /L)	H-8206	438.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	80	D(C), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	1.7	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	7	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.1	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	4042	P(P), P(1)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: PW2 (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	7.21 @ 24.9°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	1901 @ 23.5°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1241 @ 23.8°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	14.5	E(M1), D(I), P(P)	0.1 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		3.3		-
Total Coliform (MPN/100mL)	SM-9221	6.1	-	-
Faecal Coliform (MPN/100mL)	SM-9221	2.0	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	34	D(C), E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	346.0	D(C)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	518.5	P(1), P(P)	127.0 – 381.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.5	-	0.8 – 1.7
Sodium (µg Na/L)	EPA 200.7	163599	P(P), P(1), D(C)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	31.0	P(P), P(1)	-
Magnesium (µg Mg/L)	EPA 200.7	19484	P(P), P(1), D(C)	3600 – 27000
Calcium (µg Ca/L)	EPA 200.7	136543	P(P), P(1), D(C)	40000 - 101000
Potassium (µg K/L)	EPA 200.7	3658	P(P), P(1), D(C)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: D1 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	3.76 @ 23.9°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	33.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	3200.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	76750	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	8219	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	4.24	P(P), P(1), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: D2 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	3.67 @ 23.3°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	34.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	2100.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	91125	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	9054	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	4.71	P(P), P(1), D(C)	-

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Sample ID (Matrix) - Qualifier: D3 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	3.81 @ 23.4°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	33.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	2400.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	65500	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	4257	D(C), P(1), E(M3)	<30
Potassium (g K/L)	EPA 200.7	3.28	P(P), P(1), D(C)	-

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Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.



Certificate of Quality

Parameter: pH (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 24/04/2024

Standard (Buffer)	pH After Calibration	Temperature (°C)
3.96 – 4.04	4.03	23.9
6.90 – 7.10	7.06	23.3
9.96 – 10.04	10.03	23.6

Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: R. Brown

Date of Analysis: 29/04/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		38.0	2.7
		37.0	
SRS	68.7-85.9	81.5	

Parameter: Orthophosphates (H-8048)

QEHL Personnel: R. Stephens

Date of Analysis: 25/04/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		0.03	
RB		<0.02	
BD		13.40	0.0
		13.40	
SRS	1.91-2.01	2.00	

Parameter: Sulfate (H-8051)

QEHL Personnel: R. Brown

Date of Analysis: 09/05/2024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	
BD		220	0.0
		220	
SRS	49-59	56	

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Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 27/04/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<3	
BD		31	0.0
		31	
SRS	121-129	125	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 27/04/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<11	
BD		91250	0.3
		91000	
SRS	488-512	498	

Parameter: Chloride (H-8206)

QEHL Personnel: A. St. Marie

Date of Analysis: 26/04/2024

	Standard Concentration (mg Cl ⁻ /L)	Determined Concentration (mg Cl ⁻ /L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		<3.0	-
		<3.0	
SRS	87.1-112.9	99.2	

Parameter: Biochemical Oxygen Demand (H-8043)

QEHL Personnel: T. Thompson, J. Webster-Jones, S. Crooks **Date of Analysis: 25/04/2024**

Parameter: Total Hardness (SM-2340 C)

QEHL Personnel: N. McCalla

Date of Analysis: 15/05/2024

	Standard Concentration (mg CaCO ₃ /L)	Determined Concentration (mg CaCO ₃ /L)	RPD (%)
BD		171.9	0.2
		171.5	
SRS	0.91 – 1.09	0.97	

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Parameter: Conductivity (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 24/04/2024

Standard (µS/cm)	Instrument Reading (µS/cm)	Temperature (°C)
1399-1427	1415	24.6

Parameter: HR Nitrate (H-8039)

QEHL Personnel: R. Ford

Date of Analysis: 25/04/2024

	Standard Concentration (mg NO ₃ ⁻ N/L)	Determined Concentration (mg NO ₃ ⁻ N/L)	RPD (%)
MB		0.7	
RB		0.7	
BD		1.8	0.0
		1.8	
SRS	8.6-11.4	9.3	

Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: R. Ford

Date of Analysis: 25/04/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#2	Standard addition checks*	1.4	2.5	2.1	84
			5.0	4.2	84
			7.5	6.2	83

*Equation of the line $y = 0.828x + 1.42$

Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: R. Ford

Date of Analysis: 25/04/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#3	Standard addition checks*	1.5	2.5	1.5	60
			5.0	3.0	60
			7.5	4.6	61

*Equation of the line $y = 0.612x + 1.48$

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Parameter: Total Dissolved Solids (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 24/04/2024

Standard (mg/L)	Instrument Reading (mg/L)	Temperature (°C)
909 - 928	919	24.5

Parameter: Faecal and Total Coliform (SM-9221)

QEHL Personnel: R. Dawkins

Date of Analysis: 24/04/2024

Media/Test Item (Batch #)	DS LTB (23/04/2024)	SS LTB (23/04/2024)	BGB (16/04/2024)	EC (24/04/2024)
Sterile (Yes/No)	Yes	Yes	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical	Typical	Typical

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 06/06/2024

**Additional Quality Control Information can be provided upon request.*

Parameter: Fats, Oil and Grease (EPA 1664 B)

QEHL Personnel: S. Robinson

Date of Analysis: 15/05/2024

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 07/06/2024

**Additional Quality Control Information can be provided upon request.*



Glossary

%	Percentage
µg/L	microgram per litre
µS/cm	Micro siemens per centimetre
a	Parameter subcontracted
ADB	Azide Dextrose Broth
AIM	The Aquaculture, Inland & Marine Products & By-Products Act (Regulations)
AOAC	American Organization of Analytical Chemists
b (1)	Parameter analysed outside of hold-time; samples submitted outside of the analysis hold-time
b (2)	Parameter analysed outside of hold-time; analysis authorised by Client
BAM	Bacteriological Analytical Manual
BD	Batch Duplicate
BDL	Analyte concentration below laboratory determined limit of detection
BDLS	Analyte detected below method detection limit (MDL). MDL greater than standard value.
BEA	Bile Esculin Azide Agar
BG	Brilliant Green Bile Broth
BGSA	Brilliant Green Sulfa Agar
BHI	Brain Heart Infusion Broth
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BSA	Bismuth Sulfite Agar
c	parameter analysed in the field
C(B)	Samples collected by the client and picked up by an ESL bearer
C(C)	Samples collected by the client and delivered to ESL
C(H)	Analytical sample submitted in incorrect container. This may affect data quality.
C(L)	Samples collected by ESL
C(S)	Sample collected by the client then sub-sampled and delivered by ESL.
CFU	Colony Forming Units
CMMEF	Compendium of Methods for the Microbiological Examination of Foods
Col	Colourimetry
CVAAS	Cold Vapour Atomic Absorption Spectroscopy
D(I)	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference
D(C)	Sample diluted due to high concentration of target analyte
DR	Direct Reading
DS ADB	Double Strength Azide Dextrose Broth
DS LTB	Double Strength Lauryl Tryptose Broth
DS PAB	Double Strength Pseudomonas Asparagine Broth
EB	Equipment Blank
E(E1)	Estimated Value. Data acquisition affected by equipment malfunction.
E(L1)	Estimated Value. Analyte recovery in the laboratory control sample (LCS) was outside of QC limits. Results for this may be affected by same bias.
E(L2)	Estimated Value due to the nature of the sample matrix.
E(M1)	Estimated Value. Result calculated using calibration curve.
E(M2)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
E(M3)	Estimated Value. Sample performance indicate presence of interference
E(R)	Estimated Value. RPD value was outside control limits.
EC	<i>E. coli</i> Media
E(V)	Estimated Value. Count(s) obtained is/are outside of the method counting range.
EC-MUG	<i>E. coli</i> Media with 4-methylumbelliferyl-β-D-glucuronide
EHU	Environmental Health Unit
EPA	(US) Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectroscopy
FAES	Flame Atomic Emission Spectroscopy
FB	Field Blank
FD	Field Duplicate
FL-PRO	Florida Petroleum Range Organic Method
GC-MS	Gas Chromatography Mass Spectrometry
H	Hach Water Analysis Workbook
H(A)	Off-scale high data obtained. Actual value may be greater than value given.

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ICP	Inductively Coupled Plasma
ISE	Ion Selective Electrode
LCA	Listeria Chromogenic Agar
LE	Data not available due to laboratory error
LIA	Lysine Iron Agar
MAC	MacConkey Agar
MB	Method Blank
mEndo	mEndo Agar/Broth
MFHPB	Microbiology Food Health Protection Branch, Government of Canada
mmhos/cm	Millimhos per centimetre
mg/kg	milligram per kilogram
mg/L	milligrams per litre
MPN	Most Probable Number
mS/cm	millisiemens per centimetre
N/A (1)	Data not yet Available. Analysis not complete.
N/A (2)	Data not Available. Sample matrix interferences prevented data acquisition.
N/A (3)	Data not Available. Insufficient sample submitted.
N/A (4)	Data not Available. Equipment malfunction prevented data acquisition.
N/A (5)	Data not Available. Analysis not complete due to force majeure.
N/A (6)	Data not available due to issues with the shipment of the sample(s).
N/A (7)	Data not available. Technical difficulties experienced by subcontractor.
NA	Nutrient Agar
NB	Nutrient Broth
NEPA	National Environment and Planning Agency
NRCA	Natural Resources Conservation Authority
NTU	Nephelometric Turbidity Units
NWC	National Water Commission (Jamaica)
NST	No Time given for collection of samples
P(P)	Sample preserved prior to analysis
P(1)	Non-routine sample pre-treatment required
PAB	Pseudomonas Asparagine Broth
PCA	Plate Count Agar
PDA + C	Potato Dextrose Agar with Chloramphenicol
Pep Water	Peptone Water
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
RED	Parameter Non-compliant
RPD	Relative Percentage Difference
RSD	Relative Standard Deviation
SM	Standard Methods for the Examination of Water and Wastewater 23 rd Edition
SRS	Standard Reference Solution
SS	Sample Submerged upon receipt at the laboratory
SS ADB	Single Strength Azide Dextrose Broth
SS LTB	Single Strength Lauryl Tryptose Broth
SS PAB	Single Strength Pseudomonas Asparagine Broth
T(H)	Samples arrived at ESL-QEHL outside holding temperature ($\leq 4.0^{\circ}\text{C}$).
TIT	Titrimetry
TPH	Total Petroleum Hydrocarbon
TSA	Tryptic Soy Agar
TSB	Tryptic Soy Broth
TSA + YE	Tryptic Soy Agar + Yeast Extract
TTC	2,3,5 Triphenyl-2H-Tetrazolium Chloride
UMR	Analyte detection was below the measuring range of instrument. This is indicative of possible matrix interference within the sample.
WHO	World Health Organization
XLD	Xylose Lysine Deoxycholate

End of Report

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ISO  **17025**
ACCREDITED LABORATORY

7 Hillview Avenue,
Kingston 10, Jamaica
Tel: (876) 978-9519, 978-6297, 978-5902
Fax: (876) 946-3745
E-mail: envirsol@cwjamaica.com

Certificate of Sample Analysis

CSA#: CDL 24052819-23 & 25-27

Attention:

Ms. Flovia Riley
Clarendon Distillers Limited
10th Floor, The Towers
25 Dominica Drive
Kingston 5



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Sample(s) Information

Job Number: 24052819-27

SPN: -

Date of Report: 24/09/2024

Revision Date: Not Applicable

Sample(s) Collected: 28/05/2024

Sample(s) Submitted: 28/05/2024

Temperature on Arrival: 1.0°C

Number of Samples: 8

Analysis Started: 28/05/2024

Analysis Completed: 26/06/2024

Prepared By: Rushell Hart, Technical Assistant

Verified By
Travis Garnett,
Senior Analyst

Approved By
Jaidene Webster-Jones,
Quality Control Officer



Results of Sample Analysis

Sample ID (Matrix) - Qualifier: #3 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	142 @ 24.2°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.04	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	0.9	P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		0.2		-
Chloride (mg Cl ⁻ /L)	H-8206	18.3	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	26	P(1), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	8.0	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	14	P(P), D(C), P(1)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.3	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	1598	P(P), P(1)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: #2 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	30100 @ 24.4°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.02	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	10.6	E(M1), P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.4		-
Chloride (mg Cl ⁻ /L)	H-8206	15100	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	2550	D(C), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	5.6	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	15	P(P), D(C), P(1)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.2	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	311448	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: #4 (Groundwater)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	34600 @ 24.5°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.13	P(P)	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	11.4	E(M1), P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.6		-
Chloride (mg Cl ⁻ /L)	H-8206	17200	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	2950	D(C), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	8.4	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	165	P(P), D(C), P(1)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	6.5	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	364525	P(P), P(1), D(C)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: #1 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	1233 @ 23.9°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.13	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	10.1	E(M1), D(I), P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.3		-
Chloride (mg Cl ⁻ /L)	H-8206	260.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	90	D(C), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	<1.6	BDL	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	11	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.0	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	3847	P(P), P(1)	740 – 5000

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Sample ID (Matrix) - Qualifier: AH (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	7.13 @ 23.7°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	2080 @ 23.8°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1349 @ 23.6°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	22.5	E(M1), D(I), P(P)	0.1 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		5.1		-
Total Coliform (MPN/100mL)	SM-9221	>1600	-	-
Faecal Coliform (MPN/100mL)	SM-9221	430	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	62	P(1), E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	426.0	D(C), P(1)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	772.2	P(1), P(P)	127.0 – 381.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.2	-	0.8 – 1.7
Sodium (µg Na/L)	EPA 200.7	95626	P(P), P(1), D(C)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	912	P(P), P(1), D(C)	-
Magnesium (µg Mg/L)	EPA 200.7	36509	P(P), P(1), D(C)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	3570	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: D1 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	3.84 @ 23.8°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	33.50	D(C), P(P)	5
Total Suspended Solids (mg/L)	SM-2540 D	4125.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	96000	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	9610	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	5.55	P(P), P(1), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: D2 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	4.13 @ 23.6°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	18.00	D(C), P(P)	5
Total Suspended Solids (mg/L)	SM-2540 D	5050.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	93750	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	5471	D(C), P(1), E(M3)	<30
Potassium (g K/L)	EPA 200.7	6.17	P(1), P(P), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: D3 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	4.14 @ 24.2°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	18.00	D(C), P(P)	5
Total Suspended Solids (mg/L)	SM-2540 D	4850.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	90750	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	12965	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	4.90	P(1), P(P), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.



