

Winchester Wastewater System

Sewage Works # 110001202

Annual Report

Prepared for: Township of North Dundas

Reporting Period of January 1st – December 31st 2022

Issued: March 31, 2023

Revision: 0

Operating Authority:



This report has been prepared to meet the requirements of Certificate of Approval #5312-88TK5R

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Operations and Compliance Reliability Indices

Compliance Event	# of Events
Ministry of Environment Inspections	0
Ministry of Labour Inspections	0
Non-Compliance	0
Spills/Overflows/Bypasses	0
Sewer Main Blockages	0

System Process Description

Winchester's wastewater system consists of a gravity fed sanitary sewage collection system, four pumping stations and a wastewater treatment lagoon. The main sewage pumping station is located on Ottawa Street and discharges directly to the lagoons. There are also two pumping stations located on Main Street and one on St. Lawrence Street which pump wastewater to the Ottawa St. SPS.

The wastewater treatment system consists of a seasonally discharged five cell lagoon system with a rated capacity of 2,220 m³/d. The three primary facultative treatment cells are operated in parallel (Cells 1, 2 and 3). Wastewater flows from the primary cells to the polishing cell (Cell No. 4), and finally to the post-aeration cell (Cell No. 5). Aeration within Cell No. 5 is supplied by centrifugal air blowers to control odours and strip hydrogen sulphide (H₂S) prior to discharge. Aluminum sulphate is dosed continuously for phosphorus control as wastewater is pumped to the lagoons. Seasonal discharge of effluent from the lagoons is permitted at specified times during the spring and fall each year. Effluent is pumped from Cell No. 5 over a distance of 7.3 kilometers to an outlet in the South Nation River.

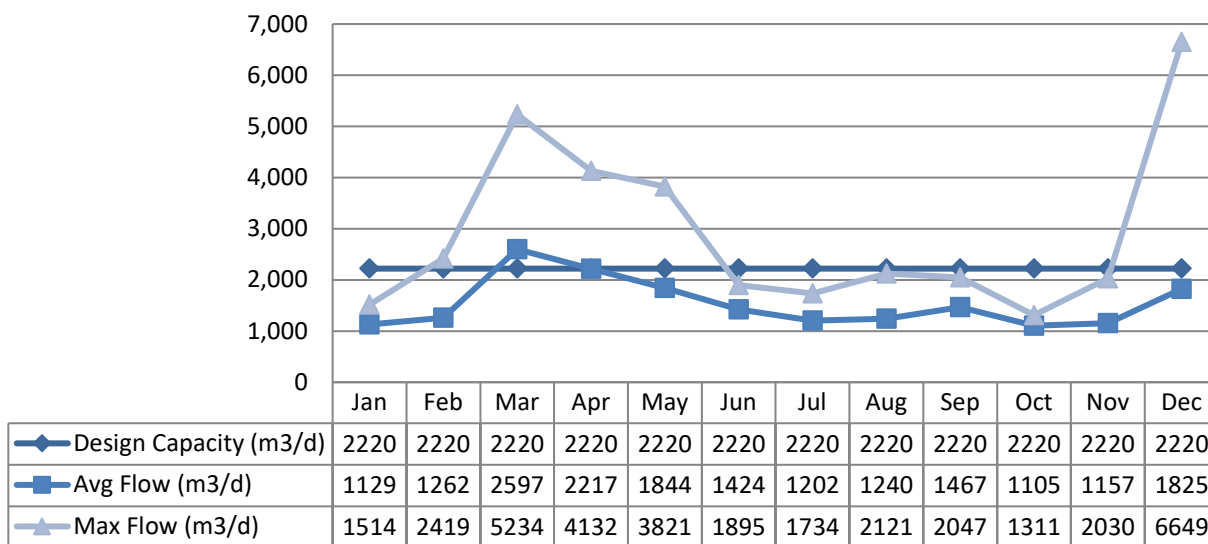
The Township of North Dundas initiated a Class Environmental Assessment of Winchester's wastewater treatment system in 2017 to address various operational challenges, such as hydraulic capacity, discharge constraints and treatment capabilities in order to ensure that increased wastewater flows from future growth can be effectively accommodated. To date, the EA process has been completed and the SAGR treatment system was selected. The new treatment system is expected to be in operation by the end of 2024.

Wastewater System Flows

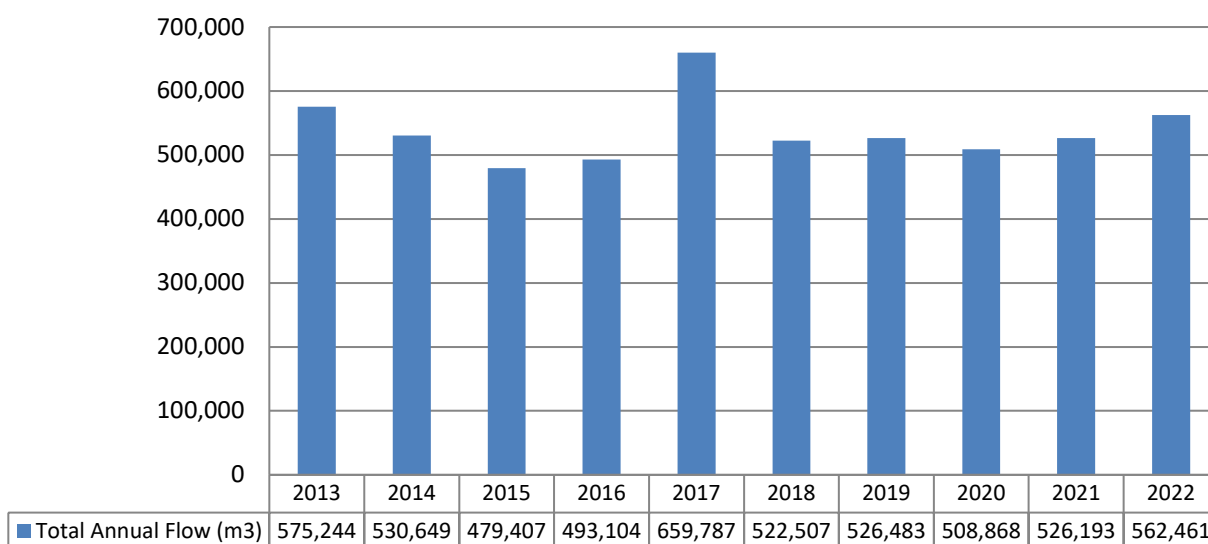
The hydraulic flows reaching the sewage lagoons in 2022 averaged 1,539 m³/day which represents 69.3% of the 2,220 m³/day design capacity.

