

**PUBLIC UTILITIES COMMISSION
FOR THE MUNICIPALITY OF CHATHAM-KENT
CHATHAM WATER POLLUTION CONTROL PLANT**

2019 PERFORMANCE REPORT

January 1 to December 31, 2019

Environmental Compliance Approval # 6551-8WXKHC

Plant Description

The Chatham Water Pollution Control Plant provides treatment for wastewater for the community of Chatham. Wastewater is collected by 24 sewage pump stations and conveyed by a largely separated sanitary sewer system. Some combined sewers remain. Final effluent is discharged to the Thames River.

The Chatham Water Pollution Control Plant was first constructed in 1964 and underwent expansions in 1992 and 2004. The development of the facility has followed the growth of the municipality and the advancement in technology and regulations. The combined Plant 1 and Plant 2 facility has a rated capacity of 36,000m³/day, with a peak flow of 72,000m³/day.

The treatment system includes the following processes:

- Raw sewage pumping
- Screening collection and removal
- Aerated grit removal using a grit chamber, grit slurry and cyclone
- Chemical phosphorus removal
- Primary treatment, primary sludge collection and pumping
- Biological treatment using the Conventional Activated Sludge process
- Final settling
- Disinfection using Chlorine Gas and Sulphur Dioxide
- Two-stage anaerobic digestion, sludge pumping and digested gas handling
- Sludge Dewatering

In addition, recovered methane gas produced from the anaerobic digesters is used to power digester gas/natural gas fired boilers and the heat is consumed within the plant to offset energy costs.

As well, recovered methane gas produced by the anaerobic digesters powers a methane fired Generator which feeds power back to the hydro grid to generate revenue.

REPORTING REQUIREMENTS UNDER ENVIRONMENTAL COMPLIANCE APPROVAL #6551-8WXKHC

Summary and Interpretation of Monitoring and Comparison to the Effluent Limits: Condition 10 (6) (a)

Tables 1 & 2 outline the monthly average results of parameters tested compared to the limits outlined in the Environmental Compliance Approval, Table 2 Effluent Limits.

Success and Adequacy of the Works

During the reporting period, the annual average daily flow was 22,162 m³/day, which represents approximately 62% of the rated capacity of 36,000 m³/day. The maximum daily flow was 64,100 m³/day, which is 89% of the Peak Flow Rate of 72,000 m³/day.

Table 1: Summary of Monitoring Data and Comparison to Effluent Limits & Objectives – Concentrations
as well as rated capacity to the sewage works

Plant rated capacity of 36,000m³/day

Total sewage flow to the works during a calendar year divided by the number of days during which sewage was flowing to the works that year

Month	Total Monthly Flow m ³	Avg Daily Flow /Month m ³ /day	Avg Daily Flow/ Year m ³ /day	% of Plant Capacity	CBOD ₅ mg/L	Total S.S. mg/L	Total Ammonia mg/L	Total P mg/L	pH	E.Coli / 100mL CFU Geomean	Total Chlorine Residual mg/L
Limits: Dec 15 – Apr 15	None	None	36,000	100	15	15	4.0	0.75	6.0 - 9.5	200	0.01
Limits: Apr 16 – Dec 14	None	None	36,000	100	15	15	3.0	0.75	6.0 - 9.5	200	0.01
Objectives: Dec 15 – Apr 15	None	None	36,000	100	10	10	3.0	0.60	6.0 - 9.5	150	
Objectives: Apr 16 – Dec 14	None	None	36,000	100	10	10	2.0	0.60	6.0 - 9.5	150	
Jan	654,320	21,107			2.0	3.6	0.54	0.36	7.75	34.59	0.00
Feb	884,530	31,590			2.0	6.8	0.08	0.21	7.64	22.13	0.01
Mar	796,340	25,688			2.0	4.3	0.10	0.29	7.60	37.22	0.00
Apr	1,038,620	34,621			2.0	4.0	0.40	0.26	7.84	27.02	0.00
May	1,002,110	32,326			2.0	4.0	0.31	0.34	8.02	22.13	0.00
Jun	665,890	22,196			2.0	5.5	0.12	0.57	7.67	26.32	0.00
Jul	545,120	17,585			2.0	6.0	0.19	0.38	7.78	63.42	0.00
Aug	472,770	15,251			2.0	4.5	0.17	0.24	7.93	82.71	0.00
Sept	532,680	17,756			2.2	5.0	0.33	0.25	7.92	80.00	0.01
Oct	532,110	17,165			2.8	4.3	1.99	0.10	7.86	24.49	0.00
Nov	474,610	15,820			2.3	5.3	0.11	0.12	7.93	50.91	0.00
Dec	490,110	15,810			2.4	9.0	0.09	0.23	7.77	97.79	0.01
YEAR			22,162	62%							
	Yearly Total Flow m ³	Yearly Maximums									
	8,089,210	34,621			2.8	9.0	1.99	0.57	8.02	97.79	0.01