Certificate of Quality

Parameter: Biochemical Oxygen Demand (H-8043)

QEHL Personnel: T. Thompson, J. Webster-Jones, S. Crooks, S. Williams

Date of Analysis: 29/05/2024

Parameter: pH (DR)

QEHL Personnel: S. Williams

Date of Analysis: 28/05/2024

Standard (Buffer)	pH After Calibration	Temperature (°C)
3.96 - 4.04	4.01	23.3
6.90 – 7.10	7.00	23.6
9.96 – 10.04	10.03	23.4

Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: R. Brown

Date of Analysis: 31/05/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		5050.0	0.0
		5050.0	
SRS	68.7-85.9	76.7	

Parameter: Orthophosphates (H-8048)

QEHL Personnel: R. Stephens

Date of Analysis: 29/05/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		0.02	
RB		<0.02	
BD		18.00	0.0
		18.00	
SRS	1.91-2.01	1.98	

Parameter: Sulfate (H-8051)

QEHL Personnel: R. Brown

Date of Analysis: 13/06/2024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	
BD		2550	0.0
		2550	
SRS	49-59	53	

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Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 04/06/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<3	
BD		11	0.0
		11	
SRS	121-129	124	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 04/06/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<11	
BD		127	0.0
		127	
SRS	488-512	502	

Parameter: Chloride (H-8206)

QEHL Personnel: A. St. Marie, S. Robinson

Date of Analysis: 30/05/2024

	Standard Concentration (mg Cl ⁻ /L)	Determined Concentration (mg Cl ⁻ /L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		3.5	0.0
		3.5	
SRS	87.1-112.9	98.0	

Parameter: Total Hardness (SM-2340 C)

QEHL Personnel: A. St. Marie

Date of Analysis: 19/06/2024

	Standard Concentration (mg CaCO ₃ /L)	Determined Concentration (mg CaCO ₃ /L)	RPD (%)
Duplicates		765.3	1.8
		779.1	
SRS	0.91 – 1.09	1.01	

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 26/06/2024

**Additional Quality Control Information can be provided upon request.*

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Parameter: HR Nitrate (H-8039)

QEHL Personnel: R. Ford, T. Clarke

Date of Analysis: 29/05/2024

	Standard Concentration (mg NO ₃ ⁻ -N/L)	Determined Concentration (mg NO ₃ ⁻ -N/L)	RPD (%)
MB		0.9	
RB		0.7	
BD		1.8	5.4*
		1.9	
SRS	8.7-11.3	10.8	

*Duplicates accepted based on the sensitivity of the analytical method used.

Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: R. Ford, T. Clarke

Date of Analysis: 29/05/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#2	Standard addition checks*	1.8	2.5	1.9	76
			5.0	3.8	76
			7.5	5.7	76

*Equation of the line $y = 0.76x + 1.8$

Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: R. Ford, T. Clarke

Date of Analysis: 29/05/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#4	Standard addition checks*	1.9	2.5	1.7	68
			5.0	3.5	70
			7.5	5.3	71

*Equation of the line $y = 0.708x + 1.87$

Parameter: Conductivity (DR)

QEHL Personnel: S. Williams

Date of Analysis: 28/05/2024

Standard (µS /cm)	Instrument Reading (µS/cm)	Temperature (°C)
1399-1427	1415	24.2

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Parameter: Total Dissolved Solids (DR)

QEHL Personnel: S. Williams

Date of Analysis: 28/05/2024

Standard (mg/L)	Instrument Reading (mg/L)	Temperature (°C)
909 - 928	919	24.2

Parameter: Faecal and Total Coliform (SM-9221)

QEHL Personnel: T. Russell

Date of Analysis: 28/05/2024

Media/Test Item (Batch #)	DS LTB (21/05/2024)	SS LTB (21/05/2024)	BGB (29/05/2024)	EC (27/05/2024)
Sterile (Yes/No)	Yes	Yes	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical	Typical	Typical

Parameter: Fats, Oil and Grease (EPA 1664 B)

QEHL Personnel: S. Robinson

Date of Analysis: 05/06/2024

Parameter: Fats, Oil and Grease (EPA 1664 B)

QEHL Personnel: S. Robinson

Date of Analysis: 06/06/2024



Glossary

%	Percentage
µg/L	microgram per litre
µS/cm	Micro siemens per centimetre
a	Parameter subcontracted
ADB	Azide Dextrose Broth
AIM	The Aquaculture, Inland & Marine Products & By-Products Act (Regulations)
AOAC	American Organization of Analytical Chemists
b (1)	Parameter analysed outside of hold-time; samples submitted outside of the analysis hold-time
b (2)	Parameter analysed outside of hold-time; analysis authorised by Client
BAM	Bacteriological Analytical Manual
BD	Batch Duplicate
BDL	Analyte concentration below laboratory determined limit of detection
BDLS	Analyte detected below method detection limit (MDL). MDL greater than standard value.
BEA	Bile Esculin Azide Agar
BG	Brilliant Green Bile Broth
BGSA	Brilliant Green Sulfa Agar
BHI	Brain Heart Infusion Broth
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BSA	Bismuth Sulfite Agar
c	parameter analysed in the field
C(B)	Samples collected by the client and picked up by an ESL bearer
C(C)	Samples collected by the client and delivered to ESL
C(H)	Analytical sample submitted in incorrect container. This may affect data quality.
C(L)	Samples collected by ESL
C(S)	Sample collected by the client then sub-sampled and delivered by ESL.
CFU	Colony Forming Units
CMMEF	Compendium of Methods for the Microbiological Examination of Foods
Col	Colourimetry
CVAAS	Cold Vapour Atomic Absorption Spectroscopy
D(I)	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference
D(C)	Sample diluted due to high concentration of target analyte
DR	Direct Reading
DS ADB	Double Strength Azide Dextrose Broth
DS LTB	Double Strength Lauryl Tryptose Broth
DS PAB	Double Strength Pseudomonas Asparagine Broth
EB	Equipment Blank
E(E1)	Estimated Value. Data acquisition affected by equipment malfunction.
E(L1)	Estimated Value. Analyte recovery in the laboratory control sample (LCS) was outside of QC limits. Results for this may be affected by same bias.
E(L2)	Estimated Value due to the nature of the sample matrix.
E(M1)	Estimated Value. Result calculated using calibration curve.
E(M2)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
E(M3)	Estimated Value. Sample performance indicate presence of interference
E(R)	Estimated Value. RPD value was outside control limits.
EC	<i>E. coli</i> Media
E(V)	Estimated Value. Count(s) obtained is/are outside of the method counting range.
EC-MUG	<i>E. coli</i> Media with 4-methylumbelliferyl-β-D-glucuronide
EHU	Environmental Health Unit
EPA	(US) Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectroscopy
FAES	Flame Atomic Emission Spectroscopy
FB	Field Blank
FD	Field Duplicate
FL-PRO	Florida Petroleum Range Organic Method
GC-MS	Gas Chromatography Mass Spectrometry
H	Hach Water Analysis Workbook
H(A)	Off-scale high data obtained. Actual value may be greater than value given.

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ICP	Inductively Coupled Plasma
ISE	Ion Selective Electrode
LCA	Listeria Chromogenic Agar
LE	Data not available due to laboratory error
LIA	Lysine Iron Agar
MAC	MacConkey Agar
MB	Method Blank
mEndo	mEndo Agar/Broth
MFHPB	Microbiology Food Health Protection Branch, Government of Canada
mmhos/cm	Millimhos per centimetre
mg/kg	milligram per kilogram
mg/L	milligrams per litre
MPN	Most Probable Number
mS/cm	millisiemens per centimetre
N/A (1)	Data not yet Available. Analysis not complete.
N/A (2)	Data not Available. Sample matrix interferences prevented data acquisition.
N/A (3)	Data not Available. Insufficient sample submitted.
N/A (4)	Data not Available. Equipment malfunction prevented data acquisition.
N/A (5)	Data not Available. Analysis not complete due to force majeure.
N/A (6)	Data not available due to issues with the shipment of the sample(s).
N/A (7)	Data not available. Technical difficulties experienced by subcontractor.
NA	Nutrient Agar
NB	Nutrient Broth
NEPA	National Environment and Planning Agency
NRCA	Natural Resources Conservation Authority
NTU	Nephelometric Turbidity Units
NWC	National Water Commission (Jamaica)
NST	No Time given for collection of samples
P(P)	Sample preserved prior to analysis
P(1)	Non-routine sample pre-treatment required
PAB	Pseudomonas Asparagine Broth
PCA	Plate Count Agar
PDA + C	Potato Dextrose Agar with Chloramphenicol
Pep Water	Peptone Water
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
RED	Parameter Non-compliant
RPD	Relative Percentage Difference
RSD	Relative Standard Deviation
SM	Standard Methods for the Examination of Water and Wastewater 23 rd Edition
SRS	Standard Reference Solution
SS	Sample Submerged upon receipt at the laboratory
SS ADB	Single Strength Azide Dextrose Broth
SS LTB	Single Strength Lauryl Tryptose Broth
SS PAB	Single Strength Pseudomonas Asparagine Broth
T(H)	Samples arrived at ESL-QEHL outside holding temperature ($\leq 4.0^{\circ}\text{C}$).
TIT	Titrimetry
TPH	Total Petroleum Hydrocarbon
TSA	Tryptic Soy Agar
TSB	Tryptic Soy Broth
TSA + YE	Tryptic Soy Agar + Yeast Extract
TTC	2,3,5 Triphenyl-2H-Tetrazolium Chloride
UMR	Analyte detection was below the measuring range of instrument. This is indicative of possible matrix interference within the sample.
WHO	World Health Organization
XLD	Xylose Lysine Deoxycholate

End of Report

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ISO  **17025**
ACCREDITED LABORATORY

7 Hillview Avenue,
Kingston 10, Jamaica
Tel: (876) 978-9519, 978-6297, 978-5902
Fax: (876) 946-3745
E-mail: envirsol@cwjamaica.com

Certificate of Sample Analysis

CSA#: CDL 24062608-15

Attention:

Ms. Flovia Riley
Clarendon Distillers Limited
10th Floor, The Towers
25 Dominica Drive
Kingston 5



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Sample(s) Information

Job Number: 24062608-15

SPN: -

Date of Report: 11/09/2024

Revision Date: Not Applicable

Sample(s) Collected: 26/06/2024

Sample(s) Submitted: 26/06/2024

Temperature on Arrival: 0.9°C

Number of Samples: 8

Analysis Started: 26/06/2024

Analysis Completed: 31/07/2024

Prepared By: Rushell Hart, Technical Assistant

Verified By
Travis Garnett,
Senior Analyst

Approved By
Jaidene Webster-Jones,
Quality Control Officer



Results of Sample Analysis

Sample ID (Matrix) - Qualifier: #1 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
Total Dissolved Solids (mg/L)	DR	187 @ 23.6°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.03	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	<1.3	P(P), BDL	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		<0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	25.9	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	23	E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	4.4	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	14	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	4.6	E(M3)	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	1976	P(P), P(1)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: #2 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
Total Dissolved Solids (mg/L)	DR	30600 @ 23.6°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.02	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	10.1	E(M1), P(1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.3		-
Chloride (mg Cl ⁻ /L)	H-8206	18100.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	2350	D(C), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	14.0	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	30	D(C), P(P), P(1)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.5	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	327684	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: #3 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
Total Dissolved Solids (mg/L)	DR	34400 @ 23.5°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	<0.02	BDL	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	10.6	P(P), E(M1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.4		-
Chloride (mg Cl ⁻ /L)	H-8206	18600.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	2600	D(C), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	7.5	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	85	P(1), D(C), P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.5	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	388537	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: PW3 (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	7.75 @ 23.6°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	1904 @ 23.8°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1229 @ 23.5°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	7.4	E(M1), D(I), P(P)	0.1 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.7		-
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.11	-	0.01 – 0.8
Total Coliform (MPN/100mL)	SM-9221	<1.8	-	-
Faecal Coliform (MPN/100mL)	SM-9221	<1.8	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	75	D(C), E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	285.0	D(C), P(1)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	491.1	P(1), P(P)	127.0 – 381.0
Total Suspended Solids (mg/L)	SM-2540 D	<1.6	BDL	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	6	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.2	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Sodium (µg Na/L)	EPA 200.7	184736	P(P), P(1)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	361	P(P), P(1)	-
Magnesium (µg Mg/L)	EPA 200.7	21890	P(P), P(1)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	4396	P(P), P(1)	740 – 5000

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Sample ID (Matrix) - Qualifier: CH (Groundwater)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	6.98 @ 23.8°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	2280 @ 24.4°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1469 @ 24.5°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	9.7	E(M1), D(I), P(P)	0.2 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.2		-
Total Coliform (MPN/100mL)	SM-9221	49	-	-
Faecal Coliform (MPN/100mL)	SM-9221	4.5	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	70	D(C), E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	500.0	D(C)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	687.9	P(1), P(P)	127.0 – 381.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.2	-	0.8 – 1.7
Sodium (µg Na/L)	EPA 200.7	172096	P(P), P(1), D(C)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	194	P(P), P(1), D(I)	-
Magnesium (µg Mg/L)	EPA 200.7	55281	P(P), P(1), D(C)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	2739	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: PW2 (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	7.33 @ 23.7°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	2100 @ 24.0°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1354 @ 23.9°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	12.0	E(M1), D(I), P(P)	0.3 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.7		-
Total Coliform (MPN/100mL)	SM-9221	170	-	-
Faecal Coliform (MPN/100mL)	SM-9221	3.7	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	67	E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	392.0	D(C), P(1)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	628.4	P(1), P(P)	127.0 – 381.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.1	-	0.8 – 1.7
Sodium (µg Na/L)	EPA 200.7	146796	P(P), P(1), D(C)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	27.0	P(P), P(1), D(I)	-
Magnesium (µg Mg/L)	EPA 200.7	36992	P(P), P(1), D(C)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	2945	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: D1 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	4.20 @ 23.8°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	55.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	4425.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	70500	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	13897	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	4.65	P(P), P(1), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

Sample ID (Matrix) - Qualifier: D3 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	4.02 @ 23.8°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	69.50	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	7400.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	98000	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	18634	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	5.32	P(P), P(1), D(C)	-

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Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.



Certificate of Quality

Parameter: pH (DR)

QEHL Personnel: S. Williams

Date of Analysis: 26/06/2024

Standard (Buffer)	pH After Calibration	Temperature (°C)
3.96 – 4.04	4.03	23.2
6.90 – 7.10	7.05	23.3
9.96 – 10.04	10.03	23.2

Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: R. Brown

Date of Analysis: 01/07/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		4450.0	1.1
		4400.0	
SRS	68.7-85.9	76.7	

Parameter: Orthophosphates (H-8048)

QEHL Personnel: R. Stephens

Date of Analysis: 26/06/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		0.09	
RB		<0.02	
BD		10.40	0.0
		10.40	
SRS	1.93-2.07	2.05	

Parameter: Sulfate (H-8051)

QEHL Personnel: R. Brown

Date of Analysis: 01/07/2024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	
BD		10	0.0
		10	
SRS	46-62	60	

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Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 30/06/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<11	
BD		384	0.3
		385	
SRS	488-512	499	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 30/06/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<3	
BD		9	0.0
		9	
SRS	121-129	124	

Parameter: Chloride (H-8206)

QEHL Personnel: A. St. Marie

Date of Analysis: 01/07/2024

	Standard Concentration (mg Cl/L)	Determined Concentration (mg Cl/L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		392.0	0.0
		392.0	
SRS	97.9-102.1	100.8	

Parameter: Biochemical Oxygen Demand (H-8043)

QEHL Personnel: J. Webster-Jones, S. Williams, T. Thompson **Date of Analysis: 27/06/2024**

Parameter: Total Hardness (SM-2340 C)

QEHL Personnel: N. McCalla

Date of Analysis: 01/07/2024

	Standard Concentration (mg CaCO ₃ /L)	Determined Concentration (mg CaCO ₃ /L)	RPD (%)
Duplicates		687.5	0.1
		688.3	
SRS	0.91 – 1.09	0.97	

Parameter: Conductivity (DR)

QEHL Personnel: S. Williams

Date of Analysis: 26/06/2024

Standard (µS/cm)	Instrument Reading (µS/cm)	Temperature (°C)
1399-1427	1412	24.8

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Parameter: HR Nitrate (H-8039)

QEHL Personnel: T. Clarke, T. Thompson

Date of Analysis: 27/06/2024

	Standard Concentration (mg NO ₃ ⁻ N/L)	Determined Concentration (mg NO ₃ ⁻ N/L)	RPD (%)
MB		0.5	
RB		0.6	
BD		2.7	0.0
		2.7	
SRS	8.7-11.3	10.2	

Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: T. Clarke

Date of Analysis: 27/06/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#2	Standard addition checks*	1.4	2.50	2.8	56
			5.00	4.3	58
			7.50	5.9	60

