



Township of Southgate

Dundalk Wastewater Treatment Plant

2023 Annual Report

8.3.2 PW2024-010 Dundalk Wastewater 2023 Annual Report

No. 2024-081

Moved By Councillor John

Seconded By Councillor Singh Soares

Be it resolved that Council receive Staff Report PW2024-010 for information; and

That Council approve the Dundalk Wastewater Treatment Plant 2023 Annual Report.

Carried

Jim Ellis
Public Works Manager

Dundalk Wastewater Treatment Plant 2023 Annual Report

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Overview:

The Dundalk Wastewater Treatment Plant (WWTP) provided treatment in 2023 with an annual average influent daily flow of 1,237 m³/day, a 24.95% increase over the 2022 average influent daily flow of 990 m³/day.

Project Description:

The Dundalk WWTP is a four-cell waste stabilization pond facility flowing into an aeration cell pond with a chemical feed system and a flocculation tank with tertiary treatment consisting of sand filters.

Plant Facts:

Facilities: Waste Stabilization Ponds with Tertiary Treatment

Design Capacity: 1832 m³/day

Receiver Water: Foley Drain/Grand River

Environmental Compliance

Approval: 5657-9D9LYE

Effluent Requirements:

Effluent Parameter	Ideal	Maximum	Maximum
	Concentration Objective	Monthly Average Concentration (MAC)	Monthly Average Loading
CBOD5	5.0 mg/L	10.0 mg/L	18.32 kg/day
Total Suspended Solids (TSS)	5.0 mg/L	10.0 mg/L	18.32 kg/day
Total Phosphorous	0.30 mg/L + 5 degrees Celsius stream temperature 0.60 mg/L - 5 degrees Celsius stream temperature	0.40 mg/L + 5 degrees Celsius stream temperature 0.80 mg/L - 5 degrees Celsius stream temperature	0.73 kg/L + 5 degrees Celsius stream temperature 1.47 kg/L - 5 degrees Celsius stream temperature
Dissolved Oxygen	5.0 mg/L	4.0 mg/L	
Unionized Ammonia	0.05 mg/L	0.1 mg/L	
pH	6.5 to 8.5 at all times	6.0 to 9.5 at all times	

Sampling Requirements:

Sampling Criteria for this system is in accordance with Ministry Policy for the Environmental Compliance Approval (ECA) No. 5657-9D9LYE

Final Effluent:

A grab sample is taken twice a month and tested for CBOD, Suspended Solids, Total Phosphorus, Total Ammonia Nitrogen, Ecoli, pH and temperature.

On site testing is performed twice a week on final effluent for Total Ammonia to determine Unionized Ammonia through lab testing, pH, temperature, and Dissolved Oxygen.

Raw Sewage:

A grab sample is taken monthly and tested for BOD, Suspended Solids, Total Kjeldahl Nitrogen and Total Phosphorus.

Effluent Flows:

The total effluent flow treated in 2023 was 384,666 m³. The annual average daily flow was 1,454 m³/day, which results in a 23.21% increase of total effluent over 2022. This is divided by days discharging.

Raw Sewage Quality:

- Annual average raw sewage BOD concentration to the lagoon system was 145.7 mg/l.
- Annual average raw sewage suspended solids (TSS) concentration to the lagoon system was 281.4 mg/l.
- Annual average raw total phosphorus was 6.18 mg/l concentration to the lagoon system.
- Annual average Total Kjeldahl Nitrogen (TKN) concentration was 63.2 mg/l.

Plant Performance and Effluent Quality:

- Annual average effluent CBOD concentration was 3.55 mg/l.
- Annual average effluent total suspended solids (TSS) concentration was 6.35 mg/l day with a removal efficiency of 97.76% with an annual monthly average loading of 8.3 kg/day.
- Annual average effluent total phosphorus concentration was 0.09 mg/l day with a removal efficiency of 98.08% with an annual monthly average loading of 0.13 kg/day.
- Annual average effluent concentration for Ammonia-nitrogen was 6.79 mg/l.
- Annual average Unionized Ammonia was 0.040608 mg/l.
- Annual average pH was 7.96.
- Annual monthly average Ecoli was 55 with the low being 2 and the high being 370.
- The summary for 2023 of the data for the systems plant operation performance is enclosed in this report.

