November 9, 2018
Our File: S-1364

Via Email: peter@andpetrealty.com

Mr. Peter Vandolder
c/o AndPet Realty Ltd.
1545 16th Street East, Unit 4
Owen Sound, ON N4K 5N3

Re: Updated Sanitary Servicing Feasibility
AndPet Subdivision
16th Avenue East, Owen Sound

Dear Peter,

In June 2006, GM BluePlan Engineering Ltd. (GMBP; formerly Gamsby and Mannerow Ltd.) prepared a review of anticipated sanitary sewage flows from the subject property as per the original Draft Plan with 52 single family residential units and 2 medium density (20 unit) residential blocks, for a total of 92 units at 3.5 persons per unit, or a total of 332 persons. The peak residential sewage design flow was calculated at 400 L/p/d to be 7.5 L/s.

About February 2018, GMBP provided an updated review of anticipated sanitary sewage flows from the subject property as per a revised Draft Plan with 22 semi-detached units, 4 street townhouse units, 1 medium density (96 unit) residential block, 1 high density (112 unit) residential block, and a retirement residence (120 unit) block, for a total of 354 units at 2.3 persons per unit, or a total of 815 persons. The residential sewage design flow was calculated at 400 L/p/d to be 14.56 L/s.

Since the time of the previous updated review, the proponent has revised the Draft Plan again, as follows:

Total Population:

	Townhouse Dwelling	27 Units
	Semi-Detached Dwelling	54 Units
	Apartment Dwelling	120 Units
	Long Term Care Facility	120 Units
Total Units:	**321 Units @ 2.3 P/Unit**	**= 739 Persons**

Area: 7.07 ha (incl. SWM Pond)

Peaking Factor: $1 + \frac{14}{4 + \sqrt{0.739}} = 3.88$

$Q_p = \frac{0.739 \times 325 \times 3.88}{86.4} = 10.79$ L/s

Infiltration Allowance: 7.07 ha x 0.20 L/ha*s = 1.41 L/s

Total Design Flow = 12.20 L/s

This flow is intended to discharge to 16th Avenue East where the existing sewer would be replaced at a lower elevation; re-connecting on the north side of 16th Street East. The proposed 16th Avenue East sewer is 250mm Ø at 0.3% grade, with a full flow capacity of approximately 32.6 L/s.

The lands draining to the 16th Avenue East sanitary sewer include southerly to 10th Street East. As shown on Figure No. 1 – Sanitary Catchment Areas, only the lands on either side of 16th Avenue East, between 10th Street East and 16th Avenue East contribute flows to the proposed sewer on 16th Avenue East.

The catchment area lands have developed differently from the original concept as was mapped by Henderson, Paddon & Associates Ltd. (HPA) in 1994. Reportedly, the 10th Street East sanitary sewer was initially constructed to service the Owen Sound Hospital, the flows from which have since been diverted easterly along the 10th Street East extension. The following pages summarize the sewage design flows from the original concept and the currently proposed sewage design flows expected to drain to the proposed 16th Avenue East sewer, based on existing and currently planned developments.

Using the design flows from the original concept, a peak design flow of 12.0 L/s was expected to discharge from the catchment areas lands to the 16th Avenue East sanitary sewer with flows from the Hospital being diverted along 10th Street East. The Sanitary Sewer Design Sheet for Proposed/ Ultimate Flows in conjunction with the Sanitary Sewage Flows Owen Sound East drawing, both prepared by HPA in 1994 as part of the design for the diversion, considered a peak design flow of 28.3 L/s draining from the Hospital. Therefore, a peak design flow of 40.3 L/s is considered to have drained to the 16th Avenue East sanitary sewer prior to the diversion of Hospital flows along the 10th Street East extension. A portion of the drawing and design sheet prepared by HPA are enclosed.