*Equation of the line $y = 0.6x + 1.35$

Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: T. Clarke

Date of Analysis: 27/06/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#3	Standard addition checks*	1.5	2.50	2.9	56
			5.00	4.4	58
			7.50	6.0	60

*Equation of the line $y = 0.6x + 1.45$

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Parameter: Total Dissolved Solids (DR)

QEHL Personnel: S. Williams

Date of Analysis: 26/06/2024

Standard (mg/L)	Instrument Reading (mg/L)	Temperature (°C)
909-928	918	24.7

Parameter: Fats, Oil and Grease (EPA 1664 B)

QEHL Personnel: S. Robinson

Date of Analysis: 02/07/2024

Parameter: Faecal and Total Coliform (SM-9221)

QEHL Personnel: R. Dawkins

Date of Analysis: 26/06/2024

Media/Test Item (Batch #)	DS LTB (24/06/2024)	SS LTB (25/06/2024)	EC (01/07/2024)	BG (07/06/2024)
Sterile (Yes/No)	Yes	Yes	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical	Typical	Typical

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 17/07/2024

**Additional Quality Control Information can be provided upon request.*

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 31/07/2024

**Additional Quality Control Information can be provided upon request.*



Glossary

%	Percentage
µg/L	microgram per litre
µS/cm	Micro siemens per centimetre
a	Parameter subcontracted
ADB	Azide Dextrose Broth
AIM	The Aquaculture, Inland & Marine Products & By-Products Act (Regulations)
AOAC	American Organization of Analytical Chemists
b (1)	Parameter analysed outside of hold-time; samples submitted outside of the analysis hold-time
b (2)	Parameter analysed outside of hold-time; analysis authorised by Client
BAM	Bacteriological Analytical Manual
BD	Batch Duplicate
BDL	Analyte concentration below laboratory determined limit of detection
BDLS	Analyte detected below method detection limit (MDL). MDL greater than standard value.
BEA	Bile Esculin Azide Agar
BG	Brilliant Green Bile Broth
BGSA	Brilliant Green Sulfa Agar
BHI	Brain Heart Infusion Broth
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BSA	Bismuth Sulfite Agar
c	parameter analysed in the field
C(B)	Samples collected by the client and picked up by an ESL bearer
C(C)	Samples collected by the client and delivered to ESL
C(H)	Analytical sample submitted in incorrect container. This may affect data quality.
C(L)	Samples collected by ESL
C(S)	Sample collected by the client then sub-sampled and delivered by ESL.
CFU	Colony Forming Units
CMMEF	Compendium of Methods for the Microbiological Examination of Foods
Col	Colourimetry
CVAAS	Cold Vapour Atomic Absorption Spectroscopy
D(I)	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference
D(C)	Sample diluted due to high concentration of target analyte
DR	Direct Reading
DS ADB	Double Strength Azide Dextrose Broth
DS LTB	Double Strength Lauryl Tryptose Broth
DS PAB	Double Strength Pseudomonas Asparagine Broth
EB	Equipment Blank
E(E1)	Estimated Value. Data acquisition affected by equipment malfunction.
E(L1)	Estimated Value. Analyte recovery in the laboratory control sample (LCS) was outside of QC limits. Results for this may be affected by same bias.
E(L2)	Estimated Value due to the nature of the sample matrix.
E(M1)	Estimated Value. Result calculated using calibration curve.
E(M2)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
E(M3)	Estimated Value. Sample performance indicate presence of interference
E(R)	Estimated Value. RPD value was outside control limits.
EC	<i>E. coli</i> Media
E(V)	Estimated Value. Count(s) obtained is/are outside of the method counting range.
EC-MUG	<i>E. coli</i> Media with 4-methylumbelliferyl-β-D-glucuronide
EHU	Environmental Health Unit
EPA	(US) Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectroscopy
FAES	Flame Atomic Emission Spectroscopy
FB	Field Blank
FD	Field Duplicate
FL-PRO	Florida Petroleum Range Organic Method
GC-MS	Gas Chromatography Mass Spectrometry
H	Hach Water Analysis Workbook
H(A)	Off-scale high data obtained. Actual value may be greater than value given.
ICP	Inductively Coupled Plasma

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ISE	Ion Selective Electrode
LCA	Listeria Chromogenic Agar
LE	Data not available due to laboratory error
LIA	Lysine Iron Agar
MAC	MacConkey Agar
MB	Method Blank
mEndo	mEndo Agar/Broth
MFHPB	Microbiology Food Health Protection Branch, Government of Canada
mmhos/cm	Millimhos per centimetre
mg/kg	milligram per kilogram
mg/L	milligrams per litre
MPN	Most Probable Number
mS/cm	millisiemens per centimetre
N/A (1)	Data not yet Available. Analysis not complete.
N/A (2)	Data not Available. Sample matrix interferences prevented data acquisition.
N/A (3)	Data not Available. Insufficient sample submitted.
N/A (4)	Data not Available. Equipment malfunction prevented data acquisition.
N/A (5)	Data not Available. Analysis not complete due to force majeure.
N/A (6)	Data not available due to issues with the shipment of the sample(s).
N/A (7)	Data not available. Technical difficulties experienced by subcontractor.
NA	Nutrient Agar
NB	Nutrient Broth
NEPA	National Environment and Planning Agency
NRCA	Natural Resources Conservation Authority
NTU	Nephelometric Turbidity Units
NWC	National Water Commission (Jamaica)
NST	No Time given for collection of samples
P(P)	Sample preserved prior to analysis
P(1)	Non-routine sample pre-treatment required
PAB	Pseudomonas Asparagine Broth
PCA	Plate Count Agar
PDA + C	Potato Dextrose Agar with Chloramphenicol
Pep Water	Peptone Water
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
RED	Parameter Non-compliant
RPD	Relative Percentage Difference
RSD	Relative Standard Deviation
SM	Standard Methods for the Examination of Water and Wastewater 23 rd Edition
SRS	Standard Reference Solution
SS	Sample Submerged upon receipt at the laboratory
SS ADB	Single Strength Azide Dextrose Broth
SS LTB	Single Strength Lauryl Tryptose Broth
SS PAB	Single Strength Pseudomonas Asparagine Broth
T(H)	Samples arrived at ESL-QEHL outside holding temperature ($\leq 4.0^{\circ}\text{C}$).
TIT	Titrimetry
TPH	Total Petroleum Hydrocarbon
TSA	Tryptic Soy Agar
TSB	Tryptic Soy Broth
TSA + YE	Tryptic Soy Agar + Yeast Extract
TTC	2,3,5 Triphenyl-2H-Tetrazolium Chloride
UMR	Analyte detection was below the measuring range of instrument. This is indicative of possible matrix interference within the sample.
WHO	World Health Organization
XLD	Xylose Lysine Deoxycholate

End of Report

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ACCREDITED LABORATORY

7 Hillview Avenue,
Kingston 10, Jamaica
Tel: (876) 978-9519, 978-6297, 978-5902
Fax: (876) 946-3745
E-mail: envirsol@cwjamaica.com

Certificate of Sample Analysis

CSA#: CDL 24072560-63

Attention:

Ms. Flovia Riley
Clarendon Distillers Limited
10th Floor, The Towers
25 Dominica Drive
Kingston 5



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Where samples are collected by ESL, these are identified, and collection follows the lab's internal procedure for sampling, ESL-P 5.7.3 and the sampling plan created for the client and identified by the Sampling Plan Number (SPN) given in this report.

The ISO/IEC 17025 accreditation only applies to the tests identified in the Results of Sample Analysis.

The data presented in this report does not imply certification, approval, or endorsement of the client's services by ESL-QEHL or the accreditation body.

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In all our undertakings, ESL maintains confidentiality and impartiality relating the client's business and operations. Any information relating to this exercise is subject to our confidentiality and impartiality policy and is held inviolate for a minimum of 5 years.



Sample(s) Information

Job Number: 24072560-63

SPN: -

Date of Report: 23/12/2024

Revision Date: Not Applicable

Sample(s) Collected: 25/07/2024

Sample(s) Submitted: 25/07/2024

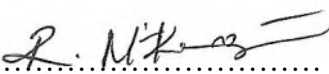
Temperature on Arrival: 2.2°C

Number of Samples: 4

Analysis Started: 25/07/2024

Analysis Completed: 28/08/2024

Prepared By: Rushell Hart, Technical Assistant

Verified By 
Reena McKenzie,
QMS Manager

Approved By 
Jaidene Webster-Jones,
Quality Control Officer



Results of Sample Analysis

Sample ID (Matrix) - Qualifier: #4 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	274 @ 24.3°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.03	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	2.2	P(1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		0.5		-
Chloride (mg Cl ⁻ /L)	H-8206	16.7	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	21	E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	3.7	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	11	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	5.4	E(M3)	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	2390	P(P), P(1)	740 – 5000
Iron (µg Fe/L)	EPA 200.7	84.2	P(P), P(1)	-
Zinc (µg Zn/L)	EPA 200.7	16.0	P(P), P(1)	-
Lead (µg Pb/L)	EPA 200.7	<4.2	P(P), P(1), BDL	-
Copper (µg Cu/L)	EPA 200.7	11.1	P(P), P(1)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: #1 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	3393 @ 23.8°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.03	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	22.7	P(1), D(I), E(M1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		5.1		-
Chloride (mg Cl ⁻ /L)	H-8206	1456.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	220	D(C), E(M1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	4.0	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	16	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.6	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664 B	8.4	P(P)	-
Potassium (µg K/L)	EPA 200.7	28097	P(P), P(1)	740 – 5000
Zinc (µg Zn/L)	EPA 200.7	15.0	P(P), P(1)	-
Iron (µg Fe/L)	EPA 200.7	79.6	P(P), P(1)	-
Lead (µg Pb/L)	EPA 200.7	4.6	P(P), P(1)	-
Copper (µg Cu/L)	EPA 200.7	13.6	P(P), P(1)	-

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Sample ID (Matrix) - Qualifier: #2 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	18980 @ 24.5°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.02	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	9.2	P(1), E(M1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.1		-
Chloride (mg Cl ⁻ /L)	H-8206	9280.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	1440	E(M1), D(C)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	8.9	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	30	P(P), D(C), P(1)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	4.3	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664 B	7.4	P(P), E(M3)	-
Potassium (µg K/L)	EPA 200.7	198158	P(P), P(1), D(C)	740 – 5000
Zinc (µg Zn/L)	EPA 200.7	<295	P(P), P(1), D(I), BDL	-
Iron (µg Fe/L)	EPA 200.7	<322	P(P), P(1), D(I), BDL	-
Lead (µg Pb/L)	EPA 200.7	<105	P(P), P(1), D(I), BDL	-
Copper (µg Cu/L)	EPA 200.7	<132	P(P), P(1), D(I), BDL	-

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Sample ID (Matrix) - Qualifier: #3 (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	1207 @ 23.4°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.13	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	7.7	P(1), E(M1), D(1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.7		-
Chloride (mg Cl ⁻ /L)	H-8206	337.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	94	E(M1), D(C)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	3.3	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	8	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.2	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	EPA 1664 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	3654	P(P), P(1)	740 – 5000
Zinc (µg Zn/L)	EPA 200.7	<11.8	P(P), P(1), BDL	-
Iron (µg Fe/L)	EPA 200.7	96.5	P(P), P(1)	-
Lead (µg Pb/L)	EPA 200.7	<4.2	P(P), P(1) BDL	-
Copper (µg Cu/L)	EPA 200.7	14.0	P(P), P(1)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.



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Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: R. Brown

Date of Analysis: 31/07/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		6.0	0.0
		6.0	
SRS	68.7-85.9	76.7	

Parameter: Orthophosphates (H-8048)

QEHL Personnel: J. Webster-Jones

Date of Analysis: 25/07/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		<0.02	
RB		<0.02	
BD		14.60	0.0
		14.60	
SRS	1.93-2.07	2.04	

Parameter: Sulfate (H-8051)

QEHL Personnel: R. Brown

Date of Analysis: 08/082024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	
BD		220	0.0
		220	
SRS	46-62	57	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 26/07/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<3	
BD		10	9.5*
		11	
SRS	121-129	123	

*Duplicates are selected based on the sensitivity of the analytical method.

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Parameter: Chloride (H-8206)

QEHL Personnel: A. St. Marie

Date of Analysis: 26/07/2024

	Standard Concentration (mg Cl ⁻ /L)	Determined Concentration (mg Cl ⁻ /L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		18960.0	0.8
		19120.0	
SRS	92.2 – 107.8	99.6	

Parameter: Biochemical Oxygen Demand (H-8043)

QEHL Personnel: T. Thompson, J. Webster-Jones, S. Williams **Date of Analysis: 26/07/2024**

Parameter: HR Nitrate (H-8039)

QEHL Personnel: T. Clarke

Date of Analysis: 26/07/2024

	Standard Concentration (mg NO ₃ ⁻ -N/L)	Determined Concentration (mg NO ₃ ⁻ -N/L)	RPD (%)
MB		0.7	
RB		0.6	
BD		3.2	0.0
		3.2	
SRS	8.5 – 11.4	9.3	

Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: T. Clarke

Date of Analysis: 26/07/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#3	Standard addition checks*	1.4	2.5	1.6	64
			5.0	3.3	66
			7.5	4.9	65

*Equation of the line $y = 0.656 + 1.39x$

Parameter: Total Dissolved Solids (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 25/07/2024

Standard (mg/L)	Instrument Reading (mg/L)	Temperature (°C)
909 - 928	918	24.7

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Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

**Additional Quality Control Information can be provided upon request.*

Date of Analysis: 28/08/2024

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

**Additional Quality Control Information can be provided upon request.*

Date of Analysis: 22/08/2024

Parameter: Fats, Oil and Grease (EPA 1664 B)

QEHL Personnel: S. Robinson

Date of Analysis: 08/08/2024



Glossary

%	Percentage
µg/L	microgram per litre
µS/cm	Micro siemens per centimetre
a	Parameter subcontracted
ADB	Azide Dextrose Broth
AIM	The Aquaculture, Inland & Marine Products & By-Products Act (Regulations)
AOAC	American Organization of Analytical Chemists
b (1)	Parameter analysed outside of hold-time; samples submitted outside of the analysis hold-time
b (2)	Parameter analysed outside of hold-time; analysis authorised by Client
BAM	Bacteriological Analytical Manual
BD	Batch Duplicate
BDL	Analyte concentration below laboratory determined limit of detection
BDLS	Analyte detected below method detection limit (MDL). MDL greater than standard value.
BEA	Bile Esculin Azide Agar
BG	Brilliant Green Bile Broth
BGSA	Brilliant Green Sulfa Agar
BHI	Brain Heart Infusion Broth
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BSA	Bismuth Sulfite Agar
c	parameter analysed in the field
C(B)	Samples collected by the client and picked up by an ESL bearer
C(C)	Samples collected by the client and delivered to ESL
C(H)	Analytical sample submitted in incorrect container. This may affect data quality.
C(L)	Samples collected by ESL
C(S)	Sample collected by the client then sub-sampled and delivered by ESL.
CFU	Colony Forming Units
CMMEF	Compendium of Methods for the Microbiological Examination of Foods
Col	Colourimetry
CVAAS	Cold Vapour Atomic Absorption Spectroscopy
D(I)	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference
D(C)	Sample diluted due to high concentration of target analyte
DR	Direct Reading
DS ADB	Double Strength Azide Dextrose Broth
DS LTB	Double Strength Lauryl Tryptose Broth
DS PAB	Double Strength Pseudomonas Asparagine Broth
EB	Equipment Blank
E(E1)	Estimated Value. Data acquisition affected by equipment malfunction.
E(L1)	Estimated Value. Analyte recovery in the laboratory control sample (LCS) was outside of QC limits. Results for this may be affected by same bias.
E(L2)	Estimated Value due to the nature of the sample matrix.
E(M1)	Estimated Value. Result calculated using calibration curve.
E(M2)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
E(M3)	Estimated Value. Sample performance indicate presence of interference
E(R)	Estimated Value. RPD value was outside control limits.
EC	<i>E. coli</i> Media
E(V)	Estimated Value. Count(s) obtained is/are outside of the method counting range.
EC-MUG	<i>E. coli</i> Media with 4-methylumbelliferyl-β-D-glucuronide
EHU	Environmental Health Unit
EPA	(US) Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectroscopy
FAES	Flame Atomic Emission Spectroscopy
FB	Field Blank
FD	Field Duplicate
FL-PRO	Florida Petroleum Range Organic Method
GC-MS	Gas Chromatography Mass Spectrometry
H	Hach Water Analysis Workbook
H(A)	Off-scale high data obtained. Actual value may be greater than value given.
ICP	Inductively Coupled Plasma