Maintenance and Calibration Activities:

Regular monthly preventative maintenance and calibration of test equipment and flow meters are performed by municipal staff and outside certified suppliers.

Third party annual calibrations were performed on October 30, 2023.

There were no by-pass events to report.

There were 8 operator shutdowns in 2023:

Please reference below table for shutdowns and limit exceedances for 2023.

2023 Wastewater effluent parameters compliance exceedances and shutdowns

	Monthly Average Effluent Concentration				Monthly Average Effluent Loading (kg/d)			Lagoon Shutdown Duration	Comments	
	CBOD5	TSS	TP	Unionized Ammonia	pH	CBOD5	TSS			TP
	Limit	Limit	Limit	Limit	Limit	Limit	Limit			Limit
	10.0 mg/day	10.0 mg/L	0.4 mg/L - > 5 C 0.8 mg/L - < 5 C	0.05 mg/L = daily testing 0.08 mg/L = proactive shutdown 0.1 mg/L = shutdown (In-house testing)	< 6.0 or > 9.5	18.32 kg/day	18.32 kg/day	0.4 kg/L - > 5 C 0.8 kg/L - < 5 C		
JAN										
FEB				0.088					17.5	17.5 days over 0.08 mg/L
MAR				0.167					31	31 days over 0.8 mg/L (No discharge for the month)
APR				0.053					17.4	17.4 days over 0.08 mg/L
MAY				0.057					2.1	2 days over 0.1 mg/L
JUN										
JUL										
AUG										
SEP					8.57				21	21 days due to 9.31 pH
OCT										
NOV				0.051					3	3 days over 0.1 mg/L
DEC				0.0595					15.5	8.5 days over 0.05 mg/L 7 days over 0.1 mg/L

Note: If daily testing for unionized ammonia occurs on a Friday we shut down for the weekend.

- Shutdown due to exceedance.

- Shutdown as a proactive measure due to approaching an exceedance.

No loading exceedances.

Discussion:

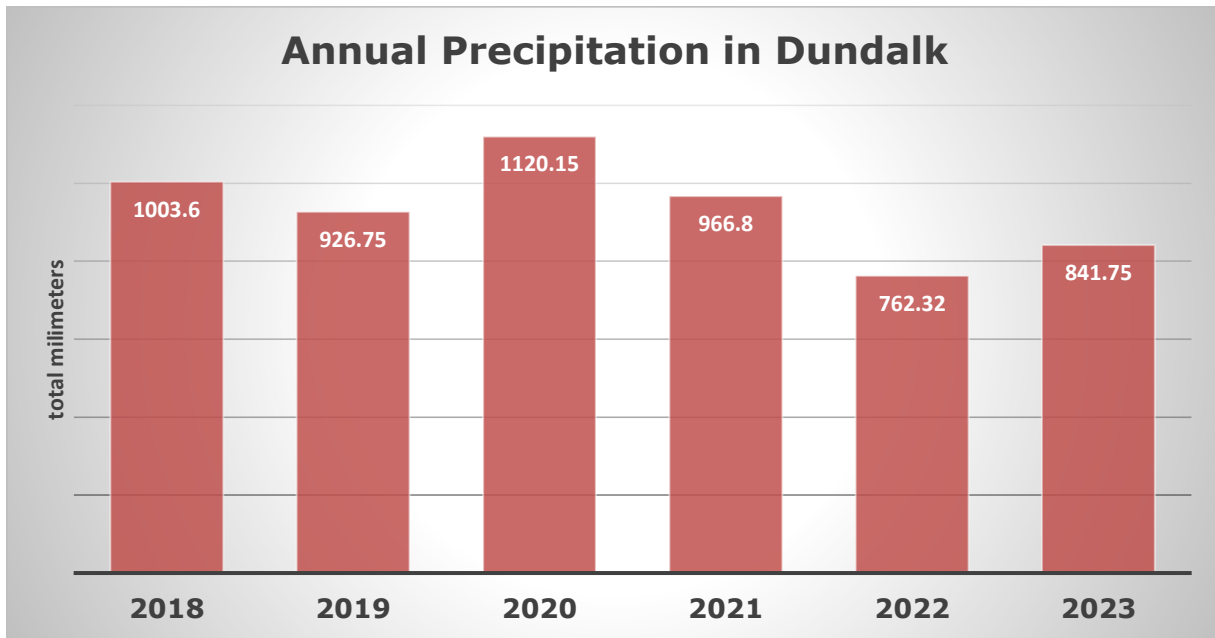
The Dundalk Wastewater Treatment upgrades are awaiting Ministry approval of the ECA amendment for the Dundalk Sewage Works.