In summary, the review concludes that the currently proposed sewage design flow from 16th Avenue East to 16th Street East is 27.4 L/s, which is approximately 84% of the 32.6 L/s design capacity of the proposed 250 mm Ø sewer at 0.3%. Furthermore, the currently proposed sewage design flow of 27.4 L/s is less than the peak design flow of 40.3 L/s as was previously considered by HPA.

Trusting this will satisfy the sanitary servicing interests for this development, I remain,

Yours truly,

GM BLUEPLAN ENGINEERING LIMITED

Prepared by:

Alex Wilkinson, E.I.T.
AW/mz
Encl.

Reviewed by:

John Slocombe, P.Eng.

cc: Jones Consulting: Lorelie Spencer, via Email – lspencer@jonesconsulting.com
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SANITARY SEWAGE FLOWS TO 16TH STREET EAST / 16TH AVENUE EAST

Henderson & Paddon Concept
Original Design Flows – January, 1994.

Assumptions:
3 Persons/Unit
LDR = 18 Units/ha
MDR = 40 Units/ha
HDR = 72 Units/ha
Com = 28m³/ha.day
450 L/P.day

	COM	HDR	MDR	LDR	TOTAL	EXTRANEOUS FLOWS
A (ha)	0.7	0.4	1.15	5.04	A_T = 7.29ha	0.2 L/ha.s
Pop	N/A	87	138	272	P_{TOT} = 497	

Peaking Factor (P) = $\frac{14}{4+\sqrt{0.497}}$ + 1 = 3.976

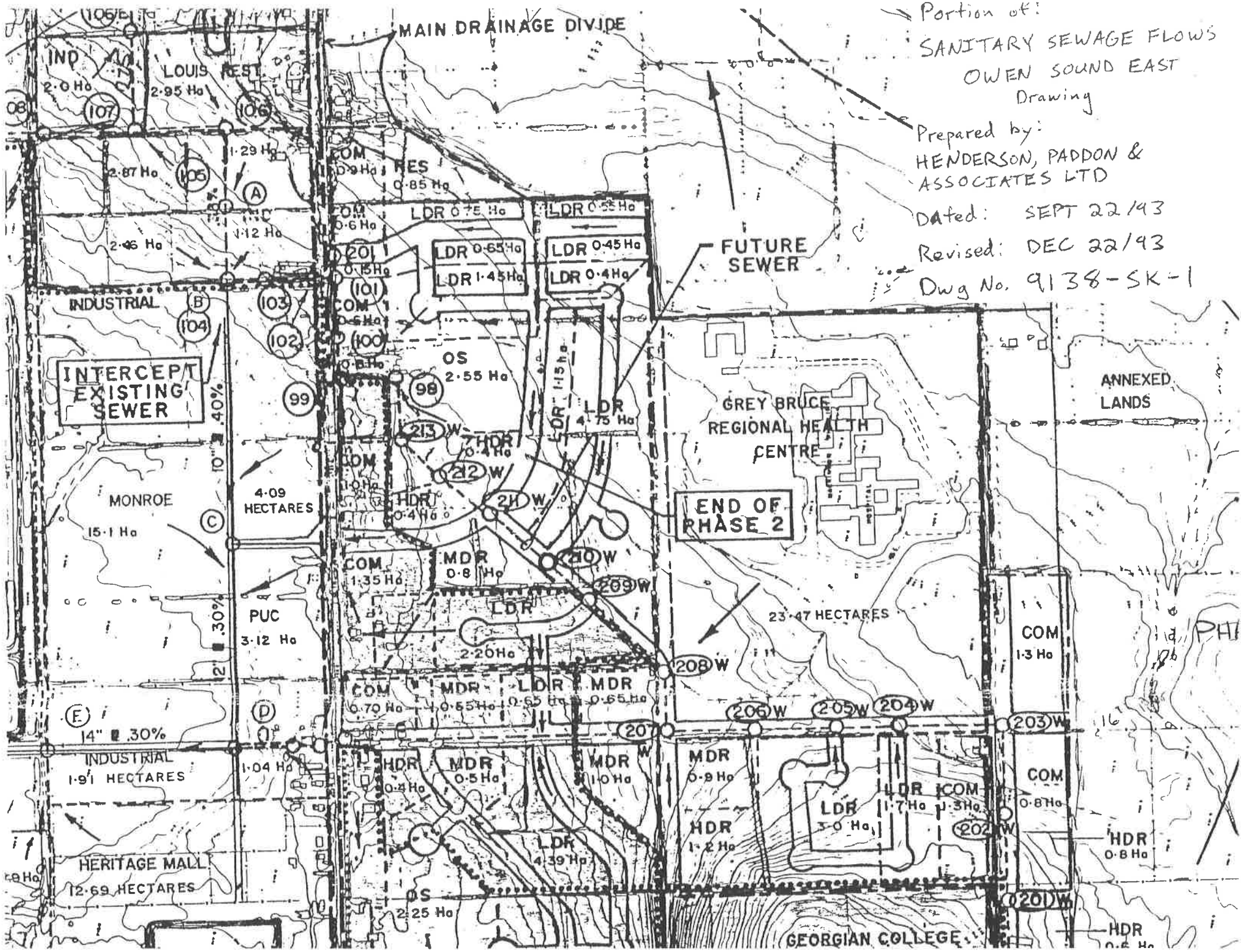
$Q_{RES} = \frac{0.497 \times 450 \times 3.976}{86.4}$ = 10.29 L/s

