The Corporation of the
Municipality of Wawa

2018
Annual Sewage Performance Report

Wawa

Prepared by:

Water & Sewer Department
Infrastructure Services

February 2019

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Wawa Townsite
2018 Annual Sewage Performance Report

Prepared by: **Municipality of Wawa**
Infrastructure Services
Water & Sewer Department

Marc Liard, Water and Wastewater Lead Hand — **Date** Jan. 25, 2019

David Lowe, Water and Wastewater Operator

Branden Kloosterhuis, Water and Wastewater Operator

Received and Reviewed on behalf of
The Corporation of the Municipality of Wawa

Cory Stainthorpe, Director
Infrastructure Services — **Date** Jan 25, 2019

Presented to Council: _____
Date

Presentation Confirmed by Resolution _____

2018 Annual Sewage Performance Report

Table of Contents

Report Period:	January 01, 2018 to December 31, 2018
Sewage System Name:	Municipality of Wawa Sewage Treatment Lagoon
Sewage System Address:	Golf Course Road, Wawa, ON, P0S1K0
MOE Works Number:	110000454
Prepared by:	Municipality of Wawa – Infrastructure Services Water & Sewer Department

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Indicate how you notified system users that your annual report is available, and is free of charge.

- Public access at Town Hall and Internet on the Municipal website @ www.wawa.cc

1.0 Introduction

1.1 Facility Description

The Wawa Sewage Treatment Plant was constructed in 1986-1987 and officially opened August 09, 1988, in partnership with the Ministry of the Environment, Ministry of Northern Development and Mines, and The Corporation of the Municipality of Wawa.

Wawa Sewage Collection is a Class 2 System, consisting of a gravity feed system with the exception of a forced sewer main at the west end of Government Road. Approximately 20 homes are on the forced main, each home is equipped with a holding tank (consisting of solid side and grey water side) and each with its own sewage pump on the grey water side of the tank, which pumps the grey water into the force main.

Sewage is pumped into the force main to the intersection of Government Road and Tamarack Street, where a gravity sewer system takes over.

The Wawa Sewage Treatment Plant is a Class 1 plant which consists of 2 aeration ponds that are used for primary treatment. Aluminum Sulphate is added at the end of the second aeration pond before going into the polishing ponds to aid in phosphorus removal. Aluminum Sulphate is considered our secondary treatment. Once the treated effluent is transferred into the polishing ponds for a predetermined amount of time, then it is discharged into the Magpie River on a continuous basis.

The Sewage Treatment Plant building is equipped with two blowers for the aeration ponds, two chemical feed pumps for Aluminum Sulphate and a milltronics OCM II (open channel monitor) for data logging. An open channel flow meter is used to monitor treated effluent leaving the aeration system before being transferred to the polishing pond.

1.2 List all sewage treatment chemical used over this reporting period.

Aluminum Sulphate (A12 (SO4) 3) used at the Wawa Sewage Treatment Plant for phosphorus removal.

1.3 Were any significant expenses incurred?

( ) Installed required equipment
( ) Repaired required equipment
(**X**) Replaced required equipment

1.4 Please provide a brief description and breakdown of monetary expenses.

Two (2) Alum pumps were purchased for $10,000.00 and installed. Metcon was on site to assist with the install and discuss with Staff operating the pumps.

1.5 Certificates

An Amended Environmental Compliance Approval (0752-ADXQUC) was issued on October 12, 2016.

2.0 Monitoring Data

2.1 Monitoring Program – Environmental Compliance Approval # 0752-ADXQUC

Table 2.1.1 – Effluent Objectives

Effluent Parameters	Concentration Objectives
CBOD5	20.0 mg/l
Total Suspended Solids	25.0 mg/l
Total Phosphorus	0.8 mg/l

Table 2.1.2 – Effluent Limits

Effluent Parameters	Average Concentration Limits
CBOD5	25.0 mg/l
Total Suspended Solids	30.0 mg/l
Total Phosphorus	1.0 mg/l

