Appendix C

Meaford WWTP Capacity Assessment

Wastewater Class EA Update

Technical Memorandum

Wastewater Treatment Pant

Capacity Assessment

Prepared For:

The Municipality of Meaford

September 2023

CREATING QUALITY SOLUTIONS TOGETHER

Ainley GROUP

WASTEWATER CLASS EA UPDATE
WASTE WATER TREATMENT PLANT CAPACITY ASSESSMENT REPORT

PROJECT NO. 121027

Prepared For:

THE MUNICIPALITY OF MEAFORD

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1 Introduction

The collected sewage within the Municipality of Meaford is transferred to the Meaford Wastewater Treatment Plant (WWTP) through four (4) pumping stations. The WWTP was built in 1969 and is considered a cross between an Extended Aeration Activated Sludge (EAAS) and a Conventional Activated Sludge (CAS) process. The plant does not include grit removal or primary clarification. The rated capacity of the plant is 3,910 m^3/day with a peak flow capacity of 11,730 m^3/day with no process for phosphorous removal. **Figure 1-1** shows the location and components of the plant.

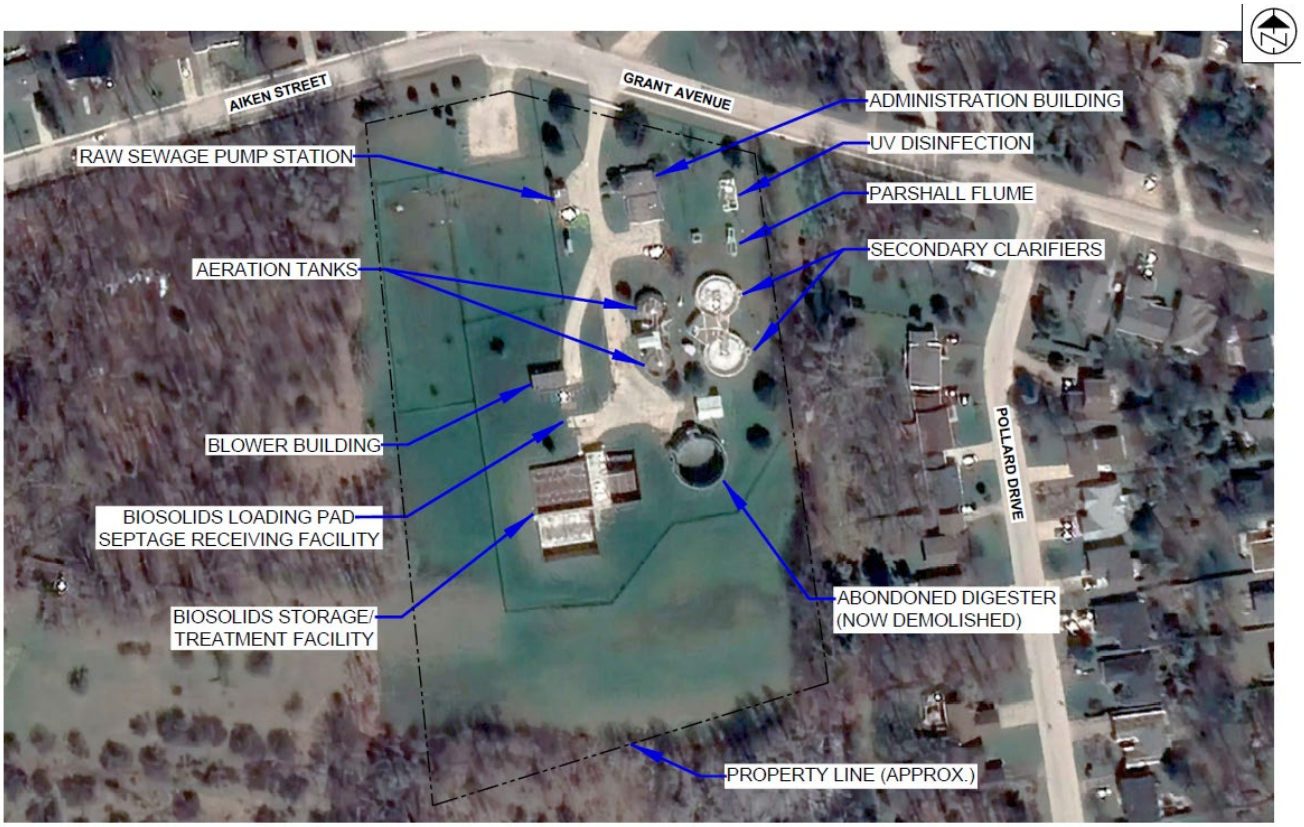

Figure 1-1: Meaford WWTP

There have been some studies on the plant capacity and effluent criteria recently which is listed chronologically in **Table 1-1**:

Table 1-1: Recent Studies on the WWTP

Year	Study	Summary of Findings
2006	Ainley Group - Capacity Analysis Report	The plant can be categorized as a CAS treatment plant. It has enough capacity to meet the average rated capacity with some hydraulic limitation at the peak flow.
2006	Hydromantis - Review of the Capacity Analysis Report	The plant is categorized as a blend of CAS and EAAS treatment plants with some deficiencies in the nitrification requirement as per the Environmental Compliance Approval (ECA) limit. Also, the effective capacity of the secondary clarifier is less than the official rated capacity of the plant.
2007	EarthTech – Environmental Study Report and Assimilative Capacity Study Report	Based on achieving an SRT of 10 days, it is suggested to derate the facility to 2,700 m^3/day. Assuming future ADF of 6,000 m^3/day, the effluent limit shall be set at $CBOD_5$ and TSS of 15 mg/d, Total Phosphorus of 0.8 mg/d, and Total Ammonia of 3.0 and 5.0 mg/d for Non-Freezing and Freezing conditions.
2010	Genivar - Alternative Upgrade Solutions	Different treatment processes are investigated to increase the plant rated capacity to 4,692 m^3/day.
2012	Genivar - Assimilative Capacity Study Update	It is estimated the future plant flows will be 4,692 m^3/day with a peaking factor of 3.5 for the peak daily flow. Accordingly, the effluent design objectives shall be set at $CBOD_5$ and TSS of 15 mg/d, Total Phosphorus of 1.0 mg/d, and Total Ammonia of 3.0 and 5.0 mg/d for Non-Freezing and Freezing conditions.
2015	Ainley - Water and Wastewater Servicing Master Plan	The effluent limit for Phosphorous is expected to change as a result of any upgrades to the plant. Some alternatives are suggested for the WWTP with an ultimate ADF capacity of 5,400 m^3/day.

1.1 Objectives

Below is the list of primary objectives of this Technical Memorandum:

- Review the capacity of the existing WWTP for existing and future (30-year) wastewater flows and effluent quality
- Review historical plant data for the WWTP

2 Flow and Effluent Limits

2.1 Raw Sewage Flow

As per the" Existing and Future Sewage Flow" Technical Memorandum, 2023 Ainley Report, the Average Daily Flow (ADF) of the plant over the 2018 to 2022 time period is 2,734 m^3/day. Also, the projected ADF at the end of the 30-year planned period (2054) is 4,400 m^3/day.

2.2 Influent Flow

Historical average influent sewage quality of the plant between years 2016 to 2022 is shown in **Table 2-1** below.

Table 2-1: Monthly Average Influent Parameters

Year	Flow (m^3/d)	$CBOD_5$ (mg/L)	TSS (mg/L)	Total Phosphorus (mg/L)	Ammonia Nitrogen (mg/L)	Kjeldahl Nitrogen (mg/L)
2016	2,777	190	166	3.0		25.6
2017	3,141	137	123	2.4		21.5
2018	2,811	157	156	3.1	22.0	27.5
2019	2,951	110	108	2.2	18.6	22.8
2020	2,891	110	66	1.7	15.2	19.0
2021	2,681	126	111	2.6	19.8	23.4
2022	2,335	114	87	2.5	18.4	
7-Year Average	**2,734**	**123**	**106**	**2.4**	**18.8**	**23.2**

Peaking factors (PF) for Peak Day Flow (PDF) and Peak Instantaneous Flow (PIF) for year 2016 to 2022 are summarized in **Table 2-2**.

Table 2-2: Peaking Factors

Year	Average Day Flow (m^3/d)	Peak Day Flow (m^3/d)	Peak Instantaneous Flow (m^3/d)	Hourly Peaking Factor (PDF/ADF)	Instantaneous Peaking Factor (PIF/ADF)
2016	2,777	13,075	18,573	4.7	6.7
2017	3,141	11,133	13,285	3.5	4.2
2018	2,811	11,864	16,974	4.2	6.0
2019	2,951	11,952	14,268	4.1	4.8
2020	2,891	9,731	14,005	3.4	4.8
2021	2,681	12,623	13,997	4.7	5.2
2022	2,335	8,648	13,997	3.7	6.0
7-Year Average	**2,798**	**11,289**	**15,014**	**4.0**	**5.4**

2.3 Effluent Requirements

Existing effluent objectives and effluent limits of the plant are summarized in **Table 2-3** and **Table 2-4,** respectively.

