

Tri-County Water Board of Management

Agenda

October 21, 2025, 7:00 p.m.

Council Chambers

160 Main Street

West Lorne

Pages

1. **Call to Order**

2. **Adoption of Agenda**

Recommendation:

That Tri-County Water Board hereby adopts the Agenda for October 21, 2025 as presented.

3. **Disclosure of Pecuniary Interest**

4. **Minutes**

1

Recommendation:

That the Tri-County Water Board hereby adopts the minutes of September 30, 2025, as presented.

5. **Business Arising from Minutes**

6. **Staff Reports**

6.1 **Tri-County Drinking Water System, Operations Report, Third Quarter 2025**

4

Recommendation:

That Tri-County Water Board hereby accept the Operations Report, Third Quarter, as presented by Joe Daly, Sr. Operations Manager, Ontario Clean Water Agency, for information purposes.

6.2 Technical Memo Re: Taste and Odour Issues in the Tri-County Drinking Water System

21

Recommendation:

That Tri-County Water Board hereby accept the Technical Memo: Taste and Odour Issues in the Tri-County Drinking Water System, prepared by Ontario Clean Water Agency, for information purposes.

6.3 West Elgin SCADA Roadmap

31

Recommendation:

That Tri-County Water Board hereby accept the Tri-County SCADA Roadmap, for information purposes.

7. Closed Session

Recommendation:

That the Tri-County Water Board hereby proceeds into Closed Session at _____ pm, to discuss two (2) matters pursuant to the *Municipal Act*, Section 239 (2)(a), being the security of the property of the municipality or local board.

8. Report from Closed Session

9. Adjournment

Recommendation:

That the Tri-County Water Board hereby adjourn at _____ pm, to meet again at 7:00pm, on Tuesday, November 18, 2025 (Budget Meeting), or at the Call of the Chair.

Tri-County Water Board of Management

Minutes

Date: September 30, 2025, 7:00 p.m.

**Location: West Elgin Community Complex - Hybrid Meeting
160 Main St
West Lorne
Electronic Hybrid Meeting**

Present: Allan Mayhew, Southwest Middlesex
Taraesa Tellier, West Elgin
Mike Hentz, Dutton Dunwich
Bill Denning, West Elgin
Corey Pemberton, Dutton Dunwich
Don McCallum, Southwest Middlesex
Ryan Statham, West Elgin
Darren Galbraith, Chatham-Kent
Philip Sousa, West Elgin

Regrets: Amarilis Drouillard, Dutton Dunwich
Kevin Derbyshire, Newbury
Mike Sholdice, Southwest Middlesex
Richard Leatham, West Elgin

Staff Present: Cathy Case, Clerk/Treasurer, Newbury
Sam Smith, OCWA
Terri Towstiuc, Recording Secretary/Clerk, West Elgin
Robin Greenall, Chief Administrative Officer, West Elgin
Amanda Gubbels, Chief Administrative Officer, Southwest Middlesex
Joe Daly, OCWA

Regrets: Maegan Garber, OCWA
Robin Trepanier, OCWA
Dave Charron, Manager of Infrastructure & Development

This meeting was held in a Hybrid format

1. Call to Order

Chair Bill Denning called the meeting to order at 7:01 pm.

2. Adoption of Agenda

Moved: Mike Hentz, Dutton Dunwich

Seconded: Ryan Statham, West Elgin

That Tri-County Water Board hereby adopts the Agenda for September 30, 2025 as presented.

Disposition: Carried

3. Disclosure of Pecuniary Interest

No disclosures

4. Adoption of Previous Meeting Minutes

Moved: Ryan Statham, West Elgin

Seconded: Corey Pemberton, Dutton Dunwich

That the Tri-County Water Board hereby adopts the minutes of July 15, 2025, as presented.

Disposition: Carried

5. Business Arising from Minutes

None.

6. Staff Reports

6.1 Facilitator Proposal for Board Discussion regarding a Municipal Service Corporation Governance Structure

Moved: Mike Hentz, Dutton Dunwich

Seconded: Corey Pemberton, Dutton Dunwich

That Tri County Water Board hereby receives the report from Robin Greenall, Administrator for the Tri County Water Board, and

That the Board approve the recommendation to engage Mary Ellen Bench as a facilitator for Board discussions regarding a Municipal Service Corporation governance structure, to be funded by the Tri-County Water Reserves.

Disposition: Carried

7. Adjournment

Next Tri-County Water Board meetings scheduled for:

- Tuesday, October 21, 2025
- Tuesday, November 18, 2025 (Tentative Budget)

Moved: Ryan Statham, West Elgin

Seconded: Mike Hentz, Dutton Dunwich

That the Tri-County Water Board hereby adjourn at 7:32 pm, to meet again at 7:00pm, on Tuesday, October 21, 2025 or at the Call of the Chair.

Disposition: Carried

Bill Denning, Chair

Terri Towstiuc, Recording Secretary



Ontario Clean Water Agency
Agence Ontarienne Des Eaux

Tri-County Drinking Water System Operations Report Third Quarter 2025

Ontario Clean Water Agency, Southwest Region
Joe Daly, Sr. Operations Manager
Date: October 15, 2025

Facility Description

Facility Name:	Tri-County Drinking Water System
Regional Manager:	Sam Smith (226) 377-1540
Sr. Operations Manager:	Joe Daly (226) 229-2995
Business Development Manager:	Robin Trepanier (519) 791-2922
Facility Type:	Municipal
Classification:	Class 2 Water Distribution, Class 2 Water Treatment
Title Holder:	Municipality

Service Information

Area(s) Serviced:	West Elgin, Dutton/Dunwich, Southwest Middlesex, Newbury and Bothwell
Population Serviced:	9,985
No. of Connections:	
Water Meters:	Commercial / Residential
In Service Date:	2009

Capacity Information

Total Design Capacity:	12.160 (1000 m ³ /day)
Total Annual Flow:	1,381 (1000 m ³ /year)
Average Day Flow:	3.770 (1000 m ³ /day)
Maximum Day Flow:	5.380 (1000 m ³ /day)

Operational Description

Water treatment with intake in Lake Erie, 4 low lift pumps, lifting up to the treatment plant. Membrane filtration followed by injection with Sodium Hypochlorite for primary disinfection and into the 2 Storage Tanks. Pumping to tower & distribution system with 4 high lift pumps.

SECTION 1: COMPLIANCE SUMMARY

FIRST QUARTER:

There were no compliance issues to report during the first quarter.

SECOND QUARTER:

There were no compliance issues to report during the second quarter.

THIRD QUARTER:

On August 25th the Health Canada limit of 0.12mg/L for Manganese in drinking water was exceeded on treated water from the plant. The MECP was notified. The sodium permanganate dosage was adjusted and the storage tanks were overflowed to flush out manganese from the system. The distribution system was also flushed. There were no other compliance issues to report during the third quarter.

SECTION 2: INSPECTIONS

FIRST QUARTER:

On February 20th, a routine MECP inspection was conducted at the Tri-County Drinking Water System by Provincial Officer, Meghan Morgan. The draft report was received for comment. There were no non-compliances or best management practices identified.

SECOND QUARTER:

On April 10th the finalized inspection report was received from the MECP inspection which occurred on February 20th. The inspection risk rating was 100%.

THIRD QUARTER:

There were no MECP or MOL inspections conducted during the third quarter.

SECTION 3: QEMS UPDATE

FIRST QUARTER:

On February 11th, the Essential/Emergency Service and Supply Contact List was updated to include changes to OCWA staff contacts as well as client contacts. The contact list is currently in its 38th revision and is reviewed annually.

SECOND QUARTER:

An internal audit was completed on May 12th, 2025 by Matt Belding. There was one opportunity for improvement (OFI) identified that will be considered at the management review which will be scheduled in accordance with OP-20.

THIRD QUARTER:

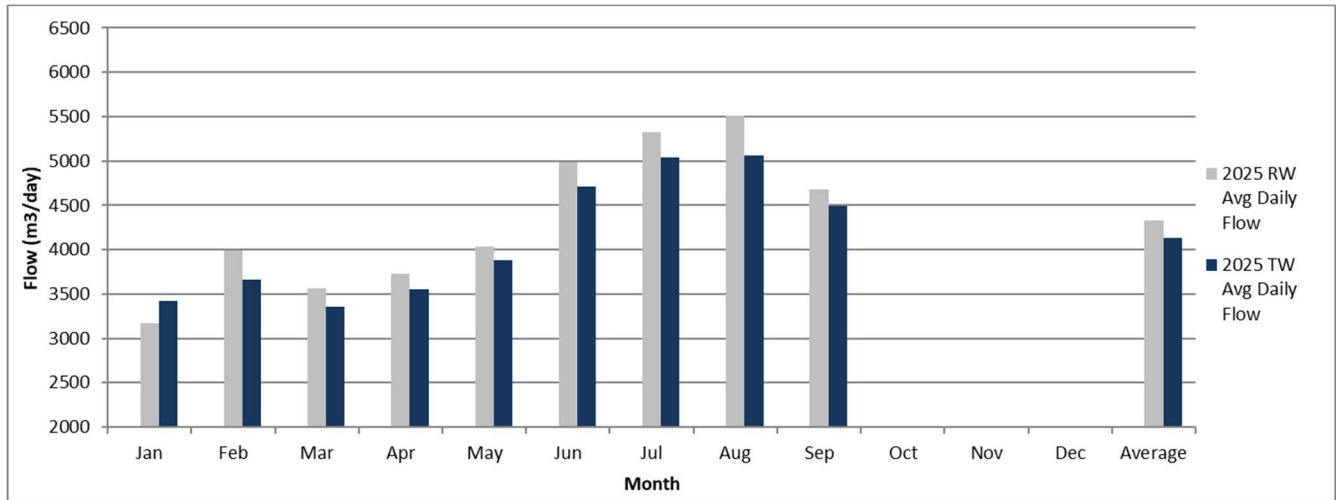
On September 23rd the management review was held for the Tri-County WTP. The surveillance external audit occurred on October 10th. The report was received on October 15th and identified one OFI.