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ISE	Ion Selective Electrode
LCA	Listeria Chromogenic Agar
LE	Data not available due to laboratory error
LIA	Lysine Iron Agar
MAC	MacConkey Agar
MB	Method Blank
mEndo	mEndo Agar/Broth
MFHPB	Microbiology Food Health Protection Branch, Government of Canada
mmhos/cm	Millimhos per centimetre
mg/kg	milligram per kilogram
mg/L	milligrams per litre
MPN	Most Probable Number
mS/cm	millisiemens per centimetre
N/A (1)	Data not yet Available. Analysis not complete.
N/A (2)	Data not Available. Sample matrix interferences prevented data acquisition.
N/A (3)	Data not Available. Insufficient sample submitted.
N/A (4)	Data not Available. Equipment malfunction prevented data acquisition.
N/A (5)	Data not Available. Analysis not complete due to force majeure.
N/A (6)	Data not available due to issues with the shipment of the sample(s).
N/A (7)	Data not available. Technical difficulties experienced by subcontractor.
NA	Nutrient Agar
NB	Nutrient Broth
NEPA	National Environment and Planning Agency
NRCA	Natural Resources Conservation Authority
NTU	Nephelometric Turbidity Units
NWC	National Water Commission (Jamaica)
NST	No Time given for collection of samples
P(P)	Sample preserved prior to analysis
P(1)	Non-routine sample pre-treatment required
PAB	Pseudomonas Asparagine Broth
PCA	Plate Count Agar
PDA + C	Potato Dextrose Agar with Chloramphenicol
Pep Water	Peptone Water
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
RED	Parameter Non-compliant
RPD	Relative Percentage Difference
RSD	Relative Standard Deviation
SM	Standard Methods for the Examination of Water and Wastewater 23 rd Edition
SRS	Standard Reference Solution
SS	Sample Submerged upon receipt at the laboratory
SS ADB	Single Strength Azide Dextrose Broth
SS LTB	Single Strength Lauryl Tryptose Broth
SS PAB	Single Strength Pseudomonas Asparagine Broth
T(H)	Samples arrived at ESL-QEHL outside holding temperature ($\leq 4.0^{\circ}\text{C}$).
TIT	Titrimetry
TPH	Total Petroleum Hydrocarbon
TSA	Tryptic Soy Agar
TSB	Tryptic Soy Broth
TSA + YE	Tryptic Soy Agar + Yeast Extract
TTC	2,3,5 Triphenyl-2H-Tetrazolium Chloride
UMR	Analyte detection was below the measuring range of instrument. This is indicative of possible matrix interference within the sample.
WHO	World Health Organization
XLD	Xylose Lysine Deoxycholate

End of Report

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ACCREDITED LABORATORY

7 Hillview Avenue,
Kingston 10, Jamaica
Tel: (876) 978-9519, 978-6297, 978-5902
Fax: (876) 946-3745
E-mail: envirsol@cwjamaica.com

Certificate of Sample Analysis

CSA#: CDL 24082816-20 & 22-24

Attention:

Ms. Flovia Riley
Clarendon Distillers Limited
10th Floor, The Towers
25 Dominica Drive
Kingston 5



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Sample(s) Information

Job Number: 24082816-24

SPN: -

Date of Report: 29/11/2024

Revision Date: Not Applicable

Sample(s) Collected: 28/08/2024

Sample(s) Submitted: 28/08/2024

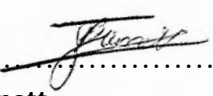
Temperature on Arrival: 1.7°C

Number of Samples: 8

Analysis Started: 28/08/2024

Analysis Completed: 17/09/2024

Prepared By: Rushell Hart, Technical Assistant

Verified By .....
Travis Garnett,
Senior Analyst

Approved By .....
Jaidene Webster-Jones,
Quality Control Officer



Results of Sample Analysis

Sample ID (Matrix) - Qualifier: #4 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	298 @ 24.4°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.03	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	1.3	P(P)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	29.7	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	27	E(M1), P(1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	14.4	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	15	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.3	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	2442	P(P), P(1)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: #3 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	5040 @ 23.9°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.05	-	0.01 – 0.8
Nitrate and Nitrite (mg NO ₃ ⁻ & NO ₂ ⁻ /L)	H-8039	41.2	P(1), D(C), E(M1), P(P)	0.1 - 7.5
Nitrate and Nitrite as Nitrogen (mg NO ₃ ⁻ & NO ₂ ⁻ -N/L)		9.4		-
Chloride (mg Cl ⁻ /L)	H-8206	2180.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	350	D(C), E(M1), P(1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	5.5	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	36	P(P) D(C)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.2	E(M3)	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	11.1	P(P)	-
Potassium (µg K/L)	EPA 200.7	39077	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: #2 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	15820 @ 23.3°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.03	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	1.3	P(P), E(M3)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	7840.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	1050	E(M1), P(1), D(C)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	7.0	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	60	P(P), D(C), E(M1)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.8	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	10.2	P(P)	-
Potassium (µg K/L)	EPA 200.7	141352	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: #1 (Groundwater)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	1216 @ 23.7°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.14	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	8.3	P(P), E(M1), D(1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.9		-
Chloride (mg Cl ⁻ /L)	H-8206	286.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	70	E(M1), P(1), D(C)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	<1.6	BDL	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	8	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.8	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	3728	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: AH (Groundwater)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	6.97 @ 22.8°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	2260 @ 24.8°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1464 @ 24.5°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	17.7	E(M1), D(C), P(P)	0.1 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		4.0		-
Total Coliform (MPN/100mL)	SM-9221	79	-	-
Faecal Coliform (MPN/100mL)	SM-9221	<1.8	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	55	D(C), E(M1), P(1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	584.0	D(C)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	834.3	P(1), P(P)	127.0 – 381.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	0.2	-	0.8 – 1.7
Sodium (µg Na/L)	EPA 200.7	112336	P(P), P(1) D(C)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	134	P(P), P(1) D(I)	-
Magnesium (µg Mg/L)	EPA 200.7	40914	P(P), P(1) D(C)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	3556	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: D1 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	4.20 @ 24.3°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	62.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	1442.8	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	40500	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	8283	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	1.94	P(P), D(C), P(1)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: D2 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	4.08 @ 23.7°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	61.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	2480.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	90250	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	14321	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	5.50	P(P), D(C), P(1)	-

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Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: D3 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Units)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH Units)	DR	3.94 @ 23.7°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	58.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	2950.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	98000	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	14375	D(C), P(1)	<30
Potassium (g K/L)	EPA 200.7	5.93	P(P), D(C), P(1)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.



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Parameter: pH (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 28/08/2024

Standard (Buffer)	pH After Calibration	Temperature (°C)
3.96 - 4.04	4.04	24.1
6.90 – 7.10	7.02	24.1
9.96 – 10.04	10.02	24.2

Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: J. Webster Jones

Date of Analysis: 03/09/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		3000.0	3.4
		2900.0	
SRS	358-465	417.5	

Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: J. Webster Jones

Date of Analysis: 04/09/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		4266.7	4.8
		4066.7	
SRS	358-465	417.5	

Parameter: Orthophosphates (H-8048)

QEHL Personnel: R. Stephens

Date of Analysis: 28/08/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		<0.02	
RB		<0.02	
BD		0.91	2.2
		0.89	
SRS	1.93-2.07	1.99	

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Parameter: Sulfate (H-8051)

QEHL Personnel: R. Ford, S. Robinson

Date of Analysis: 12/09/2024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	
BD		150	0.0
		150	
SRS	46 - 62	54	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 03/09/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<11	
BD		90000	0.6
		90500	
SRS	490-510	498	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 03/09/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<3	
BD		530	0.0
		530	
SRS	121-129	127	

Parameter: Chloride (H-8206)

QEHL Personnel: A. St. Marie

Date of Analysis: 03/09/2024

	Standard Concentration (mg Cl ⁻ /L)	Determined Concentration (mg Cl ⁻ /L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		5.5	0.0
		5.5	
SRS	92.2- 107.8	100.4	

Parameter: Biochemical Oxygen Demand (H-8043)

QEHL Personnel: T. Thompson, J. Webster-Jones, S. Crooks

Date of Analysis: 29/08/2024

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Parameter: Total Hardness (SM-2340 C)

QEHL Personnel: A. St. Marie

Date of Analysis: 09/09/2024

	Standard Concentration (mg CaCO ₃ /L)	Determined Concentration (mg CaCO ₃ /L)	RPD (%)
BD		302.6	3.5
		292.0	
SRS	0.91 – 1.09	1.01	

Parameter: Conductivity (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 28/08/2024

Standard (µS/cm)	Instrument Reading (µS/cm)	Temperature (°C)
1399-1427	1413	24.9

Parameter: HR Nitrate (H-8039)

QEHL Personnel: T. Clarke

Date of Analysis: 29/08/2024

	Standard Concentration (mg NO ₃ ⁻ -N/L)	Determined Concentration (mg NO ₃ ⁻ -N/L)	RPD (%)
MB		0.8	
RB		0.7	
BD		160.6	4.2
		154.0	
SRS	8.5-11.4	9.2	

Parameter: HR Nitrate (H-8039)

QEHL Personnel: R. Stephens & S. Robinson

Date of Analysis: 17/09/2024

	Standard Concentration (mg NO ₃ ⁻ -N/L)	Determined Concentration (mg NO ₃ ⁻ -N/L)	RPD (%)
MB		0.7	
RB		0.7	
BD		20.5	2.4
		21.0	
SRS	8.5-11.4	8.7	

Parameter: Total Dissolved Solids (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 28/08/2024

Standard (mg/L)	Instrument Reading (mg/L)	Temperature (°C)
909-928	918	24.4

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Standard Additions

QEHL Personnel: R. Stephens

Date of Analysis: 29/08/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#2	Standard addition checks*	1.3	2.50	1.60	64
			5.00	3.20	64
			7.50	5.00	67

*Equation of the line $y = 0.664x + 1.26$

Parameter: Faecal and Total Coliform (SM-9221)

QEHL Personnel: L. Wilson

Date of Analysis: 28/08/2024

Media/Test Item (Batch #)	DS LTB (27/08/2024)	SS LTB (27/08/2024)	BG Broth (06/09/2024)	EC Broth (03/09/2024)
Sterile (Yes/No)	Yes	Yes	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical	Typical	Typical

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 12/09/2024

*Additional Quality Control Information can be provided upon request.

Parameter: Fats, Oil and Grease (EPA 1664 B)

QEHL Personnel: S. Robinson

Date of Analysis: 11/09/2024

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 13/09/2024

*Additional Quality Control Information can be provided upon request.



Glossary

%	Percentage
µg/L	microgram per litre
µS/cm	Micro siemens per centimetre
a	Parameter subcontracted
ADB	Azide Dextrose Broth
AIM	The Aquaculture, Inland & Marine Products & By-Products Act (Regulations)
AOAC	American Organization of Analytical Chemists
b (1)	Parameter analysed outside of hold-time; samples submitted outside of the analysis hold-time
b (2)	Parameter analysed outside of hold-time; analysis authorised by Client
BAM	Bacteriological Analytical Manual
BD	Batch Duplicate
BDL	Analyte concentration below laboratory determined limit of detection
BDLS	Analyte detected below method detection limit (MDL). MDL greater than standard value.
BEA	Bile Esculin Azide Agar
BG	Brilliant Green Bile Broth
BGSA	Brilliant Green Sulfa Agar
BHI	Brain Heart Infusion Broth
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BSA	Bismuth Sulfite Agar
c	parameter analysed in the field
C(B)	Samples collected by the client and picked up by an ESL bearer
C(C)	Samples collected by the client and delivered to ESL
C(H)	Analytical sample submitted in incorrect container. This may affect data quality.
C(L)	Samples collected by ESL
C(S)	Sample collected by the client then sub-sampled and delivered by ESL.
CFU	Colony Forming Units
CMMEF	Compendium of Methods for the Microbiological Examination of Foods
Col	Colourimetry
CVAAS	Cold Vapour Atomic Absorption Spectroscopy
D(I)	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference
D(C)	Sample diluted due to high concentration of target analyte
DR	Direct Reading
DS ADB	Double Strength Azide Dextrose Broth
DS LTB	Double Strength Lauryl Tryptose Broth
DS PAB	Double Strength Pseudomonas Asparagine Broth
EB	Equipment Blank
E(E1)	Estimated Value. Data acquisition affected by equipment malfunction.
E(L1)	Estimated Value. Analyte recovery in the laboratory control sample (LCS) was outside of QC limits. Results for this may be affected by same bias.
E(L2)	Estimated Value due to the nature of the sample matrix.
E(M1)	Estimated Value. Result calculated using calibration curve.
E(M2)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
E(M3)	Estimated Value. Sample performance indicate presence of interference
E(R)	Estimated Value. RPD value was outside control limits.
EC	<i>E. coli</i> Media
E(V)	Estimated Value. Count(s) obtained is/are outside of the method counting range.
EC-MUG	<i>E. coli</i> Media with 4-methylumbelliferyl-β-D-glucuronide
EHU	Environmental Health Unit
EPA	(US) Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectroscopy
FAES	Flame Atomic Emission Spectroscopy
FB	Field Blank
FD	Field Duplicate
FL-PRO	Florida Petroleum Range Organic Method
GC-MS	Gas Chromatography Mass Spectrometry
H	Hach Water Analysis Workbook
H(A)	Off-scale high data obtained. Actual value may be greater than value given.