Table 2-3: Effluent Objectives

Effluent Parameter	Monthly Average Concentration (milligrams per litre)	Annual Average Loading (kilograms per day)
$CBOD_5$	15.0	58.7
Total Suspended Solids	15.0	58.7
Total Phosphorus	2.0	7.8
Total Ammonia Nitrogen		
Non-Freezing Period*	3.0	11.7
Freezing Period*	5.0	19.6
pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times		

*Note: Freezing Period: October 1 to May 14, Non-Freezing Period: May 15 to September 30

Table 2-4: Effluent Limits

Effluent Parameter	Monthly Average Concentration (milligrams per litre)	Annual Average Loading (kilograms per day)
$CBOD_5$	20.0	78.2
Total Suspended Solids	20.0	78.2
Total Phosphorus	4.0	15.6
Total Ammonia Nitrogen		
Non-Freezing Period*	3.0	11.7
Freezing Period*	5.0	19.6
pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times		

*Note: Freezing Period: October 1 to May 14, Non-Freezing Period: May 15 to September 30

3 Meaford Wastewater Treatment Plant

The WWTP has manual and mechanical fine screen, circular aeration tanks, circular secondary clarifiers, aerobic digesters, aerated sludge tanks, and UV disinfection unit with no chemical addition in processes. The plant was originally designed as a “High Rate” facility with aerobic design without nitrification and has been in operation since 1970 (ECA – No. 3697-62MGNC). The nitrification requirement was added in 2004 (Certification of Approval #3697-62MGNC). The latest Environmental Compliance Approval (ECA No. 9036-AZFPV6) listed the plant with an ADF of 3,910 m^3/day, with a nitrification requirement.

Previous studies (refer to **Table 1-1**) indicate that the plant is operating as a blend of CAS and EAAS processes. The average Hydraulic Retention Time (HRT), at the current ADF is approximately 10 to 11 hours which places the secondary treatment process between the criteria of CAS process (with HRT of 6 hours) and EAAS (with HRT of 15 hours).

A previous study (EarthTech – Environmental Study Report and Assimilative Capacity Study Report – 2007) suggested to derate the plant to 2,700 m^3/day to address the hydraulic bottlenecks of the plant.

3.1 Preliminary Treatment

The preliminary treatment systems of the plant are integrated into the aeration tanks structure, with the two process channels running between the aeration basins.

3.1.1 Screening

The screening system includes the following:

- Two (2) screening channels:
  - One (1) fine screen with 3 mm openings, with a peak instantaneous flow rate of 100 L/s
  - One (1) coarse bar screen with 25 mm bar spacing, with a peak instantaneous flow rate of 328 L/s
- One (1) transport screw conveyor
- One (1) bagging system

As per the manufacturer's specification, the system has a rated peak daily flow rate capacity of 9,842 m^3/day. There is also a bypass channel, which diverts the flows over 9,842 m^3/day. A copy of the manufacturer's information is provided in **Appendix A**.

Screening Unit Capacity = 9,842 m^3/day

3.1.2 Septage Receiving

The facility is equipped with in-ground Septage Receiving Station of 80 m^3 with a bubble diffuser. A submersible pump rated at 10.1 L/s at a 9.0 m TDH transfers the sewage from the station to the screening at the influent works.

3.2 Secondary Treatment

The secondary treatment consists of an extended aeration biological treatment system and a secondary clarifier system. Although the plant is recognized as a blend of CAS and EAAS, there are no design parameters of blended process to assess the aeration tank capacity. As such, the capacity of the secondary treatment has been calculated based on EAAS as a conservative approach.

3.2.1 Aeration Tank Biological Treatment

The aeration system has two tanks, each equipped with fine bubble diffusers as below.

- Two (2) 10.9 m internal diameter x 5.9 m Side Water Depth (SWD) aeration tanks each equipped with a fine bubble aeration system
- Three (3) positive displacement air blowers equipped with variable speed drives, rated at 482.4 m^3/h, two (2) blowers on duty, one (1) blower standby.

The total volume of the existing aeration tank is 1,101 m^3.

Check HRT – 15 hours:

According to MECP Design Guideline, the minimum HRT for the extended aeration process is 15 hr. Therefore, Q_{inflow} can be calculated as:

$$Q_{inflow} = \frac{V_{tank}}{HRT} = \frac{1{,}101\ m^3}{0.625\ day} \xrightarrow{calculating\ for\ Qinflow} Q_{inflow} = 1{,}762\ {}^{m^3}/_{day}$$

Check SRT – 15 days:

HRT calculation resulted in a total aeration tank capacity of 1,762 m^3/day for the EAAS process. This number should be checked against the required SRT to make sure that the calculated capacity leads to enough SRT of 15 days or more, as per the MECP guideline.

SRT can be calculated as:

$$SRT = \frac{Total\ Solids}{Daily\ WAS + Daily\ Effluent\ SS}$$

Total Solids:

There is no available plant data for the MLSS concentration for this study. However, as per the MECP Design Guideline, Table 12-1, the MLSS concentration for an EAAS process ranges from 3,000 mg/L to 5,000 mg/L. Based on the plant's operation team feedback, the MLSS is typically on the high end of the range. Higher MLSS would results in higher SRT.

$$Min\ MLSS = 3{,}000\frac{mg}{L} \xrightarrow{Tank\ Volume=1{,}101\ m^3} Total\ Solid = 3{,}303\frac{kg}{day}$$

$$Max\ MLSS = 5{,}000\frac{mg}{L} \xrightarrow{Tank\ Volume=1{,}101\ m^3} Total\ Solid = 5{,}505\ \frac{kg}{day}$$

Daily WAS Flow:

The plant's operational data shows an average of 267 kg/d WAS production for an average daily flow of 2335 m^3/day. Therefore, it can be assumed that a 1,762 m^3/day daily flow, would result in $\frac{1{,}762\ m3/day}{2{,}335\ m3/day} * 267\frac{kg}{day} = 201\frac{kg}{day}$ WAS production.