Table 2.1.3 – Raw Sewage Monitoring

Parameters	Sample Type	Frequency
BOD5	Composite	Monthly
Total Suspended Solids	Composite	Monthly
Total Phosphorus	Composite	Monthly
Total Kjeldahl Nitrogen (mg/l)	Composite	Monthly

Table 2.1.4 – Aerated Lagoon Cells Content Monitoring

Parameters	Sample Type	Frequency
Dissolved Oxygen	Grab	Weekly

Table 2.1.5 – Final Effluent Monitoring

Parameters	Sample Type	Frequency
CBOD5	Composite	Weekly
Total Suspended Solids	Composite	Weekly
Total Phosphorus	Composite	Weekly
Total Ammonia Nitrogen	Composite	Weekly
E.coli	Grab	Weekly
Temperature	Grab	Weekly
pH	Grab	Weekly
Unionized Ammonia	Calculated	Weekly

Table 2.1.6 – Monthly Raw Sewage Sampling Results

Date	BOD5 (mg/l)	TSS (mg/l)	TP (mg/l)	TKN (mg/l)
January 2018	72	51.3	1.97	21.0
February 2018	58	16.8	1.73	14.8
March 2018	66.4	58.9	1.67	16.1
April 2018	62	69.4	2.66	16.8
May 2018	70	87.6	2.61	22.6
June 2018	59	68.4	2.70	23.1
July 2018	57	47.6	2.84	26.9
August 2018	78	79.8	3.29	30.0
September 2018	46.4	28.8	2.90	24.8
October 2018	86	58.4	2.40	21.0
November 2018	83	60.4	2.97	28.9
December 2018	64	49.6	2.27	21.8

Table 2.1.7 – Weekly Effluent Sampling Results

Date	CBOD5 (mg/l)	TSS (mg/l)	TP (mg/l)	TAN (mg/l)	E. Coli (MPN/100ml)	Field Temp (*c)	Field pH
Jan. 02, 2018	<2.0	2.3	0.421	7.86	980	1.83	7.45
Jan. 09, 2018	<2.0	2.0	0.59	7.14	1990	1.79	7.57
Jan. 15, 2018	<2.0	3.6	0.56	7.56	1300	1.56	7.70
Jan. 24, 2018	2.6	3.6	0.68	7.82	1200	1.52	7.51
Jan. 29, 2018	2.3	4.4	0.59	7.85	1200	1.55	8.00
Feb. 05, 2018	2.1	4.1	0.492	6.45	461	1.40	7.69
Feb. 13, 2018	2.4	6.5	0.61	7.87	225	1.27	7.40
Feb. 20, 2018	2.1	3.7	0.56	6.12	687	0.44	7.55
Feb. 26, 2018	2.4	4.8	0.58	6.23	397	1.12	7.40

Table 2.1.7 – Weekly Effluent Sampling Results (Cont.)