Table 2: Summary of Monitoring Data and Comparison to Effluent Limits – Loadings

Year	Avg Daily Effluent Flow /Year m ³ /day	CBOD5 Kg/day	Total S.S. Kg/day	Total P Kg/day
Limits: Receiver	None	540	540	27
Annual Average				
2019	22,162	47.3	114.7	6.2

**Operating Problems and Corrective Action:
Condition 10 (6) (b)**

There were no significant operating problems encountered during this reporting period.

**Summary of Maintenance Activities:
Condition 10 (6) (c)**

Routine maintenance was performed throughout the reporting period. Chatham-Kent PUC utilises an electronic preventative maintenance program to track preventative maintenance. In addition to the routine maintenance, the following additional maintenance activities and equipment replacement was completed for the reporting period:

- Main Lift Pump #3 Rebuild \$ 29,500
- Replacement Chains & Flights for Plant #2 28,000
- 47' 1/2" Checkmate Valve Pump Station 5 Storm Outfall 27,000
- Lagoon Pump #1 Repair 19,800
- Plant & Pump Station Electrical Upgrades 17,400
- Piping Remediation (Main Lift) 16,900
- Divers for Tidemate Install (Pump Station #5) 16,300
- Automatic Composite Samplers (2) 15,400
- New Check Valve (Pump Station #3) 12,400
- New Transfer Pump Digester #3 11,700
- New Pipes (Gas Room Basement) 10,700
- Press Belts and Rollers 10,500
- New Flow Meters (4) 9,900
- Gas Room Maintenance & Inspection 9,300

• Replacement Press Conveyer Liners	8,500
• New Impeller for Main Lift Pump #4	7,400
• 150 HP Blower Motor Repair	7,200
• Runners for Final Chamber (Plant 2)	7,200
• SCADA Remediation & New SCADA Computer	7,000
• Sewer Plugs for Pipe Repairs (Grand Ave)	6,400
• Portable Sampler	6,350
• New In-ground Pipes	6,200
• Gas RM Plug Valves	5,700
• New Main Lift Pump #3 Impeller	5,500
• Seal Kits for Vogelsang Pumps	5,350
• Plant Blower Laser Alignment	4,100
• Annual Flow, Pressure & Level Meter Calibrations	4,000
• Press Replacement Equipment	3,900
• Pump Station #3 Variable Frequency Drive (VFD) Repair	3,900
• Pump Station #2 V.F.D. Repair	3,700
• Aeration Valves (3)	3,600
• Pump Station 3, Pump #3 VFD Repair	3,300
• Rear Substation Reparation	3,300
• Flight Chain Linkage and Blocks (Plant #1)	3,300
• New Press V.F.D.	3,200
• Main Lift Pump #4 Rebuild	3,000
• Flight Chain Linkage and Blocks (Plant #2)	2,600
• Boiler Inspection & Service	2,500
• Backflow Inspection	2,400
• Gas Room Electrical Upgrades	2,400
• Seal Kit for Netzsch Pump	2,300
• Vogelsang Wear Plates (6)	2,300
• Tubing for Heat Exchanger #1	2,000
• New VFD for Pump Station #22	1,800

**Quality Assurance and Control Measures:
Condition 10 (6) (d)**

The Chatham-Kent Public Utilities Commission followed a sampling schedule developed in accordance with the Environmental Compliance Approval and applicable regulations for this reporting period.

Composite chemistry samples of the raw flow were collected using an auto sampler. Chemistry samples were submitted weekly to an accredited laboratory for analysis of CBOD₅, BOD₅, Total Suspended Solids, Total Kjeldhal Nitrogen, Total Phosphorus, Total Ammonia Nitrogen, Nitrite and Nitrate, Alkalinity and pH.