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ICP	Inductively Coupled Plasma
ISE	Ion Selective Electrode
LCA	Listeria Chromogenic Agar
LE	Data not available due to laboratory error
LIA	Lysine Iron Agar
MAC	MacConkey Agar
MB	Method Blank
mEndo	mEndo Agar/Broth
MFHPB	Microbiology Food Health Protection Branch, Government of Canada
mmhos/cm	Millimhos per centimetre
mg/kg	milligram per kilogram
mg/L	milligrams per litre
MPN	Most Probable Number
mS/cm	millisiemens per centimetre
N/A (1)	Data not yet Available. Analysis not complete.
N/A (2)	Data not Available. Sample matrix interferences prevented data acquisition.
N/A (3)	Data not Available. Insufficient sample submitted.
N/A (4)	Data not Available. Equipment malfunction prevented data acquisition.
N/A (5)	Data not Available. Analysis not complete due to force majeure.
N/A (6)	Data not available due to issues with the shipment of the sample(s).
N/A (7)	Data not available. Technical difficulties experienced by subcontractor.
NA	Nutrient Agar
NB	Nutrient Broth
NEPA	National Environment and Planning Agency
NRCA	Natural Resources Conservation Authority
NTU	Nephelometric Turbidity Units
NWC	National Water Commission (Jamaica)
NST	No Time given for collection of samples
P(P)	Sample preserved prior to analysis
P(1)	Non-routine sample pre-treatment required
PAB	Pseudomonas Asparagine Broth
PCA	Plate Count Agar
PDA + C	Potato Dextrose Agar with Chloramphenicol
Pep Water	Peptone Water
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
RED	Parameter Non-compliant
RPD	Relative Percentage Difference
RSD	Relative Standard Deviation
SM	Standard Methods for the Examination of Water and Wastewater 23 rd Edition
SRS	Standard Reference Solution
SS	Sample Submerged upon receipt at the laboratory
SS ADB	Single Strength Azide Dextrose Broth
SS LTB	Single Strength Lauryl Tryptose Broth
SS PAB	Single Strength Pseudomonas Asparagine Broth
T(H)	Samples arrived at ESL-QEHL outside holding temperature ($\leq 4.0^{\circ}\text{C}$).
TIT	Titrimetry
TPH	Total Petroleum Hydrocarbon
TSA	Tryptic Soy Agar
TSB	Tryptic Soy Broth
TSA + YE	Tryptic Soy Agar + Yeast Extract
TTC	2,3,5 Triphenyl-2H-Tetrazolium Chloride
UMR	Analyte detection was below the measuring range of instrument. This is indicative of possible matrix interference within the sample.
WHO	World Health Organization
XLD	Xylose Lysine Deoxycholate

End of Report

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ISO  **17025**
ACCREDITED LABORATORY

7 Hillview Avenue,
Kingston 10, Jamaica
Tel: (876) 978-9519, 978-6297, 978-5902
Fax: (876) 946-3745
E-mail: envirsol@cwjamaica.com

Certificate of Sample Analysis

CSA#: CDL 24092517-22

Attention:

Ms. Flovia Riley
Clarendon Distillers Limited
10th Floor, The Towers
25 Dominica Drive
Kingston 5



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Sample(s) Information

Job Number: 24092517-23

SPN: -

Date of Report: 29/11/2024

Revision Date: Not Applicable

Sample(s) Collected: 25/09/2024

Sample(s) Submitted: 25/09/2024

Temperature on Arrival: 1.4°C

Number of Samples: 7

Analysis Started: 25/09/2024

Analysis Completed: 31/10/2024

Prepared By: Rushell Hart, Technical Assistant

Verified By
Shanice Robinson,
Senior Analyst

Approved By
Jaidene Webster-Jones,
Quality Control Officer



Results of Sample Analysis

Sample ID (Matrix) - Qualifier: #2 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	161 @ 23.8°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.31	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	<1.3	P(P), UMR	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		<0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	8.2	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	14	E(M1), P(1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	66.0	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	56	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	3.4	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	2697	P(P), P(1)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: #3 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	192 @ 23.4°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.25	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	<1.3	P(P), UMR	0.1 - 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		<0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	21.4	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	11	E(M1), P(1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	124.0	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	40	P(P), D(C)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	3.4	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	12.2	P(P)	-
Potassium (µg K/L)	EPA 200.7	2260	P(P), P(1)	740 – 5000

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Sample ID (Matrix) - Qualifier: #1 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	279 @ 23.1°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.34	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	<1.3	P(P), UMR	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		<0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	55.6	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	18	E(M1), D(C)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	35.1	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	59	P(P) D(C) E(M1)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.1	-	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	2943	P(P), P(1)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: PW3 (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	7.49 @ 23.0°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	1893 @ 23.7°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1234 @ 23.7°C	-	120.0 – 300
Total Suspended Solids (mg/L)	SM-2540 D	2.7	-	-
Nitrate (mg NO ₃ ⁻ /L)	H-8039	8.5	E(M1), D(I), P(P)	0.1 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.9		-
Total Coliform (MPN/100mL)	SM-9221	49	-	-
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.12	-	0.01 – 0.8
Faecal Coliform (MPN/100mL)	SM-9221	2.0	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	88	D(C), E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	318.0	D(C), P(1)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	505.2	P(1), P(P)	127.0 – 381.0
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	11	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	4.8	E(M3)	0.8 – 1.7
Fats, Oil & Grease (mg/L)	SM-5520 B	6.0	P(P)	-
Sodium (µg Na/L)	EPA 200.7	161354	P(P), P(1), D(C)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	585	P(P), P(1) D(I)	-
Magnesium (µg Mg/L)	EPA 200.7	19341	P(P), P(1), D(C)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	3878	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: CH (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	6.70 @ 23.4°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	2290 @ 24.8°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1488 @ 24.8°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	15.9	E(M1), D(I), P(P)	0.1 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		3.6		-
Total Coliform (MPN/100mL)	SM-9221	9.3	-	-
Faecal Coliform (MPN/100mL)	SM-9221	1.8	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	96	D(C), E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	440.0	D(C)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	721.0	P(1), P(P)	127.0 – 381.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	4.1	E(M3)	0.8 – 1.7
Sodium (µg Na/L)	EPA 200.7	158377	P(P), P(1), D(C)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	60.4	P(P), P(1) D(I)	-
Magnesium (µg Mg/L)	EPA 200.7	49288	P(P), P(1), D(C)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	2571	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: PW2 (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	6.67 @ 24.4°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	1902 @ 24.5°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1232 @ 24.4°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	10.6	E(M1), D(C), P(P)	0.1 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.4		-
Total Coliform (MPN/100mL)	SM-9221	49	-	-
Faecal Coliform (MPN/100mL)	SM-9221	49	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	88	D(C), E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	348.0	D(C)	5.0 – 20.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	458.9	P(1), P(P)	127.0 – 381.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.7	E(M3)	0.8 – 1.7
Sodium (µg Na/L)	EPA 200.7	179832	P(P), P(1), D(C)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	59.0	P(P) P(1) D(I)	-
Magnesium (µg Mg/L)	EPA 200.7	26996	P(P), P(1), D(C)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	3051	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: P (Potable Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
pH (pH units)	DR	5.14 @ 24.1°C	b(1)	7.00 – 8.40
Turbidity (NTU)	EPA 180.1	<0.41	BDL	-
Nitrate (mg NO ₃ ⁻ /L)	H-8039	<1.3	BDL, P(P), P(1)	0.1 – 7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		<0.3		-
Total Coliform (MPN/100mL)	SM-9221	12	-	-
Total Aerobic Plate Count (CFU/mL)	SM-9215 B	7.8 x 10 ³	-	-
<i>E. coli</i> (MPN/100mL)	SM-9221	<1.1	-	-
<i>Pseudomonas aeruginosa</i> (MPN/100ml)	SM-9213 F	2.0	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	3	E(M1)	3.0 – 10.0
Chloride (mg Cl ⁻ /L)	H-8206	408.0	D(C), P(1)	5.0 – 20.0

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.



Certificate of Quality

Parameter: Turbidity (EPA 180.1)

QEHL Personnel: R. Stephens, T. Clarke

Date of Analysis: 26/09/2024

	Standard Concentration (NTU)	Determined Concentration (NTU)	RPD (%)
BD		<0.41	-
		<0.41	
SRS	9.00- 11.00	9.70	

Parameter: Fats, Oil and Grease (EPA 1664 B)

QEHL Personnel: S. Robinson

Date of Analysis: 09/10/2024

Parameter: Total Aerobic Plate Count (SM-9215 B)

QEHL Personnel: T. Garnett

Date of Analysis: 25/09/2024

Media/Test Item (Batch#)	PCA (19/09/2024)	0.1% 9ml Pep Water (20/09/2024)
Sterile (Yes/No)	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical

Parameter: pH (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 25/09/2024

Standard (Buffer)	pH After Calibration	Temperature (°C)
3.96 - 4.04	3.97	23.6
6.90 – 7.10	7.05	24.1
9.96 – 10.04	10.02	24.7

Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: A. St. Marie, S. Robinson

Date of Analysis: 30/09/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		66.4	1.0
		65.7	
SRS	358-465	417.5	

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 10/11/2024

**Additional Quality Control Information can be provided upon request.*

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Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 31/10/2024

**Additional Quality Control Information can be provided upon request.*

Parameter: Orthophosphates (H-8048)

QEHL Personnel: T. Clarke, R. Stephens

Date of Analysis: 25/09/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		<0.02	
RB		<0.02	
BD		1.13	3.6
		1.09	
SRS	1.96-2.04	2.01	

Parameter: Orthophosphates (H-8048)

QEHL Personnel: T. Clarke

Date of Analysis: 26/09/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		<0.02	
RB		<0.02	
BD		65.50	0.0
		65.50	
SRS	1.96-2.04	2.01	

Parameter: Sulfate (H-8051)

QEHL Personnel: R. Ford, S. Robinson

Date of Analysis: 27/09/2024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	
BD		14	0.0
		14	
SRS	46-62	61	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 08/10/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<3	
BD		45	0.0
		45	
SRS	121-129	122	

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Parameter: Chloride (H-8206)

QEHL Personnel: B. Davis, R. Ford

Date of Analysis: 27/09/2024

	Standard Concentration (mg Cl/L)	Determined Concentration (mg Cl/L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		320.0	1.2
		316.0	
SRS	95.3- 104.7	103.6	

Parameter: Biochemical Oxygen Demand (H-8043)

QEHL Personnel: T. Thompson, J. Webster-Jones, S. Williams **Date of Analysis: 26/09/2024**

Parameter: Total Hardness (SM-2340 C)

QEHL Personnel: R. Pryce

Date of Analysis: 15/10/2024

	Standard Concentration (mg CaCO ₃ /L)	Determined Concentration (mg CaCO ₃ /L)	RPD (%)
BD		184.4	0.4
		185.2	
SRS	0.91 – 1.09	1.03	

Parameter: Total Hardness (SM-2340 C)

QEHL Personnel: R. Pryce

Date of Analysis: 26/10/2024

	Standard Concentration (mg CaCO ₃ /L)	Determined Concentration (mg CaCO ₃ /L)	RPD (%)
BD		102.3	0.4
		103.2	
SRS	0.91 – 1.09	1.05	

Parameter: Conductivity (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 25/09/2024

Standard (µS/cm)	Instrument Reading (µS/cm)	Temperature (°C)
1399-1427	1413	24.9

Parameter: Total Dissolved Solids (DR)

QEHL Personnel: S. Crooks

Date of Analysis: 25/09/2024

Standard (mg/L)	Instrument Reading (mg/L)	Temperature (°C)
909-928	918	24.9

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Parameter: HR Nitrate (H-8039)

QEHL Personnel: R. Stephens, T. Clarke

Date of Analysis: 26/09/2024

	Standard Concentration (mg NO ₃ ⁻ -N/L)	Determined Concentration (mg NO ₃ ⁻ -N/L)	RPD (%)
MB		0.7	
RB		0.7	
BD		15.9	0.0
		15.9	
SRS	8.5-11.4	9.2	

Parameter: *Pseudomonas aeruginosa* (SM-9213 F)

QEHL Personnel: T. Garnett

Date of Analysis: 25/09/2024

Media/Test Item (Batch #)	SS Asparagine Broth (19/09/2024)	DS Asparagine Broth (12/09/2024)	Acetamide Agar (24/09/2024)
Sterile (Yes/No)	Yes	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical	Typical

Parameter: *E. Coli* (SM-9221)

QEHL Personnel: T. Garnett

Date of Analysis: 25/09/2024

Media/Test Item (Batch #)	DS LTB (24/09/2024)	EC MUG (27/09/2024)
Sterile (Yes/No)	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical

Parameter: Faecal and Total Coliform (SM-9221)

QEHL Personnel: T. Garnett

Date of Analysis: 25/09/2024

Media/Test Item (Batch #)	DS LTB (24/09/2024)	SS LTB (24/09/2024)	BG (27/09/2024)	EC (04/10/2024)
Sterile (Yes/No)	Yes	Yes	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical	Typical	Typical



Glossary

%	Percentage
µg/L	microgram per litre
µS/cm	Micro siemens per centimetre
a	Parameter subcontracted
ADB	Azide Dextrose Broth
AIM	The Aquaculture, Inland & Marine Products & By-Products Act (Regulations)
AOAC	American Organization of Analytical Chemists
b (1)	Parameter analysed outside of hold-time; samples submitted outside of the analysis hold-time
b (2)	Parameter analysed outside of hold-time; analysis authorised by Client
BAM	Bacteriological Analytical Manual
BD	Batch Duplicate
BDL	Analyte concentration below laboratory determined limit of detection
BDLS	Analyte detected below method detection limit (MDL). MDL greater than standard value.
BEA	Bile Esculin Azide Agar
BG	Brilliant Green Bile Broth
BGSA	Brilliant Green Sulfa Agar
BHI	Brain Heart Infusion Broth
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BSA	Bismuth Sulfite Agar
c	parameter analysed in the field
C(B)	Samples collected by the client and picked up by an ESL bearer
C(C)	Samples collected by the client and delivered to ESL
C(H)	Analytical sample submitted in incorrect container. This may affect data quality.
C(L)	Samples collected by ESL
C(S)	Sample collected by the client then sub-sampled and delivered by ESL.
CFU	Colony Forming Units
CMMEF	Compendium of Methods for the Microbiological Examination of Foods
Col	Colourimetry
CPD	Client provided data
CVAAS	Cold Vapour Atomic Absorption Spectroscopy
D(I)	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference
D(C)	Sample diluted due to high concentration of target analyte
DR	Direct Reading
DS ADB	Double Strength Azide Dextrose Broth
DS LTB	Double Strength Lauryl Tryptose Broth
DS PAB	Double Strength Pseudomonas Asparagine Broth
EA	Enterococcosel Agar
EB	Equipment Blank
E(E1)	Estimated Value. Data acquisition affected by equipment malfunction.
E(L1)	Estimated Value. Analyte recovery in the laboratory control sample (LCS) was outside of QC limits. Results for this may be affected by same bias.
E(L2)	Estimated Value due to the nature of the sample matrix.
E(M1)	Estimated Value. Result calculated using calibration curve.
E(M2)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
E(M3)	Estimated Value. Sample performance indicate presence of interference
E(R)	Estimated Value. RPD value was outside control limits.
EC	EC Broth
E(V)	Estimated Value. Count(s) obtained is/are outside of the method counting range.
EC-MUG	<i>E. coli</i> Media with 4-methylumbelliferyl-β-D-glucuronide
EHU	Environmental Health Unit
EPA	(US) Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectroscopy
FAES	Flame Atomic Emission Spectroscopy
FB	Field Blank
FD	Field Duplicate
FL-PRO	Florida Petroleum Range Organic Method
GC-MS	Gas Chromatography Mass Spectrometry
H	Hach Water Analysis Workbook
H(A)	Off-scale high data obtained. Actual value may be greater than value given.
ICP	Inductively Coupled Plasma
ISE	Ion Selective Electrode
LCA	Listeria Chromogenic Agar