Date	CBOD5 (mg/l)	TSS (mg/l)	TP (mg/l)	TAN (mg/l)	E.Coli (MPN/100ml)	Field Temp(*c)	Field pH
Mar. 05, 2018	2.3	4.1	0.53	6.40	119	1.12	7.61
Mar. 12, 2018	2.9	4.1	0.60	5.64	921	1.18	7.50
Mar. 19, 2018	2.8	4.8	0.59	5.62	770	1.02	7.39
Mar. 26, 2018	2.4	4.9	0.54	6.26	461	1.11	7.41
Apr. 03, 2018	2.5	4.0	0.49	5.84	260	0.94	7.45
Apr. 09, 2018	2.8	4.8	0.56	5.63	285	1.01	7.47
Apr. 16, 2018	2.5	5.1	0.56	5.59	52	0.94	7.56
Apr. 23, 2018	3.1	4.4	0.56	6.00	27	1.76	7.49
Apr. 30, 2018	<2.0	2.4	0.232	3.83	0	3.65	7.69
May 07, 2018	2.6	2.8	0.126	1.94	0	6.38	8.64
May 14, 2018	2.1	6.0	0.141	1.17	0	8.16	7.70
May 22, 2018	5.1	17.3	0.141	0.300	0	9.00	8.06
May 28, 2018	2.5	4.8	0.093	0.039	0	19.65	8.41
June 04, 2018	<2.0	2.4	0.149	0.125	0	19.70	8.16
June 11, 2018	<2.0	<2.0	0.122	0.084	0	20.13	8.38
June 18, 2018	<2.0	<2.0	0.137	0.110	0	20.70	8.36
June 25, 2018	<2.0	2.0	0.098	0.208	0	21.40	8.42
July 3, 2018	2.2	4.8	0.088	0.112	0	21.60	8.50
July 09, 2018	<2.0	2.5	0.055	0.084	0	22.8	8.02
July 16, 2018	<2.0	<2.0	0.039	0.271	0	23.2	8.48
July 23, 2018	<2.0	<2.0	0.037	0.065	0	21.8	9.18
July 30, 2018	2.2	3.7	0.047	0.049	0	22.7	8.10
Aug. 07, 2018	<2.0	2.9	0.042	0.054	<100	22.5	8.51
Aug. 13, 2018	<2.0	3.3	0.047	0.254	0	22.2	8.62
Aug. 20, 2018	<2.0	2.1	0.044	0.203	0	24.8	8.82
Aug. 27, 2018	<2.0	<2.0	0.042	0.027	4	21.39	9.00
Sept. 04, 2018	<2.0	<2.0	0.028	0.024	2	18.65	9.05
Sept. 10, 2018	<2.0	<2.0	0.0319	0.186	0	19.02	9.00

Table 2.1.7 – Weekly Effluent Sampling Results (Cont.)

Date	CBOD5 (mg/l)	TSS (mg/l)	TP (mg/l)	TAN (mg/l)	E.Coli (MPN/100ml)	Field Temp(*c)	Field pH
Sept. 17, 2018	<2.0	2.4	0.055	0.135	4	19.52	8.91
Sept. 24, 2018	<2.0	2.0	0.057	0.351	6	11.25	9.39
Oct. 01, 2018	3.4	44.8	0.053	0.061	14	7.60	9.00
Oct. 09, 2018	5.9	10.1	0.073	0.325	2	7.60	9.03
Oct. 15, 2018	8.7	12.1	0.099	0.032	0	6.50	9.26
Oct. 22, 2018	7.4	11.9	0.092	0.088	1	3.44	9.35
Oct. 29, 2018	6.4	15.2	0.057	0.066	0	4.82	9.00
Nov. 05, 2018	4.0	8.1	0.101	0.332	<10	4.57	9.23
Nov. 13, 2018	5.5	15.6	0.127	0.265	<10	1.53	9.40
Nov. 19, 2018	5.1	14.0	0.148	1.28	<10	2.42	8.95
Nov. 26, 2018	3.9	15.1	0.162	1.43	<10	2.54	8.13
Dec. 03, 2018	7.6	13.9	0.168	2.04	10	2.91	8.78
Dec. 11, 2018	3.0	5.3	0.162	2.61	<10	2.35	8.31
Dec. 17, 2018	9.7	8.0	0.252	3.98	<10	2.20	8.19

Table 2.1.8 – Weekly Dissolved Oxygen Sampling Results

Date	Cell #1 (mg/l)	Cell #2 (mg/l)
January 02, 2018	1.94	1.69
January 09, 2018	1.98	1.59
January 15, 2018	2.22	2.52
January 22, 2018	2.17	2.41
January 29, 2018	2.42	2.00
February 05, 2018	1.63	1.76
February 12, 2018	2.01	2.46
February 20, 2018	1.47	1.23
February 26, 2018	2.01	1.96

Table 2.1.8 – Weekly Dissolved Oxygen Sampling Results (Cont.)