Daily Effluent SS:

$$Daily\ EFF\ SS = \ 6.8\frac{mg}{L}\ (section\ 4) \times ADF = 6.8 \times 1{,}762 \times 10^{-3} = 12\frac{kg}{d}$$

Therefore, SRT for the aeration tank can be calculated in a range as:

$$SRT_{min} = \ 15.5\ days$$

$$SRT_{max} = \ 25.8\ days$$

The SRT calculation confirms that there is enough SRT for the influent flow of 1,762 m^3/day.

Considering the aeration tanks process as EAAS results in a total biological capacity of 1,762 m^3/day. However, historical performance data of the plant (7 years) shows aeration tanks are capable of handling flow of 2,734 m^3/d which is much higher than desktop capacity assessment of the aeration tanks.

Aeration Tanks Capacity = 2,734 m^3/day

3.2.2 Secondary Sedimentation

The plant has two (2) secondary clarifiers equipped with activated sludge pumps, as below:

- Two (2) 12.2 m internal diameter x 2.9 m SWD secondary clarifiers, with sludge and scum removal mechanisms
- Two (2) return activated sludge pumps (one standby), each rated at 45 L/s, discharging to the headworks
- Two (2) waste-activated sludge/Scum pumps (one standby), each rated at 23 L/s discharging to the biosolids treatment facility.

Check Weir Loading – 250 m^3/ (m·d):

This provides a total surface area of 233.8 m^2 and the total length of the weir is 76.7 m. As per the MECP Design Guideline, Table 13-2, the recommended weir loading rate for the secondary clarifier for the plant with less than 4,000 m^3/day capacity is 250 m^3/(m·d). Therefore:

$$Q_{peak} = Loading\ Rate \times Weir\ Length = 250 \frac{m^3}{m.day} \times 76.7\ m = 19{,}164\ {}^{m^3}/_{day}$$

$$\xrightarrow{PHF=4.7\ ADF} Q_{Daily\ Average} = 4{,}166\ {}^{m^3}/_{day}$$

the weir is good for a peak hourly flow of up to 19,164 m^3/day.

Check Solid Loading – 170 kg/ (m^2·d):

As per the MECP guideline, Table 13-1, the peak solids loading rate for an Extended Aeration process is 170 kg/(m^2·d). Reviewing the recent plant Return Activated Sludge (RAS) shows that depending on the incoming flow, RAS is set at 3,000 to 4,000 m^3/day (approximately 150% of average influent flow). Therefore:

$$Max\ Solids\ Loading = (Q_{peak} + RAS) \times MLSS$$

$$\xrightarrow{MLSS=3\frac{kg}{m3}\ and\ PF=4.7} Q_{Daily\ Average} = \frac{170\ {}^{kg}/_{(m^3.day)} \times 233.8 m^2}{3 \times 6.1} = 2{,}172\ {}^{m^3}/_{day}$$

Check Surface Overflow Rate – 40 m^3/ (m^2·d):

As per the MECP guideline, Table 13-1, the Surface Overflow Rate at Design Peak Hourly Flow is 40 m^3/(m^2.day). Calculating for the Peak Hourly Flow and Day Average Flow results in:

$$Q_{peak} = Surface\ Rate \times Surface\ Area = 40 \frac{m^3}{m^2.day} \times 233.8\ m^2 = 9{,}352\ {}^{m^3}/_{day}$$

$$\xrightarrow{PHF=4.7\ ADF} Q_{Daily\ Average} = 2{,}033\ {}^{m^3}/_{day}$$

Therefore, the secondary clarifier capacity can be identified by the surface overflow rate as the limiting factor in the process unit.

Secondary Clarifier Capacity in EAAS Process = 2,033 m^3/day

3.3 Disinfection System

3.3.1 UV Light

The UV disinfection system was installed in the plant in 2004 and 2005. The UV system has two (2) channels, each equipped with a Trojan UV 3000 PTP disinfection system, each with a total Peak Hourly Flow Rate of 220.8 m³/h (5,299 m^3/day). A copy of the manufacturer's information is provided in **Appendix B**.

UV Disinfection System Capacity = 10,598 m^3/day

3.4 Sludge Management System

Meaford WWTP sludge management system is built to reduce the volume of the sludge and stabilize the organic material using a two stages sludge aerobic digestion system and a biosolids storage and disposal facility.