The Essential Emergency Service and Supplier Contact List was updated to reflect changes in the system and is now in its 40th revision.

SECTION 4: PERFORMANCE ASSESSMENT REPORT

The Tri-County Drinking Water System is currently operating at 95.44% efficiency with the water taken from Lake Erie that is treated and sent to the distribution systems. Chart 1 below shows the raw water takings compared to the treated water distributed to the distribution system so far in 2025.

Chart 1: Average daily water takings compared to treated water distributed to the distribution system



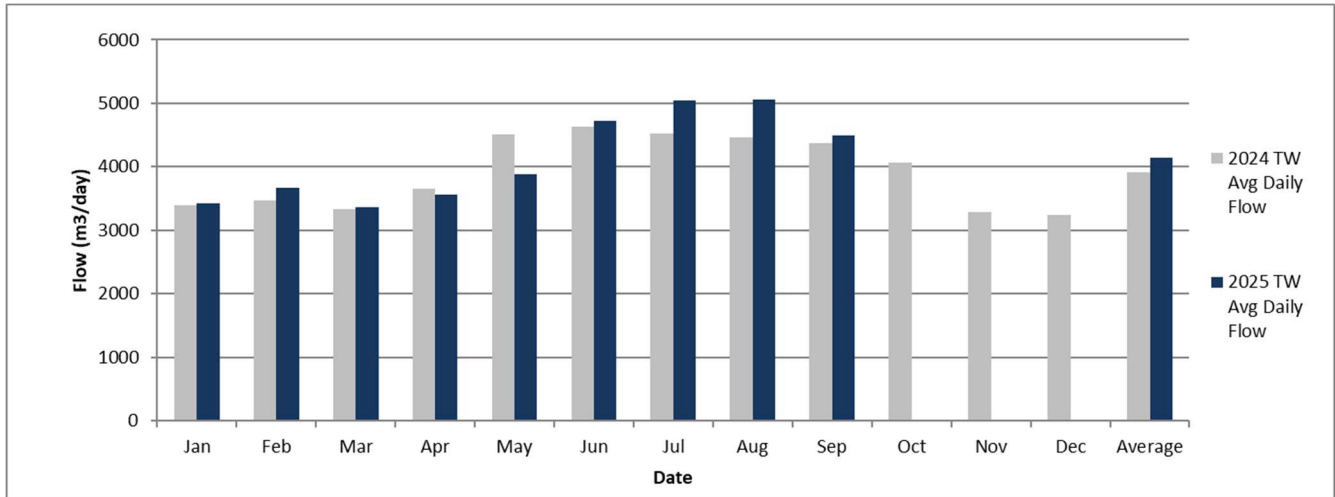
Raw water is sampled on a weekly basis and tested for E. coli and Total coliforms as per regulatory requirements. There are no limits identified in the regulations for E. coli and Total Coliform found in the raw water source. Table 1 below identifies the sample results for 2025 so far.

Table 1: Raw water sample results 2025

	# Samples	E. Coli Range (cfu/100mL)	Total Coliform Range (cfu/100mL)
January	4	2 - 50	6 - 700
February	4	<2 - <10	4 - 50
March	5	<10 - <100	210 - 2400
April	4	1 - 20	<2 - 1410
May	4	<2 - <2	2 - 70
June	5	<2 - <100	<2 - 1300
July	4	2 - 50	28 - 120
August	4	100 - 500	200 - 1800
September	5	<2 - <10	<2 - 90

The raw water is treated through membrane filtration and chlorine disinfection. The treated water is distributed to the systems it serves through the high lift pumps. The average daily treated water sent to the distribution in 2025 so far is 4,134.1 m³/d. The average treated water flow in the third quarter of 2025 is up 2.4% when compared against the average daily flow in the third quarter of 2024. The Tri-County Drinking Water System is currently at 32.1% of its rated capacity. Chart 2 below depicts the treated water flow for 2025 compared to 2024 average daily flows.

Chart 2: Treated water average daily flow in 2025 compared to 2024



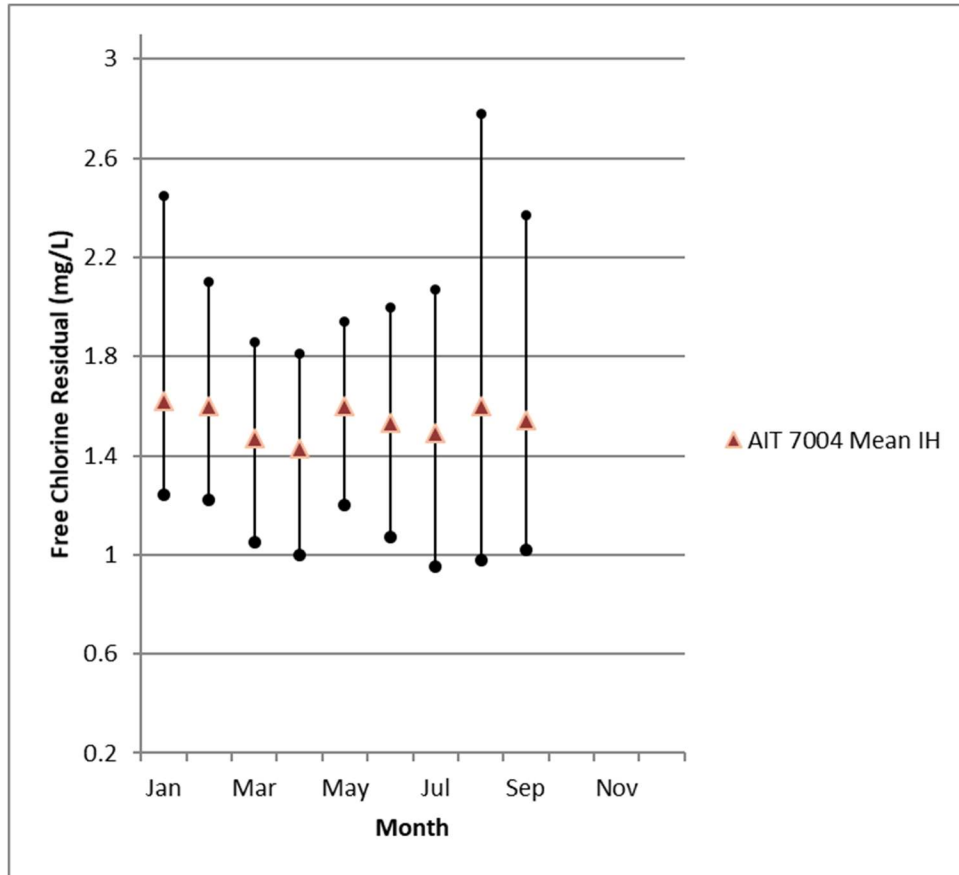
To ensure inactivation of viruses, bacteria and microorganisms the membrane filtration system is required to meet performance criteria for filtered water turbidity of less than or equal to 0.1 NTU in 99% of the measurements each month. The Tri-County Water Treatment Plant has met all regulatory requirements for inactivation in 2025 so far. Table 2 below shows the performance of each filter rack and the overall filter rack performance.

Table 2: Filter Rack Performance in 2025

	Rack 1 % Readings <0.1ntu	Rack 2 % Readings <0.1ntu	Rack 3 % Readings <0.1ntu	Rack 4 % Readings <0.1ntu	Overall Filter Performance (% readings <0.1ntu)
January	100.00	100.00	100.00	99.90	99.98
February	100.00	100.00	100.00	99.80	99.95
March	100.00	100.00	100.00	99.90	99.98
April	100.00	100.00	100.00	100.00	100.00
May	100.00	100.00	100.00	100.00	100.00
June	100.00	100.00	100.00	99.90	99.98
July	100.00	100.00	100.00	99.90	99.98
August	100.00	100.00	100.00	99.40	99.85
September	100.00	100.00	100.00	99.80	99.95

Along with turbidity, chlorine residuals are monitored throughout the treatment process by continuous online free chlorine analyzers. Residuals are maintained in order to provide adequate primary disinfection to meet inactivation of viruses, bacteria and microorganisms. The chlorine also provides adequate residuals in the distribution systems the treatment plant serves (secondary disinfection). Chart 3 below provides the online minimum, maximum and average readings of free chlorine provided to the distribution systems. All results have met regulatory requirements.

Chart 3: Distribution System Free Chlorine Residuals



On a weekly basis the treated water is tested for *E. coli*, Total Coliforms and heterotrophic plate count (HPC). The limit for Total Coliform and *E. coli* is zero. There is no limit specified for heterotrophic plate count (HPC) as this is an operational guide to initiate an action plan if HPC results are continuously high. Table 3 below shows the number of samples taken each month along with the range of results. All samples have met regulatory requirements.

Table 3: Treated water sample results for 2025

	# Samples	Total Coliform Range (cfu/100mL)	<i>E. coli</i> Range (cfu/100mL)	HPC (cfu/100mL)
January	4	0 - 0	0 - 0	<10 - <10
February	6	0 - 0	0 - 0	<10 - 10
March	5	0 - 0	0 - 0	<10 - <10
April	5	0 - 0	0 - 0	<10 - 40
May	4	0 - 0	0 - 0	<10 - <10
June	5	0 - 0	0 - 0	<10 - <10
July	4	0 - 0	0 - 0	<10 - <10
August	4	0 - 0	0 - 0	<10 - <10
September	5	0 - 0	0 - 0	1 - 10

The transmission main (distribution system) is sampled on a weekly basis at two locations for *E. coli*, Total Coliforms and heterotrophic plate count (HPC) to meet regulatory requirements. As with the treated water the limit for Total Coliform and *E. coli* is zero, heterotrophic plate count (HPC) doesn't have a limit. This is an

operational guide to initiate an action plan if HPC results are continuously high. Table 4 below shows the number of samples taken each month along with the range of results.