Composite chemistry samples of the effluent were collected using an auto sampler. Chemistry samples were submitted weekly to an accredited laboratory for analysis of CBOD₅, Total Suspended Solids, Total Kjeldhal Nitrogen, Total Phosphorus and Total Ammonia Nitrogen, Alkalinity, pH, Nitrite and Nitrate and Unionized Ammonia.

Bacteriological samples of the effluent were collected weekly according to the Sampling Program and submitted weekly to an accredited laboratory for analysis.

In house samples were analysed by a licensed operator for pH, temperature and D.O.

**Calibration and Maintenance on Effluent Monitoring Equipment
Condition 10 (6) (e)**

All required probes and sensors are cleaned, maintained and/or calibrated on a monthly basis or as required by manufacturers' specifications.

Monitoring equipment calibration/verification report(s) included for the following:

- Effluent flow meter
- Spectrophotometer
- pH meter

Effluent Objectives Condition 10 (6) (f)

Table 1 outlines monthly average results of parameters tested compared to the objectives outlined in the Certificate of Approval Table 1 Effluent Objectives.

Sludge Management Condition 10 (6) (g)

The sludge generated at the facility is treated and air dried on site for 1 year, then land applied at the Ridge Landfill as top cover.

MONTH	DISPOSAL AREA	SLUDGE QUALITY	SLUDGE QUANTITY LAND APPLIED m ³
June	Ridge Landfill	Within Ministry Guidelines	559.26
July	Ridge Landfill	Within Ministry Guidelines	2,321.57
August	Ridge Landfill	Within Ministry Guidelines	2,954.97
Total			5,835.8

Outline of Anticipated Volumes in Next Reporting Period

The sludge production and sludge handling method for the coming reporting period is anticipated to be the similar to that of this reporting period.

**Community Complaints:
Condition 10 (6) (h)**

There were no Customer Complaints received during the reporting period.

**By-pass, Spill, or Abnormal Discharge Events:
Condition 10 (6) (i)**

A Pump Station Bypass event of 4,234 m³ occurred on May 02 for 14 hours immediately downstream from Pump Station #10, 251 Park Ave West, Chatham. The Bypass event resulted from heavy rainfall over the previous two weeks.

**Other Information the District Manager Requires:
Condition 10 (6) (j)**

No other information was required from the District Manager during this reporting period.