Qcom = 28m³/ha.day x 0.7ha = 0.23 L/s

Q_{ELT} – 0.2L/ha.s x 7.29ha = 1.46L/s

Original Design Flow Q_T = 11.98L/s*

*Plus Hospital Flow Temporary Prior to Diversion


MAIN DRAINAGE DIVIDE
Portion of:
SANITARY SEWAGE FLOWS
OWEN SOUND EAST
Drawing
Prepared by:
HENDERSON, PADDON & ASSOCIATES LTD
Dated: SEPT 22/93
Revised: DEC 22/93
Dwg No. 9138-SK-1
FUTURE SEWER
INTERCEPT EXISTING SEWER
INDUSTRIAL
LOUIS
2·95 Ha
2·0 Ha
1·29 Ha
2·87 Ha
2·46 Ha
1·12 Ha
4·09 HECTARES
MONROE
15·1 Ha
PUC
3·12 Ha
1·04 Ha
INDUSTRIAL
1·91 HECTARES
HERITAGE MALL
12·69 HECTARES
10" @ .40%
12" @ .30%
14" @ .30%
COM
0·9 Ha
RES
0·85 Ha
COM
0·6 Ha
LDR 0·75 Ha
LDR 0·55 Ha
LDR 0·65 Ha
LDR 1·45 Ha
LDR 0·45 Ha
LDR 0·4 Ha
201
0·15 Ha
101
100
0·8 Ha
OS
2·55 Ha
1·15 Ha
LDR
4·75 Ha
213 W
HDR
0·4 Ha
212 W
211 W
COM
1·0 Ha
HDR
0·4 Ha
210 W
MDR
0·8 Ha
209 W
COM
1·35 Ha
LDR
2·20 Ha
208 W
COM
0·70 Ha
MDR
0·55 Ha
LDR
0·65 Ha
MDR
0·65 Ha
207
206 W
205 W
204 W
203 W
HDR
0·4 Ha
MDR
0·5 Ha
MDR
1·0 Ha
LDR
4·39 Ha
OS
2·25 Ha
MDR
0·9 Ha
HDR
1·2 Ha
LDR
3·0 Ha
LDR
1·7 Ha
COM
1·3 Ha
202 W
201 W
COM
1·3 Ha
COM
0·8 Ha
HDR
0·8 Ha
HDR
GEORGIAN COLLEGE
GREY BRUCE REGIONAL HEALTH CENTRE
ANNEXED LANDS
END OF PHASE 2
23·47 HECTARES
PHI