3.4.1 Sludge Digestion

Below is the description of the sludge digestion system:

- One (1) two-stage aerobic digester with Stage 1 digester tank (aerobic) with an approximate size of 9.5 m x 10 m x 4.35 m (total volume of 413 m^3), and Stage 2 digester tank (aerobic) with an approximate size of 4.9 m x 10 m x 4.35 m (total volume of 213 m^3), equipped with coarse bubble diffused aeration system and supernatant decanting facility. The total Digester volume is 626 m^3
- Two (2) sludge transfer pumps, each rated at 23 L/s at 7.5 m TDH for the transfer of sludge between the digesters and from the digesters to the biosolids storage
- One (1) duty decanting pump, rated at 23 L/sec at 7.5m TDH to transfer supernatant to inlet works

The capacity of the digestion system is calculated from operational data in 2022. The following are the WAS characteristics:

- Plant average daily flow = 2335 m^3/day
- Average WAS Total Solids = 1.56%
- Average WAS Generation = 17.14 m^3/day (267 kg/day)

Requirement for aerobic digester design is:

- Minimum total SRT 45 days, including the aeration tanks and the sludge digestion units SRT.
- The maximum month CBOD mass loading and flow rate shall be used in digester design.

The digester should be designed with 2% TS feeding and additional 25% of volume for decanting.

the plant is operated with MLSS on a higher range of 3,000 mg/L to 5,000 mg/L, and sometimes above 5,000 mg/L according to the operation team feedback. Therefore, as a conservative assumption, MLSS is set to 4,500 mg/L in capacity assessment. Also, the historical average MM peak factor is 1.9 for BOD loadings in 2017-2021.

Check Aeration Tanks SRT – Maximum Month Daily flow of 2,900 m³/day:

$$Aeration\ Tank\ SRT = \frac{Total\ Solids}{Wasted\ Solids} = \frac{MLSS\ \left(\frac{kg}{m^3}\right) \times Aeration\ Tank\ Volume(m^3)}{WAS\ Flow\ (\frac{kg}{d})}$$

Therefore, SRT can be calculated as:

$$\xrightarrow{MLSS=4.5\ kg/m3} SRT_{Aeration\ Tank} = 14.9\ days$$

Check Digesters SRT – Daily flow of 2,900 m³/day:

$$Digester\ SRT = \frac{Digester\ Volume\ (m^3)}{Digester\ Flow\ (\frac{m^3}{day})}$$

$$SRT_{Digester} = 30.2\ days$$

The total SRT is sum of aeration tank and digester SRT:

$$SRT_{total} = 45\ days$$

Therefore, based on the recent year WAS characteristics, and a conservative assumption of MLSS of 4500 mg/L, the total capacity of the digester is 2,900 m³/day. However, a higher MLSS will result in a slightly higher digester capacity.

Sludge Digestion Unit Capacity = 2,900 m³/day for the maximum month loading, and 1,526 m³/day for the plant ADF with the BOD loadings MM peak factor of 1.9.

3.4.2 Biosolids Storage and Disposal

The biosolids storage tank details are provided in the following:

- One (1) two-celled liquid biosolids storage tank, each cell is approximately 18 m x 14.75 m x 4.35 m with an effective storage volume of 2,300 m³, equipped with a coarse bubble diffused aeration system and supernatant decanting facility.

To calculate the capacity of the storage, the total sludge storage duration should be calculated and compared with the MECP design guideline. As per MECP design guideline, Section 18.1, a minimum of 240 days storage is required for incremental weather.

The historical operation data shows an average biosolids volume generation of 2,614 m³/year, and average daily influent flow of 2,734 m³/day, from 2018 to 2022. Therefore, a 3,600 m³/day average daily flow would result in 3,442 m³/year biosolids generation, with 244 days of storage days.

Hence, according to the recent years biosolids generation rate, the biosolids storage has a capacity for 3,600 m³/day average influent daily flow.

Sludge Storage Unit Capacity= 3,600 m³/day

4 WWTP Performance

Based on the review of the historical data, the WWTP has been consistently achieving all effluent limits and objectives mentioned in the latest Environmental Compliance Approval

(ECA). **Table 4-1** below shows the average effluent concentrations achieved by WWTP between 2016 to 2022.

Table 4-1: Monthly Average Effluent Parameters

Year	$CBOD_5$ (mg/L)	TSS (mg/L)	Total Phosphorus (mg/L)	Ammonia Nitrogen (mg/L)	Kjeldahl Nitrogen (mg/L)
2016	5.1	6.0	1.76	0.88	
2017	5.7	6.8	1.54	0.87	
2018	6.0	7.2	1.87	0.81	1.69
2019	4.4	7.9	1.67	0.47	1.25
2020	4.1	5.2	1.47	0.53	1.33
2021	4.3	6.8	2.05	0.54	1.29
2022	4.2	6.8	2.06	0.53	
7-year Average	**4.6**	**6.8**	**1.8**	**0.57**	**1.39**

5 Plant Capacity Summary and Conclusion

Table 5-1 and **Figure 5-1** below summarize the calculation of this study.