Raw Flows

2022 Raw Flows:



Annual Raw Flow Comparison:



Effluent Flow

A total of 550,020 m³ of effluent was discharged from Winchester's sewage lagoons in 2022 with 292,584 m³ discharged in the spring and 257,436 m³ discharged in the fall.

Effluent Quality Assurance or Control Measures

Effluent control measures include pre-discharge sampling and testing of lagoon cell contents prior to seasonal discharges. The samples are collected by OCWA's competent and licensed staff using approved methods and protocols for sampling including those specified in the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", the Ministry's publication, "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the publication, "Standard Methods for the Examination of Water and Wastewater".

All effluent samples collected during the reporting period were submitted to Caduceon in Ottawa for analysis, with the exception of pH, temperature and unionized ammonia. Caduceon is accredited by the Canadian Association for Laboratory Accreditation (CALA). Accredited labs must meet strict provincial guidelines including an extensive quality assurance/quality control program. By choosing these laboratories, OCWA is ensuring appropriate control measures are undertaken during sample analysis.

The pH and temperature parameters were analyzed in the field at the time of sample collection by certified operators to ensure accuracy and precision of the results obtained. Un-ionized ammonia was calculated using the total ammonia nitrogen concentration, pH and temperature as required by the facility's Certificate of Approval.

Effluent Quality

During the reporting period, the average concentrations of carbonaceous biochemical oxygen demand (CBOD₅), and total phosphorus (TP) remained below the effluent limits and objectives outlined in the ECA. In addition, the Dissolved Oxygen (D.O.) measured above the allowable minimum concentration throughout both the spring and fall discharge periods. The objective level of non-detectable was exceeded for undissociated hydrogen sulphide (H₂S) during both discharge periods, although the measured concentrations remained quite low. The pH exceeded the objective in three out of five of the samples collected during the fall discharge but all samples remained below the ECA limit.

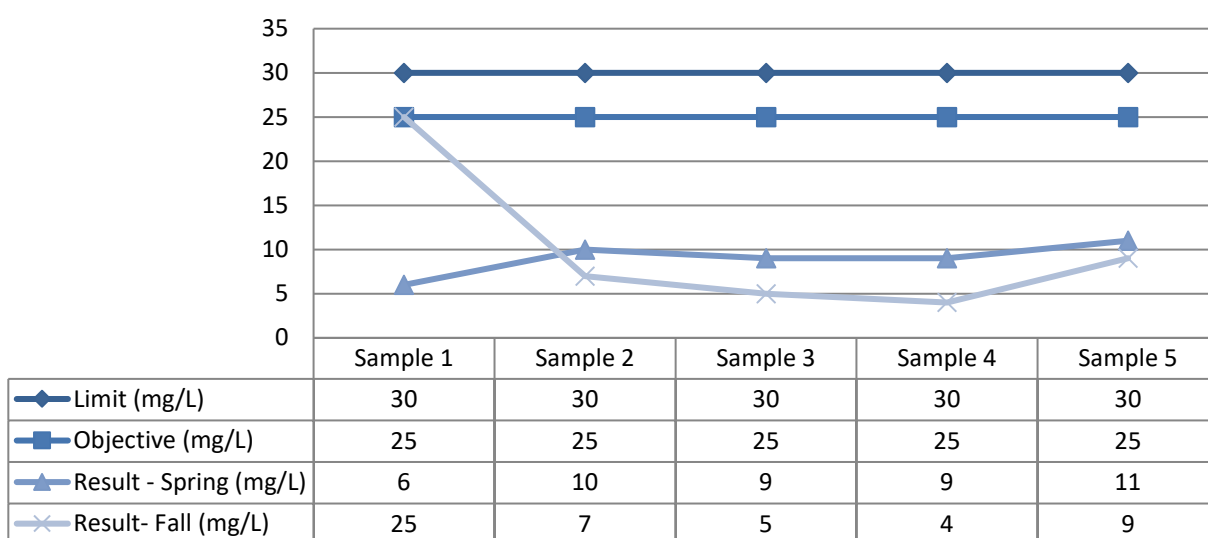
Total suspended solids (TSS) and total ammonia nitrogen (TAN) remained below the effluent limit during the reporting period. TSS exceeded the objective during the spring discharge. TAN exceeded the objective during the fall discharge. Please refer to the 'Operating Issues' section of this report for details.

Effluent during both the spring and fall discharge periods remained essentially free of floating or settleable solids and did not contain substances that would cause a film, sheen, foam or discoloration to the receiving stream.

The results from the spring and fall discharge periods are tabulated below. Please refer to the Performance Reports in Appendix A and the 'Operational Issues' section of this report for further information.

Carbonaceous Biochemical Oxygen Demand (5-Day)

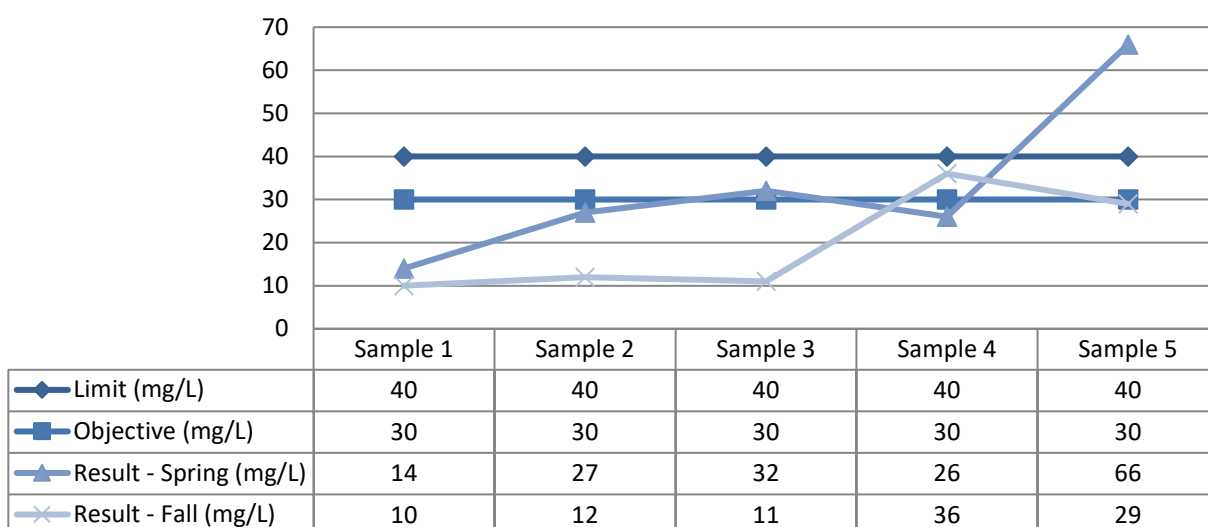
Discharge Period	Seasonal Average Concentration (mg/L)	Limit (mg/L)	Objective (mg/L)	Exceedance
Spring	9	30	25	No
Fall	10	30	25	No