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LE	Data not available due to laboratory error
LIA	Lysine Iron Agar
MAC	MacConkey Agar
MB	Method Blank
mEndo	mEndo Agar/Broth
MFHPB	Microbiology Food Health Protection Branch, Government of Canada
mmhos/cm	Millimhos per centimetre
mg/kg	milligram per kilogram
mg/L	milligrams per litre
MPN	Most Probable Number
mS/cm	millisiemens per centimetre
N/A (1)	Data not yet Available. Analysis not complete.
N/A (2)	Data not Available. Sample matrix interferences prevented data acquisition.
N/A (3)	Data not Available. Insufficient sample submitted.
N/A (4)	Data not Available. Equipment malfunction prevented data acquisition.
N/A (5)	Data not Available. Analysis not complete due to force majeure.
N/A (6)	Data not available due to issues with the shipment of the sample(s).
N/A (7)	Data not available. Technical difficulties experienced by subcontractor.
NA	Nutrient Agar
NB	Nutrient Broth
NEPA	National Environment and Planning Agency
NRCA	Natural Resources Conservation Authority
NTU	Nephelometric Turbidity Units
NWC	National Water Commission (Jamaica)
NST	No Time given for collection of samples
P(P)	Sample preserved prior to analysis
P(1)	Non-routine sample pre-treatment required
PAB	Pseudomonas Asparagine Broth
PCA	Plate Count Agar
PDA + C	Potato Dextrose Agar with Chloramphenicol
Pep Water	Peptone Water
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
RED	Parameter Non-compliant
RPD	Relative Percentage Difference
RSD	Relative Standard Deviation
SM	Standard Methods for the Examination of Water and Wastewater 23 rd Edition
SRS	Standard Reference Solution
SS	Sample Submerged upon receipt at the laboratory
SS ADB	Single Strength Azide Dextrose Broth
SS LTB	Single Strength Lauryl Tryptose Broth
SS PAB	Single Strength Pseudomonas Asparagine Broth
T(H)	Samples arrived at ESL-QEHL outside holding temperature ($\leq 4.0^{\circ}\text{C}$).
TIT	Titrimetry
TPH	Total Petroleum Hydrocarbon
TSA	Tryptic Soy Agar
TSB	Tryptic Soy Broth
TSA + YE	Tryptic Soy Agar + Yeast Extract
TTC	2,3,5 Triphenyl-2H-Tetrazolium Chloride
UMR	Analyte detection was below the measuring range of instrument. This is indicative of possible matrix interference within the sample.
WHO	World Health Organization
XLD	Xylose Lysine Deoxycholate

End of Report

ESL QUALITY & ENVIRONMENTAL HEALTH LABORATORY

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ISO 17025
ACCREDITED LABORATORY

7 Hillview Avenue,
Kingston 10, Jamaica
Tel: (876) 978-9519, 978-6297, 978-5902
Fax: (876) 946-3745
E-mail: envirsol@cwjamaica.com

Certificate of Sample Analysis

CSA#: CDL 24103107-10 & 12-14

Attention:

Ms. Flovia Riley
Clarendon Distillers Limited
10th Floor, The Towers
25 Dominica Drive
Kingston 5



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Where samples are collected by ESL, these are identified, and collection follows the lab's internal procedure for sampling, ESL-P 5.7.3 and the sampling plan created for the client and identified by the Sampling Plan Number (SPN) given in this report.

The ISO/IEC 17025 accreditation only applies to the tests identified in the Results of Sample Analysis.

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Sample(s) Information

Job Number: 24103107-14

SPN: -

Date of Report: 23/12/2024

Revision Date: Not Applicable

Sample(s) Collected: 31/10/2024

Sample(s) Submitted: 31/10/2024

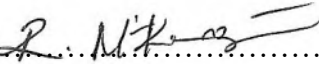
Temperature on Arrival: 2.2°C

Number of Samples: 7

Analysis Started: 01/11/2024

Analysis Completed: 13/11/2024

Prepared By: Rushell Hart, Technical Assistant

Verified By 
Reena Mckenzie,
QMS Manager

Approved By 
Rashidah Khan-Haqq,
Manager, EHAS



Results of Sample Analysis

Sample ID (Matrix) - Qualifier: #2 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	273 @ 24.5°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.22	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	<1.3	P(1), BDL	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		<0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	12.0	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	20	E(M1), P(1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	13.7	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	23	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	4.9	E(M3)	0.8 – 1.7
Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	2302	P(P), P(1),	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: #4 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	364 @ 24.1°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.27	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	<1.3	P(1), UMR	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		<0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	47.4	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	29	E(M1), P(1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	10.1	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	13	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.7	E(M3)	0.8 – 1.7
Oil & Grease (mg/L)	SM-5520 B	<5.0	P(P), BDL	-
Potassium (µg K/L)	EPA 200.7	2819	P(P), P(1)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: #1 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	4660 @ 23.8°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.24	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	7.5	P(1), E(M1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.7		-
Chloride (mg Cl ⁻ /L)	H-8206	2360.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	320	E(M1), P(1), D(C)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	18.7	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	20	P(P), D(C)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	3.1	E(M3)	0.8 – 1.7
Oil & Grease (mg/L)	SM-5520 B	5.7	P(P)	-
Potassium (µg K/L)	EPA 200.7	202552	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: #3 (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	1244 @ 24.3°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.14	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	7.2	P(1), D(C), E(M1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.6		-
Chloride (mg Cl ⁻ /L)	H-8206	328.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	83	E(M1), P(1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	<1.6	BDL	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	43	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.2	-	0.8 – 1.7
Oil & Grease (mg/L)	SM-5520 B	5.2	P(P)	-
Potassium (µg K/L)	EPA 200.7	809	P(P), P(1), D(C)	740 – 5000

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Sample ID (Matrix) - Qualifier: D1 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH units)	DR	4.05 @ 23.5°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	42.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	5500.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	101000	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	16139	P(1), D(C)	<30
Potassium (g K/L)	EPA 200.7	5.89	P(P), P(1),D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

Sample ID (Matrix) - Qualifier: D2 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH units)	DR	4.06 @ 24.1°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	23.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	6150.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	105000	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	13268	P(1), D(C)	<30
Potassium (g K/L)	EPA 200.7	5.45	P(P), P(1),D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: D3 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH units)	DR	4.08 @ 23.5°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	16.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	1266.7	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	87000	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	8098	P(1), D(C)	<30
Potassium (g K/L)	EPA 200.7	4.29	P(P), P(1),D(C)	-

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Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.



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Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 03/11/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		3	
BD		10	0.0
		10	
SRS	123-137	129	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 03/11/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<11	
BD		428	0.2
		427	
SRS	490-510	508	

Parameter: Oil and Grease (EPA 1664 B)

QEHL Personnel: S. Robinson

Date of Analysis: 13/11/2024

Parameter: pH (DR)

QEHL Personnel: S. Williams

Date of Analysis: 01/11/2024

Standard (Buffer)	pH After Calibration	Temperature (°C)
3.96 - 4.04	4.03	23.3
6.90 - 7.10	7.05	23.5
9.96 - 10.04	10.04	23.4

Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: A. St. Marie

Date of Analysis: 04/11/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		6300.0	4.9
		6000.0	
SRS	358-465	417.5	

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Parameter: Orthophosphates (H-8048)

QEHL Personnel: T. Clarke

Date of Analysis: 01/11/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		<0.02	
RB		<0.02	
BD		16.60	1.2
		16.40	
SRS	1.96-2.04	1.99	

Parameter: Sulfate (H-8051)

QEHL Personnel: J. Webster-Jones

Date of Analysis: 04/11/2024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	
BD		80	0.0
		80	
SRS	51-67	58	

Parameter: Chloride (H-8206)

QEHL Personnel: B. Davis

Date of Analysis: 01/11/2024

	Standard Concentration (mg Cl ⁻ /L)	Determined Concentration (mg Cl ⁻ /L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		608.0	1.3
		600.0	
SRS	95.4- 104.7	98.4	

Parameter: Biochemical Oxygen Demand (H-8043)

QEHL Personnel: J. Webster- Jones, S. Williams, T. Thompson **Date of Analysis: 01/11/2024**

Parameter: HR Nitrate (H-8039)

QEHL Personnel: R. Stephens

Date of Analysis: 31/10/2024

	Standard Concentration (mg NO ₃ ⁻ -N/L)	Determined Concentration (mg NO ₃ ⁻ -N/L)	RPD (%)
MB		0.7	
RB		0.7	
BD		1.5	12.5*
		1.7	
SRS	8.5-11.4	8.8	

*Duplicates are selected based on the sensitivity of the analytical method.

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Standard Additions

Parameter: HR Nitrate (H-8039)

%R Limits: 95 – 105

QEHL Personnel: R. Stephens

Date of Analysis: 31/10/2024

Sample ID		Unspiked Sample Concentration (mg/L)	Spike Concentration Added (mg/L)	Spike Concentration Recovered (mg/L)	Recovery (%R)
#1	Standard addition checks*	0.7	2.50	1.00	40
			5.00	2.00	40
			7.50	3.10	41

*Equation of the line $y = 0.412x + 0.68$

Parameter: Total Dissolved Solids (DR)

QEHL Personnel: S. Willimas

Date of Analysis: 01/11/2024

Standard (mg/L)	Instrument Reading (mg/L)	Temperature (°C)
909-928	919	24.8

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 08/11/2024

*Additional Quality Control Information can be provided upon request.

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 13/11/2024

*Additional Quality Control Information can be provided upon request.

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Glossary

%	Percentage
µg/L	microgram per litre
µS/cm	Micro siemens per centimetre
a	Parameter subcontracted
ADB	Azide Dextrose Broth
AIM	The Aquaculture, Inland & Marine Products & By-Products Act (Regulations)
AOAC	American Organization of Analytical Chemists
b (1)	Parameter analysed outside of hold-time; samples submitted outside of the analysis hold-time
b (2)	Parameter analysed outside of hold-time; analysis authorised by Client
BAM	Bacteriological Analytical Manual
BD	Batch Duplicate
BDL	Analyte concentration below laboratory determined limit of detection
BDLS	Analyte detected below method detection limit (MDL). MDL greater than standard value.
BEA	Bile Esculin Azide Agar
BG	Brilliant Green Bile Broth
BGSA	Brilliant Green Sulfa Agar
BHI	Brain Heart Infusion Broth
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BSA	Bismuth Sulfite Agar
c	parameter analysed in the field
C(B)	Samples collected by the client and picked up by an ESL bearer
C(C)	Samples collected by the client and delivered to ESL
C(H)	Analytical sample submitted in incorrect container. This may affect data quality.
C(L)	Samples collected by ESL
C(S)	Sample collected by the client then sub-sampled and delivered by ESL.
CFU	Colony Forming Units
CMMEF	Compendium of Methods for the Microbiological Examination of Foods
Col	Colourimetry
CPD	Client provided data
CVAAS	Cold Vapour Atomic Absorption Spectroscopy
D(I)	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference
D(C)	Sample diluted due to high concentration of target analyte
DR	Direct Reading
DS ADB	Double Strength Azide Dextrose Broth
DS LTB	Double Strength Lauryl Tryptose Broth
DS PAB	Double Strength Pseudomonas Asparagine Broth
EA	Enterococcosel Agar
EB	Equipment Blank
E(E1)	Estimated Value. Data acquisition affected by equipment malfunction.
E(L1)	Estimated Value. Analyte recovery in the laboratory control sample (LCS) was outside of QC limits. Results for this may be affected by same bias.
E(L2)	Estimated Value due to the nature of the sample matrix.
E(M1)	Estimated Value. Result calculated using calibration curve.
E(M2)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
E(M3)	Estimated Value. Sample performance indicate presence of interference
E(R)	Estimated Value. RPD value was outside control limits.
EC	EC Broth
E(V)	Estimated Value. Count(s) obtained is/are outside of the method counting range.
EC-MUG	<i>E. coli</i> Media with 4-methylumbelliferyl-β-D-glucuronide
EHU	Environmental Health Unit
EPA	(US) Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectroscopy
FAES	Flame Atomic Emission Spectroscopy
FB	Field Blank
FD	Field Duplicate
FL-PRO	Florida Petroleum Range Organic Method
GC-MS	Gas Chromatography Mass Spectrometry
H	Hach Water Analysis Workbook
H(A)	Off-scale high data obtained. Actual value may be greater than value given.
ICP	Inductively Coupled Plasma

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ISE	Ion Selective Electrode
LCA	Listeria Chromogenic Agar
LE	Data not available due to laboratory error
LIA	Lysine Iron Agar
MAC	MacConkey Agar
MB	Method Blank
mEndo	mEndo Agar/Broth
MFHPB	Microbiology Food Health Protection Branch, Government of Canada
mmhos/cm	Millimhos per centimetre
mg/kg	milligram per kilogram
mg/L	milligrams per litre
MPN	Most Probable Number
mS/cm	millisiemens per centimetre
N/A (1)	Data not yet Available. Analysis not complete.
N/A (2)	Data not Available. Sample matrix interferences prevented data acquisition.
N/A (3)	Data not Available. Insufficient sample submitted.
N/A (4)	Data not Available. Equipment malfunction prevented data acquisition.
N/A (5)	Data not Available. Analysis not complete due to force majeure.
N/A (6)	Data not available due to issues with the shipment of the sample(s).
N/A (7)	Data not available. Technical difficulties experienced by subcontractor.
NA	Nutrient Agar
NB	Nutrient Broth
NEPA	National Environment and Planning Agency
NRCA	Natural Resources Conservation Authority
NTU	Nephelometric Turbidity Units
NWC	National Water Commission (Jamaica)
NST	No Time given for collection of samples
P(P)	Sample preserved prior to analysis
P(I)	Non-routine sample pre-treatment required
PAB	Pseudomonas Asparagine Broth
PCA	Plate Count Agar
PDA + C	Potato Dextrose Agar with Chloramphenicol
Pep Water	Peptone Water
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
RED	Parameter Non-compliant
RPD	Relative Percentage Difference
RSD	Relative Standard Deviation
SM	Standard Methods for the Examination of Water and Wastewater 23 rd Edition
SRS	Standard Reference Solution
SS	Sample Submerged upon receipt at the laboratory
SS ADB	Single Strength Azide Dextrose Broth
SS LTB	Single Strength Lauryl Tryptose Broth
SS PAB	Single Strength Pseudomonas Asparagine Broth
T(H)	Samples arrived at ESL-QEHL outside holding temperature ($\leq 4.0^{\circ}\text{C}$).
TIT	Titrimetry
TPH	Total Petroleum Hydrocarbon
TSA	Tryptic Soy Agar
TSB	Tryptic Soy Broth
TSA + YE	Tryptic Soy Agar + Yeast Extract
TTC	2,3,5 Triphenyl-2H-Tetrazolium Chloride
UMR	Analyte detection was below the measuring range of instrument. This is indicative of possible matrix interference within the sample.
WHO	World Health Organization
XLD	Xylose Lysine Deoxycholate

End of Report

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7 Hillview Avenue,
Kingston 10, Jamaica
Tel: (876) 978-9519, 978-6297, 978-5902
Fax: (876) 946-3745
E-mail: envirsol@cwjamaica.com

Certificate of Sample Analysis

CSA#: CDL 24112845 & 47-50

Attention:

Ms. Flovia Riley
Clarendon Distillers Limited
10th Floor, The Towers
25 Dominica Drive
Kingston 5



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Sample(s) Information

Job Number: 24112845-50

SPN: -

Date of Report: 28/12/2024

Revision Date: Not Applicable

Sample(s) Collected: 28/11/2024

Sample(s) Submitted: 28/11/2024

Temperature on Arrival: 3.4°C

Number of Samples: 5

Analysis Started: 28/11/2024

Analysis Completed: 16/12/2024

Prepared By: Rushell Hart, Technical Assistant

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Verified By
Travis Garnett,
Client Manager