Upon issuance of the ECA amendment, Triton Engineering will release the tender documents, followed by award of the contract by Southgate Council. Construction is

anticipated for later 2024 and completion in 2025 for the first phase of the upgrades.

The Township of Southgate received from the MECP a Consolidated Linear Infrastructure – Environmental Compliance Approval (CLI-ECA) for the Municipal Sewage Collection System, ECA Number 110-W601, issued March 2, 2023.

The annual precipitation chart below is data collected from Dundalk Well D3 pumphouse measurements. Precipitation also correlates to the inflow and infiltration that is subject to the sanitary sewer collection system.



Township of Southgate - Village of Dundalk

2023 General Wastewater Information

Plant # : 0-101006-67

ECA # : 5657-9D9LYE

Population: 2,803 (Village of Dundalk)

Flows

	<u>Design</u>		<u>2023</u>	<u>2022</u>	<u>2021</u>	<u>2020</u>	<u>2019</u>
Capacity:	208,500						
Influent Average Daily:	-	m ₃	1,237	990	1,220	1,161	1,114
Annual Influent Flow:	668,600	m ₃	450,793	360,770	446,719	425,922	405,664
Influent Maximum Daily:	-	m ₃	4,017	3,247	6,740	4,510	3,989
Effluent Average Daily (days operating):	1,832	m ₃	1,497	1,196	2,096	1,087	1,315
Annual Effluent Flow:	-	m ₃	384,666	312,215	470,150	396,688	407,659
% Discharge vs. Total Capacity:	-		57.5%	46.7%	70.3%	59.3%	61.0%
Influent Increase 2023 over 2022:	-		24.95%	-19.24%	4.88%	4.99%	1.09%
Effluent Increase 2023 over 2022:	-		23.21%	-33.59%	18.52%	-2.69%	0.69%

Township of Southgate
Loading Report - Dundalk Wastewater Plant

Municipality:	Township of Southgate	Year:	2023
Plant:	Dundalk Wastewater Treatment Lagoons & Collection System		
Plant # :	0-101006-67		
Works # :	110001471		
System Description :	Faculative Lagoons & Sand Filters		

Month	Loading Influent			Effluent Loading		
	BOD kg/day	SS kg/day	T Phos. kg/day	Effluent CBOD kg/day	Effluent SS kg/day	Effluent T Phos. kg/day
January	254.4	331.9	8.3	5.7	11.9	0.10
February	239.3	449.0	10.5	2.2	3.1	0.03
March	170.8	248.4	6.4	PS	PS	PS
April	296.6	426.7	7.0	6.1	13.1	0.14
May	128.9	229.7	6.0	7.6	8.9	0.15
June	121.7	385.2	7.3	5.4	5.4	0.34
July	148.4	347.5	6.9	2.8	3.3	0.03
August	97.7	159.8	5.1	2.2	2.2	0.03
September	123.6	289.6	8.3	6.6	12.2	0.11
October	132.4	219.2	7.0	4.3	11.5	0.06
November	97.8	323.1	4.2	4.9	12.2	0.13
December	302.7	362.4	3.3	5.8	16.5	0.40
Total	2114.1	3772.4	80.2	53.6	100.1	1.52
Average	176.2	314.4	6.7	4.5	8.3	0.13
Maximum	302.7	449.0	10.5	7.6	16.5	0.40

PS = Plant Shutdown

**Township of Southgate
Performance Report - Dundalk Wastewater Plant**

Municipality: Township of Southgate
 Plant: Dundalk Wastewater Treatment Lagoons & Collection System
 Plant #: 0-101006-67
 Works #: 110001471
 System Description: Faculative Lagoons & Sand Filters

Year: 2023
 Receiver: Foley Drain - Grand River
 Design Average Day Flow (m3): 1832