C.4069

HENDERSON, PADDON & ASSOCIATES LIMITED

Sanitary Sewer Design Sheet — 9138FM4

Project Name — Trunk Sewer – Proposed/Ultimate Flows

Project No. 9138
Date January 1994
Designed by R.J. Henderson

Avg daily flow
- Res, r — 450 L/Cap.d
- Comm/Inst, c — 28 CM/hectare.day
- Ind, i — 33.7 CM/hectare.day

Peak extraneous flow
- Res, r — 0.196 L/ha.s
- Comm/Inst, c — 0.105 L/ha.s
- Ind, i — 0.105 L/ha.s

Manning's n 0.013

Location Street	From	To	Source known	& Code r,c,i	Residential Pop	Residential Accum	Non–Res Flow known (CM/ha.day)	Non–Res Flow unknown (CM/ha.day)	Area (ha)	Accum – Ind (ha)	Peak Factor RES	Peak Factor NON–RES	San Flow L/s	Ext Flow L/s	Incr Flow L/s	Design Flow L/s	Sewer Dia mm	Grade %	Cap L/s	Full V M/s	Ex Cap L/s
Serv Corr	100E	101E		r	11471	11471			146.65		2.89525		172.98	28.74	201.72						
				c				28	30.91			3.50	35.06	3.25	38.30						
				i				33.7	4.00	4.00		2.70	4.21	0.42	4.63						
			park	c					35.20			3.50	0.00		0.00	244.65	600	0.29	330.70	1.17	86.05
Serv Corr	101E	102E														244.65	600	0.29	330.70	1.17	86.05
Serv Corr	102E	103E		i				33.7	7.23	11.23		3.85	10.85	0.76	11.61	256.26	600	0.32	347.38	1.23	91.12
Serv Corr	103E	104E		c				28	4.08			3.50	4.63	0.43	5.06	261.32	600	1.00	614.09	2.17	352.77
Serv Corr	104E	105E		i				33.7	4.78	16.01		3.65	6.81	0.50	7.31	268.63	600	1.00	614.09	2.17	345.46
Serv Corr	105E	106E		i				33.7	2.83	18.84		3.50	3.87	0.30	4.16	272.79	600	1.00	614.09	2.17	341.30
Serv Corr	106E	107		i				33.7	2.00	20.84		3.50	2.73	0.21	2.94	275.73	600	1.00	614.09	2.17	338.96
	200W	201W		r	389	389			2.70		4.02787		8.16	0.53	8.69	8.69	200	0.34	19.13	0.61	10.44
	201W	202W		r	160	549			0.80		3.95299		3.29	0.16	3.45	12.14	200	0.34	19.13	0.61	6.99
	202W	203W		c				28	2.10			3.50	2.38	0.22	2.60	14.74	200	0.34	19.13	0.61	4.38
	203W	204W		c				28	1.30			3.50	1.47	0.14	1.61	16.35	200	0.34	19.13	0.61	2.77
	204W	205W		r	92	641			1.70		3.91628		1.88	0.33	2.21	18.56	250	0.30	32.58	0.66	14.01
	205W	206W		r	163	804			3.00		3.85909		3.28	0.59	3.86	22.43	250	0.30	32.58	0.66	10.15
	206W	207W														22.43	250	0.30	32.58	0.66	10.15
	207W	208W		r	566	1370			3.75		3.70768		10.93	0.74	11.67	34.09	300	0.30	52.97	0.75	18.88
	208W	209W	GBRHC	c											28.32						
			MNR	c											0.59	63.00	375	0.30	96.04	0.87	33.04
	209W	210W														63.00	375	0.30	96.04	0.87	33.04
	210W	211W		r	360	1730			5.55		3.63390		6.81	1.09	7.90	70.90	375	0.30	96.04	0.87	25.14
	211W	212W		r	223	1953			1.95		3.59379		4.17	0.38	4.56	75.46	375	0.30	96.04	0.87	20.58
	212W	213W														75.46	375	0.30	96.04	0.87	20.58
	213W	98														75.46	375	0.30	96.04	0.87	20.58
	98	99		r	101	2054			1.85		3.57676		1.88	0.36	2.24						
			park	c			11.22		2.55			3.50	1.16	0.27	1.43	79.13	375	0.25	87.68	0.79	8.55
	99	100		c				28	0.60			3.50	0.68	0.06	0.74	79.87	375	0.25	87.68	0.79	7.80
	100	101		c				28	0.60			3.50	0.68	0.06	0.74	80.61	375	0.25	87.68	0.79	7.06