Table 4: Distribution system sample results for 2025

	# Samples	Total Coliform Range (cfu/100mL)	E. coli Range (cfu/100mL)	HPC (cfu/100mL)
January	8	0 - 0	0 - 0	<10 – <10
February	8	0 - 0	0 - 0	<10 – 10
March	10	0 - 0	0 - 0	<10 – <10
April	8	0 - 0	0 - 0	<10 - <10
May	8	0 - 0	0 - 0	<10 - 30
June	10	0 - 0	0 - 0	<10 - 10
July	8	0 - 0	0 - 0	<10 - 10
August	8	0 - 0	0 - 0	<10 - 10
September	10	0 - 0	0 - 0	<10 - <10

On a quarterly basis trihalomethanes are tested at two locations in the system. The first location is at the treatment plant prior to the water leaving the facility. The second location is at the end of the system, at the West Lorne Standpipe. Sampling from both locations provides information on how the THMs are forming in the system with retention time. There is an issue with elevated THMs in the distribution systems that the Tri-County Drinking Water System provides water to. Table 5 below provides the running average quarterly results; the running average limit for THMs is 100µg/L. All results are within regulatory requirements. However, THMs increase with increased retention time therefore THMs in the distribution system the WTP serves can be much higher, even reaching the regulatory limit.

Table 5: Trihalomethane sampling results

	Limit (µg/L)	Treated Water THM Result (µg/L)	West Lorne Standpipe THM Result (µg/L)
October 2024		52	90
January 2025		16	20
April 2025		22	26
July 2025		28	45
Running Average	100	29.50	45.25

On a quarterly basis Haloacetic Acids (HAAs) are tested as per regulatory requirements. They are sampled at two locations in the system. The first location is at the treatment plant prior to the water leaving the facility. The second location is at the end of the system, at the West Lorne Standpipe. Sampling from both locations provides information on how the HAAs are forming in the system with retention time. Table 6 below provides the current running average quarterly results; the running average limit for HAAs is 80µg/L. All results are within regulatory requirements.

Table 6: Haloacetic Acid sampling results

	Limit (µg/L)	Treated Water HAA Result (µg/L)	West Lorne Standpipe HAA Result (µg/L)
October 2024		28	55.2
January 2025		5.3	5.3
April 2025		15.2	19.4
July 2025		12.9	22.4
Running Average	80	15.35	25.58

SECTION 5: OCCUPATIONAL HEALTH & SAFETY**FIRST QUARTER:**

On March 3rd the annual occupational health and safety inspection was completed. There were no issues identified. There were no additional Health & Safety issues identified in the first quarter.

SECOND QUARTER:

There were no additional Health & Safety issues identified during the second quarter.

THIRD QUARTER:

There were no additional Health & Safety issues identified during the third quarter.

SECTION 6: GENERAL MAINTENANCE**FIRST QUARTER:****JANUARY:**

- 8: Greatario repaired small leak on south storage tank T- 6020.
- 16: Gerber electric Fixed the caustic heater, eagle west panel heater, confirmed silver clay chamber and pioneer line chamber will need new heaters. Installed new limit switch in eagle east chamber.
- 27: Syntec onsite to investigate PRVs and demonstrate proper maintenance.
- 31: Southwest mechanical on site to replace PHC 4736 air regulator.

FEBRUARY:

- 5: Nevro onsite to repair pin hole leaks on high lift line and RFR line.
- 10: Plasco Welding & Fabrication onsite to look at Caustic tank.
- 19: Martins lift truck service on site and completed service on forklift, WO #4353632 Vehicle Lift Truck Clar Insp/Service.

MARCH:

- 4&5: Flowmetrix onsite for annual meter readings. The Pioneer meter failed the inspection and will be replaced later on.
- 13: Plasco on site to perform repair on Caustic Tank.
- 18: Levitt safety onsite for air pack inspection and fit testing.
- 18: Eramosa on site to Fix PDP pump.
- 19: Ontario Compressor on site to inspect compressors.
- 21: Southwest Mechanical onsite to see if they can get the low lift sample pumps pulling water again.
- 25: Gerber's onsite to look at faulting PDP-9010.

25: Waddick onsite for diesel delivery.

SECOND QUARTER:

APRIL:

23: Nevro onsite to begin fixing leak on high lift line.
25: Gerber onsite for heater and AC inspections
25: Hetek onsite for annual inspection on peroxide gas and CO2 sensors.
29: Gerber onsite for heat and ac inspections.

MAY:

22: Plasco on-site to fix leak on Caustic Tank.

JUNE:

17: Keith Douglas onsite for back flow preventer inspections.
18: Deilco onsite at West Elgin North panel to begin commissioning of new panel, did not get finished due to rain. Will come back later.
18: Flowmetrix onsite to replace flow meter in pioneer line chamber behind service center, install spare flow meter on chlorine transfer pump line and install a new purging fitting on cl gas ejector.
18: Southwest Mechanical onsite to repair leaking 4" PVC water line in basement of chlorine gas building.
18: Eramosa onsite to help with the commissioning of the new West Elgin North panel.
24: Ontario Compressor on site for compressor Insp/Maintenance.
25: Keith Douglas onsite for Low Lift back flow preventer Insp/Maintenance.
25: Deilco on-site for commissioning Pioneer Panel (Not finish yet), Eramosa onsite to help with Pioneer panel & to resolve few SCADA alarms.
26: SOM from Eramosa on-site to help Deilco for commissioning west north chamber.
30: Trojan On-site for UV annual maintenance.
30: Eramosa on-site to look at Dialer CL alarm issue.

THIRD QUARTER:

JULY:

2: Flowmetrix onsite to install new chlorine gas detector in chlorination room at low lift.
6: Received diesel for the generator.
8: Trojan onsite for membrane replacement on rack 1.
9: Trojan onsite for replacement membrane replacement on rack 1.
10: Trojan onsite to finish the install of rack 1.
22: Lavo onsite to deliver 12,800 L of sodium hypochlorite.
25: Deilco and Eramosa onsite to continue work on new West Elgin North panel.
28: Eramosa onsite to troubleshoot issues with West Lorne pressure reducing valve not opening for high lift pump 7010 & 7020.
30: Eramosa onsite to investigate loss of communications.

AUGUST:

12: Manitoulin Transport delivered 8 chlorine gas cylinders.
13: Air Liquide delivered 2 carbon dioxide tanks.
27: Air Liquide on site to deliver 2 carbon dioxide tanks.

SEPTEMBER:

- 8: Hetek onsite for CO2 & peroxide sensor calibrations.
- 11: Ontario Compressor Supplies on-site for compressor maintenance. Oil filters changes, changed air filters, new cabinet filters, oil samples obtained on both compressors. Changed float drain in the inline filter.
- 12: Chubb on site, completed fire alarm inspection, back up lighting inspection and fire extinguisher inspection.
- 23: Gerber Electric on-site to fix the storage tank level issue. Checked input and output signal, entered simulated value for T-6020 and showing those levels on SCADA. Confirmed issue with actual level meter and suggested meter replacement.

SECTION 7: ALARM SUMMARY

FIRST QUARTER:

JANUARY :

- 3: Received call for main generator running, inlet valve fault now normal. All low lift pumps faulted and MV7041 stuck, blower A is faulted. Put MV7041 in manual and now normal. Arrived at the low lift building and reset all 4 pumps. Plant switched back to hydro power, Compressor A still faulted.
- 4: Faulted low lift pumps have been reset, LLP 1010 and 1030 are both running. Plant running on compressor B and running well.
- 16: Received alarm for HI-HI turbidity on AIT- 7003 most likely caused from opening cooling lines on UV and stirring up sediment in those lines.
- 21: received call from spectrums for storage tank fault now normal.
- 23: Received text from spectrums "FILTRATE STORAGE TANK FULL" logged on remotely to find tanks were filling and level at 7.24m. After reviewing trending at 11:13 the tank hit 3.09m and at 11:20 the tank was back up 7.21m most likely caused by ice forming in tank and falling into water causing ripples in the water affecting the transducer.
- 23: Received call from spectrums for storage tank fault. logged on remotely and level was normal at 8.00m. After reviewing trending at 1935 the tank hit 4.78m and at 19:41 the tank was back up 7.96m. most likely caused from ice forming in tank and falling into water causing ripples in the water affecting the transducer.
- 24: Received call from spectrums for Wallacetown Tower fault. Logged onsite and found Wallacetown Tower at 8.14m. Placed PRV-7051 into manual and changed manual set point. Flow now at 46 l/s. Wallacetown Tower now at 8.30m placed PRV-7051 back into auto and flow is now at 40 l/s, level now at 9.79m PRV-7051 still running normally with flow at FIT-7052 at 40 l/s. Syntec coming Monday to look at both PRVs.
- 25: Received call from spectrums for storage tank fault. Arrived onsite alarm most likely caused from freezing on the transducer, lo and lo alarms on LIT-6010 as tank 6020 and LIT-6021 are now in duty. Started plant back up and everything looks normal.
- 27: Received call from Spectrums for Rodney tower general alarm. found Rodney tower LIT2 HIHI Alarm; stop setpoint 9m but tank filled to 9.75m and holding. Received call for Wallacetown critical alarm, tower level at 8.09. Spoke with OIC, close the bypass valve on Wallacetown line. Rodney tower current level 9.66m and out of HIHI alarm. Level will continue to drop with consumption. Leaving site.
- 28: Received call from Spectrum for Rodney tower general alarm. Rodney tower appears to have filled after West Lorne and reached level greater than 9.60m. Tower back to 9.48m and alarm call now normal.
- 31: Received call from Spectrums for chemical containment high level or low temp for caustic tank. high level float tripped from ongoing leak. Will discuss with OIC/ORO.