Month	Flows			Effluent Total Flow m ³	Discharge Duration Days	Bio-Chemical Oxygen Demand			Suspended Solids			Phosphorus			E Coli average Effluent Count	Temperature < 5 C. or > 5 C.	Nitrogen Series			Effluent CBOD kg/day	Effluent SS kg/day	Effluent T Phos. kg/day	
	Total Flow m ³	Avg. Flow m ³	Max. Flow m ³			Avg. Raw BOD mg/l	Avg Effluent CBOD mg/l	Percent Removal	Avg. Raw SS mg/l	Avg. Effluent SS mg/l	Percent Removal	Avg. Raw T. Phos mg/l	Avg. Effluent T. Phos mg/l	Percent Removal			TKN mg/l	Avg. Effluent NH ₃ + NH ₄ mg/l	Unionized Ammonia mg/l				
January	45307	1462.00	2482.00	44469	31	174.0	4.0	97.70%	227.0	8.3	96.34%	5.70	0.07	98.77%	114	1.4	51.3	10.38	0.016154	5.7	11.9	0.1	
February	41360	1477.00	3312.00	5443	17.5	162.0	7.0	95.68%	304.0	10.0	96.71%	7.10	0.11	98.45%	370	0.4	63.6	17.60	0.050267	2.2	3.1	0.0	
March	53479	1725.0	3180.0	P/S	P/S	99.0	P/S	100.0%	144.0	P/S	100.0%	3.7	P/S	100.0%	P/S	P/S	33.4	P/S	0.167100	0.0	0.0	0.0	
April	72329	2411.00	4017.00	21938	12.6	123.0	3.5	97.15%	177.0	7.5	95.76%	2.90	0.08	97.24%	43	9.4	37.6	12.40	0.052770	6.1	13.1	0.1	
May	41637	1343.00	2580.00	73402	28.9	96.0	3.0	96.88%	171.0	3.5	97.95%	4.50	0.06	98.67%	12	13.9	38.9	12.80	0.057657	7.6	8.9	0.2	
June	21609	720.00	831.00	54060	30	169.0	3.0	98.22%	535.0	3.0	99.44%	10.10	0.19	98.12%	2	20.3	96.9	4.70	0.018011	5.4	5.4	0.3	
July	26586	858.00	1801.00	28880	31	173.0	3.0	98.27%	405.0	3.5	99.14%	8.00	0.03	99.63%	2	23.1	87.0	1.18	0.001273	2.8	3.3	0.0	
August	25672	828.00	1025.00	22708	31	118.0	3.0	97.46%	193.0	3.0	98.45%	6.10	0.04	99.34%	3	20.7	61.5	0.05	0.004178	2.2	2.2	0.0	
September	22734	758.00	870.00	19929	9	163.0	3.0	98.16%	382.0	5.5	98.56%	11.00	0.05	99.55%	5	17.5	89.8	0.06	0.003108	6.6	12.2	0.1	
October	25158	812.00	977.00	44566	31	163.0	3.0	98.16%	270.0	8.0	97.04%	8.60	0.04	99.53%	46	11.8	90.0	0.29	0.008633	4.3	11.5	0.1	
November	30863	1029.00	1262.00	43753	27	95.0	3.0	96.84%	314.0	7.5	97.61%	4.10	0.08	98.05%	6	3.3	69.9	8.1	0.051220	4.9	12.2	0.1	
December	44059	1421.00	2696.00	25518	15.5	213.0	3.5	98.36%	255.0	10.0	96.08%	2.30	0.24	89.57%	8	1.9	38.8	7.10	0.059506	5.8	16.5	0.4	
Total	450793			384666	264.5																		
Average	37566	1237		34970		145.7	3.5	97.74%	281.4	6.3	97.76%	6.18	0.09	98.08%	56	11.2	63.2	6.79	0.040823	4.5	8.3	0.1	
Maximum	72329	2411	4017	73402		213.0	7.0		535.0	10.0		11.00	0.24		370	23.1	96.9	17.60	0.167100	7.6	16.5	0.4	