SANITARY SEWAGE FLOWS TO 16TH STREET EAST / 16TH AVENUE EAST

Summary of Design Flows Draining to 16th Street East/ 16th Avenue East Intersection

CATCHMENT ID *	CURRENT & PLANNED DEVELOPMENT CONDITIONS – 2018	AREA (ha)	SEWAGE DESIGN FLOW (L/s)
A	Seasons Retirement Home	1.11	2.22
B	Undeveloped Commercial Property	0.20	0.24
C	Canadian Tire Property (incl. Mark's Work Wearhouse, Gas Station and Car Wash)	3.12	3.65
D	Sun Life Development (Phases 1, 2 & 3) - Diverted to 16th Ave. E. from 10th St. E.	1.12	4.53
E	Planned Hotel Development	0.81	1.20
F	Planned Southbridge Retirement Home	1.46	2.81
G	Southerly Portion of East Court Plaza	0.32	0.37
H	16th Ave. E Roadway, between 10th St. E and 16th St. E.	1.02	0.20
I	Proposed Subdivision - Westerly portion diverted easterly.	7.07	12.20
	TOTAL AREA/ SEWAGE FLOW	**16.23**	**27.42**

** As shown on Figure No. 1 – Sanitary Catchment Areas*

Calculation of sanitary flows draining from each catchment are shown on the following pages.

Design Criteria Used in Calculations

Residential Design Flow: 325 L/cap*d
Extraneous Flow: 0.20 L/s*ha
Commercial Flow:
Catchment D: 3.0 L/ m^2*d for commercial spaces (based on floor area)
125 L/seat*d for restaurant (as per OBC Table 8.2.1.3.B.)
Other Catchments: 28 m^3/ha*d (based on property area)

Population Density: 1 person per bed space for retirement homes
2 bed spaces per unit for hotels
2.3 persons per unit for all other domestic units

Peaking Factor: For commercial purposes, based on expected daily operating hours (as per the Design Guidelines for Drinking-Water Systems)
For residential purposes, based on Harmon Formula

Proposed Sanitary Sewer Pipe Capacity:
Proposed lowered sewer on 16th Avenue East thru 16th Street East 250mm Ø @ 0.3% CAP = 32.6 L/s

SANITARY SEWAGE FLOWS DRAINING FROM CATCHMENT AREAS

Catchment A – Seasons Retirement Home

Residential

$P = \frac{126}{1000} = 0.126$ $\qquad$ $M = 1 + \frac{14}{4 + (0.126)^{0.5}} = 4.21$

$Q_r = \frac{0.126 \times 325 \times 4.21}{86.4} = 2.00$ L/s

Extraneous

$Q_e = 0.20$ L/ha*s x 1.11 ha = 0.22 L/s

Peak Sewage Flow – Catchment A

$Q = Q_r + Q_e = 2.00$ L/s + 0.22 L/s = 2.22 L/s

Catchment B – Undeveloped Commercial Property

Commercial

$Q_c = 28$ m³/ha*s x 0.20 ha x $\frac{24\text{ h}}{8\text{ h}}$ = 17 m³/d = 0.20 L/s

Extraneous

$Q_e = 0.20$ L/ha*s x 0.20 ha = 0.04 L/s

Peak Sewage Flow – Catchment B

$Q = Q_c + Q_e = 0.20$ L/s + 0.04 L/s = 0.24 L/s

Catchment C – Canadian Tire Property

Commercial

$Q_c = 28$ m³/ha*s x 3.12 ha x $\frac{24\text{ h}}{8\text{ h}}$ = 262 m³/d = 3.03 L/s