Effluent CBOD₅ Results:**Total Suspended Solids**

Discharge Period	Seasonal Average Concentration (mg/L)	Limit (mg/L)	Objective (mg/L)	Exceedance
Spring	33	40	30	Yes – Objective*
Fall	19.6	40	30	No

*Please refer to the 'Operating Issues' section of this report for details.

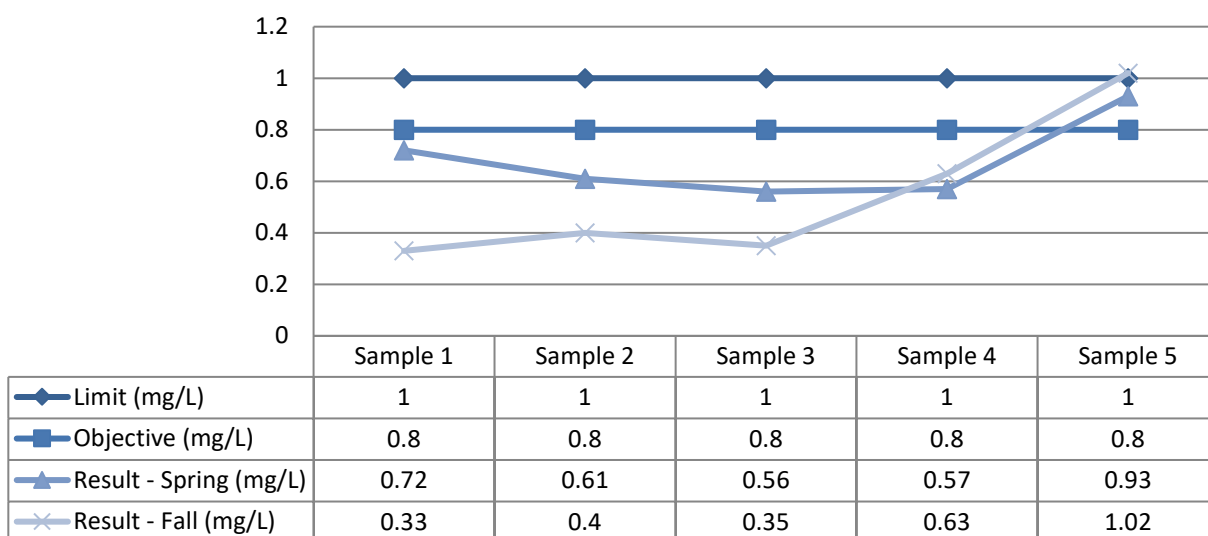
Effluent TSS Results:



Total Phosphorus

Discharge Period	Seasonal Average Concentration (mg/L)	Limit (mg/L)	Objective (mg/L)	Exceedance
Spring	0.68	1.0	0.8	No
Fall	0.55	1.0	0.8	No

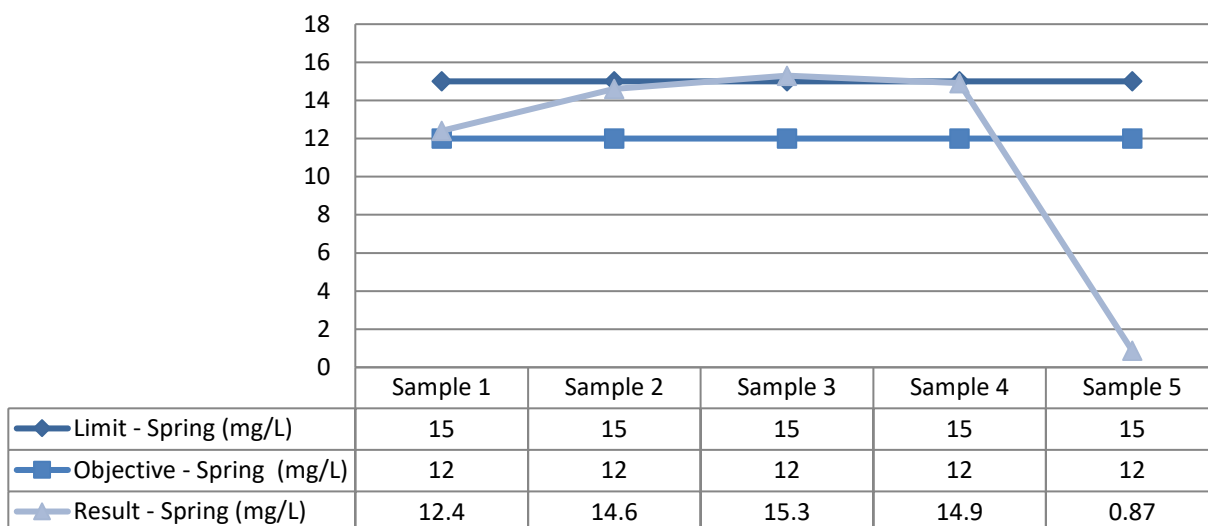
Effluent TP Results:

**Total Ammonia Nitrogen**

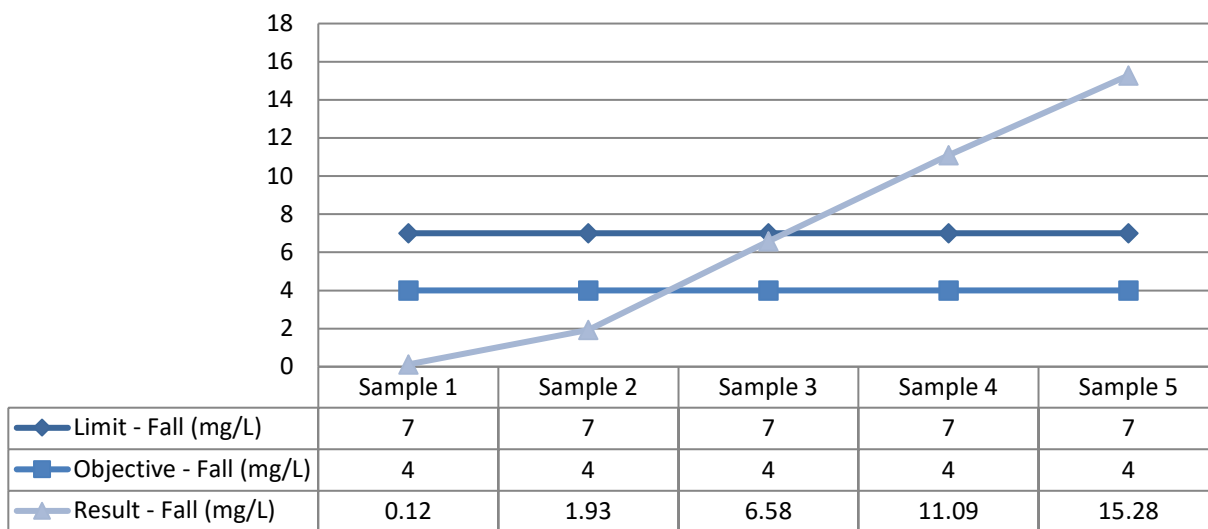
Discharge Period	Seasonal Average Concentration (mg/L)	Limit (mg/L)	Objective (mg/L)	Exceedance
Spring	11.6	15	12	No
Fall	7.0	7	4	Yes – Objective*

*Please refer to the 'Operating Issues' section of this report for details.

Effluent TAN Results for Spring Discharge Period:



Effluent TAN Results for Fall Discharge Period:

Hydrogen Sulphide

Discharge Period	Seasonal Average Concentration (mg/L)	Limit (mg/L)	Objective (mg/L)	Exceedance
Spring	0.0078	0.02	Non-detectable	Yes – <i>Objective</i>
Fall	0.0026	-	Non-detectable	Yes – <i>Objective</i>

Effluent Undissociated H₂S Results for Spring Discharge Period:

	31-Mar	05-Apr	10-Apr	15-Apr	26-Apr	Average
S ²⁻ (mg/L)	0.05	< 0.1	0.08	< 0.1	< 0.1	0.056
pH	8.02	8.19	8.17	8.30	7.52	8.04
Temp	5.3	7.0	9.0	9.5	13.4	N/A
% Undissociated H ₂ S (from table)	15.38	9.8	9.2	7.3	30.756	N/A
Undissociated H ₂ S (mg/L)	0.008	0.0049	0.007	0.004	0.015	0.0078

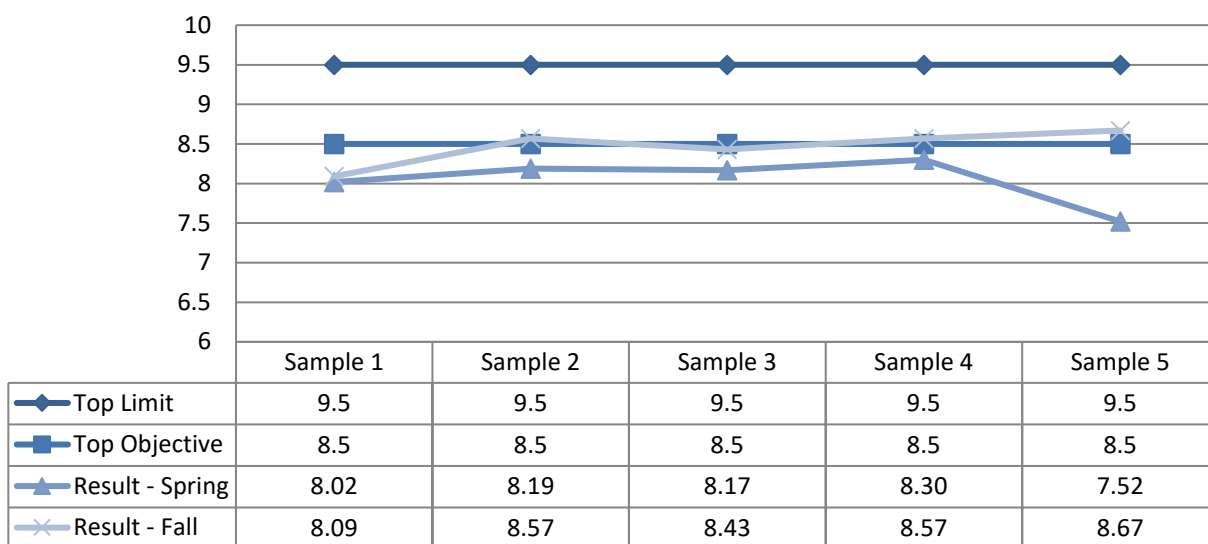
Effluent Undissociated H₂S Results for Fall Discharge Period:

	01-Nov	07-Nov	15-Nov	21-Nov	27-Jan	Average
S ²⁻ (mg/L)	< 0.01	< 0.1	0.03	< 0.2	< 0.1	0.137
pH	8.09	8.57	8.43	8.57	8.67	8.47
Temp	11.1	4.5	8.5	4.9	5	N/A
% Undissociated H ₂ S (from table)	10.616	5.645	6.081	5.645	4.450	N/A
Undissociated H ₂ S (mg/L)	0.001	0.003	0.002	0.006	0.002	0.0026