Table 5-1: Treatment Capacity Summary (m^3/day)

Process	Primary Treatment	Secondary Treatment		UV Disinfection (Peak Hourly)	Sludge Digestion (MM)	Biosolids Storage (ADF)
	Screening (Inst. Peak)	Aeration (ADF)	Secondary Clarifier (ADF)			
EAAS	9,842	2,700	2,700	10,598	2,900 (MM) 1,526 (ADF)	3,600

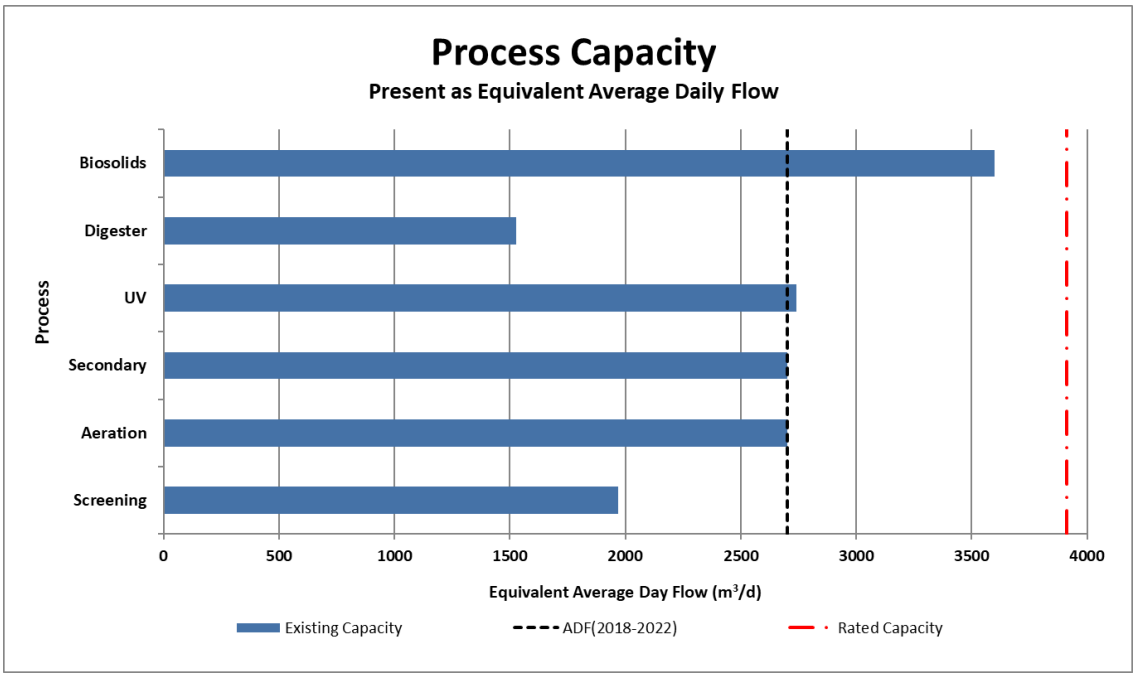

Figure 5-1: Process Capacity

Key findings of the report are:

- The lack of grit removal system causes lots of grit settlement in the aeration tank, which reduces the actual capacity of the aeration tanks by 10% to 15% annually as noted by the plant staff.
- The plant is unique in the way that it operates as a blend of CAS and EAAS processes and meet ECA discharge limits consistently in the last 7 years with the operation ADF significantly higher than calculated secondary capacity based on EAAS process
- The actual capacity of the plant is not as stated in the ECA as the rated capacity of the plant. Any decisions for the future upgrades of the plant should be based on either utilizing the plant as an EAAS plant, or upgrading the plant to operate as CAS.
- The plant is heavily constrained by biological capacity for nitrification.
- The plant is not equipped with phosphorous removal. A phosphorous removal system should be added to the requirement of the plant in case of any major upgrades.
- The digester has the maximum month capacity of 2,900 m^3/d.

Appendix A
Screening System Specification

PARKSON CORPORATION

Parkson Corporation
29850 North Skokie Highway
Lake Bluff, IL 60044-1192 USA
Tel: (847) 473-3700
Fax: (847) 473-0477

QUOTE NO. 230575-1A

DATE: November 28, 2003 **PAGE 1 OF 3**

TO: The Corporation of the Municipality of Meaford

REF.: Meaford, ON STP
Helisieve Cylindrical Fine Screen

MAKE ORDER TO:
Parkson Corporation
c/o H2 Flow Equipment Company
470 North Rivermede Road, #7
Concord, ON L4K 3R8
Ph# 905-660-9775
Attn: Michael Albanese

Scope of Supply:

Parkson Corporation is pleased to submit our proposal for the supply of the following equipment:

One (1) Hycor® Helisieve® unit model HLS40045, complete with the following features:

- Design to fit the following installation parameters:

Peak Daily Flow	2.6 MGD
Channel Width	20"
Channel Depth	48"
Solids Discharge Height	36" Above top of channel.