APPENDIX A

Yearly Operational Data Summary for the Reporting Period

	2019	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	TOTAL	MAX	MIN	AVG
Raw Sewage																	
Total Flow 10 ³ m ³		654.320	884.530	796.340	1038.620	1002.110	665.890	545.120	472.770	532.680	532.110	474.610	490.110	8089.210	1038.620	472.770	674.101
Avg. Daily Flow 10 ³ m ³		21.107	31.590	25.688	34.621	32.326	22.196	17.585	15.251	17.756	17.165	15.820	15.810		34.621	15.251	22.162
Max. Daily Flow 10 ³ m ³		49.460	60.680	43.240	64.100	60.740	31.320	30.790	21.960	32.970	40.200	26.130	23.180		64.100	21.960	40.398
Diverted to Lagoons 10 ³ m ³		20.048	129.305	13.553	347.172	34.265	10.569	20.116	8.268	24.165	18.241	7.620	8.439		347.172	7.620	53.480
Lagoons Discharge 10 ³ m ³		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Final Effluent																	
Avg. Daily Flow 10 ³ m ³		21.107	31.590	25.688	34.621	32.326	22.196	17.585	15.251	17.756	17.165	15.820	15.810	266.915	34.621	15.251	22.162
Raw Sludge																	
Total Volume In m ³		4475	3021	5300	3372	5710	5562	4452	3570	6109	5357	7106	6852	60885	7106	3021	5074
Avg. T.S. %		3.7	4.5	3.7	3.9	4.1	3.5	3.3	0.0	2.9	2.6	3.0	3.3		4.5	0.0	3.2
Avg. V.S. %		63.5	61.0	62.9	59.5	53.2	53.2	52.9	0.0	65.0	56.5	53.4	51.4		64.98	0	52.7
# 1 Primary Digestion																	
Total Volume Out m ³		2829	2333	4004	2971	4049	4066	3550	3221	3904	3909	5110	4429	44375	5110	2333	3698
Avg. T.S. %		3.1	3.5	2.3	2.8	10.5	3.0	2.7	2.4	2.6	2.6	2.6	2.9		10.5	2.3	3.4
Avg. V.S. %		51.1	48.6	51.1	50.2	43.9	45.9	49.4	46.5	54.7	49.7	49.5	50.2		54.7	43.9	49.2
# 3 Primary Digestion																	
Total Volume Out m ³		3331	2665	4534	3220	4942	4510	3983	3540	4413	4160	5127	4718	49143	5127	2665	4095
Avg. T.S. %		1.9	2.1	2.2	2.2	3.0	2.8	2.4	2.2	1.9	2.2	2.4	2.3		3.0	1.9	2.3
Avg. V.S. %		50.1	49.6	50.1	50.3	44.3	46.1	48.9	49.1	54.2	49.2	50.1	53.4		54.2	44.3	49.6
Belt Press																	
Total Hours Operated		212.8	194.0	217.1	164.6	196.8	239.4	186.3	217.2	213.2	187.8	132.4	233.0	2394.5	239.4	132.4	199.5
Total Sludge Dewatered m ³		6628	6032	6530	5497	7268	8720	6761	7231	7473	5377	4502	7475	79495	8720	4502	6625
T.S. Sludge %		3.5	3.6	3.4	3.5	3.6	3.1	3.1	3.1	3.1	3.1	2.7	3.1		3.6	2.7	3.2
Polymer # 757 lbs/month		753	615	865	680	820	912	627	808	857	468	589	934	8927	934	468	744
Cake Total Solids %		15.3	17.9	17.9	17.4	19.1	16.5	17.5	18.5	17.5	17.3	16.4	16.8	208.1	19.1	15.3	17.3
Phosphorous Removal Chemicals																	
Iron Dosage mg/L		5.05	3.49	3.07	3.11	3.03	5.80	7.49	7.20	3.70	5.42	5.15	4.89	57.4	7.5	3.0	4.8
Ferrous Chloride kg/D		75.21	75.70	58.57	70.47	68.03	93.62	108.96	108.97	45.61	69.19	62.10	56.87	893	109	46	74