FEBRUARY:

- 1: Received alarm for caustic tank hi level or low temp. Arrived on site; containment float tripped due to high level. Spoke with OIC CR, was instructed to disable the alarm for the weekend due to the ongoing issue. Alarm now disabled.
- 1: Received call from Spectrums for caustic high temp. Arrived onsite, caustic tank temp 35.0 degrees and within setpoint range. Heater is disabled.

- 2: Received call for Rodney tower. Arrived on site, PRV7061 faulted several times. Stopped high lifts, put PRV 7061 into manual then back to auto. High lifts and low lifts are currently off. Rodney tower is now down to 9.68m and out of HIHI alarm. Rodney tower Isolation valve ISV301 failed to close and in HI alarm again. Switched to manual and closed valve. Spoke with ORO SS, changed West Lorne tower setpoints to start at 33m from 34m, and stop at 35m from 36m.
- 12: Received alarm call for storage fault, alarm was for storage tank LO level, tanks currently at 6.50 and 6.39, two high lifts currently running, shut one down to reduce flow leaving plant, storage tanks came out of LO level.
- 17: Received call for generator running and all low lift pumps are faulted. Reset progress drain pump, reset all four low lift pumps, plant now making water. Hydro is still out at WP and low lift, repaired at approx. 6pm. Utility power is now back to both buildings, generators are off, reset low lift pump faults and brought PALL system back online.
- 22: Received call from spectrums for high distribution turbidity. Arrived onsite and restarted high lifts turbidity now at 0.23. Collected sample from north tank overflow. isolating tank until we have lab results back.
- 25: Received alarm call for PALL system critical failure and remotely saw alarm was for too few racks, plant is still currently making water, rack 2 was in idle state, no alarms as to why rack is shut down, placing into forward flow and now making water.
- 25: Received alarm call for turbidity analyzer fault, logged in remotely, distribution turbidity is bouncing around 0.65/0.70, increased Hi-Hi alarm to 0.85.

MARCH:

- 8: Received alarm for Rodney tower general alarm PUC. Rodney tower in HIHI at 9.78, west Lorne standpipe at 36.45, HL still sending water. Changed HL set point from 36.5 to 36 as directed by ORO.
- 8: Received alarm for Rodney tower general alarm. Rodney tower in HI level, called out and began coming down, west Lorne tower is currently at 35.96. High lifts have stopped sending water, Rodney level coming down out of HI currently at 9.68, West Lorne standpipe at 35.50.
- 10: Received alarm for filtrate storage tank fault, found both storage tanks in LO alarm at 6.36m and 6.46m. Hit all 3 low lift page reset buttons. Low lifts duty 1 and 2 started and out of LO alarm.
- 13: Received alarm for less than 3 high lift pumps available, seems there was a CP2000 power loss and high lift pump 2 and low lift pump 2 are faulted. Arrived onsite, reset high lift pump 7020 and closed MV-7041 as it was stuck open. Reset low lift Pumps.
- 14: Received alarm call for filtrate storage, noticed alarms other than storage tanks LO, Communication failure alarm CP1000 – CP2000 Low lift PLC to PALL comms failure. storage tanks are at 6.31 and 6.41 with west Lorne train taking water. Hit all 3 low lift resets, cleared pall alarms, toggled low lift pumps in and out of auto, reset individual low lift pump alarm page. Two low lifts are now running and the storage tank out of LO alarm.
- 15: Received alarm for generator running, high lift 7010 fault, MV- 2002 faults, and CP2000 power fail most likely due to storm. All alarms are normal when logging on, all the PALL equipment is faulted and plant is not making water; plant is switching back to Utility power. Reset PALL equipment, hit low lift and HighLift

SECOND QUARTER:

APRIL:

- 7: Received call for Rodney tower alarm. Logged on remotely and found Rodney tower in high level at 9.73m. Found the high lift to West Lorne tower shut down at 23:24. Checked trending for Rodney tower and found tower had hit high level around 23:24 and only hit a max of 9.73m. High lift is off, level should start coming down will continue to monitor.
- 09: Received call for process drain pump fault. Arrived onsite and found alarm for both processes drain pumps faulted, unsure of reason why both pumps faulted. Reset both pumps and currently watching 9020

runs. Pumps finished run cycle and appear to be operating normally. Will continue to monitor pumps during regular hours.

- 23: Received SCADA alarm for Distribution turbidity 7003 spiked (Max 1.77), HL shut off probably because of sample valves open and closed to collect bacti sample.
- 24: Received low Cl alarm on analyzer 7004. Because sample line connection was loose & leaking, tighten and Cl2 level went down up to 1mg/L and back up to 1.20.
- 24: Received alarm call for main generator and low lift generator running, logged on, reset LLP 1030 and MV-7021. Power is out for entire area. Arrived onsite, Wallace town is running on back up pressure mode. Will continue to monitor. Rodney tower and West Lorne standpipe both lost communications, notified on call operator. Hydro is still out but communications have returned. Received call for generator running now normal & the plant is back on hydro power and all communications have been restored.
- 30: Received alarm for West Elgin standpipe power loss. Everything appears normal on SCADA but was informed they are replacing a hydro pole nearby. Will continue to monitor.
- 30: received call for Wallace town tower low level. Logged on and found alarm for PRV-7061 for West Lorne faulted. PRV-7061 on SCADA appeared closed but its position set point was still saying 5.5% due to the system not thinking the valve was closed due to its position sensor being off. it continued to run a HLP but because the valve was closed all water was going through the surge relive valve and once Wallace town tried to start it wouldn't allow any water to go through it PRV because it was all going through the SRV. Manually opened PRV to Wallace town so it would start sending water. Arrived onsite and shut HLP down manually adjusted position set point on PRV - 7061 so it is now at 0.0% instead of 5.5%. Started HLP and started sending water to Wallace town. Started West Lorne train up and shut it down to make sure issue wasn't occurring again, everything appears normal.

MAY:

- 12: Received alarm from spectrums for cl tank loss of echo. Logged on remotely and found cl level transmitter LIT-8002 appeared to have had a spike level dropped down to 3.34m then back up to 3.83m. Will speak with SOM in morning about having unit inspected.
- 16: Received call from spectrums for main generator running. Logged on remotely, plant running on generator likely due to storm in the area everything seems to be operating normally will continue to monitor. Plant still on generator, Hydro one map says power is expected to come back at 05:45. Appears plant had switched back to normal power around 06:00.
- 16: Received alarm for main generator running. Logged on remotely and found plant back on main power. power flicker occurred. Generator has now turned off.
- 26: Received alarm call from Spectrum for standpipe comms loss, attempted to log in remotely and cannot establish connection. Arrived on-site, plant is running on pressure mode, comms is down from plant to West Lorne tower, Wallacetown and Rodney, internet is out area wide, will speak with provider to see when restoration is expected. Plant still operating on backup pressure mode, both trains are sending water, have not received a restoration time from NFTC yet.
- 27: Received alarm of Wallacetown tower going into high level from Dutton On-call, changed backup pressure mode setpoints to shut down feed to Wallacetown.

JUNE:

- 01: Received an alarm call for West Lorne standpipe, logged on remotely and saw that standpipe hollow level alarm, currently 28.9, not sending water. Arrived on-site, saw PRV 7061 was commanding to open but the position was not changing cycled power to unit, once back on PRV began to show that it was opening, will continue to monitor. Flow to West Lorne now 75Lps; tower is filling currently at 28.30. West Lorne standpipe now out of low-level alarm, level 29 and continuing to increase, leaving site.

- 05: Received call in other area for high Wallacetown Tower logged on to inspect issues. Appears West Lorne train may be feeding Wallacetown Tower while filling West Lorne causing it to go into high level. Shut West Lorne train down for now and wait for it to start again to see if the issue continues.
- 09: Received alarm call for Pall critical failure, racks 1 & 2 are disabled due to high turbidity, tried resetting and ran air scrub on rack 1 and tried to bring back online but turbidity values appear frozen. Arrived on-site, removed power cord from turbidity unit in rack one to reset, once plugged back in turbidity readings immediately changed, bringing racks back online, Racks 1 and 2 now in steady water production state, turbidities down to normal level, leaving site.
- 11: Received alarm call for building intrusion. inspected all doors at main building and low lift building, ensured all were tight and fastened, did not find any issues, alarm has cleared will re arm alarm system.
- 14: Received alarm call for Pall critical failure, will log on remotely and inspect. Logged on remotely, found Pall failure was for strainer high differential pressure, strainers had faulted had to reset system modes, then brought filters back online, once online monitored operation, strainers went through backwash and plant is making water. Remotely checked on plant again, everything appears to be running normal, strainers are running good plant is making water.
- 15: Received alarm call for pump fault, logged on remotely, saw alarm is for too few high lifts available. Arrived on-site, reset VFD on high lift pumps 1 and 2, faults cleared, high lift pump 2 now running will continue to monitor. Plant lost utility power and switched to the generator then back to utility. utility power is showing 599/620/603. Power flickered again, leaving the generator running for now until peak demand drops. Shutting down high lifts, will switch back to utility power and see if power is stable. Utility power looks more stable at 597/617/603, leaving site.
- 16: Received alarm call from spectrums for main generator running. Logged on remotely and found the plant was switching back to normal power. Air compressor A & B both faulted, reset both compressors. Plant appears to be running normally.
- 16: Received call from spectrums for main generator running. ran generator until peak demand dropped to stop the generator from switching on and off causing hard stops on the plant. Switched the plant back to utility power.
- 16: Received call from spectrums for low lift basement gas alarm. Found a leak in the basement water line. shut cl gas off for the night.
- 22: Received alarm for main generator running. It appears the power has switched back and fourth multiple times. ORO suggest to leave generator on to minimize the amount of hard stops on the plant. switched power back to normal power and switched back to generator 2 times since running in normal power. Switched back to the generator for now. Arrived onsite and switched the plant back to normal power.
- 22: Received alarm for critical process alarm. found another power flicker and high lift pump 7020 faulted. Reset high lift 7020. power is still going back and forth between normal and generator. leaving in generator mode for a bit more and then will switch it back again. switched plant back to normal power & appears to be running fine on normal power.
- 25: Received alarm call for main generator running. Remotely reset high lift pump one, and the air compressors, plant is making water and still on generator power. Reset high lift pump 7020, both trains are filling and plants are making water. Switched plant back to Utility power, plant making water and one high lift going.
- 27: Received alarm call for main generator running, reset most equipment remotely, plant is making water, one high lift pump is faulted. Switched plant back to Utility power, starting Wallacetown train, and plant back up again. Plant running on Utility power, making and sending water fine.
- 28: Received call from SOM Sam smith to adjust West Lorne tower stop and start set points to help keep the tower full due to a large fire in town. Changed stop set point from 36m to 37m and start from 33m to 34m & return set point to previous state at 14:28.
- 28: Received alarm call for main generator running inlet strainer fault. Plant has switched back to Utility power, reset compressors and all faulted equipment, plant and high lifts started, received 2nd call that Plant running on generator power, transfer switch possibly faulted. Reset compressors and plant making water again, one high lift pump running. Arrived onsite to change the plant from generator power to normal power.