- Shaftless spiral constructed of nominal 0.75" high strength carbon steel.
- Water resistant brush attached to the leading edge of the spiral in the basket area.
- Screen basket with .125" diameter perforations, fabricated of 14gauge type 304L stainless steel.
- Rubber channel seals fastened to the outer edges of the screen basket.
- Transport tube constructed of 11gauge type 304L stainless steel.
- Press zone consisting of a spool piece with attached drain box and spray wash system.
  - Spool piece constructed of 7gauge type 304L stainless steel.
  - Drain section made of type 304L stainless steel with 1/8" perforations.
  - Spray wash system made of ¾" NPT pipe, fittings, solenoid valve.
  - Jacket assembly consisting of a 14gauge type 304L stainless steel outer shell and drainage collection box with attached drainage hose.
- Discharge section made of 11gauge type 304L stainless steel with a type 304L stainless chute, designed to deposit screenings into solids discharge receptacle supplied by others.
- Longopac type bagger system, supplied loose, for mounting on a 300mm diameter chute by others. Supplied with five cassettes each with a standard length of 230 feet.
- Drive system consisting of a 1.5HP (600/3/60), gear reducer and drive shaft that is welded directly to the spiral.
- Pivot stand constructed of a minimum 10 gauge type 304L stainless steel structural members.

PARKSON CORPORATION

Parkson Corporation
29850 North Skokie Highway
Lake Bluff, IL 60044-1192 USA
Tel: (847) 473-3700
Fax: (847) 473-0477

- Freeze protection consisting of heat tracing the conveyance tube, press zone and discharge with heat cable, 1.5" thick foam insulation and protected with .080" thick polyethylene jacket material. **The contractor will be responsible for providing the heat cable, insulation and protective jacket for the wash water supply pipe.** Power will be provided from the Helisieve main control panel.
- The following unit-mounted electrical devices will be furnished:
  - Access door interlock switch.
  - E-stop
  - Solenoid Valve
- Controls furnished in a NEMA 4X 304 stainless steel enclosure.
  - 600/3/60 supply with motor starter, disconnect switch and 120 volt step down transformer.
  - H-O-A switch and E-Stop button.
  - Adjustable current monitor and timers.
  - Indicating lights.
  - Float switch level sensor.
- Corrosion protection consisting of passivation of stainless steel components.
- Services of a factory representative for one (1) day during one (1) trip to the jobsite for installation inspection, start-up supervision and operator training.

Price: All of the above for the sum of $59,792 CDN. DDP Meaford, ON. Purchaser will pay 7% Federal GST, provided Parkson shows proof that GST has been paid on this product at Port of Entry and / or through GST Registration numbers. 8% Ontario PST is not included.

The price quoted is based on an exchange rate of U.S. $1.00/CDN $1.3125, as listed in the Wall Street Journal dated November 26, 2003. Should the exchange rate change as of the date of invoicing such that the contract value changes by more than CDN $500.00, the contract value will be revised up or down accordingly.

Validity: The above price is firm for 45 days from the date of bid. Pricing is based on the schedules stated in this proposal.

Exclusions: state or local taxes, if applicable; interconnecting wiring, wiring and conduit from each unit-mounted electrical device to a terminal box or control panel, piping, anchor bolts, connections, platforms, gratings, railings, solids receptacles, influent gate, installation, installation supervision, or any other auxiliary equipment or service not detailed above.

Specifically Excluded: LIQUIDATED AND CONSEQUENTIAL DAMAGES.

PARKSON CORPORATION

Parkson Corporation
29850 North Skokie Highway
Lake Bluff, IL 60044-1192 USA
Tel: (847) 473-3700
Fax: (847) 473-0477

QUOTE NO.:230575-1A

Owner/Contractor Responsibility:

- Unloading, uncrating and installation. (Note: Installation will, at minimum, require a forklift and possibly a crane/hoist for larger units.)
- Shower water and supply connection.
- Spare parts.
- Water supply heat trace cable and insulation.
- Solids discharge receptacle.
- Electrical connection and interconnecting wiring to or from any of the following listed electrical devices:
  - E-Stop button.
  - Motor.
  - Controls.
  - Level sensor.
  - Interlock switch.

Delivery: Ex-factory, Fourteen (14) Weeks After Final Drawing Approval or Release to Manufacture with Full Freight Allowed to Jobsite.

Terms: 10% with shop drawing approval, 80% net 30 days after delivery, 10% retainage not to exceed 120 days after shipment.

Drawings: Approval drawings will be furnished within 4 weeks of purchase order or Letter of Intent.

Please consult Parkson Corporation or your local representative with any questions.

Warranty - standard, with additional terms attached.

Thank you for your consideration.
Parkson Corporation.

for: Don Kramer
Municipal Inside Sales

Enclosures: Warranty, Terms and Conditions

Appendix B
UV Specification

Trojan Technologies Inc.

UV3000™ PACKAGE TREATMENT PLANT (PTP)
To be installed in Concrete Channel (by others)

In response to your request, we are pleased to provide the following **Package Treatment Plant (UV3000™PTP)** information. Since Trojan introduced the open channel approach to disinfection in 1981, many municipalities and private/commercial treatment plants users have selected ultraviolet as the preferred method for pathogen destruction at their facilities.