Date	Cell #1	Cell #2
March 05, 2018	3.38	3.58
March 12, 2018	1.76	1.75
March 19, 2018	2.08	2.13
March 26, 2018	3.27	3.16
April 03, 2018	2.64	3.37
April 09, 2018	3.02	3.41
April 16, 2018	3.08	3.42
April 23, 2018	1.95	3.16
April 30, 2018	1.57	2.67
May 07, 2018	1.66	2.74
May 14, 2018	1.75	2.91
May 22, 2018	2.02	2.16
May 28, 2018	2.08	2.10
June 04, 2018	1.75	2.01
June 11, 2018	0.64	0.62
June 18, 2018	0.70	0.61
June 25, 2018	0.71	0.68
July 03, 2018	0.70	0.82
July 09, 2018	0.84	0.94
July 16, 2018	0.90	2.00
July 23, 2018	0.93	2.20
July 30, 2018	0.89	2.02
August 07, 2018	0.91	2.12
August 13, 2018	1.01	2.14
August 20, 2018	1.11	2.25
August 27, 2018	1.09	2.21

Table 2.1.8 – Weekly Dissolved Oxygen Sampling Results (Cont.)

Date	Cell #1	Cell #2
September 04, 2018	1.14	0.30
September 10, 2018	1.12	0.59
September 17, 2018	1.15	0.48
September 24, 2018	1.14	2.14
October 01, 2018	1.37	2.53
October 09, 2018	1.29	2.69
October 15, 2018	1.89	3.34
October 22, 2018	1.91	3.38
November 05, 2018	2.35	4.17
November 12, 2018	2.94	3.85
November 19, 2018	3.51	4.73
November 26, 2018	4.02	5.21
December 03, 2018	4.01	4.35
December 10, 2018	3.90	4.95
December 17, 2018	3.97	4.90

Table 2.1.9 – Summary Weekly Effluent Sampling Results

Parameters	Average	Maximum	Objective Limits	Compliance Limits
CBOD5 (mg/l)	3.14	8.7	20	25.0
Total Suspended Solids (mg/l)	5.38	44.8	25	30.0
Total Phosphorus (mg/l)	0.25	0.61	0.8	1.0

Table 2.1.10 – Summary Weekly Dissolved Oxygen Results

Cell number	Average mg/l	Maximum mg/l
Cell # 1	1.92	4.02
Cell # 2	2.45	4.73

3.0 Parameters

3.1 Description of Parameters

BOD5 – (also known as TBOD5) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogen oxygen demand.

TSS – (Total Suspended Solids) are solid organic and inorganic materials that hang below the water surface. Suspended solids, in layman's terms, are similar to stirring up the sand near the shore of a lake. The water turns cloudy from the suspended solids. Total suspended solids must be coarse enough to be trapped by a coffee filter.

TP – (Total Phosphorus) refers to the amount of phosphorus in a sample. Excess TP stimulates algae and weed growth that may cause fluctuations in dissolved oxygen in the receiving waters.

TKN - (Total Kjeldahl Nitrogen) is the total concentration of organic nitrogen and ammonia.

CBOD5 – means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measure in an unfiltered sample.

TAN – (Total Ammonia Nitrogen) Ammonia exists in two forms in the water: NH_3 (this is called unionized ammonia) and NH_4^+ (this is called ionized ammonia). Together, these two forms of ammonia are called TAN which means total ammonia nitrogen. NH_3 is the principal form of toxic ammonia.

E.coli – (*Escherichia coli)* is commonly regarded as one of first microorganisms of choice in water and wastewater quality monitoring programs and serves as the primary indicator for water contaminated with fecal matter due to their prevalence in the gut of warm-blooded animals as well as high numbers excreted in both human and animal.

PH - is a measure of how acidic/basic water is. The range goes from 0 - 14, with 7 being neutral. PH's of less than 7 indicate acidity, whereas a PH of greater than 7 indicates a base. PH is really a measure of the relative amount of free hydrogen and hydroxyl ions in the water.

Unionized Ammonia - is the calculation using total ammonia concentration, PH and temperature using the methodology stipulated in "Ontario Provincial Water Quality Objectives".