2019	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	TOTAL	MAX	MIN	AVG
Disinfection																
Chlorine Used kg/D	1409.5	1599.0	1771.5	1891.5	1653.5	1489.0	1090.5	1128.5	1333.0	1277.0	1343.0	1119.0	17105.04	1891.5	1090.5	1425.42
Chlorine Dosage mg/L	2.23	1.90	2.30	2.05	1.75	2.29	2.09	2.43	2.63	2.53	2.87	2.31		2.87	1.75	2.28
SO ₂ Used kg/D	1271.5	1265.0	1409.5	1255.0	1357.5	1264.0	985.5	903.0	1306.0	1082.0	986.5	1117.0	14202.5	1409.5	903	1184
SO ₂ Dosage mg/L	2.07	1.58	1.82	1.38	1.48	1.96	1.91	1.94	2.56	2.20	2.13	2.32		2.56	1.38	1.95
Final Residual mg/L	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01		0.01	0.00	0.01
E.Coli Average /100mL	34.59	22.13	37.22	27.02	22.13	26.32	63.42	82.71	80.00	24.49	50.91	97.79		97.79	22.13	47.40
Raw Sewage Average																
pH	7.53	7.65	7.52	7.75	7.86	7.59	7.63	7.66	7.66	7.23	7.61	7.59		7.86	7.225	7.61
Ammonia as N, mg/L	21	15	19	19	16	20	25	35	27	26	26	28		35.3	15.3	23.0
Nitrogen, T. Kjeldahl as N, mg/L	26	19	25	23	20	26	32	39	33	32	33	32		39	18.5	28.3
Phosphorous, Total as P, mg/L	3.3	2.6	4.1	4.6	5.8	9.2	8.0	9.1	5.9	5.2	8.6	8.3		9.2	2.6	6.2
Solids, Suspended mg/L	226	183	193	235	315	425	320	393	306	365	570	470		570	183	333
Alkalinity CaCO ₃ mg/L	326	290	295	334	298	293	308	343	284	268	248	308		343	247.5	299
BOD ₅ mg/L	138	115	117	102	127	150	149	150	182	280	178	160		280	102	154
Final Effluent Average																
pH	7.75	7.64	7.60	7.84	8.02	7.67	7.78	7.93	7.92	7.86	7.93	7.77		8.02	7.60	7.81
Ammonia as N, mg/L	0.54	0.08	0.10	0.40	0.31	0.12	0.19	0.17	0.33	1.99	0.11	0.09		1.99	0.08	0.37
NH ₃ Un-Ionized - Federal	0.0031	0.0006	0.0006	0.0032	0.0021	0.0008	0.0014	0.0024	0.0034	0.0200	0.0010	0.0022		0.0200	0.0006	0.0034
Nitrogen, T. Kjeldahl as N, mg/L	1.2	0.8	1.0	1.0	1.0	0.7	1.2	0.7	1.3	2.5	1.2	1.0		2.46	0.67	1.12
Nitrate as N, mg/L	13.17	12.20	11.88	11.55	9.33	17.28	18.91	13.33	20.58	6.20	17.53	21.54		21.54	6.20	14.46
Nitrite as N, mg/L	0.031	0.013	0.021	0.038	0.035	0.011	0.028	0.011	0.027	0.094	0.019	0.012		0.094	0.011	0.03
Phosphorous, Total as P, mg/L	0.36	0.21	0.29	0.26	0.34	0.57	0.38	0.24	0.25	0.10	0.12	0.23		0.57	0.10	0.28
Solids, Suspended mg/L	3.6	6.8	4.3	4.0	4.0	5.5	6.0	4.5	5.0	4.3	5.3	9.0		9.0	3.6	5.2
Alkalinity CaCO ₃ mg/L	194	173	193	196	220	135	134	175	132	170	180	164		220	132	172
CBOD ₅ mg/L	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.8	2.3	2.4		2.8	2.0	2.1
D.O. Avg. mg/L	7.7	8.4	8.2	8.6	8.5	7.6	6.7	6.0	6.0	6.3	6.9	7.4		8.6	6.0	7.4
Temperature C	11.47	9.59	10.61	12.29	14.93	18.97	21.97	23.10	23.68	20.75	17.23	14.59		23.68	9.59	16.60
Leachate, Septage & Grit																
Septage Received m ³ /Day	131.7	254.9	213.5	429.9	679.6	357.1	527.4	383.8	287.0	318.2	235.7	203.7	4022.48	679.58	131.73	335.2
Leachate monthly total 1000m ³	3207.2	3183.0	3237.3	3251.7	4224.9	2304.1	2642.8	1640.3	2113.0	3989.6	3936.0	3448.0	37177.8	4224.9	1640.27	3098.2
Total Grit Removed m ³	12	12	12	12	15	12	12	15	12	12	0	12	138	15	0	12

APPENDIX B

Calibration Reports for the Reporting Period



AS FOUND CERTIFICATION

PASS

CLIENT DETAIL

CUSTOMER Chatham-Kent - Chatham STP
CONTACT Tim Dickinson
Chief Operator
519-359-3811

EQUIPMENT DETAIL

[MUT] MANUFACTURER Milltronics
MODEL MultiRanger 200
CONVERTER SERIAL NUMBER PBD/B8231599

PLANT ID Chatham Pollution Control Plant
METER ID Final Effluent
FIT ID FIT-671
CLIENT TAG FIT-671
OTHER N/A
GPS COORDINATES N42 23.304 W082 12.872

VER. BY - FM Paris Machuk / Brendon Jacksic

Quality Management Standards Information -
Reference equipment and instrumentation used to
conduct this verification test is found in our AC-
QMS document at the time this test was

VERIFICATION DATE March 05, 2019
CAL. FREQUENCY Annual
CAL. DUE DATE March, 2020

PROGRAMMING PARAMETERS

THROAT WIDTH, (exp 1.5)	m	3.030
EMPTY DISTANCE, TX to notch	m	0.785
TRANSDUCER (TX), to sump flc	m	N/A
SUMP LEVEL, zero flow	m	n/a
MAX. HEAD	m	0.509
BLANKING DISTANCE	m	0.305
DEAD ZONE	m	-0.029
MAX. FLOW	LPS	2022.4
F.S. RANGE - O/P	LPS	2022.4

