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Solving today's problems with tomorrow in mind

BEST MANAGED COMPANIES CANADA'S

October 6, 2016

Justin Waugh-Cress, P.Eng.
Director of Engineering and Operations
Municipality of Cumberland
Upper Nappan Service Center
1395 Blair Lake Road
Upper Nappan, NS B4H 3Y4

Dear Mr. Waugh-Cress:

RE: Parrsboro Wastewater System Design – Sanitary Flow Rates

CBCL completed a sanitary flow analysis for the Town of Parrsboro as part of the Parrsboro Wastewater Servicing project. The town has been split into two service areas; Downtown and Riverside. Average and peak daily sanitary flows were determined based on a combination of existing flow data and theoretical flows. The attached figure (Fig 1) shows the limits of each service area.

A description of the process used to determine the sanitary flows is provided below.

EXISTING COLLECTION SYSTEM

The existing average daily flows for the Downtown service area were taken from the 2003 Flow Monitoring program completed for the Town of Parrsboro. No flow measurement was completed for the Riverside service area.

The average sewage flows for the Riverside area were calculated by adding the average dry weather flows to the inflow/infiltration allowances. The average dry weather flows were calculated by multiplying the average daily flows for private residential dwellings of 340Lpd/cap (Atlantic Canada Wastewater Guidelines) by the population. The inflow/infiltration allowances were calculated by multiplying the allowance value 0.48 m^3/cm pipe diameter/km of pipe/day (Atlantic Canada Wastewater Guidelines) by the length of pipe and the pipe diameter.

Peak flows for the Downtown service area were taken from the 2003 Flow Monitoring program completed for the Town of Parrsboro. No flow measurement was completed for the Riverside service area.

Peak flows for the Riverside area were calculated by multiplying the average dry weather flows by a peaking factor then adding the inflow/infiltration allowance. The peaking factor was calculated based on the Babbit formula (Atlantic Canada Wastewater Guidelines).

Service Area	Population	ADWF	Peak Flow		
			Peak Factor	I/I	Peak Flow Rate
Downtown	289	140 Lpm*	-	-	17.9 Lps
Riverside	60	14 Lpm	8.78	4 Lpm	2.1 Lps

*Based on flow monitoring of existing combined sewer.

EXTENSION OF COLLECTION SYSTEM

The additional population to be serviced once the sewer system has be extended as shown in Fig 1 was based on an average road frontage of the new sanitary systems being proposed. An average frontage of 30m per home and a population density of two (2) people per home were used.

The average sewage flows were calculated by adding the average dry weather flows to the inflow/infiltration allowances. The average dry weather flows were once again calculated by multiplying the average daily flows for private residential dwellings of 340Lpd/cap (Atlantic Canada Wastewater Guidelines) by the population. The inflow/infiltration allowances were also once again calculated by multiplying the allowance value 0.48 m^3/cm pipe diameter/km of pipe/day (Atlantic Canada Wastewater Guidelines) by the length of pipe and the pipe diameter.

Peak flows were calculated by multiplying the average dry weather flows by a peaking factor then adding the inflow/infiltration allowance. The peaking factor was calculated based on the Babbit formula (Atlantic Canada Wastewater Guidelines).

Service Area	Population	ADWF	Peak Flow		
			Peak Factor	I/I	Peak Flow Rate
Downtown	528	125 Lpm	6.68	36 Lpm	12.4 Lps
Riverside	212	50 Lpm	6.82	16 Lpm	5.2 Lps

SEWER EXTENSION INTO UNDEVELOPED AREAS

A portion of the Downtown service area is currently undeveloped. The additional population of this undeveloped area was calculated based on an average road frontage. This frontage was derived from a conceptual undeveloped service area sewer routing generated by using existing lot lines. The routing can be seen on Fig 1. An average frontage of 30m per home and a population density of two (2) people per home were used.

The average sewage flows were calculated by adding the average dry weather flows to the inflow/infiltration allowances. The average dry weather flows were once again calculated by multiplying the average daily flows for private residential dwellings of 340Lpd/cap (Atlantic Canada Wastewater Guidelines) by the population. The inflow/infiltration allowances were also once again calculated by multiplying the allowance value 0.48 m^3/cm pipe diameter/km of pipe/day (Atlantic Canada Wastewater Guidelines) by the length of pipe and the pipe diameter.