29: Received alarm call for inlet chlorine low alarm Called the dialer & all channels were normal. No alarm history on SCADA as well. The inlet chlorine reading has been above its low alarm set point all day, no alarms present, instructed answering service to hold the alarm until the morning and will fix during working hours as directed by ORO.

THIRD QUARTER:

JULY:

- 1: Received alarm call for main generator running arrived onsite, switched plant back to utility power.
- 2: Received alarm call for main generator running, plant has switched back to utility power
- 3: Received alarm call for distribution chlorine residual analyzer 7004 LO alarm now normal. Prompted Wallacetown train to start to get fresh flow of water through analyzer. Alarm call most likely due to the high lifts not running in a while and water back feeding the analyzer.
- 3: Received alarm call for main generator running. Put plant back on utility power.
- 5: Received alarm call for main generator running. Arrived onsite to switch back to utility power
- 6: Received generator running alarm. Arrived onsite to switch plant back to utility power.
- 8: Received alarm for main generator running. Arrived onsite to switch plant back to utility power.
- 8: Received alarm for Wallacetown Tower low level due to high demand in the area and hydrant flushing due to community complaint.
- 9: Received alarm call for low discharge chlorine level. Highlifts starting to send water. Increased cl residual set point from 1.90 to 1.95.
- 9: Received call for main generator running. Logged on remotely, hydro back on utility power reset UV and plant appears to be running normally.
- 10: Power flickered multiple times between generator and normal power. Switched to generator power until peak demand is over. Arrived onsite and shut generator down.
- 11: Power flickered multiple times between generator and normal power. Switched to generator power until peak demand is over. Onsite to switch power back to generator.
- 12: Received alarm for main generator running. Leaving on generator power until peak demand is down. Onsite to switch power back to generator.
- 13: Received a now normal alarm on inlet strainer. Arrived onsite and found there had been a power flicker. Power switched over to generator and will change back after peak demand. Arrived onsite and switched power back to utility.
- 14: Power flickered from generator to normal power. Switched plant to generator power. Arrived on-site to switch back to utility power.
- 14: Received alarm call for chlorine tank fault, logged on remotely, alarm is for chlorine day tank 8002 loss of echo, tank is not in use, will disarm alarm and notify daytime operator.
- 23: Received call from spectrums for HIHI distribution chlorine analyzer. Cleaned probe, probe housing and refilled electrolyte in probe cap.
- 24: Received alarm for Rodney Tower fault and high lift pump fault. Shut down high lifts feeding West Lorne Standpipe to stop flow to Rodney. Arrived onsite and reset both high lift pumps. Notified West Elgin on-call operator.
- 27: Received alarm for high lift pump fault. Arrived onsite and found HLP 7010 & 7020 faulted with input phase loss alarm. Reset both VFDs.
- 28: Received alarm for UV outlet chlorine analyzer fault. Chlorine pump diaphragm damaged.
- 28: Received alarm call for communication failure alarm cp2000- cp1000. Switched the plant back to utility power and communication was restored.
- 30: Received alarm call for main generator now normal. Duty one and two low lifts are operating.

AUGUST:

- 1: Received alarm call for discharge chlorine 7004 low chlorine, chlorine reading at 1.09, low set point is 1.10. Suspected due to less water going out of the plant because the Iona flow control valve is filling the Wallacetown Tower. Raised chlorine set point from 2.10-2.20.
- 1: Received alarm call for UV #2 fault. Unable to reset remotely. Duty storage tank is at 9m and plant will remain off.
- 2: Arrived onsite to perform extra testing to monitor conditions for a yellow water event.
- 3: Arrived onsite to perform extra testing to monitor conditions for a yellow water event.
- 3: Received alarm call for Rodney Tower LO chlorine alarm, sitting at 0.39 free chlorine. Alerted on call operator for West Elgin Distribution.
- 4: Received alarm call for main generator running and inlet strainer fault. Logged on, plant is back on utility power.
- 5: Received alarm for UV chlorine discharge fault and shut the plant down. Analyzer 5006 reading was at 0.00 started plant again and value began rising, watched pumps and monitored.
- 5: Received alarm call for UV chlorine analyzer fault. Took chlorine pump 8030 out of service and running again on chlorine pump 8040. Low chlorine possibly due to pumps switching to 8030.
- 5: Received alarm call for main generator running. Suspected power flicker. Plant back on utility power. Reset UV's, reset lowlift page.
- 5: Received alarm call for Rodney Tower low chlorine. Notified West Elgin Distribution on call operator. High lift pump started to send water to Tower.
- 8: Received alarm call for main generator running, strainer inlet fault now normal. Power flicker. Generator running.
- 9: Received alarm for power flicker, logged on and reset UV, reset low lifts and reset compressors and PALL system equipment, plant is still on generator and running. Arrived onsite, reset transfer switch, plant is now running on utility power, fuel level is at half.
- 10: Received alarm call for main generator running. Arrived onsite to switch plant back to utility power, reset transfer switch, reset UV's, reset low lifts. Plant now running on utility power
- 11: Received alarm for main generator running logged on and found there had been a power flicker and the transfer switch had failed. Arrived onsite and reset the transfer switch the plant switched back to utility. Reset both compressors and High lift 7020.
- 12: Received alarm for filtrate storage tank fault. Took apart and cleaned all 4 strainers. Plant now back online and doing well.
- 12: Received alarm for high lift pump fault and Wallacetown Tower fault. Logged on remotely and found high lift pump 7020 faulted and Wallacetown Tower in low level 8.18 causing the fault. Issue due to power flicker due to storm in the area.
- 13: Received alarm for main generator running. Leaving plant on generator power until peak demand is over.
- 14: Received alarm for main generator running. Logged on remotely and power was back on utility reset UVs and high lift pump 4 rotork valve.
- 16: Received alarm for main generator running leaving on until peak demand is over.
- 19: Received alarm call for low lift meter fault, logged on remotely and found alarm to be for FIT 1017 signal error, flow shows to be stuck at 64.24. Checked meter at low lift and was showing alarm for electronics fail. No flow going through meter and it's still reading 64 l/s. Switched line from west to east.
- 24: Received alarm call for dialer Channel 48, logged on remotely, found alarm was for raw water aquarium LOLO DO, sitting at 2.90 now, appears to have steadily dropped from normal reading.
- 25: Yellow water event
- 26: Yellow water event.
- 27: Yellow water event.
- 28: Yellow water event.
- 29: Yellow water event.
- 30: Yellow water event.
- 31: Yellow water event.

SEPTEMBER:

- 7: Received alarm call for UV reactor 1 faulted. Found UV reactor 1 faulted. Reset low lift pumps and UV fault reset. Onsite reset the UV reactor 1 from HMI panel. Continuing monitor the plant.
- 8: Received alarm call for Rodney Tower general alarm. Logged on remotely and found alarm for Rodney Tower HIHI level. Informed West Elgin Distribution on-call operator. Changed set-points to stop flow to the Tower.
- 21: Received alarm for treated water storage tank fault. Logged on remotely and found the signal for storage tank 9020 had dropped and reading was showing 0.00. Duty storage tank still reading. Call to Eramosa required.
- 28: Received alarm call for UV 1 fault. Logged in remotely, UV 1 was still in fault, fault reset.

SECTION 8: COMMUNITY COMPLAINTS & CONCERNS

FIRST QUARTER:

There were no complaints or concerns reported during the first quarter.

SECOND QUARTER:

There were no complaints or concerns reported during the second quarter.

THIRD QUARTER:

JULY:

8: Multiple community complaints received in West Elgin for taste and odour concerns, customers indicating their water tastes like dirt. Suspected Geosmin/MIB in water which was confirmed with sampling. AOP system brought online. Flushing at storage tanks and in the distribution system. Complaints logged in OPEX.