TOTALIZER		
AS FOUND	84938.71	M3
AS LEFT	85446.11	M3
DIFFERENCE	507.4	M3

TEST CRITERIA		
AS FOUND CERTIFICATION TEST	Yes	
ALLOWABLE [%] ERROR	5	

COMPONENTS TESTED

CONVERTER DISPLAY	Yes
mA OUTPUT	Yes
TOTALIZER	Yes
ACCURACY BASED ON [% o.r.]	No

Ultrasonic Sensor is not installed high enough, to ensure full scale flow conditions

ERROR DOCUMENTED IN THIS REPORT; BASED ON % F.S.

AS FOUND TEST RESULTS

		16.0	24.6	34.4	45.2	62.0	% F.S. Range
		0.150	0.200	0.250	0.300	0.370	m
REF. FLOW RATE		323.54	498.12	696.14	915.10	1253.40	LPS
MUT [Reading]		346.04	524.85	726.34	956.42	1284.40	LPS
MUT [Difference]		22.50	26.73	30.20	41.32	31.00	LPS
MUT [% Error]		1.1	1.3	1.5	2.0	1.5	%
mA OUTPUT		6.560	7.941	9.507	11.240	13.916	mA
MUT [Reading]	min. 4.000 mA	6.738	8.151	9.745	11.568	14.160	mA
MUT [Difference]	max. 20.000 mA	0.178	0.210	0.238	0.328	0.244	mA
MUT [% Error]		0.89	1.05	1.19	1.64	1.22	%
TOTALIZER - REF. FLOW RATE						1253.403	LPS
TOTALIZER [MUT]						139.75	M3
TEST TIME						107.54	SECONDS
CALC. TOTALIZER						134.791	M3
ERROR						3.55	%

COMMENTS

QUALITY MANAGEMENT STANDARDS INFO.

[QMS] INFORMATION	IDENT.	ID #
[REFERENCE] LEVEL	Sim. BOARD	Yes
PROCESS METER	PM	11
STOP WATCH	SW	Yes

RESULTS

TEST	AVG %FS	PASS FAIL
DISPLAY	1.60	PASS
mA OUTPUT	1.20	PASS
TOTALIZER	3.55	PASS

This report reflects the test results of the overall accuracy for the above flow converter using the specified manufacturers flow tube simulator to within the specified tolerance as identified within this report



PASS

AS FOUND CERTIFICATION

CUSTOMER CONTACT	Municipality of Chatham-Kent Tim Dickinson Chief Operator, Chatham STP 325 Grand Ave Chatham Ontario T: 519-359-3811 E. timdi@chatham-kent.ca	[MUT] MANUFACTURER	HACH
		MODEL	DR3900
		SERIAL NUMBER	1613114
		CLIENT TAG	Chatham STP
		LOCATION	Chatham STP
		OTHER	n/a
VER. BY	Randy Nichol	TOLERANCE [mg/L]	0.05
		STANDARD RECOVERY [%]	90
Quality Management Standards Information - Standards, reference equipment, and instrumentation used to conduct this test outlining the lot#, and expiry date is found in our current QMS document.		VERIFICATION DATE	Mar 12, 2019
		CAL. FREQUENCY	Annual
		CAL. DUE DATE	March , 2020

CHLORINE [Cl₂] SECONDARY STANDARDS

STANDARD	BLANK [mg/L]			READING mg/L	PASS FAIL
		+/-			
STD 1	0.25	+/-	0.09	0.23	PASS
STD 2	0.94	+/-	0.10	0.92	PASS
STD 3	1.71	+/-	0.14	1.71	PASS

CHLORINE [Cl₂] PRIMARY STANDARDS

STANDARD VALUE [mg/L]	27.3	BLANK SAMPLE SIZE [mL]	10.0
STANDARD ADDITIONS SIZE [mL]	0.200	DPD LOT#	A8134
		EXPIRY DATE	May-23