PS = Plant Shutdown

Township of Southgate
Annual Report - Dundalk Wastewater Plant

Plant: Dundalk Wastewater Treatment Lagoons & Collection System
 Works: 110001471
 Year: 2023
 Location Type: **Final Effluent Discharge Report**

Month	Discharge Duration Days	Total Effluent m3	Total Coagulant Used (kg)	Average Coagulant Dosage (mg/l)	Average CBOD mg/l	Average SS mg/l	Average T. Phos. mg/l	Average NH ₃ + NH ₄ as N (mg/l)	E Coli average Count	Average pH Reports	Average Temp. C	Average D.O. mg/l
January	31	44469	1.55	22.7	4.0	8.3	0.07	10.38	114	7.99	1.40	12.13
February	10	5443	0.50	59.7	7.0	10.0	0.11	17.60	370	8.05	0.40	11.54
March	0	0	0.00	0.0	0.0	0.0	0.00	0.00	0	P/S	0.00	0.00
April	12.6	21938	0.63	18.7	3.5	7.5	0.08	12.40	43	8.11	9.40	9.03
May	28.9	73402	1.45	12.8	3.0	3.5	0.06	12.80	12	8.01	13.90	8.07
June	30	54060	1.50	18.0	3.0	3.0	0.19	4.70	2	7.96	20.30	6.20
July	31	28880	1.55	34.9	3.0	3.5	0.03	1.18	2	7.55	23.10	6.31
August	31	22708	1.55	44.4	3.0	3.0	0.04	0.05	3	7.47	20.70	6.44
September	9	19929	0.45	14.7	3.0	5.5	0.05	0.06	5	7.80	17.50	7.80
October	31	44566	1.55	22.6	3.0	8.0	0.04	0.29	46	8.45	11.80	9.45
November	27	43753	1.35	20.1	3.0	7.5	0.08	8.10	6	8.09	3.30	12.55
December	15.5	25518	0.78	19.7	3.5	10.0	0.24	7.10	8	8.13	1.90	12.58
Total	257	384666	12.85									
Average		34970	1.17	26.20	3.55	6.35	0.09	6.79	56	7.96	11.25	9.28
Maximum		73402			7	10	0.24	17.6	370	8.45	23.10	12.58

PS = Plant Shutdown

Township of Southgate - Village of Dundalk
Annual Report - Dundalk Wastewater Plant

Plant: Dundalk Wastewater Treatment Lagoons & Collection System
Works: 110001471
Classification: Class 1 Wastewater Collection & Class 1 Wastewater Treatment
Receiver: Foley Drain to Grand River

Year: 2023
Population Served: 2803

Raw Sewage Parameters		January	February	March	April	May	June	July	August	September	October	November	December	Summary
	Average	176	162	99	123	97	169	173	119	163	163	96	213	146
BOD	Minimum	110	162	132	79	76	149	147	112	122	163	96	213	130
	Maximum	242	162	66	167	117	189	198	125	204	163	96	213	162
Suspended	Average	226	304	144	177	4	535	405	193	383	270	314	255	267
Solids	Minimum	208	304	204	158	3	460	270	128	375	270	288	255	244
	Maximum	244	304	84	196	4	610	540	258	390	270	340	255	291
	Average	48.2	63.6	33.4	37.6	14.9	96.9	87.0	61.6	89.8	90.0	69.9	38.8	61.0
TKN	Minimum	27.8	63.6	44.4	27.7	12.0	88.7	63.0	61.1	76.5	90.0	47.1	38.8	53.4
	Maximum	68.6	63.6	22.4	47.4	17.8	105.0	111.0	62.0	103.0	90.0	92.7	38.8	68.5
Total	Average	5.27	7.13	3.73	2.87	0.26	10.13	8.28	6.11	11.02	8.62	4.13	2.27	5.82
Phosphorus	Minimum	3.11	7.13	4.8	0.91	0.17	9.16	5.66	5.63	6.73	8.62	3.32	2.27	4.79
	Maximum	7.42	7.13	2.66	4.82	0.34	11.10	10.90	6.59	15.30	8.62	4.94	2.27	6.84

Township of Southgate - Village of Dundalk
Annual Report - Dundalk Wastewater Plant

Plant: Dundalk Wastewater Treatment Lagoons & Collection System
Works: 110001471
Classification: Class 1 Wastewater Collection & Class 1 Wastewater Treatment
Receiver: Foley Drain to Grand River