SECTION 9: GENERATOR RUNTIMES

Table 7: Tri-County Generator Run Time Breakdown Totals:

	Generator	Maintenance (hrs)	Brown Out or Power Outage (hrs)	IESO Demand Response (hrs)	Monthly Totals (hrs)
January	Main	1.1	3.5	0	4.6
	LLPS	1.1	3.1	0	4.2
February	Main	1.1	3.3	0	4.4
	LLPS	1	3.4	0	4.4
March	Main	2.2	0.3	0	2.5
	LLPS	2.2	0	0	2.2
April	Main	1.2	4.6	0	5.8
	LLPS	1.1	4.5	0	5.6
May	Main	1	3.5	0	4.5
	LLPS	.9	3.3	0	4.2
June	Main	0	0	5	5
	LLPS	0	0	5	4.9
July	Main	0	97.8	8	105.8
	LLPS	1.3	0	8	6.7
August	Main	0	21.4	8	29.4
	LLPS	0	0	8	5.5

September	Main	1.1	14.3	0	15.4
	LLPS	1.1	4.8	0	5.9
October	Main	-	-	-	-
	LLPS	-	-	-	-
November	Main	-	-	-	-
	LLPS	-	-	-	-
December	Main	-	-	-	-
	LLPS	-	-	-	-
YTD Totals	Main	7.7	148.7	21	177.4
	LLPS	8.7	19.1	21	43.6
YTD Total Combined	-	16.4	167.8	42	226.2

Technical Memo: Taste and Odour Issues in the Tri-County Drinking Water System

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Tri-County Water Treatment Plant

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Table of Contents

1. Background	4
1.1 Treatment Processes.....	4
1.2 Water Quality Concerns	5
2. MIB and Geosmin.....	6
Tri-County WTP Advanced Oxidation Process (AOP)	7
2.1 AOP Process	7
2.2 Optimizing AOP for Taste and Odours	7
3. Recommendations	8
4. Conclusions	9
5. References	9

List of Tables

Table 1 MIB (2-Methylisoborneol)/Geosmin Results July 8th, 2025	6
Table 2 AOP Optimization Summary.....	8

List of Figures

Figure 1 - Tri-County Simplified PFD	5
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1. Background

The Tri-County Drinking Water System (DWS) serves the municipalities of West Elgin, Dutton-Dunwich, Southwest Middlesex, Chatham-Kent, and the Village of Newbury. It is located at 9210 Graham Road in West Lorne, Ontario. The plant and system are owned by the Tri-County Water Board (the Board) and are operated by the Ontario Clean Water Agency (OCWA).

1.1 Treatment Processes

The Tri-County DWS consists of the Tri-County Water Treatment Plant (WTP), the Tri-County Transmission Main and the West Lorne Standpipe. The Tri-County WTP is a membrane filtration, water treatment facility with a total design capacity of 12,160 m³/day (MDWL 043-101). The WTP receives and treats water from Lake Erie, and consists of an intake system, a low lift pumping station, treatment and distribution pumping systems.

- The intake consists of one 700 mm diameter polyethylene pipe extending approximately 610 m into Lake Erie at a depth of 5.7 m. A gas chlorine zebra mussel chemical control system located in the intake is used seasonally. There is a second intake located at the shoreline, this is used only as a backup if required due to water quality issues or a blockage.
- The raw water is screened by two coarse screens prior to being sent to the Low Lift Pumping Station.
- At the water treatment plant, the water is pre-filtered by four automatic 200-micron strainers to protect the filter membranes from coarser particles and algae in the raw water. The raw water pH is adjusted using carbon dioxide, as required. After the water is strained, it goes through the membrane filtration system, which removes fine particles, sediment, algae, protozoa and bacteria.
- During summer months, the filtered water is then directed through the UV/hydrogen peroxide advanced oxidation process (AOP) for taste and odour control.
- Chlorination for disinfection of the treated water is dosed upstream of the treated water storage tanks (for primary disinfection). From the storage tanks, four high lift pumps pump the water into the distribution network. A second dosing point for secondary disinfection is downstream of the high lift pumps before the distribution but is not currently being used at the facility. **Figure 1** shows a Process Flow Diagram (PFD) of the system.

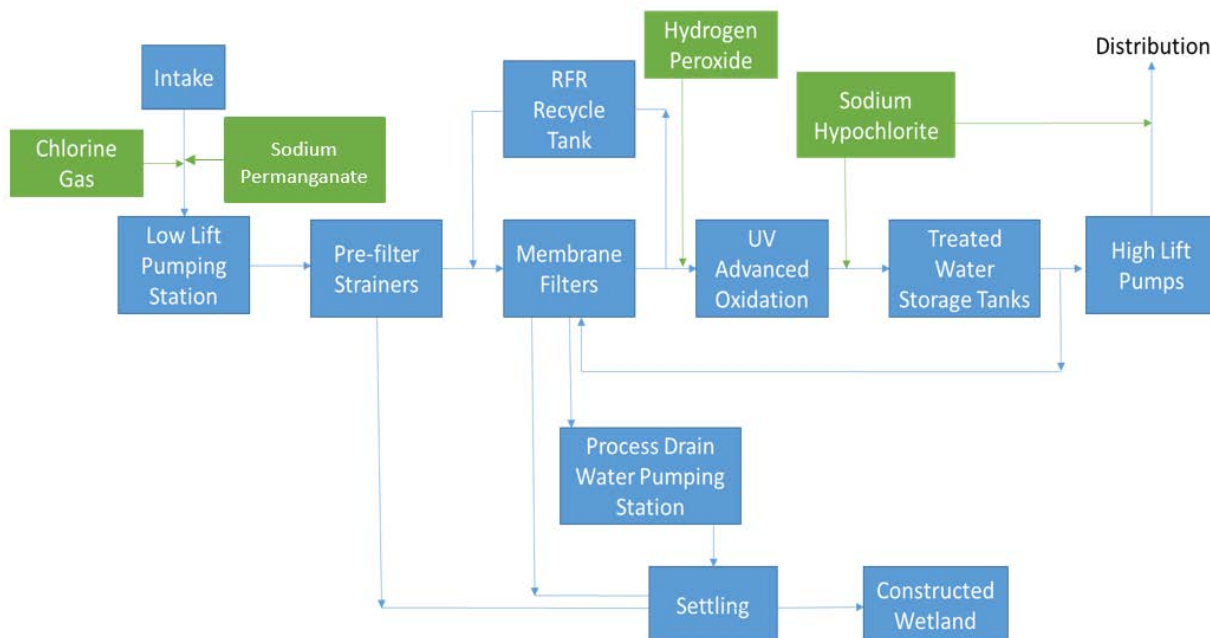


Figure 1 - Tri-County Simplified PFD

1.2 Water Quality Concerns

Historically, the Tri-County DWS has experienced water quality issues related to fluctuations in the source water, including colour, disinfection by-products, and more recently, taste and odour challenges. These challenges have been attributed to:

- Elevated dissolved manganese levels due to anoxic conditions in warmer source water during late summer months
- Increased algal growth in Lake Erie, resulting from unusually warm weather and inhibited lake turnover

In 2022, OCWA's Innovations, Process Optimization and Technical Services (IPOTS) team conducted a study investigating coloured water events at the WTP. Additional samples were collected to support the study. Alongside routine sampling, a one-time analysis of parameters (lead, copper, chloride, hydrogen sulphide, and nitrogen species) commonly associated with taste and odour issues in drinking water was performed to rule out other causes of discoloured water. The results indicated that these parameters were below both aesthetic objectives and Maximum Acceptable Concentrations (MAC), and were not considered a concern at that time.

In July 2025, OCWA staff received complaints from residents regarding taste and odour in their drinking water. The operations team promptly investigated potential causes. At this time the AOP was not in operation in an effort to conserve energy and reduce the costs of chemicals. Historically, the AOP has been operated starting in early August to ensure all systems are fully functional in advance of a yellow

water event which typically occurs in late August or early September. On July 8, 2025, samples were sent to the laboratory, which confirmed the presence of taste and odour compounds. The results are summarized below Table 1:

Sample Location	MIB (ng/L)	Geosmin (ng/L)
Raw Water	< MDL (3)	4
Treated Water	6	8
Distribution Water	9	10

Table 1 MIB (2-Methylisoborneol)/Geosmin Results July 8th, 2025

Note: The method detection limit (MDL) for these compounds is 3 ng/L.

In response to the detection of 2-Methylisoborneol (MIB) and geosmin, the operations team initiated continuous use of the AOP through the summer months and updated operational practices to monitor source water for these compounds.

This technical memo is intended to provide background on MIB and geosmin and to support the operations team in optimizing plant conditions to effectively treat these compounds and prevent taste and odour issues in the treated water.

2. MIB and Gesomin

MIB and geosmin are both naturally occurring compounds produced by microorganisms such as cyanobacteria (blue-green algae). They are known for causing earthy or musty odours in water, especially in drinking water. Although these compounds are not harmful to health, they are aesthetically unpleasant and detectable by humans at extremely low concentrations (as low as 5 ng/L).

In Ontario, and more broadly in Canada, as per the *Canadian Guidelines for Drinking Water Quality* published by Health Canada, MIB and geosmin are not regulated as health-based contaminants in drinking water. Instead, they are addressed under aesthetic objectives due to their impact on taste and odour. These compounds are not considered toxic at levels typically found in drinking water, and no Maximum Acceptable Concentrations (MAC) have been established. Utilities are encouraged to monitor MIB and geosmin levels, particularly during algal bloom seasons, and to apply treatment methods such as activated carbon or advanced oxidation.

Similarly, Ontario Regulation 169/03 under the Safe Drinking Water Act sets enforceable standards for microbiological, chemical, and radiological parameters, but does not include MIB or geosmin. While there is no legal requirement for testing for these compounds, utilities are expected to respond to taste and

odour complaints and take corrective actions under Ontario Regulation 170/03 to maintain public confidence in water quality.