SAMPLE TEST #	Cl ₂ STANDARD mL	COMBINED SAMPLE mL	REFERENCE STANDARD mg/L	REFERENCE READING mg/L	MUT READING mg/L	DIFF. ERROR mg/L	PASS FAIL	STANDARD RECOVERY %
BLANK	0	10.000	0	0	0	0	PASS	N/A
STD 1	0.200	10.200	0.54	0.53	0.53	0.00	PASS	98.1
STD 2	0.400	10.400	1.05	1.01	1.01	0.00	PASS	96.2
STD 3	0.600	10.600	1.55	1.46	1.46	0.00	PASS	94.2
AVERAGE RESULTS						0.00	PASS	96.2

COMMENTS	[QMS] INFORMATION	ITEM	ID #
	[REFERENCE] HACH PCII	HACH PC II	1
	10.0 mL PIPETTE	HACH-PP-10	1
	0.2 mL PIPETTE	G-PP-2	1
	SECONDARY STANDARDS	AS-CLSS	1
	PRIMARY STANDARDS	AS-CLPS	1
	ABSORBANCE STANDARDS	AS-ABS	1

ABSORBANCE CHECKS		
WAVELENGTH	TESTED	PASS/FAIL
420 nm	Yes	PASS
520 nm	Yes	PASS
560 nm	Yes	PASS
610 nm	Yes	PASS

Primary and Secondary standards were used to confirm the overall accuracy of this instrument along with conducting an analytical comparative technique against a reference meter. All values are considered "AS FOUND" readings. If the "AS FOUND" readings were not within acceptable limits, an "AS LEFT" report will be issued if the instrument was able to be calibrated to indicate the overall accuracy of the meter. If the meter was not calibrated for any reason, a comment will be issued for this instrument.



PASS

AS FOUND CERTIFICATION

CUSTOMER CONTACT	Municipality of Chatham-Kent Tim Dickinson Chief Operator, Chatham STP 325 Grand Ave Chatham Ontario T: 519-359-3811 E. timdi@chatham-kent.ca	[MUT] MANUFACTURER	HACH
		MODEL	Pocket Colorimeter II
		SERIAL NUMBER	08070E105502
		CLIENT TAG	n/a
		LOCATION	Chatham STP
		OTHER	n/a
VER. BY	Randy Nichol	TOLERANCE [mg/L]	0.05
		STANDARD RECOVERY [%]	90
Quality Management Standards Information - Standards, reference equipment, and instrumentation used to conduct this test outlining the lot#, and expiry date is found in our current QMS document.		VERIFICATION DATE	Mar 12, 2019
		CAL. FREQUENCY	Annual
		CAL. DUE DATE	March, 2020

CHLORINE [Cl₂] SECONDARY STANDARDS

STANDARD	NIST STD [mg/L]			READING mg/L	PASS FAIL
STD 1	0.26	+/-	0.09	0.22	PASS
STD 2	0.92	+/-	0.10	0.91	PASS
STD 3	1.68	+/-	0.14	1.68	PASS

CHLORINE [Cl₂] PRIMARY STANDARDS

STANDARD VALUE [mg/L]	27.3	BLANK SAMPLE SIZE [mL]	10.0
STANDARD ADDITIONS SIZE [mL]	0.200	DPD LOT#	A8134
		EXPIRY DATE	May-23

SAMPLE TEST #	Cl ₂ STANDARD mL	COMBINED SAMPLE mL	REFERENCE STANDARD mg/L	REFERENCE READING mg/L	MUT READING mg/L	DIFF. ERROR mg/L	PASS FAIL	STANDARD RECOVERY %
BLANK	0	10.000	0	0	0	0	PASS	N/A
STD 1	0.200	10.200	0.54	0.53	0.54	0.01	PASS	98.1
STD 2	0.400	10.400	1.05	1.01	1.02	0.01	PASS	96.2
STD 3	0.600	10.600	1.55	1.46	1.46	0.00	PASS	94.2
AVERAGE RESULTS						0.01	PASS	96.2

COMMENTS

[QMS] INFORMATION	ITEM	ID #
[REFERENCE] HACH PCII	HACH PC II	1
10.0 mL PIPETTE	HACH-PP-10	1
0.2 mL PIPETTE	G-PP-2	1
SECONDARY STANDARDS	AS-CLSS	1
PRIMARY STANDARDS	AS-CLPS	1

Primary and Secondary standards were used to confirm the overall accuracy of this instrument along with conducting an analytical comparative technique against a reference meter. All values are considered "AS FOUND" readings. If the "AS FOUND" readings were not within acceptable limits, an "AS LEFT" report will be issued if the instrument was able to be calibrated to indicate the overall accuracy of the meter. If the meter was not calibrated for any reason, a comment will be issued for this instrument.