Extraneous

$Q_e = 0.20$ L/ha*s x 3.12 ha = 0.62 L/s

Peak Sewage Flow – Catchment C

$Q = Q_c + Q_e = 3.03$ L/s + 0.62 L/s = 3.65 L/s

Catchment D – Sun Life Development

Commercial

Q_c (comm. spaces) = 3.5 L/m²*d x (1260 m² + 1257 m²) x $\frac{24\ h}{8\ h}$ = 26,429 L/d = 0.31 L/s

Q_c (restaurant) = 125 L/seat*d x 150 seats x $\frac{24\ h}{12\ h}$ = 37,500 L/d = 0.43 L/s

$Q_c = Q_c$ (comm. spaces) + Q_c (restaurant) = 0.31 L/s + 0.43 L/s = 0.74 L/s

Residential

$P = \frac{100 \times 2.3}{1000} = 0.23$ $\qquad$ $M = 1 + \frac{14}{4+(0.23)^{0.5}} = 4.13$

$Q_r = \frac{0.23 \times 325 \times 4.13}{86.4} = 3.57$ L/s

Extraneous

Q_e = 0.20 L/ha*s x 1.12 ha = 0.22 L/s

Peak Sewage Flow – Catchment D

$Q = Q_c + Q_r + Q_e$ = 0.74 L/s + 3.57 L/s + 0.22 L/s = 4.53 L/s

Catchment E – Planned Hotel Development

Commercial

Q_c = 225 L/bed*d x 100 units x 2 bed spaces/unit x $\frac{24\ h}{12\ h}$ = 90,000 L/d = 1.04 L/s

Extraneous

Q_e = 0.20 L/ha*s x 0.81 ha = 0.16 L/s

Peak Sewage Flow – Catchment E

$Q = Q_c + Q_e$ = 1.04 L/s + 0.16 L/s = 1.20 L/s

Catchment F – Southbridge Retirement Home

Residential

$P = \frac{160}{1000} = 0.16$ $M = 1 + \frac{14}{4+(0.16)^{0.5}} = 4.18$

$Q_r = \frac{0.16 \times 325 \times 4.18}{86.4} = 2.52$ L/s

Extraneous

$Q_e = 0.20$ L/ha*s x 1.46 ha = 0.29 L/s

Peak Sewage Flow – Catchment F

$Q = Q_r + Q_e = 2.52$ L/s + 0.29 L/s = 2.81 L/s

Catchment G – Southerly Portion of East Court Plaza

Commercial

$Q_c = 28$ m³/ha*s x 0.32 ha x $\frac{24\text{ h}}{8\text{ h}}$ = 27 m³/d = 0.31 L/s

Extraneous

$Q_e = 0.20$ L/ha*s x 0.32 ha = 0.06 L/s

Peak Sewage Flow – Catchment G

$Q = Q_c + Q_e = 0.31$ L/s + 0.06 L/s = 0.37 L/s

Catchment H – 16th Avenue East Roadway

Extraneous

$Q_e = 0.20$ L/ha*s x 1.02 ha = 0.20 L/s

Peak Sewage Flow – Catchment H

$Q = Q_e = 0.20$L/s

Catchment I – Proposed AndPet Subdivision

- See Design Letter

S-1364
AndPet Realty Ltd.
City of Owen Sound

LEGEND

A — Sanitary Catchment ID
1.11 ha — Sanitary Catchment Area
2.22 L/S — Peak Design Flow
Draining from Sanitary Catchment

Not To Scale
November 2018

SANITARY CATCHMENTS

AndPet Subdivision
16th Avenue East

Figure No. 1

BluePlan ENGINEERING

GMBP FILE:S1364 Catchment Figures-KM.dwg LAYOUT:APECs
LAST SAVED: 11/5/2018 3:43:56 PM PLOTTED: 11/5/2018 3:48:53 PM