Water treatment for MIB and geosmin presents challenges due to their strong odour at extremely low concentrations and their chemical stability, which makes them resistant to conventional treatments like chlorination. The most effective methods for removing these compounds include activated carbon adsorption and advanced oxidation processes (AOPs). The carbon adsorption process includes the use of powdered activated carbon (PAC) for short-term control and granular activated carbon (GAC) for long-term filtration. AOPs, such as ozonation and UV/H₂O₂, break down these compounds using strong oxidants or hydroxyl radicals, though they can be energy-intensive. Biological filtration, often following ozonation, uses biofilms to degrade MIB and geosmin under stable microbial conditions. Source water management is a preventative strategy involving monitoring algal blooms, aeration, and cautious use of algaecides to minimize release of these compounds. Membrane filtration methods like nanofiltration and reverse osmosis can remove MIB and geosmin but are less commonly used due to high costs. Treatment selection depends on the scale, budget, and nature of the contamination, with PAC and GAC being the most common for seasonal and continuous control, respectively. The Tri-County WTP process includes a UV/H₂O₂ advanced oxidation process to treat MIB/geosmin.

Tri-County WTP Advanced Oxidation Process (AOP)

2.1 AOP Process

The AOP at the Tri-County Water Treatment Plant is in place to treat the taste and odour compounds in the water. This process uses a combination of hydrogen peroxide and UV to oxidize the taste and odour compounds before they reach the consumer. Because these compounds are not always present, the system is designed such that the AOP system can be initiated when issues arise. Due to the fluctuating presence of taste and odour compounds, some operational adjustments may be required. Below are some recommendations to control the AOP system through MIB and /or geosmin events.

2.2 Optimizing AOP for Taste and Odours

Optimizing **hydrogen peroxide (H₂O₂) dosing** in a **UV/H₂O₂ AOP system** for MIB and geosmin treatment involves balancing radical generation efficiency with operational cost and safety. In UV/H₂O₂ AOPs, radical generation refers to the formation of highly reactive chemical species known as hydroxyl radicals (•OH). These radicals are produced when hydrogen peroxide (H₂O₂) is exposed to ultraviolet (UV) light, which causes the H₂O₂ molecules to dissociate. The resulting hydroxyl radicals are extremely reactive and non-selective, meaning they readily attack a wide range of organic contaminants present in water. This mechanism is particularly effective for degrading compounds such as MIB and geosmin. The efficiency of radical generation is influenced by several factors, including UV intensity, H₂O₂ concentration, and the presence of radical scavengers like natural organic matter in the form of Total Organic Carbon (TOC) or Dissolved Organic Carbon (DOC). Optimizing these conditions is essential to ensure sufficient radical

production for effective contaminant removal while minimizing excess chemical use and operational costs.

Optimal operating conditions for the UVAOP system are outlined in Table 2 below.

Parameter	Optimization Strategy
H ₂ O ₂ Dose	2–10 mg/L based on water quality and target removal
Monitoring	Online sensors for H ₂ O ₂ and UV Weekly samples of MIB/geosmin, TOC/DOC Daily in house readings of UVT
Residual Management	Target H ₂ O ₂ residuals of 1-5 mg/L post-AOP
pH Range	6.5–7.5
Temperature	Moderate (20–25°C ideal)

Table 2 AOP Optimization Summary

3. Recommendations

Monitoring for MIB and geosmin should begin and continue throughout the algae bloom season (June 1st to October 30th). During this period, the AOP process should also be proactively activated at a low dose to treat any taste and odour compounds that may arise during this time. Note that as climate change expands the warm weather season, this period of increased monitoring and activation of the UVAOP system may be warranted as early as April (CBC, 2025), depending on winter and spring temperatures, as monitored in Lake Erie.

The monitoring plan should include weekly sampling of MIB and geosmin concentrations, as well as TOC/DOC levels, all in both the raw and treated water. Additionally, UV transmittance (UVT) and hydrogen peroxide (H₂O₂) residuals in the AOP effluent should be monitored daily to track changes in water quality between weekly samples. Comparing the MIB and geosmin concentrations in the raw and treated water will indicate whether the AOP system is effective, while the other parameters are essential for determining the appropriate H₂O₂ dosage. Based on the sample results, the AOP system should be adjusted by modifying the H₂O₂ dose and UV intensity to ensure optimal treatment efficiency and to respond to fluctuations in organic load and contaminant levels.

Hydrogen peroxide dose typically ranges from 2–10 mg/L, depending on initial levels of MIB and geosmin and TOC/DOC. Periods of time with elevated levels of MIB, geosmin and/or organics will increase the demand of the hydrogen peroxide. If TOC levels rise above 4.0 mg/L or UVT drops below 85%, the H₂O₂ dose should be increased incrementally (e.g., by 5–10 mg/L) and UV intensity should be adjusted to maintain the effective dose. Additionally, maintaining pH between 6.5–7.5 and considering temperature effects is crucial for optimal radical generation and minimizing volatilization of target compounds.

If MIB or geosmin concentrations exceed 5 mg/L in the effluent, there is a chance of taste and odour events in the distribution system, so the H₂O₂ dosage in the AOP system should be increased. The Tri-County WTP AOP system has real-time control via online H₂O₂ analyzers which measure the H₂O₂ residual

after the AOP system. Controlling the H_2O_2 added such that this residual H_2O_2 is less than 1mg/L can reduce chemical costs and minimize the need for post-treatment quenching. However, in events where MIB or geosmin exceed 5ng/L in the raw water, a residual H_2O_2 of 1-5mg/L should be targeted to ensure sufficient removal, noting that increased chlorination may be required for quenching residual H_2O_2 .

Additional processes such as activated carbon could be considered for additional removal of MIB and geosmin however these are not currently warranted as the installed UVAOP is designed for this purpose and should be capable of meeting this need with sufficient monitoring and optimization.

4. Conclusions

The Tri-County Water Treatment Plant (WTP) has faced ongoing source water challenges, including the presence of algae, elevated levels of iron and manganese, increased organics, and more recently, taste and odour compounds such as MIB and geosmin. In response to coloured water events caused by iron and manganese, a pilot project was initiated in 2022 to evaluate the effectiveness of a potassium permanganate dosing system. The treatment system at the Tri-County WTP includes a UVAOP system that is capable of addressing taste and odour concerns, including concerns from MIB and geosmin.

As MIB and geosmin are not always present, the UVAOP was offline for efficiency purposes in July 2025 when taste and odour issues occurred. The OCWA operations team responded promptly by activating the UVAOP and performing sampling which confirmed that MIB and geosmin were the cause of the taste and odour issues. Proactive activation of the AOP system and enhanced monitoring of these compounds is recommended during the algae bloom season when these compounds are likely to be detected. Furthermore, OCWA's IPOTS team has provided technical guidance on AOP optimization and will continue to support the local operations team during these events.

5. References

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5.0 IMPLEMENTATION PLAN / PROJECTS (REVISED)

Based on the earlier sections of the report, the following implementation plan, complete with proposed projects, and programs has been developed to assist the OCWA in moving from their current state through the recommendations for the SCADA system. The following is a summary table of the proposed projects, timeline for implementation and estimated cost for planning purposes.

Detailed project budgets are shown in Appendix A.

Table 41 – Completed Projects

Project Title	Project Description	Duration/Timeline	Estimated Cost
Completed Projects			
Workstation Replacement (COMPLETED 2023)	Replacement of legacy Windows OS and complete an upgrade to the latest version of FactoryTalk View SE. Included in the replacement there is engineering and programming effort for the transition from the current FactoryTalk View SE to the latest version. The current UPS power within the WTP control room is also aging and has been included to replace the UPS in this project.	COMPLETE	\$25,000.00
Historian Server Replacement (COMPLETED 2023)	Replacement of legacy Windows OS and complete an upgrade to the latest version of FactoryTalk Historian SE. Included in the replacement there is engineering and programming effort for the transition from the current FactoryTalk Historian SE to the latest version.	COMPLETE	\$26,000.00
Years 1 & 2 PLC Components Procurement (Remotes) (COMPLETED 2024)	To make use of the available 2023 SCADA upgrade budget, we recommend the procurement of the PLC component hardware (PLC Processors, Power Supplies, Networking modules, I/O Modules, etc.). By procuring long lead time PLC components, Tr County is protected from project delays later due to PLC part component procurement, Contractor mark up on PLC components, additional inflation on the costs of these parts, and also satisfies in the short term the need for a spare stock of PLC components.	COMPLETE	\$99,000.00
Year 3 PLC Components Procurement (WTP LLPs) (COMPLETED 2024)	To make use of the available 2023 SCADA upgrade budget, we recommend the procurement of the PLC component hardware (PLC Processors, Power Supplies, Networking modules, I/O Modules, etc.). By procuring long lead time PLC components, Tr County is protected from project delays later due to PLC part component procurement, Contractor mark up on PLC components, additional inflation on the costs of these parts, and also satisfies in the short term the need for a spare stock of PLC components.	COMPLETE	\$77,000.00
Remote Panel Replacements/Upgrades (COMPLETED 2024)	This project is intended to replace the legacy PLC products installed in the field. The project will identify the phases of upgrades required starting with legacy I/O card replacement, CPU/communication card replacement, or complete PLC replacement at the site based on the current age and condition of the equipment. The overall project will include the engineering of the new control panels and software integration. It includes coordinating with an electrical contractor for manufacturing the hardware replacement of the panels, construction administration and commissioning. Pioneer Line Meter Chamber and West Elgin North Meter Chamber have been completed.	COMPLETE	\$90,000