[MUT] AS FOUND **PASS**
[MUT] AS LEFT **PASS**

CUSTOMER CONTACT	Municipality of Chatham-Kent Tim Dickinson Chief Operator, Chatham STP 325 Grand Ave Chatham Ontario T: 519-359-3811 E. timdi@chatham-kent.ca	[MUT] MANUFACTURER MODEL SERIAL NUMBER CLIENT TAG LOCATION OTHER	HACH Sension +ph 608073 n/a Chatham STP
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VER. BY	Randy Nichol	TOLERANCE [pH]	0.05
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Quality Management Standards Information - Standards, reference equipment, and instrumentation used to conduct this test outlining the lot#, and expiry date is found in our current QMS document.

VERIFICATION DATE	Mar 5, 2019
CAL. FREQUENCY	Annual
CAL. DUE DATE	Mar-2020

pH VERIFICATION
NIST TRACEABLE (BUFFERS)

BEFORE CALIBRATION

REFERENCE BUFFER			[MUT] READINGS			
pH BUFFER	TEMP. ° C	pH CORRECTED	pH	TEMP. ° C	pH - ERROR DIFF.	PASS FAIL
4.01	15.8	4.00	4.02	15.6	0.02	PASS
7.01	15.8	7.04	7.02	15.7	-0.02	PASS
10.01	15.8	10.10	10.09	15.8	-0.01	PASS
RESULT					PASS	

AFTER CALIBRATION

REFERENCE BUFFER			[MUT] READINGS			
pH BUFFER	TEMP. ° C	pH CORRECTED	pH	TEMP. ° C	pH - ERROR DIFF.	PASS FAIL
4.01	15.8	4.00	4.02	15.6	0.02	PASS
7.01	15.8	7.04	7.02	15.7	-0.02	PASS
10.01	15.8	10.10	10.09	15.8	-0.01	PASS
RESULT					PASS	

mv offset/Assymetry	n/a
Slope	n/a

COMMENTS

no calibration needed

[QMS] INFORMATION	ITEM	ID #
[REFERENCE]		
4.01 BUFFER	pHBUFF4	1
7.01 BUFFER	pHBUFF7	1
10.01 BUFFER	pHBUFF10	1
TEMPERATURE REF.	DDTEMP	1

NIST Traceable Buffers were used to confirm the overall accuracy of this instrument. "AS FOUND" readings and "AS FOUND" readings are reported within this report. A temperature device was used to measure and record the buffer temperature to correct for pH values due to the effects related to buffer temperature.



Dissolved Oxygen

Verification/Calibration Report

CUSTOMER CONTACT	Municipality of Chatham-Kent Tim Dickinson Chief Operator, Chatham STP 325 Grand Ave Chatham Ontario T: 519-359-3811 E. timdi@chatham-kent.ca	[MUT] MANUFACTURER MODEL SERIAL NUMBER CLIENT TAG LOCATION OTHER	Aysix 3100 30S4949 Chatham STP Chatham STP n/a
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VER. BY	Randy Nichol	TOLERANCE [pH]	0.05
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Quality Management Standards Information - Standards, reference equipment, and instrumentation used to conduct this test outlining the lot#, and expiry date is found in our current QMS document.

VERIFICATION DATE	Mar 12, 2019
CAL. FREQUENCY	Annual
CAL. DUE DATE	Mar-2020

AS FOUND

DO Concentration [mg/L]	8.7
DO Concentration [%]	n/a
Barometric Pressure [hpa]	n/a
Temperature	19

AS LEFT

DO Concentration [mg/L]	9.3
DO Concentration [%]	n/a
Barometric Pressure [hpa]	n/a
Temperature	19.1

COMMENTS

Comparison Match to HQ30D 080200018124

[QMS] INFORMATION

ITEM

ID #

Performed calibration as per manufacturers suggested technique

NIST Traceable Buffers were used to confirm the overall accuracy of this instrument. "AS FOUND" readings and "AS FOUND" readings are reported within this report. A temperature device was used to measure and record the buffer temperature to correct for pH values due to the effects related to buffer temperature.