Dissolved Oxygen - (DO) refers to microscopic bubbles of gaseous oxygen (O2) that are mixed in water and available to aquatic organisms for respiration — a critical process for almost all organisms. Primary sources of DO include the atmosphere and aquatic plants.

3.2 Summary of Parameters

In 2018, the effluent from the Wawa Sewage Treatment Facility was within the compliance limits listed in the Environmental Compliance Approval # 0752-ADXQUC. The average and maximum sampling results is listed in tables 2.1.9 of this report and the maximum and average dissolved oxygen is listed in table 2.1.10.

4.0 Flows

4.1 Summary of Flow Data for 2018

The Wawa Sewage Treatment Plant continuously discharges to the Magpie River with a yearly average of 1854.6 m^3/day, which is 48.36% of the Sewage Plant capacity. The maximum daily flow for 2018 was 4234 m^3/day which happened in July 2018. Below is a summary of monthly minimum, average and maximum flows.

Table 4.2 - Effluent Flow - Plant Rated Capacity (m^3/day): 4300

	Minimum Flow (m^3/day)	Average Flow (m^3/day)	% of Plant Capacity	Maximum Flow (m^3/day)	Total Flow (m^3)
January	2257	2635	61.27	3106	81709
February	1989	2650	61.62	3455	74208
March	2269	2607	60.62	2963	80817
April	2088	2604	60.55	3188	78125
May	1205	2025	47.09	4222	62790
June	1148	1503	34.95	2278	45117
July	1175	1581	36.76	4234	49024
August	955	1433	33.32	1915	44425
September	1146	1877	43.65	3111	56329
October	1125	1821	42.34	4105	56455
November	1334	1899	44.16	3890	56992
December	1797	2326	54.09	3286	72122

4.3 - Summary of Effluent Flow

Minimum Flow	Average Flow	Average % of Plant Capacity	Maximum Flow	Total Flow
955	2080	48.36	4234	758113

5.0 Calibrations

The calibration on the open channel flow meter OCM II was performed by Metcon Sales and Engineering Limited on. This flow meter is calibrated for accuracy yearly. The calibration report is under **Appendix A**.

6.0 Complaints

Over the period of 2018, the Municipality did not receive any complaints of odours emitting from the sewage lagoons.

APPENDIX A

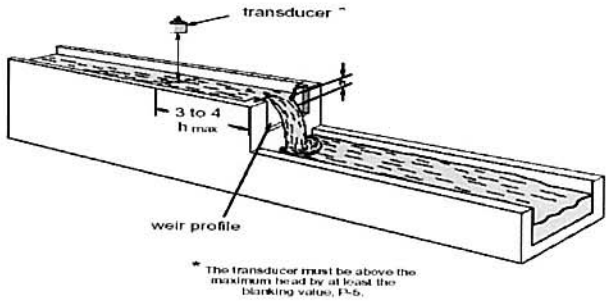
Metcon Calibration Report

metcon
SALES & ENGINEERING LTD

Metcon Sales and Engineering
15 Connie Crescent Unit 3
Concord ON
L4K 1L3

Phone: 905-738-2355
Fax: 905-738-5520
www.metconeng.com

OCM VERIFICATION SHEET



Meter Under Test

Customer:	Corporation of Wawa	Tag:	N/A
Date Performed:	October 30, 2018	Meter Type:	Open Chanel Flow Meter
Site:	Wawa WTP	Manufacturer	Miltronics / Siemens
Location:	Lagoon Effluent	Model #:	OCM II
Performed By:	Mike Nakonecznyj	Transmitter S/N:	N/A

Installation Details

Units:	cm	Near Blanking	30.480
Mode:	OCM	Ananlog Out:	4-20mA
Empty Distance:	103.52	Profile:	V Notch
Span:	60		

Test Results

	Reading	Measured	Error	Error %
Distance	97.660	97.550	0.110	0.11%
Head	4.210	4.300	-0.090	-0.15%
			Final Error	-0.02%
			Maximum Allable Error	2.00%