Year: 2023
Population Served: 2803

Final Effluent Parameters		January	February	March	April	May	June	July	August	September	October	November	December	Summary
	Average	4.0	7.0	P/S	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5
CBOD mg/l	Minimum	3.0	7.0	P/S	3	3.0	3.0	3	3.0	3.0	3.0	3.0	3.0	3.0
	Maximum	5.0	7.0	P/S	4	3.0	3.0	3	3.0	3.0	3.0	3.0	4.0	7.0
Suspended Solids mg/l	Average	8.5	10.0	P/S	7.5	3.5	3.0	3.5	3.0	5.5	8.0	7.5	10.0	6.4
	Minimum	3.0	10.0	P/S	7	3.0	3.0	3	3.0	3.0	4.0	7.0	10.0	3.0
	Maximum	14.0	10.0	P/S	8	4.0	3.0	4	3.0	8.0	12.0	8.0	10.0	14.0
	Average	9.4	17.6	P/S	12.4	12.8	4.7	1.2	0.1	0.1	0.3	5.1	3.6	6.10
NH3 + NH4 mg/l	Minimum	3.94	17.60	P/S	12.3	12.20	3.94	0.05	0.05	0.05	0.05	4.59	0.16	0.05
	Maximum	14.80	17.60	P/S	12.5	13.40	5.46	2.31	0.05	0.07	0.52	5.65	6.94	17.60
	Average	11.70	19.80	P/S	15.95	14.90	5.75	2.15	1.00	1.15	1.65	8.10	11.90	8.55
TKN mg/l	Minimum	5.00	19.80	P/S	15	12.00	5.40	0.9	1.00	1.10	1.30	7.10	11.00	0.90
	Maximum	18.40	19.80	P/S	16.9	17.80	6.10	3.4	1.00	1.20	2.00	9.10	12.80	19.80
Total Phosphorus mg/l	Average	0.06	0.11	P/S	0.08	0.06	0.10	0.03	0.04	0.06	0.04	0.08	0.24	0.08
	Minimum	0.01	0.11	P/S	0.08	0.05	0.05	0.02	0.03	0.05	0.04	0.07	0.06	0.01
	Maximum	0.10	0.11	P/S	0.08	0.07	0.14	0.04	0.05	0.06	0.04	0.09	0.42	0.42
	Average	105.00	370.00	P/S	43.00	12.00	2.00	2.00	3.00	5.00	46.00	5.00	8.00	55
Ecoli	Minimum	2	370	P/S	4	6	2	2	2	2	2	2	2	2
	Maximum	208	370	P/S	82	18	2	2	4	8	90	8	14	370
pH Lab Results (In-house testing not included)	Average	7.99	8.05	P/S	8.11	8.01	7.96	7.55	7.47	7.80	8.45	8.09	8.13	7.96
	Minimum	7.95	8.05	P/S	8.05	7.99	7.90	7.22	7.02	7.12	8.21	8.07	8.08	7.02
	Maximum	8.03	8.05	P/S	8.16	8.02	8.02	7.87	7.91	8.47	8.68	8.10	8.17	8.68
	Average	16.15	11.20	P/S	8.80	7.40	6.45	6.40	6.55	7.50	8.95	12.55	11.00	9.36
DO mg/l	Minimum	10.70	10.50	P/S	8	5.20	5.50	5.4	5.90	6.40	7.30	10.30	8.40	5.20
	Maximum	21.60	11.90	P/S	9.6	9.60	7.40	7.4	7.20	8.60	10.60	14.80	13.60	21.60
Unionized Ammonia mg/l	Average	0.018500	0.054700	0.167100	0.058350	0.063100	0.020600	0.002800	0.016000	0.004665	0.010950	0.072150	0.073550	0.046872
	Minimum	0.001400	0.021700	0.105100	0.024100	0.017000	0.005500	0.000000	0.000100	0.000000	0.000000	0.032000	0.014000	0.000000
	Maximum	0.035600	0.087700	0.229100	0.092600	0.109200	0.035700	0.005600	0.031900	0.009330	0.021900	0.112300	0.133100	0.229100

PS = Plant Shutdown