pH

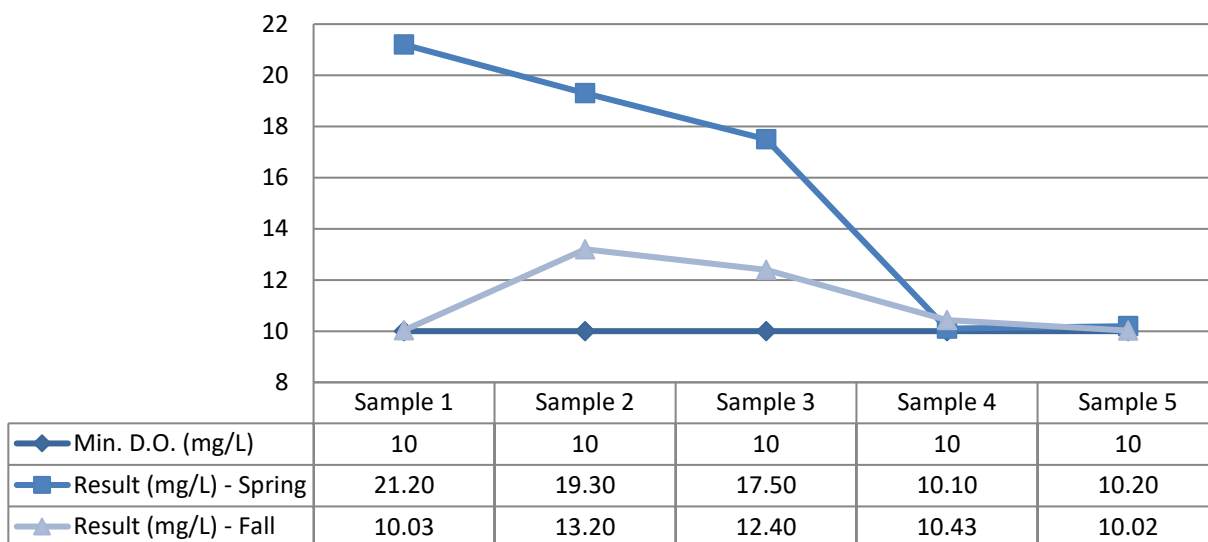
Discharge Period	Seasonal Average	Limit	Objective	Exceedance
Spring	8.04	6.0 – 9.5	6.5 – 8.5	No
Fall	8.47	6.0 – 9.5	6.5 – 8.5	Yes - Objective

Effluent pH Results:

**Dissolved Oxygen**

Discharge Period	Seasonal Average Concentration (mg/L)	Limit (mg/L)	Objective (mg/L)	Compliant
Spring	11.6	10	n/a	Yes
Fall	11.2	10	n/a	Yes

Effluent D.O. Results:



Acute Lethality

Based on the ammonia concentration of the 2022 fall pre-discharge sample, as a precautionary measure, one sample was collected and tested for acute lethality to Rainbow Trout and Daphnia Magna. Results are displayed as % mortality. An adverse result is a >50% mortality rate.

Sample Date	Rainbow Trout	Daphnia Magna
November 8, 2022	0 %	0 %

Operating Issues

The ECA objective for TSS was exceeded during the spring discharge in 2022. The final sample was the only sample that measured above the limit. Effluent TSS increased gradually over the course of the discharge as the level in the cells decreased.

The ECA objective for total ammonia nitrogen (TAN) was exceeded during the fall discharge in 2022. The last two samples were above the limit. The elevated TAN concentration in the samples increased as the temperatures decreased. The colder temperature appears to have reduced nitrification bacteria activity.

Maintenance

Flow Meter Calibration and Maintenance

Copies of the flow meter calibration certificates for 2022 are attached in Appendix B.

Maintenance Summary

Description
<ul style="list-style-type: none"> - Performed routine sewer flushing - Performed routine wet well cleaning - Repaired/upgraded manholes in collection system - Performed annual maintenance on generators - Repaired valve stem in chamber between Cell 4 & Cell 5 at lagoon - Replaced discharge piping and valves in wet well at Bailey SPS - Repaired leaking Back flow preventer

Notice of Modifications

Date	Process	Modification	Status
None to report			

Sludge Generation

Sludge depth is monitored periodically, and plans for sludge removal are made as required for optimal operation of the lagoon system.

Summary of Complaints

Location	Date	Nature of Complaint	Actions Taken
None to report			

Summary of Abnormal Discharge Events

Bypass/Overflow/Spills

No bypasses, overflows, or spills occurred during the reporting period.

Appendix A – Performance Assessment Reports

ONTARIO CLEAN WATER AGENCY PERFORMANCE ASSESSMENT REPORT

MUNICIPALITY: TOWNSHIP OF NORTH DUNDAS
PROJECT: WINCHESTER WASTEWATER TREATMENT PLANT

PROJECT NUM.: 5679

WORKS NUM.: 110001202

DESCRIPTION: A FIVE CELL LAGOON (#5 CELL POST AERATION) CELL #1 - 3.95 HA, CELL #2 - 2.75 HA,
CELL #3 - 4.1 HA, CELL #4 - 6.3 HA, CELL #5 - 2.0 HA

YEAR: 2022
WATER COURSE: SOUTH NATION RIVER
DESIGN CAPACITY: 2220 m³/day

MONTH	FLOWS					Avg. Alum Dosage (mg/L)	CBOD5			TOTAL SUSPENDED SOLIDS			PHOSPHORUS			TKN
	TOTAL FLOW m ³	AVG DAY FLOW m ³	MAX DAY FLOW m ³	EFFLUENT FLOW m ³	DISCHARGE DURATION (days)		AVG RAW BOD5 (mg/L)	AVG EFF CBOD5 (mg/L)	PERCENT REMOVAL (%)	AVG RAW TSS (mg/L)	AVG EFF TSS (mg/L)	PERCENT REMOVAL (%)	AVG RAW PHOS. (mg/L)	AVG EFF PHOS. (mg/L)	PERCENT REMOVAL (%)	AVG RAW TKN (mg/L)
JAN	34,997	1,129	1,514			115.1	158			320			6.13			53.6
FEB	35,323	1,262	2,419			115.1	74			96			5.17			80.3
MAR	80,519	2,597	5,234	7,472	1	112.2	56	6.0		154	14.0		3.02	0.72		27.2
APR	66,507	2,217	4,132	285,112	26	122.5	80	9.8		68	37.8		3.12	0.67		32.0
MAY	57,174	1,844	3,821			122.2	85			85			4.67			31.5
JUN	42,728	1,424	1,895			116.1	107			105			4.50			41.0
JUL	37,252	1,202	1,734			112.8	44			76			3.39			39.9
AUG	38,439	1,240	2,121			111.4	80			180			6.06			55.9
SEP	43,997	1,467	2,047			118.1	108			96			5.35			52.4
OCT	34,260	1,105	1,311			119.3	65			43			4.56			58.1
NOV	34,702	1,157	2,030	257,436	27	113.0	131	10.0		90	19.6		7.05	0.55		70.8
DEC	56,563	1,825	6,649			116.0	54			60			5.26			80.7
TOTAL	562,461		SPRING	292,584	27											
TOTAL			FALL	257,436	27											
AVG		1,539				116.1	87	9.5	89.1	114	26.3	77.0	4.86	0.61	87.4	51.9
MAX			6,649				158			320			7.05			80.7
CRITERIA		2,220		SPRING	21			30			40			1		
CRITERIA				FALL	21			30			40			1		