Approved By
Jaidene Webster-Jones,
Quality Control Officer



Results of Sample Analysis

Sample ID (Matrix) - Qualifier: #2 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
Total Dissolved Solids (mg/L)	DR	224 @ 23.5°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.32	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	<1.3	P(1), BDL	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		<0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	11.0	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	12	E(M1), P(1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	87.7	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	9	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	7.8	E(M3)	0.8 – 1.7
Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	2273	P(P), P(1)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: PW2 (Groundwater)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESHWATER STANDARD
Total Dissolved Solids (mg/L)	DR	1327 @ 24.3°C	-	120.0 – 300
pH (pH units)	DR	6.93 @ 24.3°C	b(1)	7.00 – 8.00
Total Coliform (MPN/100mL)	SM-9221	>1600	-	-
Faecal Coliform (MPN/100mL)		130	-	-
Nitrate (mg NO ₃ ⁻ /L)	H-8039	4.4	D(C)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.0		-
Chloride (mg Cl ⁻ /L)	H-8206	416.0	D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	75	E(M1)	3.0-10.0
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	676.6	P(P), P(1)	127.0 – 381.0
Conductivity (uS/cm)	DR	2040 @ 24.2°C	-	150.0-600
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	0.6	-	0.8 – 1.7
Sodium (µg Na/L)	EPA 200.7	150057	P(P), P(1)	4500 – 12000
Magnesium (µg Mg/L)	EPA 200.7	36035	P(P), P(1)	3600 - 27000
Iron (µg Fe/L)	EPA 200.7	32.4	P(P), P(1)	-
Calcium (µg Ca/L)	EPA 200.7	178263	P(P), P(1)	40000 – 101000
Potassium (µg K/L)	EPA 200.7	3228	P(P), P(1)	740 – 5000

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Sample ID (Matrix) - Qualifier: D1 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH units)	DR	4.07 @ 23.6°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	44.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	3380.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	81400	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	18412	P(1), D(C)	<30
Potassium (g K/L)	EPA 200.7	4.52	P(P), P(1),D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

Sample ID (Matrix) - Qualifier: D2 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH units)	DR	3.75 @ 24.2°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	77.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	2820.0	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	123900	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	31000	P(1), D(C), E(M3)	<30
Potassium (g K/L)	EPA 200.7	6.59	P(P), P(1),D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: D3 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA RADE EFFLUENT STANDARD
pH (pH units)	DR	4.04 @ 24.3°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	62.00	D(C)	5
Total Suspended Solids (mg/L)	SM-2540 D	3637.5	-	All times <150 Monthly average 50
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	74700	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	15367	P(1), D(C)	<30
Potassium (g K/L)	EPA 200.7	3.92	P(P), P(1), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Certificate of Quality

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 03/12/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		3	
BD		24	0.0
		24	
SRS	123-137	129	

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 03/12/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<11	
BD		123800	0.2
		124000	
SRS	490-510	500	

Parameter: Oil and Grease (EPA 1664 B)

QEHL Personnel: S. Robinson

Date of Analysis: 05/12/2024

Parameter: E. Coli (SM-9221)

QEHL Personnel: T. Russell

Date of Analysis: 28/11/2024

Media/Test Item (Batch #)	DS LTB (28/11/2024)	SS LTB (28/11/2024)	EC (09/12/2024)	BGB (03/12/2024)
Sterile (Yes/No)	Yes	Yes	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical	Typical	Typical

Parameter: Total Coliform (SM-9221)

QEHL Personnel: T. Russell

Date of Analysis: 28/11/2024

Media/Test Item (Batch #)	DS LTB (28/11/2024)	SS LTB (28/11/2024)	EC (09/12/2024)	BGB (03/12/2024)
Sterile (Yes/No)	Yes	Yes	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical	Typical	Typical

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Parameter: Total Hardness (SM-2340 C)

QEHL Personnel: R. Pryce

Date of Analysis: 16/12/2024

	Standard Concentration (mg CaCO ₃ /L)	Determined Concentration (mg CaCO ₃ /L)	RPD (%)
Duplicates		679.1	0.7
		674.2	
SRS	0.91 – 1.09	1.01	

Parameter: Conductivity (DR)

QEHL Personnel: S. Williams

Date of Analysis: 29/11/2024

Standard (µS /cm)	Instrument Reading (µS/cm)	Temperature (°C)
1399-1427	1416	24.8

Parameter: Chloride (H-8206)

QEHL Personnel: D. Gayle; R. Ford

Date of Analysis: 02/12/2024

	Standard Concentration (mg Cl ⁻ /L)	Determined Concentration (mg Cl ⁻ /L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		14.5	0.7
		14.4	
SRS	95.0-105.0	96.8	

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 11/12/2024

**Additional Quality Control Information can be provided upon request.*

Parameter: Sulfate (H-8051)

QEHL Personnel: A. St. Marie

Date of Analysis: 10/12/2024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	
BD		36	0.0
		36	
SRS	55-63	58	

Parameter: pH (DR)

QEHL Personnel: S. Williams

Date of Analysis: 29/11/2024

Standard (Buffer)	pH After Calibration	Temperature (°C)
3.96 – 4.04	4.02	23.4
6.90 – 7.10	7.05	23.7
9.96– 10.04	10.04	24.0

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Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: A. St. Marie

Date of Analysis: 03/12/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		13.3	0.0
		13.3	
SRS	358-465	394.5	

Parameter: Orthophosphates (H-8048)

QEHL Personnel: T. Clarke

Date of Analysis: 29/11/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		0.02	
RB		<0.02	
BD		44.00	0.0
		44.00	
SRS	1.87-2.13	1.98	

Parameter: Biochemical Oxygen Demand (H-8043)

QEHL Personnel: J. Webster-Jones, T. Thompson, S. Williams **Date of Analysis: 29/11/2024**

Parameter: HR Nitrate (H-8039)

QEHL Personnel: R. Stephens

Date of Analysis: 29/11/2024

	Standard Concentration (mg NO ₃ ⁻ -N/L)	Determined Concentration (mg NO ₃ ⁻ -N/L)	RPD (%)
MB		0.6	
RB		0.6	
BD		3.2	0.0
		3.2	
SRS	8.5-11.4	10.5	

Parameter: Total Dissolved Solids (DR)

QEHL Personnel: S. Williams

Date of Analysis: 29/11/2024

Standard (mg/L)	Instrument Reading (mg/L)	Temperature (°C)
909 - 928	919	24.8

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 12/12/2024

**Additional Quality Control Information can be provided upon request.*



Glossary

%	Percentage
µg/L	microgram per litre
µS/cm	Micro siemens per centimetre
a	Parameter subcontracted
ADB	Azide Dextrose Broth
AIM	The Aquaculture, Inland & Marine Products & By-Products Act (Regulations)
AOAC	American Organization of Analytical Chemists
b (1)	Parameter analysed outside of hold-time; samples submitted outside of the analysis hold-time
b (2)	Parameter analysed outside of hold-time; analysis authorised by Client
BAM	Bacteriological Analytical Manual
BD	Batch Duplicate
BDL	Analyte concentration below laboratory determined limit of detection
BDLS	Analyte detected below method detection limit (MDL). MDL greater than standard value.
BEA	Bile Esculin Azide Agar
BG	Brilliant Green Bile Broth
BGSA	Brilliant Green Sulfa Agar
BHI	Brain Heart Infusion Broth
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BSA	Bismuth Sulfite Agar
c	parameter analysed in the field
C(B)	Samples collected by the client and picked up by an ESL bearer
C(C)	Samples collected by the client and delivered to ESL
C(H)	Analytical sample submitted in incorrect container. This may affect data quality.
C(L)	Samples collected by ESL
C(S)	Sample collected by the client then sub-sampled and delivered by ESL.
CFU	Colony Forming Units
CMMEF	Compendium of Methods for the Microbiological Examination of Foods
Col	Colourimetry
CPD	Client provided data
CVAAS	Cold Vapour Atomic Absorption Spectroscopy
D(I)	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference
D(C)	Sample diluted due to high concentration of target analyte
DR	Direct Reading
DS ADB	Double Strength Azide Dextrose Broth
DS LTB	Double Strength Lauryl Tryptose Broth
DS PAB	Double Strength Pseudomonas Asparagine Broth
EA	Enterococcosel Agar
EB	Equipment Blank
E(E1)	Estimated Value. Data acquisition affected by equipment malfunction.
E(L1)	Estimated Value. Analyte recovery in the laboratory control sample (LCS) was outside of QC limits. Results for this may be affected by same bias.
E(L2)	Estimated Value due to the nature of the sample matrix.
E(M1)	Estimated Value. Result calculated using calibration curve.
E(M2)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
E(M3)	Estimated Value. Sample performance indicate presence of interference
E(R)	Estimated Value. RPD value was outside control limits.
EC	EC Broth
E(V)	Estimated Value. Count(s) obtained is/are outside of the method counting range.
EC-MUG	<i>E. coli</i> Media with 4-methylumbelliferyl-β-D-glucuronide
EHU	Environmental Health Unit
EPA	(US) Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectroscopy
FAES	Flame Atomic Emission Spectroscopy
FB	Field Blank
FD	Field Duplicate
FL-PRO	Florida Petroleum Range Organic Method
GC-MS	Gas Chromatography Mass Spectrometry
H	Hach Water Analysis Workbook

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H(A)	Off-scale high data obtained. Actual value may be greater than value given.
ICP	Inductively Coupled Plasma
ISE	Ion Selective Electrode
LCA	Listeria Chromogenic Agar
LE	Data not available due to laboratory error
LIA	Lysine Iron Agar
MAC	MacConkey Agar
MB	Method Blank
mEndo	mEndo Agar/Broth
MFHPB	Microbiology Food Health Protection Branch, Government of Canada
mmhos/cm	Millimhos per centimetre
mg/kg	milligram per kilogram
mg/L	milligrams per litre
MPN	Most Probable Number
mS/cm	millisiemens per centimetre
N/A (1)	Data not yet Available. Analysis not complete.
N/A (2)	Data not Available. Sample matrix interferences prevented data acquisition.
N/A (3)	Data not Available. Insufficient sample submitted.
N/A (4)	Data not Available. Equipment malfunction prevented data acquisition.
N/A (5)	Data not Available. Analysis not complete due to force majeure.
N/A (6)	Data not available due to issues with the shipment of the sample(s).
N/A (7)	Data not available. Technical difficulties experienced by subcontractor.
NA	Nutrient Agar
NB	Nutrient Broth
NEPA	National Environment and Planning Agency
NRCA	Natural Resources Conservation Authority
NTU	Nephelometric Turbidity Units
NWC	National Water Commission (Jamaica)
NST	No Time given for collection of samples
P(P)	Sample preserved prior to analysis
P(I)	Non-routine sample pre-treatment required
PAB	Pseudomonas Asparagine Broth
PCA	Plate Count Agar
PDA + C	Potato Dextrose Agar with Chloramphenicol
Pep Water	Peptone Water
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
RED	Parameter Non-compliant
RPD	Relative Percentage Difference
RSD	Relative Standard Deviation
SM	Standard Methods for the Examination of Water and Wastewater 23 rd Edition
SRS	Standard Reference Solution
SS	Sample Submerged upon receipt at the laboratory
SS ADB	Single Strength Azide Dextrose Broth
SS LTB	Single Strength Lauryl Tryptose Broth
SS PAB	Single Strength Pseudomonas Asparagine Broth
T(H)	Samples arrived at ESL-QEHL outside holding temperature ($\leq 4.0^{\circ}\text{C}$).
TIT	Titrimetry
TPH	Total Petroleum Hydrocarbon
TSA	Tryptic Soy Agar
TSB	Tryptic Soy Broth
TSA + YE	Tryptic Soy Agar + Yeast Extract
TTC	2,3,5 Triphenyl-2H-Tetrazolium Chloride
UMR	Analyte detection was below the measuring range of instrument. This is indicative of possible matrix interference within the sample.
WHO	World Health Organization
XLD	Xylose Lysine Deoxycholate

End of Report

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ISO 17025
ACCREDITED LABORATORY

7 Hillview Avenue,
Kingston 10, Jamaica
Tel: (876) 978-9519, 978-6297, 978-5902
Fax: (876) 946-3745
E-mail: envirsol@cwjamaica.com

Certificate of Sample Analysis

CSA#: CDL 24121138-43 & 45-47

Attention:

Ms. Flovia Riley
Clarendon Distillers Limited
10th Floor, The Towers
25 Dominica Drive
Kingston 5



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Sample(s) Information

Job Number: 24121138-47

SPN: -

Date of Report: 12/03/2025

Revision Date: Not Applicable

Sample(s) Collected: 11/12/2024

Sample(s) Submitted: 11/12/2024

Temperature on Arrival: 3.7°C

Number of Samples: 9

Analysis Started: 11/12/2024

Analysis Completed: 23/12/2024

Prepared By: Rushell Hart, Technical Assistant

Verified By
Travis Garnett,
Senior Analyst

Approved By
Jaidene Webster-Jones,
Quality Control Officer



Results of Sample Analysis

Sample ID (Matrix) - Qualifier: #2 (Surface Water)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	304 @ 23.7°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.12	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	<1.3	P(1), BDL	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		<0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	16.9	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	19	E(M1), P(1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	18.0	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	12	P(P)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	0.7	-	0.8 – 1.7
Oil & Grease (mg/L)	SM-5520 B	<5.0	BDL, P(P)	-
Potassium (µg K/L)	EPA 200.7	1002	P(P), P(1)	740 – 5000

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Sample ID (Matrix) - Qualifier: #3 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	368 @ 23.4°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.13	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	<1.3	P(1), BDL	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		<0.3		-
Chloride (mg Cl ⁻ /L)	H-8206	38.1	P(1)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	26	E(M1), P(1)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	14.0	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	150	P(P), D(I) E(M1)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	2.4	-	0.8 – 1.7
Oil & Grease (mg/L)	SM-5520 B	<5.0	P(P), BDL	-
Potassium (µg K/L)	EPA 200.7	1526	P(P), P(1)	740 – 5000

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Sample ID (Matrix) - Qualifier: #1 (Surface Water)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Dissolved Solids (mg/L)	DR	4220 @ 23.6°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.11	-	0.01 – 0.8
Nitrate & Nitrite (mg NO ₃ ⁻ & NO ₂ ⁻ /L)	H-8039	34.4	P(1), E(M1), P(P), D(I)	0.1-7.5
Nitrate & Nitrite as Nitrogen (mg NO ₃ ⁻ & NO ₂ ⁻ -N/L)		7.8		-
Chloride (mg Cl ⁻ /L)	H-8206	1840.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	290	E(M1), P(1), D(C)	3.0 - 10.0
Total Suspended Solids (mg/L)	SM-2540 D	9.6	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	115	P(P), D(I), E(M1)	-
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.0	-	0.8 – 1.7
Oil & Grease (mg/L)	SM-5520 B	<5.0	P(P), BDL	-
Potassium (µg K/L)	EPA 200.7	40890	P(P), P(1)	740 – 5000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

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Sample ID (Matrix) - Qualifier: PW3 (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
pH (pH units)	DR	7.60 @ 24.0°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	1908 @ 24.2°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1238 @ 24.3°C	-	120.0 – 300
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	0.13	-	0.01 – 0.8
Nitrate (mg NO ₃ ⁻ /L)	H-8039	8.6	P(1), D(I), E(M1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		1.9		-
Chloride (mg Cl ⁻ /L)	H-8206	328.0	P(1), D(C)	5.0 – 20.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	55	E(M1), P(1) D(C)	3.0-10.0
Total Suspended Solids (mg/L)	SM-2540 D	2.8	-	-
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	10	P(P)	-
Total Coliform (MPN/100mL)	SM-9221	49	-	-
Faecal Coliform (MPN/100mL)	SM-9221	<1.8	-	-
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	507.1	P(1), P(P)	127.0 – 381.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.2	-	0.8 – 1.7
Oil & Grease (mg/L)	SM-5520 B	<5.0	P(P), BDL	-
Potassium (µg K/L)	EPA 200.7	3673	P(P), P(1)	740 – 5000
Sodium (µg Na/L)	EPA 200.7	177587	P(P), P(1)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	387	P(P), P(1)	-
Magnesium (µg Mg/L)	EPA 200.7	19999	P(P), P(1)	3600 – 27000