All of Trojan's UV systems are modular in design, with each design customized in response to the effluent criteria. This information is based on the use of Trojan Technologies Inc. **Package Treatment Plant.**

Project Name: MEAFORD STP
(Project name, city, state or province)

Trojan Quote No: H2FPTP-052003 REV. 4

Trojan Model: UV3001M-1 PTP

Total Unit(s) Included: 1

Design Criteria:

Current Peak Design Flow:	1,400,000 GPD
Minimum UV Transmission:	65 %
Total Suspended Solids:	30 mg/l (30 day Geometric Average; grab samples)
Max Average Particle Size:	30 microns
Disinfection Limit:	200 per 100 ml, Fecal Coliform, based on a 30-day geometric mean of consecutive daily grab samples

Please refer all inquires and orders to Trojan Manufacturer's Representative:

Contact: **MICHAEL ALBANESE, P.ENG.**

Company: **H2Flow Equipment Inc., 470 North Rivermede Rd. #7, Concord, Ontario LK4 3R8**

Phone: **905-660-9775**

Fax: **905-660-9744**

Date: Nov. 26, 2003

ULTRAVIOLET MODULES

Each module will consist of 4 UV lamps with their corresponding electronic ballast in an aluminium enclosure mounted on a stainless steel type 316 frame. The electrical wires connecting the lamps and ballasts will be enclosed in the stainless steel frame and not exposed to the effluent.

Each UV module will be provided with a standard 120 Volt plug and weatherproof cable for connection to a receptacle. The cable will be no longer than 10 feet. A total of 10 UV modules (40 UV lamps) will be supplied. Lamp status will be displayed on top of each UV module by watertight LED indicator lights.

Modules will be approximately 68 in long, 20 in high and 2.8 in wide, weighing approximately 38 lbs. Materials of construction will be stainless steel type 316, anodised aluminium, quartz 214, and teflon.

Note: Installation contractor will need to provide ground fault interrupter protection from the power source, or utilize optional Trojan Power Distribution Receptacles specifically designed for this application.

MONITORING SYSTEM

A submersible UV sensor will continuously sense the UV intensity produced in each bank of UV lamp modules. UV intensity in mW/cm^2 will be indicated on a 3 character display. Elapsed time in hours will be indicated on 5 character display. Both displays will utilize 7 segment LEDs and will be visible through the panel door. The Monitoring System will be enclosed in a Type 4X wall mounted panel.

Note: Contractor to supply a separate 120 Volt, single phase, 60 Hz, 5 amps, power supply for each monitoring system.

POWER DISTRIBUTION RECEPTACLE (PDR) Qty 5

Duplex ground fault interrupter receptacle(s), mounted in individual, painted cast aluminium junction boxes complete with a rain shield, to provide power to each UV module.

Note: Contractor to supply appropriate 120 Volt, single phase, 60 Hz circuit to power the PDRs which have a total current draw of approximately 35 amps. Contractor to be responsible for distributing the power from the main 120 Volt feed to the individual PDRs. Responsibility to be all encompassing and in accordance with the local electrical codes.

MAINTENANCE RACK

A maintenance rack of type 304 stainless steel will be included. The rack is designed to facilitate the servicing operation of the UV modules.

ADDITIONAL WEIR FOR BY-PASS CHANNEL

Qty (1) Additional stainless steel weir will be provided for the by-pass channel

SPARE PARTS

	Quantity
UV Lamps	4
Quartz Sleeves	4
Lamp Holder Seals	4

MISCELLANEOUS ITEMS

Each system will be supplied with the following items:

1. **Operator's Kit**

3020 Gore Road, London, Ontario Canada N5V 4T7 Tel: (519) 457-3400 Fax: (519) 457-3030 www.trojanuv.com

1 pair of rubber gloves
1 face shield
1 UV warning label

2. **Cleaning Agent**
   1 US gallon (4L) jug of Lime-A-Way (In Canada & U.S. only)

3. **O&M Manuals**
   3 Copies

START-UP AND COMMISSIONING (ONE DAY)

Local Trojan Rep [X] Not Included [ ]

NOTES

1. UV Disinfection Equipment specification is available upon request.
2. Trojan Technologies Inc. warrantees all components of the system (excluding UV lamps) against faulty workmanship and materials for a period of 12 months from date of start-up or 18 months after shipment, which ever comes first. The lamps supplied with the system will be warranted for 12,000 hours of operation.

SELLING PRICE: $ 41,600

(This price includes all equipment listed in the above proposal.)

TERMS & CONDITIONS:

1. Submittals provided within 2 weeks after receipt of purchase order.
2. Equipment delivery within 5-8 weeks from receipt of purchase order and engineer's approval (where applicable).
3. Selling price does not include taxes, which may be applicable.
4. Net 30 days.
5. F.O.B Factory; Freight paid to jobsite.
6. Validity is 90 days from date above

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