Note: PERCENT REMOVAL BASED ON 12 MONTHS OF RAW SEWAGE COMPOSITE SAMPLES

**ONTARIO CLEAN WATER AGENCY
LAGOON PERFORMANCE ASSESSMENT REPORT**

MUNICIPALITY: TOWNSHIP OF NORTH DUNDAS
PROJECT: WINCHESTER WASTEWATER TREATMENT LAGOONS
PROJECT NUM.: 5673
WORKS NUM.: 110901202
DESCRIPTION: A FIVE CELL LAGOON (#5 CELL POST AERATION) CELL #1 - 3.95 HA, CELL #2 - 2.75 HA
CELL #3 - 4.1 HA, CELL #4 - 6.3 HA, CELL #5 - 2.0 HA

YEAR: 2022
WATER COURSE: SOUTH NATION RIVER
DESIGN CAPACITY: 2220 m³/day

SAMPLE 5X/DISCH.	SAMPLE RESULTS	SPRING						292,584 m ³	
	DATE	31-Mar	05-Apr	10-Apr	15-Apr	26-Apr	Average	C of A Objective	C of A Limit
START, 25%, 50%, 75%, END	CBOD (mg/L)	6	10	9	9	11	9.0	25	30
	TSS (mg/L)	14	27	32	26	66	33.0	30	40
	TP (mg/L)	0.72	0.61	0.56	0.57	0.93	0.68	0.8	1
	DO (mg/L)	21.2	19.3	17.5	10.1	10.2	15.7	-	10
	N-NH ₃ (mg/L)	12.4	14.6	15.3	14.9	0.87	11.6	12	15
	unionized NH ₃ *	0.16	0.32	0.38	0.51	0.007	0.28		
	NO ₂ (mg/L)	< 0.1	< 0.2	< 0.1	< 0.1	< 0.1			
	NO ₃ (mg/L)	< 0.1	< 0.2	0.10	0.20	< 0.1			
	TKN (mg/L)	16	21.3	21.7	20.5	14.1			
	E.coli (cfu/100 mL)	41	24	4	10	150			

* un-ionized NH₃ based on in-house calculation

	31-Mar	05-Apr	10-Apr	15-Apr	26-Apr	Average	Objective	Limit
S2 ⁻ (mg/L)	0.05	< 0.1	0.08	< 0.1	< 0.1	0.056	N/A	N/A
pH	8.02	8.19	8.17	8.30	7.52	8.04	6.5 - 8.5	6.0 - 9.5
Temp	5.3	7.0	9.0	9.5	13.4	N/A	N/A	N/A
% Undissociated H ₂ S	15.38	9.8	9.2	7.3	30.756	N/A	N/A	N/A
Undissociated H ₂ S	0.008	0.0049	0.007	0.004	0.015	0.0078	ND	0.02

PRE-DISCHARGE RESULTS	22-Mar-21	Cell 1	Cell 2*	Cell 3	Cell 4	Cell 5
	CBOD (mg/L)	< 3	-	< 3	< 3	< 3
	TSS (mg/L)	13	-	12	21	8
	TP (mg/L)	0.34	-	0.41	0.20	0.14
	NH ₃ (mg/L)	3.88	-	2.84	2.76	1.67
	TKN (mg/L)	5.90	-	3.70	3.90	2.40
	H ₂ S (mg/L)	0.03	-	0.01	0.04	0.01
	E.coli (cfu/100 mL)	18	-	92	< 2	4

*Cell 2 empty at time of sampling. It is not being discharged. Routing raw sewage to this cell during discharge

COMMENTS: H₂S, TP, E.coli sampled prior to discharge
Dilution ratio as per operations manual

TOTAL LOADING	SPRING	FALL	TOTAL	ECA LIMIT
CBOD (kg)	2,633	2,574	5,208	24,309
SS (kg)	9,655	5,046	14,701	32,412
TP (kg)	198	141	339	810.3
NH ₃ (kg)	3,398	1,802	5,200	-

SAMPLE 5X/DISCH.	SAMPLE RESULTS	FALL						257,436 m ³	
	DATE	01-Nov	07-Nov	15-Nov	21-Nov	27-Nov	Average	C of A Objective	C of A Limit
START, 25%, 50%, 75%, END	CBOD (mg/L)	25	7	5	4	9	10.0	25	30
	TSS (mg/L)	10	12	11	36	29	19.6	30	40
	TP (mg/L)	0.33	0.4	0.35	0.63	1.02	0.55	0.8	1
	DO (mg/L)	10.03	13.2	12.4	10.43	10.02	11.22	-	10
	N-NH ₃ (mg/L)	0.12	1.93	6.58	11.09	15.28	7.000	4	7
	unionized NH ₃ (mg/L)	0.003	0.08	0.28	0.49	0.84	0.34		
	NO ₂ (mg/L)	<0.1	1.2	<0.1	<0.1	<0.1			
	NO ₃ (mg/L)	0.6	0.7	1.2	0.7	1			
	TKN (mg/L)	1.7	6.1	10.3	17.40	2.3			
	E.coli (cfu/100 mL)	<10	46	180	670	110			

** un-ionized NH₃ based on in-house calculation

	01-Nov	07-Nov	15-Nov	21-Nov	27-Jan	Average	Objective	Limit
S2 ⁻ (mg/L)	< 0.01	< 0.1	0.03	< 0.2	< 0.1	0.137	N/A	N/A
pH	8.09	8.57	8.43	8.57	8.67	8.47	6.5 - 8.5	6.0 - 9.5
Temp	11.1	4.5	8.5	4.9	5	N/A	N/A	N/A
% Undissociated H ₂ S	10.616	5.645	6.081	5.645	4.450	N/A	N/A	N/A
Undissociated H ₂ S	0.001	0.003	0.002	0.006	0.002	0.0026	ND	-

PRE-DISCHARGE RESULTS	20-Oct	Cell 1	Cell 2*	Cell 3	Cell 4	Cell 5
	CBOD (mg/L)	13	-	7	8	<3
	TSS	46	-	17	29	<3
	TP (mg/L)	0.64	-	0.52	0.29	0.38
	NH ₃ (mg/L)	9.73	-	2.26	10.40	0.31
	TKN (mg/L)	16.3	-	6.4	16.3	2.0
	H ₂ S (mg/L)	<0.1	-	<0.1	<0.1	<0.01
	E.coli (cfu/100 mL)	240	-	200	108	30

*Cell 2 empty at time of sampling. It is not being discharged. Routing raw sewage to this cell during discharge