Table 42 – 2024 Projects – Remaining as of Oct 2025

Year 0 (2024) Projects – Outstanding to be completed in 2025			
Remote Panel Replacements/Upgrades Eagle East moved to Year 1 (2025) below.	This project is intended to replace the legacy PLC products installed in the field. The project will identify the phases of upgrades required starting with legacy I/O card replacement, CPU/communication card replacement, or complete PLC replacement at the site based on the current age and condition of the equipment. The overall project will include the engineering of the new control panels and software integration. It includes coordinating with an electrical contractor for manufacturing the hardware replacement of the panels, construction administration and commissioning. Pioneer Line Meter Chamber, West Elgin North Meter Chamber and Eagle East Meter Chamber have been identified as the highest priority due to poor condition of the panels and replace the legacy PLC products.	8 months Target Dates Start Jan. 2024 2025 Complete Sept 2024 2025	\$159,000 (Adjusted to remove Prepurchased PLC parts. Pioneer Line, and West Elgin North)
PALL Industrial Computer Removal	This Industrial Computer is running a legacy Windows OS and should be removed from the SCADA system. The industrial PC would be powered down and removed from the panel and a filler plate installed where the panel hole is.	1 month Target Dates Complete Dec 31, 2023 2025	Internal Forces (\$0)
Low Lift Panel Repair	Repairs to panel door latch and wiring damaged by mice.	1 month Target Dates Complete Dec, 2025	\$2,000

Table 43 – Year 1 Projects – Remaining as of Oct 2025

Year 1 (2025) Projects			
Remote Panel Replacements/Upgrades Eagle East Meter Chamber	The large stainless panel at Eagle East in in need of repair or replacement, and houses a very old PLC. It is suspected that this panel is abandoned, and should be investigated to verify. Budget for this project contains \$60,000 for replacement of the MicroLogix panel, \$3,000 for investigation into the large stainless panel, and \$28,000 for full removal of the stainless panel and remounting of the new PLC panel, provided the large panel is confirmed to be abandoned.	8 months Target Dates Start Jan. 2024 2025 Complete Sept 2024 2025	\$91,000
Cybersecurity Upgrades Phase 1	This project is comprised of the Cybersecurity Phase 1 projects outlined in Section 4.4.2.1. Refer to the Cybersecurity Maturity Assessment Report for full details.	1 year Target Dates Start Oct 2025 Complete Sept 2026	\$109,000
Network Organization and Hardware Audit	This project is intended to review and update the network drawing for connections. The review would include investigation of SCADA networking hardware in the Tri-Counties WTP, as it has recently been noted to be outdated. Panel cabling should also be addressed. This price includes documentation updates and hardware analysis, but not hardware replacement costs, as the correct hardware must be ascertained during review/design.	1 month Target Dates Start June Oct 2025 Complete July Nov 2025	\$11,000 \$25,000
DeviceNet Audit	This project is intended to review the plant’s control infrastructure to document all existing DeviceNet nodes and interface devices. Since DeviceNet is deprecated and spare parts will become difficult to find, the plant should be migrated to Ethernet. This may require replacing communications modules or entire devices, such as valves or VFDs, so an audit must be completed first to properly understand the scope. Estimated pricing includes a site audit of all DeviceNet subnetworks and the creation of documentation identifying each node in the field and the current hardware availability status, as well as suitable Ethernet replacements and migration paths, for each device. Initial analysis of potential PLC migration from ControlLogix to CompactLogix.	1 month Target Dates Start Oct 2025 Complete Nov 2025	\$25,000

Table 44 – Year 2 Projects – Remaining as of Oct 2025

Year 2 (2026) Projects			
Remote Panel Replacements/Upgrades Glencoe Meter Chamber Eagle West Meter Chamber	This project is intended to replace the legacy PLC products installed in the field. The project will identify the phases of upgrades required starting with legacy I/O card replacement, CPU/communication card replacement, or complete PLC replacement at the site based on current age and condition of the equipment. The overall project will include the engineering of the new control panels and software integration. It includes coordinating with an electrical contractor for manufacturing the hardware replacement of the panels, construction administration and commissioning. Glencoe Meter Chamber, Eagle West Meter Chamber, Wallacetown Elevated Tank and West Lorne Standpipe have been identified as the next highest priority due to condition of the panels and replace the legacy PLC products. Moved from Year 1(2025) to allow budget for Cybersecurity. Wallacetown and West Lorne moved to Year 4 (2028). Updated pricing is based on these panels being full panel replacements that will closely emulate the Pioneer Line/WE North updates (~\$47,000), plus replacement of MeterMaster units (See Section 4.6), contingency and inflation (total \$60,000/panel).	8 months Target Dates Start Sept 2024 Dec 2025 Complete June 2025 Aug 2026	\$159,000 Total - \$120,000 (Adjusted to remove Prepurchased PLC parts) Glencoe - \$60,000 Eagle West - \$60,000
WTP Controller Replacements	Low Lift moved to Year 3 (2027). High Lift and PALL PLCs moved to Year 5 (2029).		\$192,000
Cybersecurity Upgrades Phase 2A	This project is comprised of the Cybersecurity Phase 2 projects outlined in Section 4.4.2.2. Refer to the Cybersecurity Maturity Assessment Report for full details.	1 year Target Dates Start Jan 2026 Complete Dec 2026	\$105,000

Table 45 – Year 3 Projects – Remaining as of Oct 2025

Year 3 (2027) Projects			
WTP Controller Replacements Low Lift PLC Replacements	This project is intended to replace the legacy PLC products installed in the field. The project will identify the phases of upgrades required starting with legacy CPU replacement, and communication card replacement. Included in this project is the Low Lift, Main Plant and PALL system Controllers and Cards. There is a possibility that these PLCs can be replaced with CompactLogix, which is a more economical option. This will be evaluated during the DeviceNet Audit in Year 1 (2025). Pricing estimates may change significantly. Low Lift PLC Replacement - The parts were purchased in 2024 and can be replaced at any time. The Low Lift panel requires repairs to the door latch and replacement of some wiring that has been damaged by mice (see Table 42 – Year 0). Estimated price for programming, PLC swap labour, and electrician labour is \$20,000.	4 months Target Dates Start Jan 2027 Complete Apr 2027	Low Lift - \$20,000 (Adjusted to remove Prepurchased Low Lift PLC parts)
Cybersecurity Upgrades Phase 2B	This project is comprised of the Cybersecurity Phase 2 projects outlined in Section 4.4.2.2. Refer to the Cybersecurity Maturity Assessment Report for full details.	1 year Target Dates Start Jan 2027 Complete Dec 2027	\$130,000

Table 46 – Year 4 Projects – Remaining as of Oct 2025

Year 4 (2028) Projects			
Remote Panel Replacements/Upgrades Wallacetown and West Lorne Moved from Year 2.	This project is intended to replace the legacy PLC products installed in the field. The project will identify the phases of upgrades required starting with legacy I/O card replacement, CPU/communication card replacement, or complete PLC replacement at the site based on current age and condition of the equipment. The overall project will include the engineering of the new control panels and software integration. It includes coordinating with an electrical contractor for manufacturing the hardware replacement of the panels, construction administration and commissioning. Glencoe Meter Chamber, Eagle West Meter Chamber, Wallacetown Elevated Tank and West Lorne Standpipe have been identified as the next highest priority due to condition of the panels and replace the legacy PLC products. West Lorne Standpipe was recommended for “Controller Hardware Replacement Only”. The PLC was updated in 2024, but since it was an urgent replacement, further panel updates were not completed. The panel should be reviewed for updates with new electronics (power supply, Ethernet switch, etc.) and additional terminals and wiring to pre-wire all available I/O points from the PLC. Updated pricing is based on the other three (3) panels being full panel replacements that will closely emulate the Pioneer Line/WE North updates (~\$47,000), plus replacement of MeterMaster units (See Section 4.6), contingency and inflation (total \$60,000/panel), and West Lorne Standpipe needing minor panel updates and associated new drawings and wiring (estimated at \$20,000).	8 months Target Dates Start Sept-2024 Jan 2028 Complete June-2025 Aug 2028	Total - \$80,000 (Adjusted to remove Prepurchased PLC parts) Wallacetown - \$60,000 West Lorne – 20,000
Cybersecurity Upgrades Phase 2C	This project is comprised of the Cybersecurity Phase 2 projects outlined in Section 4.4.2.2. Refer to the Cybersecurity Maturity Assessment Report for full details.	1 year Target Dates Start Jan 2028 Complete Dec 2028	\$103,000
Trojan UV Controls Replacement	This project is intended to replace the legacy PLC products installed in the field. The project will identify the phases of upgrades required starting with legacy CPU replacement, and communication card replacement.	8 months Target Dates Start Jan 2027 2028 Complete Sept 2027 2028	\$90,000.00

Table 47 – Year 5 Projects – Remaining as of Sept 2025

Year 5 (2029) Projects			
WTP Controller Replacements	This project is intended to replace the legacy PLC products installed in the field. The project will identify the phases of upgrades required starting with legacy CPU replacement, and communication card replacement. Included in this project is the Low Lift, Main Plant and PALL system Controllers and Cards. There is a possibility that these PLCs can be replaced with CompactLogix, which is a more economical option. This will be evaluated during the DeviceNet Audit in Year 1 (2025). Pricing estimates may change significantly. Main PLC Replacement – PLC parts estimate is \$120,000. The panel requires some general housekeeping and cleanup of communications cables. Additional clarity will be available after the Network Organization project above. Estimated price for programming, PLC swap labour, and electrician labour is \$20,000. PALL PLC Replacement – PLC parts estimate for the primary PALL panel is \$80,000. The program indicates that it branches to several remote panels that have not been reviewed. A site visit to inspect these panels and audit their hardware will be required. Estimated price for programming, PLC swap labour, and electrician labour is \$20,000. Pricing can be updated after the inspection of remote panels.	4 months Target Dates Start Jan 2029 Complete May 2029	\$192,000.00 Total - \$240,000 Main PLC - \$140,000 PALL PLC - \$100,000 (excludes remote panels)
Cybersecurity Upgrades Phase 2D	This project is comprised of the Cybersecurity Phase 2 projects outlined in Section 4.4.2.2. Refer to the Cybersecurity Maturity Assessment Report for full details.	1 year Target Dates Start Jan 2029 Complete Dec 2029	\$114,000