Peak flows were calculated by multiplying the average dry weather flows by a peaking factor then adding the inflow/infiltration allowance. The peaking factor was calculated based on the Babbit formula (Atlantic Canada Wastewater Guidelines).

Service Area	Population	ADWF	Peak Flow		
			Peak Factor	I/I	Peak Flow Rate
Downtown	311	73 Lpm	6.32	16 Lpm	8.0 Lps
Riverside	-	-	-	-	-

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WASTEWATER DESIGN FLOWS

A summary of the estimated flows for the various stages of the collection system development are provided below.

Service Area	Current Flows		Sewer Extension		Sewer of Undeveloped Lands	
	ADWF	Peak	ADWF	Peak	ADWF	Peak
Downtown	140 Lpm*	17.9 LPS	125 Lpm	12.4 LPS	73 Lpm	8.0 Lps
Riverside	14 Lpm	2.1 LPS	50 Lpm	5.2 LPS	-	-
Total	154 Lpm	20 LPS	175 Lpm	17.6 LPS	73 Lpm	8.0 Lps

*Based on flow monitoring of existing combined sewer.

The wastewater treatment facility will be design to accommodate current flows, plus the sewer extension and the development of undeveloped lands. The estimated average daily wastewater flow received at the WWTF will be 682,560 Lpd and a peak flow will be 45.6 Lps.

The predesign report estimated the design average daily and peak flows at 542,000 Lpd and 36.1 Lps respectively. The predesign report did not make an allowance for the development of greenspace within the service area. It was thought that this would result in much larger than need treatment system at this time.

Yours truly,

CBCL Limited

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Manager Municipal Engineering

Attachment: Figure 1 – Proposed Town Service Areas

Project No: 161039.00

NORTH

DOWNTOWN SERVICE AREA

UNDEVELOPED SERVICE AREA

SEWAGE TREATMENT PLANT

RIVERSIDE SERVICE AREA

PARAMETER	EXISTING SERVICE AREA			ADDITIONAL SERVICE AREA			UNDEVELOPED SERVICE AREA			TOTAL FUTURE SERVICE AREA		
	POPULATION	AVERAGE FLOW	PEAK FLOW	POPULATION	AVERAGE FLOW	PEAK FLOW	POPULATION	AVERAGE FLOW	PEAK FLOW	POPULATION	AVERAGE FLOW	PEAK FLOW
DOWNTOWN	289	140 LPM	17.9 LPS	528	161 LPM	12.4 LPS	311	89 LPM	8.0 LPS	1128	390 LPM	38.3 LPS
RIVERSIDE	60	18 LPM	2.1 LPS	212	66 LPM	5.2 LPS	–	–	–	272	84 LPM	7.3 LPS
TOTAL	349	158 LPM (227,520 LPD)	20 LPS	740	227 LPM (326,880 LPD)	17.6 LPS	311	89 LPM (128,160 LPD)	8.0 LPS	1400	474 LPM (682,560 LPD)	45.6 LPS

SITE PLAN
1: 3500

NOTES:
1. –

LEGEND:

- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- PROPOSED SANITARY SEWER
- CONCEPTUAL UNDEVELOPED SERVICE AREA SEWER
- RIVERSIDE SERVICE AREA
- DOWNTOWN SERVICE AREA
- UNDEVELOPED SERVICE AREA

No.	Description	Date	By
A	ISSUED FOR INFORMATION	OCT 6/16	JAB

Revision or Issue

TOWN OF PARRSBORO
WASTEWATER PRE-DESIGN

CIVIL

PROPOSED TOWN SERVICE AREA

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ISO 9001 CERTIFIED

CBCL No	Contract No	Date	Scale
140834.02	140834	OCT 2016	1:3500

Designed	Drawn
TB	AD
Checked	Approved
TB	JAB

Sheet No 1 of 1

Drawing No **FIG 1**

DRAWING_NAME: K:\PROJECTS\140339.00 PARRSBORO WASTEWATER SYSTEM\20 DAD\01 CIVIL\WASTEWATER SERVICE AREA\140834_02_FIG 1.DWG LAYOUT_NAME: FIG 1 PLOT_DATE: October-06-16 3:31:06 PM CAD_OPERATOR: ADYALE