COMMENTS: H₂S, TP, E.coli sampled prior to discharge
Dilution ratio as per operations manual

Acute Lethality	Nov 8, 2022
Rainbow Trout	0%
Daphnia Magna	0%

**ONTARIO CLEAN WATER AGENCY
WINCHESTER SEWAGE LAGOON 2022**

DETERMINATION OF UN-IONIZED AMMONIA (NH₃) IN WASTEWATER EFFLUENT

Sample Date	Temperature (°C)	Degrees Kelvin	Dissociation Constant pKa	Sample pH on-site	Fraction of Un-ionized Ammonia	Total Ammonia (mg/L) (NH ₃ +NH ₄ +as N)	Un-ionized Ammonia (mg/L)
31-Mar	5.3	278.45	9.89	8.02	0.0132	12.40	0.163
05-Apr	7.0	280.15	9.83	8.19	0.0222	14.60	0.324
10-Apr	9.0	282.15	9.77	8.17	0.0247	15.30	0.379
15-Apr	9.5	282.65	9.75	8.30	0.0344	14.90	0.512
26-Apr	13.4	286.55	9.62	7.52	0.0079	0.87	0.007

01-Nov	11.1	284.25	9.69	8.09	0.0243	0.12	0.003
07-Nov	4.5	277.65	9.92	8.57	0.0425	1.93	0.082
15-Nov	8.5	281.65	9.78	8.43	0.0425	6.58	0.280
21-Nov	4.9	278.05	9.91	8.57	0.0439	11.10	0.487
27-Nov	5.0	278.15	9.90	8.67	0.0550	15.30	0.842

Appendix B – Flow Meter Calibration Reports



Electrical/Control Panels – PLC/SCADA Programming – Instrumentation Calibrations

03-1333 Michael St Ottawa, ON K1B-3M9 Ph. 613 248-1999 Fax: 613 248-1997

Winchester

Calibration of Lagoon Effluent Flow Meter

Report April 25th , 2022

Prepared For: O.C.W.A. Seaway Valley

Calibration Date: April 13th, 2022

Calibration Due: April 13th, 2023

Verifications performed by: Tim Stewart

Report prepared by: Tim Stewart



Electrical/Control Panels – PLC/SCADA Programming – Instrumentation Calibrations

03-1333 Michael St Ottawa, ON K1B-3M9 Ph. 613 248-1999 Fax: 613 248-1997

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4	CALIBRATION CERTIFICATE	- 5 -

1 List of Verified Devices

This letter is to confirm that annual verification on the following devices has been completed.

ID	Process	Make/Model	Results
FIT-01	Lagoon Effluent	E and H / 33F	Passed

2 Equipment Used

The following equipment was used to perform the calibrations:

Fluke 725 for current and resistance measurement

2.1 Flowmeter Verification

Verification, Magnetic Flow Meter:

The verification of Endress & Hauser Flow measuring devices (the device under test) are checked for the following characteristic values:

1. Functionality and deviation in flow measurement.
2. Deviation in the current and frequency outputs in reference to the flow rate data determined by the measuring device.
3. Coil resistance and Isolation

3 Instrument Verification

See the following pages of reports for individual equipment.

3.1 FIT 01 Lagoon Effluent

Flow Transmitter
As Found Results

Instrument Calibration/Verification Report

Date: April 13th, 2022

Client Details

Customer O.C.W.A. Seaway Valley
Contact Jon Hartle
613-229-7135

Calibrations by: Tim Stewart
Capital Controls
613-248-1999

Instrument Details

Manufacturer Eand H
Model 33FH4H-MD1FD81F21A
Serial Number 5M627538
Location Winchester Lagoon
Process Lagoon Effluent
Tag ID FIT-01
Output 4-20 mA

Programming Parameters

4-20 mA = 0-378.54 l/s
K factor = 1.097
Zero Point = -1
Empty pipe Detector = on
16 inch tube

Calibration Equipment

Make Fluke Meter
Model 725
Serial # 8759025

Errors are expressed in percentage of Full Scale

Test Procedure

Simulation

Coil Resistance = 136.0 Ohms

Simulated Flow	0.00 l/s	189.27 l/s	378.54 l/s
Expected mA Value	4.00 mA	12.00 mA	20.00 mA
Actual mA Value	4.03 mA	12.01 mA	20.00 mA
Error	0.19%	0.06%	0.00%

Comments

The instrument under test has passed the annual calibration.

4 Calibration Certificate



www.pylonelectronics.com

Pylon Electronics Inc.
147 Colonnade Road
Ottawa, ON K2E 7L9

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CERTIFICATE OF CALIBRATION

Description	MULTI FUNCTION PROCESS	Work Order	N0984334
Model Number	725	Serial Number	8759025
Instrument Id	N/A	Cal Procedure	667581
Manufacturer	FLUKE	Cal Date	14 Jan 2022
Customer Name	CAPITAL CONTROLS	Recall Cycle	52 Weeks
		Next Cal Date	14 Jan 2023
		Purchase Order	CREDIT CARD

Calibration Environment: Temperature 23.0 °C Relative Humidity 33.8 %RH
Received Condition: Within Tolerance
Completed Condition: Within Tolerance

Standards Used to Establish Traceability

Instrument Type	Model	Asset #	Cal Due Date
CALIBRATOR WITH SCOPE OPTION	5522A-SC1100	240-1205	17 May 2022
8.5 DIGIT MULTIMETER	3458A	240-720	14 Jul 2022

Pylon certifies that, at the time of calibration, the above listed instrument meets or exceeds all of the specifications defined on the Test Data Sheet (TDS), unless otherwise indicated. The Certificate received and completed conditions and the TDS specifications are based on the procedure(s) and/or specification(s) referenced on the TDS unless otherwise indicated. Any statement of compliance is made without taking measurement uncertainty into account and is based on the instrument's performance against the test limits documented on the test data sheet.

The above listed instrument has been calibrated using standards that are traceable to the International System of Units (SI) through a National Metrological Institute (such as NRC or NIST). Pylon's quality system meets the requirements of ISO/IEC 17025:2017. Unless otherwise specified, Pylon maintains a minimum of a 4:1 ratio between the equipment under test and the measurement system.

This report consists of two parts with separate page numbering schemes; the Certificate of Calibration and the Test Data Sheet (TDS). Copyright of this report is owned by the issuing laboratory and may not be reproduced, other than in full, except with the prior written permission of the issuing laboratory.

Test data As Found and Final (as left) results are the same unless reported otherwise. Certificate remarks identify if adjustments were performed.