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: CH (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
pH (pH units)	DR	7.61 @ 24.2°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	2280 @ 24.3°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1480 @ 24.2°C	-	120.0 – 300
Nitrate (mg NO ₃ ⁻ /L)	H-8039	10.3	D(I), E(M1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ ⁻ -N/L)		2.3		-
Chloride (mg Cl ⁻ /L)	H-8206	436.0	P(1), D(C)	5.0 – 20.0
Total Coliform (MPN/100mL)	SM-9221	33	-	-
Faecal Coliform (MPN/100mL)	SM-9221	2.0	-	-
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	673.1	P(1), P(P)	127.0 – 381.0
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	80	E(M1), D(C)	3.0-10.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.1	-	0.8 – 1.7
Potassium (µg K/L)	EPA 200.7	1966	P(P), P(1)	740 – 5000
Sodium (µg Na/L)	EPA 200.7	173731	P(P), P(1), D(C)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	149	P(P), P(1)	-
Magnesium (µg Mg/L)	EPA 200.7	49414	P(P), P(1)	3600 – 27000

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Sample ID (Matrix) - Qualifier: PW2 (Groundwater)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA AMBIENT FRESH WATER STANDARD
Total Hardness (mg CaCO ₃ /L)	SM-2340 C	651.4	P(1), P(P)	127.0 – 381.0
pH (pH units)	DR	7.14 @ 23.6°C	b(1)	7.00 – 8.40
Conductivity (µS/cm)	DR	2100 @ 24.2°C	-	150.0 – 600
Total Dissolved Solids (mg/L)	DR	1361 @ 24.3°C	-	120.0 – 300
Nitrate (mg NO ₃ /L)	H-8039	13.2	D(I), E(M1)	0.1-7.5
Nitrate as Nitrogen (mg NO ₃ -N/L)		3.0		-
Chloride (mg Cl/L)	H-8206	420.0	P(1), D(C)	5.0 – 20.0
Total Coliform (MPN/100mL)	SM-9221	240	-	-
Faecal Coliform (MPN/100mL)	SM-9221	<1.8	-	-
Sulfate (mg SO ₄ ²⁻ /L)	H-8051	55	E(M1), D(C)	3.0-10.0
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	1.7	-	0.8 – 1.7
Sodium (µg Na/L)	EPA 200.7	149087	P(P), P(1)	4500 - 12000
Iron (µg Fe/L)	EPA 200.7	17.2	P(P), P(1)	-
Magnesium (µg Mg/L)	EPA 200.7	36068	P(P), P(1)	3600 – 27000
Potassium (µg K/L)	EPA 200.7	2672	P(P), P(1)	740 – 5000

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Sample ID (Matrix) - Qualifier: D1 (Trade Effluent)

- ☐ C(B) ☒ C(C) ☐ C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH units)	DR	4.05 @ 24.0°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	49.00	D(C)	5.0
Total Suspended Solids (mg/L)	SM-2540 D	3615.0	-	All Times <150 mg/l Monthly average 50 mg/l
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	82000	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	7785	P(1), D(C), E(M3)	<30
Potassium (g K/L)	EPA 200.7	2.73	P(P), P(1), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.

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Sample ID (Matrix) - Qualifier: D2 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH units)	DR	4.12 @ 23.9°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	61.00	D(C)	5.0
Total Suspended Solids (mg/L)	SM-2540 D	9020.0	-	All Times <150 mg/l Monthly average 50 mg/l
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	64750	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	7368	P(1), D(C), E(M3)	<30
Potassium (g K/L)	EPA 200.7	4.65	P(P), P(1), D(C)	-

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Sample ID (Matrix) - Qualifier: D3 (Trade Effluent)

- ☐C(B) ☒C(C) ☐C(L)

Parameters (Unit)	Test Method	Results	Qualifier	NRCA TRADE EFFLUENT STANDARD
pH (pH units)	DR	3.99 @ 23.4°C	b(1)	6.5 – 8.5
Orthophosphate (mg PO ₄ ³⁻ /L)	H-8048	44.00	D(C)	5.0
Total Suspended Solids (mg/L)	SM-2540 D	10670.0	-	All Times <150 mg/l Monthly average 50 mg/l
Chemical Oxygen Demand (mg O ₂ /L)	H-8000	86750	P(P), D(C)	<100
Biochemical Oxygen Demand (mg O ₂ /L)	H-8043	10596	P(1), D(C), E(M3)	<30
Potassium (µg K/L)	EPA 200.7	4.28	P(P), P(1), D(C)	-

*Blue shaded parameters are ISO/IEC 17025:2017 accredited.

Please note that the data presented in the table above are determined to be compliant or non-compliant based on the value provided without the incorporation of the measurement uncertainty.



Certificate of Quality

Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 17/12/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<11	
BD		304	0.0
		304	
SRS	490-510	498	

Parameter: Oil and Grease (EPA 1664 B)

QEHL Personnel: S. Robinson

Date of Analysis: 17/12/2024

Parameter: pH (DR)

QEHL Personnel: S. Williams

Date of Analysis: 11/12/2024

Standard (Buffer)	pH After Calibration	Temperature (°C)
3.96 - 4.04	4.04	24.0
6.90 - 7.10	7.04	23.7
9.96 - 10.04	10.01	23.8

Parameter: Total Suspended Solids (SM-2540 D)

QEHL Personnel: A. St. Marie

Date of Analysis: 17/12/2024

	Standard Concentration (mg/L)	Determined Concentration (mg/L)	RPD (%)
MB		<1.6	
BD		24.5	2.1
		24.0	
SRS	358 - 465	394.5	

Parameter: Orthophosphates (H-8048)

QEHL Personnel: T. Clarke

Date of Analysis: 12/12/2024

	Standard Concentration (mg PO ₄ ³⁻ /L)	Determined Concentration (mg PO ₄ ³⁻ /L)	RPD (%)
MB		<0.02	
RB		<0.02	
BD		13.00	1.6
		12.80	
SRS	1.87-2.13	1.94	

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Parameter: Sulfate (H-8051)

QEHL Personnel: A. St. Marie

Date of Analysis: 17/12/2024

	Standard Concentration (mg SO ₄ ²⁻ /L)	Determined Concentration (mg SO ₄ ²⁻ /L)	RPD (%)
MB		<1	
BD		1	0.0
		1	
SRS	55-63	60	

Parameter: Chloride (H-8206)

QEHL Personnel: D. Gayle, R. Ford

Date of Analysis: 17/12/2024

	Standard Concentration (mg Cl ⁻ /L)	Determined Concentration (mg Cl ⁻ /L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		4620.0	0.0
		4620.0	
SRS	94.2- 105.8	96.0	

Parameter: Biochemical Oxygen Demand (H-8043)

QEHL Personnel: R. Khan-Haqq, S. Williams, N. Finlay

Date of Analysis: 12/12/2024

Parameter: HR Nitrate (H-8039)

QEHL Personnel: R. Stephens

Date of Analysis: 23/12/2024

	Standard Concentration (mg NO ₃ ⁻ - N/L)	Determined Concentration (mg NO ₃ ⁻ - N/L)	RPD (%)
MB		0.7	
RB		0.7	
BD		7.8	0.0
		7.8	
SRS	8.5-11.4	10.2	

Parameter: Total Dissolved Solids (DR)

QEHL Personnel: S. Williams

Date of Analysis: 12/12/2024

Standard (mg/L)	Instrument Reading (mg/L)	Temperature (°C)
909-928	915	24.8

Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 18/12/2024

**Additional Quality Control Information can be provided upon request.*

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Parameter: Metals via EPA 200.7 (EPA 200.7)

QEHL Personnel: N. McCalla

Date of Analysis: 19/12/2024

**Additional Quality Control Information can be provided upon request.*

Parameter: Total Hardness (SM-2340 C)

QEHL Personnel: R. Pryce

Date of Analysis: 17/12/2024

	Standard Concentration (mg CaCO ₃ /L)	Determined Concentration (mg CaCO ₃ /L)	RPD (%)
Duplicates		<18.3	-
		<18.3	
SRS	0.91 – 1.09	1.01	

Parameter: HR Nitrate (H-8039)

QEHL Personnel: R. Stephens

Date of Analysis: 12/12/2024

	Standard Concentration (mg NO ₃ ⁻ -N/L)	Determined Concentration (mg NO ₃ ⁻ -N/L)	RPD (%)
MB		0.6	
RB		0.7	
BD		26.0	0.0
		26.0	
SRS	8.5-11.4	10.7	

Parameter: Chloride (H-8206)

QEHL Personnel: D. Gayle; R. Ford

Date of Analysis: 16/12/2024

	Standard Concentration (mg Cl ⁻ /L)	Determined Concentration (mg Cl ⁻ /L)	RPD (%)
MB		<3.0	
RB		<3.0	
BD		158.4	0.5
		157.6	
SRS	94.2-105.8	97.2	

Parameter: Faecal and Total Coliform (SM-9221)

QEHL Personnel: T. Russell

Date of Analysis: 12/12/2024

Media/Test Item (Batch #)	DS LTB (11/12/2024)	SS LTB (11/12/2024)	BG (18/12/2024)	EC Broth (18/12/2024)
Sterile (Yes/No)	Yes	Yes	Yes	Yes
Media performance (Typical, not typical)	Typical	Typical	Typical	Typical

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Parameter: Chemical Oxygen Demand (H-8000)

QEHL Personnel: T. Thompson

Date of Analysis: 17/12/2024

	Standard Concentration (mg O ₂ /L)	Determined Concentration (mg O ₂ /L)	RPD (%)
MB		<3	
BD		7	0.0
		7	
SRS	123-137	132	

Parameter: Conductivity (DR)

QEHL Personnel: S. Williams

Date of Analysis: 11/12/2024

Standard (µS /cm)	Instrument Reading (µS/cm)	Temperature (°C)
1399-1427	1414	24.8

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Glossary

%	Percentage
µg/L	microgram per litre
µS/cm	Micro siemens per centimetre
a	Parameter subcontracted
ADB	Azide Dextrose Broth
AIM	The Aquaculture, Inland & Marine Products & By-Products Act (Regulations)
AOAC	American Organization of Analytical Chemists
b (1)	Parameter analysed outside of hold-time; samples submitted outside of the analysis hold-time
b (2)	Parameter analysed outside of hold-time; analysis authorised by Client
BAM	Bacteriological Analytical Manual
BD	Batch Duplicate
BDL	Analyte concentration below laboratory determined limit of detection
BDLS	Analyte detected below method detection limit (MDL). MDL greater than standard value.
BEA	Bile Esculin Azide Agar
BG	Brilliant Green Bile Broth
BGSA	Brilliant Green Sulfa Agar
BHI	Brain Heart Infusion Broth
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BSA	Bismuth Sulfite Agar
c	parameter analysed in the field
C(B)	Samples collected by the client and picked up by an ESL bearer
C(C)	Samples collected by the client and delivered to ESL
C(H)	Analytical sample submitted in incorrect container. This may affect data quality.
C(L)	Samples collected by ESL
C(S)	Sample collected by the client then sub-sampled and delivered by ESL.
CFU	Colony Forming Units
CMMEF	Compendium of Methods for the Microbiological Examination of Foods
Col	Colourimetry
CPD	Client provided data
CVAAS	Cold Vapour Atomic Absorption Spectroscopy
D(I)	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference
D(C)	Sample diluted due to high concentration of target analyte
DR	Direct Reading
DS ADB	Double Strength Azide Dextrose Broth
DS LTB	Double Strength Lauryl Tryptose Broth
DS PAB	Double Strength Pseudomonas Asparagine Broth
EA	Enterococcosel Agar
EB	Equipment Blank
E(E1)	Estimated Value. Data acquisition affected by equipment malfunction.
E(L1)	Estimated Value. Analyte recovery in the laboratory control sample (LCS) was outside of QC limits. Results for this may be affected by same bias.
E(L2)	Estimated Value due to the nature of the sample matrix.
E(M1)	Estimated Value. Result calculated using calibration curve.
E(M2)	Estimated Value. Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
E(M3)	Estimated Value. Sample performance indicate presence of interference
E(R)	Estimated Value. RPD value was outside control limits.
EC	EC Broth
E(V)	Estimated Value. Count(s) obtained is/are outside of the method counting range.
EC-MUG	<i>E. coli</i> Media with 4-methylumbelliferyl-β-D-glucuronide
EHU	Environmental Health Unit
EPA	(US) Environmental Protection Agency
FAAS	Flame Atomic Absorption Spectroscopy
FAES	Flame Atomic Emission Spectroscopy
FB	Field Blank
FD	Field Duplicate
FL-PRO	Florida Petroleum Range Organic Method
GC-MS	Gas Chromatography Mass Spectrometry
H	Hach Water Analysis Workbook
H(A)	Off-scale high data obtained. Actual value may be greater than value given.
ICP	Inductively Coupled Plasma
ISE	Ion Selective Electrode
LCA	Listeria Chromogenic Agar

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LE	Data not available due to laboratory error
LIA	Lysine Iron Agar
MAC	MacConkey Agar
MB	Method Blank
mEndo	mEndo Agar/Broth
MFHPB	Microbiology Food Health Protection Branch, Government of Canada
mmhos/cm	Millimhos per centimetre
mg/kg	milligram per kilogram
mg/L	milligrams per litre
MPN	Most Probable Number
mS/cm	millisiemens per centimetre
N/A (1)	Data not yet Available. Analysis not complete.
N/A (2)	Data not Available. Sample matrix interferences prevented data acquisition.
N/A (3)	Data not Available. Insufficient sample submitted.
N/A (4)	Data not Available. Equipment malfunction prevented data acquisition.
N/A (5)	Data not Available. Analysis not complete due to force majeure.
N/A (6)	Data not available due to issues with the shipment of the sample(s).
N/A (7)	Data not available. Technical difficulties experienced by subcontractor.
NA	Nutrient Agar
NB	Nutrient Broth
NEPA	National Environment and Planning Agency
NRCA	Natural Resources Conservation Authority
NTU	Nephelometric Turbidity Units
NWC	National Water Commission (Jamaica)
NST	No Time given for collection of samples
P(P)	Sample preserved prior to analysis
P(I)	Non-routine sample pre-treatment required
PAB	Pseudomonas Asparagine Broth
PCA	Plate Count Agar
PDA + C	Potato Dextrose Agar with Chloramphenicol
Pep Water	Peptone Water
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
RED	Parameter Non-compliant
RPD	Relative Percentage Difference
RSD	Relative Standard Deviation
SM	Standard Methods for the Examination of Water and Wastewater 23 rd Edition
SRS	Standard Reference Solution
SS	Sample Submerged upon receipt at the laboratory
SS ADB	Single Strength Azide Dextrose Broth
SS LTB	Single Strength Lauryl Tryptose Broth
SS PAB	Single Strength Pseudomonas Asparagine Broth
T(H)	Samples arrived at ESL-QEHL outside holding temperature ($\leq 4.0^{\circ}\text{C}$).
TIT	Titrimetry
TPH	Total Petroleum Hydrocarbon
TSA	Tryptic Soy Agar
TSB	Tryptic Soy Broth
TSA + YE	Tryptic Soy Agar + Yeast Extract
TTC	2,3,5 Triphenyl-2H-Tetrazolium Chloride
UMR	Analyte detection was below the measuring range of instrument. This is indicative of possible matrix interference within the sample.
WHO	World Health Organization
XLD	Xylose Lysine Deoxycholate

End of Report