Test Notes

* This Meter is operating within Manufacturer's tolerance

PASS

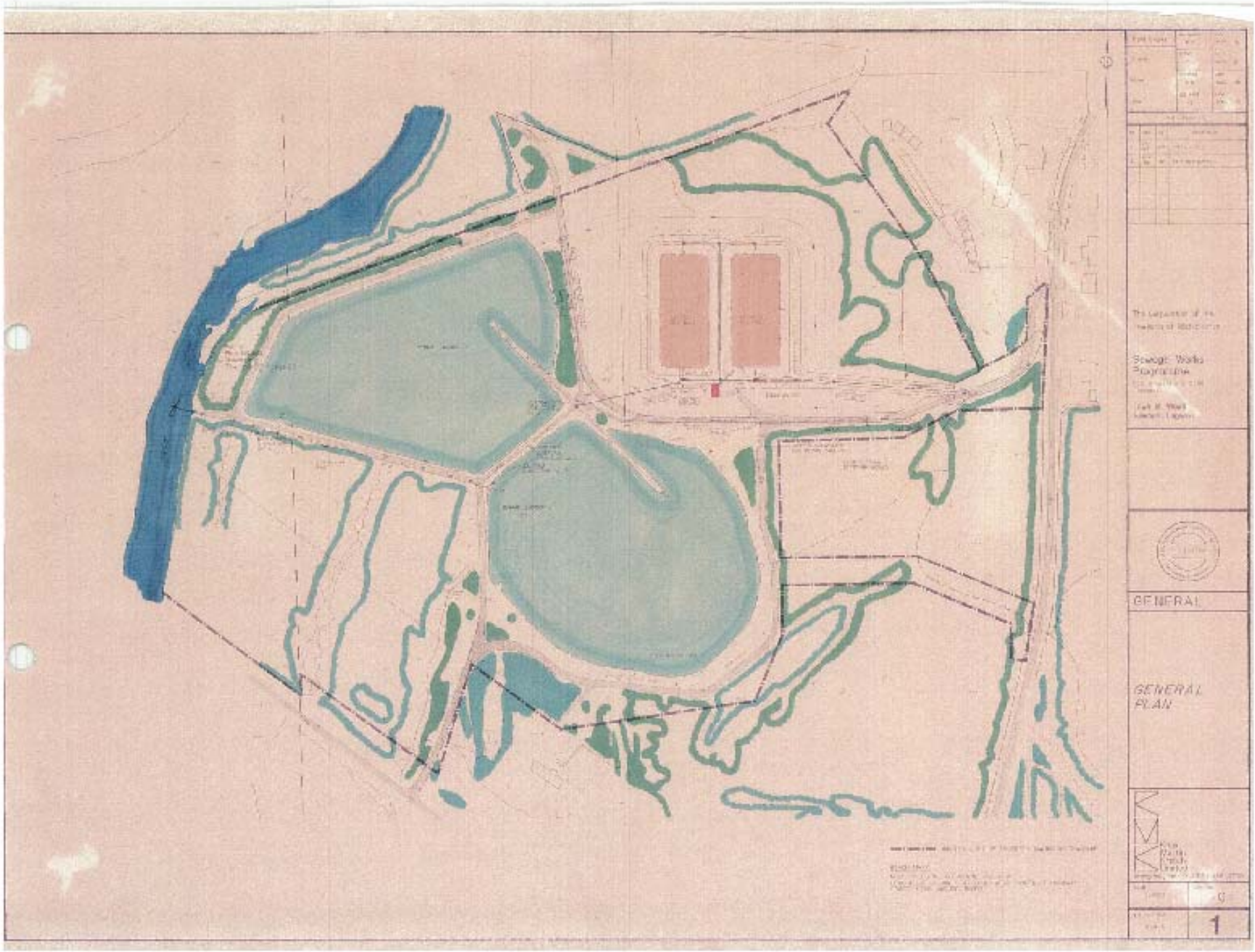
APPENDIX B

Environmental Compliance Approval

0752-ADXQUC

APPENDIX C

Overview of Sewage Lagoons



GENERAL

GENERAL PLAN

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