Metrologist: 178

Quality Assurance: 330

Date of Issue: 20 Jun 2022

F083 Rev 16
pylcont1

HALIFAX


MONTREAL

OTTAWA

TORONTO

EDMONTON

CALGARY



Calibration Test Data

Description: MULTI FUNCTION PROCESS CALIBRATOR

Model: 725

Customer ID.: N/A

Manufacturer: FLUKE

Customer: CAPITAL CONTROLS

Work order: N0984334

Serial: 8759025

Procedure: 667581

Proc. Rev.: 01-Apr-2014

Cal Date: 14-Jan-2022

Rev:03Jul2009

AF=0

725 Fluke (ISO 17025).xls


Temp. 062

Apr. 006

05-Jul-2016

F=0

TEST REF.	TEST DESCRIPTION		RESULTS				
			MIN	AS FOUND	FINAL	MAX	UNC.
p26	Upper Display Voltage Measurement Tests:						
	Range	Applied					
	30 V	0 V	-0.002 V	0.000 V		0.002 V	0.00058 V
		15 V	14.995 V	15.002 V		15.005 V	0.00060 V
		30 V	29.992 V	30.005 V		30.008 V	0.00065 V
p27	Lower Display mV/TC Measurement Tests:						
	Range	Applied					
	90.00 mV	0.00 mV	-0.02 mV	0.00 mV		0.02 mV	0.0058 mV
		45.00 mV	44.97 mV	44.99 mV		45.03 mV	0.0060 mV
		89.00 mV	88.96 mV	88.99 mV		89.04 mV	0.0062 mV
p28	Lower Display Voltage Measurement Tests:						
	Range	Applied					
	20 V	0 V	-0.002 V	0.000 V		0.002 V	0.00058 V
		10 V	9.996 V	9.999 V		10.004 V	0.00059 V
		20 V	19.994 V	19.999 V		20.006 V	0.00061 V
p29	Upper Display mA Measurement Tests:						
	Range	Applied					
	24 mA	4 mA	3.997 mA	4.000 mA		4.003 mA	0.00077 mA
		12 mA	11.996 mA	12.003 mA		12.004 mA	0.0013 mA
		24 mA	23.993 mA	24.006 mA		24.007 mA	0.0021 mA



Calibration Test Data


Description: MULTI FUNCTION PROCESS CALIBRATOR

Model: 725

Work order: N0984334

Serial: 8759025

TEST REF.	TEST DESCRIPTION		RESULTS				
			MIN	AS FOUND	FINAL	MAX	UNC.
p30	Lower Display mA Measurement Tests:						
	Range	Applied					
	24 mA	4 mA	3.997 mA	4.000 mA		4.003 mA	0.00077 mA
		12 mA	11.996 mA	12.001 mA		12.004 mA	0.0013 mA
		24 mA	23.993 mA	24.005 mA		24.007 mA	0.0021 mA
p31	Lower Display Frequency Measurement Test:						
	Applied	Freq					
	1 Vpp SQ	10 kHz	9.98 kHz	10.00 kHz		10.02 kHz	0.0058 kHz
p32	Lower Display Frequency Source Test:						
	Applied	Freq					
	5 V	10 kHz	9.975 kHz	10.000 kHz		10.025 kHz	0.0013 kHz
p33	Lower Display 4-Wire Resistance Measurement Tests:						
	Range	Applied					
	400 Ω	15 Ω	14.90 Ω	14.99 Ω		15.10 Ω	0.0060 Ω
		350 Ω	349.90 Ω	350.05 Ω		350.10 Ω	0.011 Ω
	1.5 kΩ	500 Ω	499.5 Ω	499.9 Ω		500.5 Ω	0.059 Ω
		1500 Ω	1499.5 Ω	1500.0 Ω		1500.5 Ω	0.075 Ω
	3.2 kΩ	3200 Ω	3199.0 Ω	3199.7 Ω		3201.0 Ω	0.10 Ω
p34	Lower Display 3-Wire RTD Measurement:						
	Range	Applied					
	400 Ω	350 Ω	349.85 Ω	349.95 Ω		350.15 Ω	0.011 Ω
p35	Lower Display Thermocouple Measurement Tests: (Type J)						
	Range	Applied					
	-200 to 1200 °C	0 °C	-0.7 °C	-0.1 °C		0.7 °C	0.12 °C



Calibration Test Data

Description: MULTI FUNCTION PROCESS CALIBRATOR

Model: 725

Work order: N0984334

Serial: 8759025

TEST REF.	TEST DESCRIPTION		RESULTS				
			MIN	AS FOUND	FINAL	MAX	UNC.
p36	Lower Display Thermocouple Source Test: (Type J)						
	Range	Applied					
	-200 to 1200 °C	0 °C	-0.7 °C	0.0 °C		0.7 °C	0.12 °C
p37	Lower Display mA Source Tests:						
	Range	Applied					
	24 mA	4 mA	3.9972 mA	3.9986 mA		4.0028 mA	0.00016 mA
		12 mA	11.9956 mA	11.9965 mA		12.0044 mA	0.0011 mA
		24 mA	23.9932 mA	23.9933 mA		24.0068 mA	0.0015 mA
p38	Lower Display mV Source Tests:						
	Range	Applied					
	100 mV	0 mV	-0.020 mV	0.009 mV		0.020 mV	0.00067 mV
		45 mV	44.970 mV	45.000 mV		45.030 mV	0.0010 mV
		100 mV	99.960 mV	100.033 mV		100.040 mV	0.0015 mV
p38	Lower Display Voltage Source Tests:						
	Range	Applied					
	10 V	0 V	-0.0020 V	0.0000 V		0.0020 V	0.000058 V
		5 V	4.9970 V	5.0001 V		5.0030 V	0.000074 V
		10 V	9.9960 V	10.0001 V		10.0040 V	0.00011 V
p39	Lower Display Ohms Source Tests:						
	Range	Applied					
	400 Ω	15 Ω	14.90 Ω	15.01 Ω		15.10 Ω	0.0058 Ω
		360 Ω	359.90 Ω	360.00 Ω		360.10 Ω	0.0075 Ω
	1.5 kΩ	500 Ω	499.5 Ω	500.0 Ω		500.5 Ω	0.059 Ω
		1500 Ω	1499.5 Ω	1500.1 Ω		1500.5 Ω	0.062 Ω
	3.2 kΩ	3200 Ω	3199.0 Ω	3200.4 Ω		3201.0 Ω	0.072 Ω

