FUNCTIONAL SERVICING REPORT

CANTERBURY PLACE DEVELOPMENT

VILLAGE OF BELMONT

MUNICIPALITY OF CENTRAL ELGIN

CJDL
Consulting Engineers

20048
11 February 2022

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1. Introduction

This Functional Servicing Report has been prepared to support the draft plan and zoning applications by Karwood Ontario Ltd. to permit the construction of an 18-lot subdivision development directly adjacent to the existing Canterbury Place Subdivision in Belmont.

The subject land is legally described as Part 3 and Part 7, Plan 11R-9106, of Lot 32 on Registered Plan 231 within the Municipality of Central Elgin. The property lies on the east side of Canterbury Place, south of the intersection of Canterbury Place and Caesar Road (County Road 37). The property is bounded by the exsiting Canterbury Place roadway and Canterbury Place Subdivision to the west, two residential dwellings to the north, agricultural lands to the east and the existing Belmont soccer fields to the south. The site is currently undeveloped with minimal tree coverage internal to the site and an existing tree row along the southern limit of the property. The lands are currently zoned Residential hR1-9. The holding provision, as indicated in Section 5.2.5.9 of the Belmont Zoning By-Law 91-21 (Jan, 2-16), states the removal of the “h” symbol requires a subdivision agreement is entered into with the Municipality of Central Elgin and the Municipality of Central Elgin certifies that there is adequate uncommitted reserve sewage capacity available for the development of the lands in question. The development is proposed to be re-zoned as Residential R1 with certain special provisions as noted in the zoning application.

2. Proposed Development

Karwood Ontario Ltd. is proposing to consutruct an 18-lot subdivision consisting of 18 single detached dwellings. Site access to the property is proposed off of Canterbury Place through a 20m public right of way (ROW). The proposed ROW is shown terminating at the east limit of the property, allowing for extension of the roadway during the possible future development of the neighboring lands to the east.

3. Sanitary Servicing

The original design of the Canterbury Place Subdivision completed by Development Engineering (London) Ltd. in 1986 did not consider the subject lands within the sanitary or storm tributary design. Upon review of the existing subdivision sanitary design sheets, the existing sanitary system was designed with reserve capacity that could accommodate the proposed Canterbury Place Development as well as the neighboring lands further to the east. The original design sheets indicated a reserve capacity of 24.0l/s. The sanitary design sheet was updated to include the proposed Canterbury Place Development and the neighboring lands further to the east using the following parameters:

- Original design population per unit (4 people/unit) and unit densities (15 units/ha) from the 1986 Canterbury Place Subdivision sanitary design by Development Engineering (London) Ltd. were used as they are more conservative than the current Central Elgin Sanitary Design Standards. Max. 60 people/ha or 4 people/unit (Development Engineering (London) Ltd., 1986)
- Design Population (Canterbury Place Development) = 18 proposed units x 4 people/unit = 72 people
- Per Capita Flow of 400 litres/capita/day (Central Elgin Sanitary Design Standards, Section 4.2)
- Harmon Peaking Factor = 1 + (14/(4+P1^0.5)) = 1 + (14/(4+0.072^0.5)) = 4.28 (Central Elgin Sanitary Design Standards, Section 4.2)
- Sewage Flow = 72 people x 400 litres/capita/day x 4.28 = 1.43 l/s
- Infiltration = 0.20 l/s/ha (Central Elgin Sanitary Design Standards, Section 4.2)
- Infiltration Flow = 0.97ha x 0.20 l/s/ha = 0.19 l/s
- Sanitary Design Flow = 1.43 l/s + 0.19 l/s = 1.62 l/s

This sanitary design flow was for the proposed Canterbury Place Development was in the updated sanitary design sheet along with the neighboring easterly lands and the existing Canterbury Place Subdivision (see Appendix 'A'). The updated sanitary design indicates there is still a reserve capacity of 23.5l/s at the existing sanitary outlet on Belmont Road (County Road 74). The proposed Canterbury Place Development consititutes 11.6% of the total tributary area for the existing sanitary outlet, including the neighboring easterly lands. The existing 250mmø sanitary outlet capacity is 34.7l/s, which equates to an outlet pipe capacity allocation of 4.0l/s for the proposed Canterbury Place Development. The sanitary design flow is only 1.6l/s, which is well within the 4.0l/s allocated capacity and as mentioned above, the total sanitary outlet flow including the neighboring easterly lands and existing Canterbury Place Subdivision is still 23.5l/s below the outlet pipe capacity.

Within the proposed development, a 200mmø sanitary pipe will be used along Street 'A' which flows from the proposed sanitary manhole at the east limit of the site and outlets at the existing SAMHS2 at the intersection of Canterbury Place and Street 'A'. A cut-out will be left within the proposed sanitary manhole at the east limit of the site to allow for connection during the possible development of the neigboring easterly lands. Individual 150mmø sanitary PDC's are proposed to be installed for each unit. All sanitary piping proposed will be designed in accordance with Section 4.0 of the Central Elgin Design Standards, updated June 2004.

4. Watermain Servicing

There is an existing 150mmø PVC DR18 watermain on Canterbury Place which is proposed as the primary watermain supply for the development. This 150mmø watermain is connected to an existing 150mmø watermain on Belmont Road (County Road 74) and an existing 150mmø watermain north of Caesar Road (County Road 37) within the ravine lands. A 200mmø internal watermain is to be provided within the Street 'A' to the east limit of the site, where the watermain will be capped to allow for future connection if the neigboring easterly lands are developed. The existing hydrant at the intersection of Cantebury Place and Street 'A' along with the proposed hydrant at the east limit of Street 'A' allow for the front door of each proposed unit to be within a 90m radius of a fire hydrant.

Domestic water demand flows were calculated in accordance with Section 5.0 of the Central Elgin Design Standards, updated June 2004, and the Ministry of the Environment, Conservation and Parks (MECP) Design Guidelines for Drinking Water Systems, 2008. Calculation parameters were as follows:

- Original Sanitary Design Density = 4 ppl/unit (Development Engineering (London) Ltd., 1986)
- Average Per Capita Demand = 400 l/cap/d (Central Elgin Design Standards, Section 5.2.2)
- Max. Day Factor = 4.56 (MECP Drinking Water Design Guidelines, Table 3-3)
- Peak Hour Factor = 6.88 (MECP Drinking Water Design Guidelines, Table 3-3)

Based on the above design parameters, the average daily demand was calculated to be 0.33 l/s corresponding to a max. day demand of 1.52 l/s and a peak hour demand of 2.29 l/s.

Firefighting flows were determined in accordance with Section 5.2.1 of the Central Elgin Design Standards and the "Water Supply For Public Fire Protection – A Guide to Recommended Practice (1999)" by the Fire Underwriters Survey. A building area of 170m^2 (max. size of single detached dwelling based on proposed zoning) with an assumed 2-storey building height of 7.5m to underside of roof (including the basement) was used, which is complaint with the OBC Section 3.2.2.47 maximum floor area of 600m^2 for an up to 3-storey Class C (residential) building. The dwellings were assumed to be constructed of ordinary, combustible materials with an OBC Section 3.2.2.47 compliant 45 min. minimum fire resistance rating between horizontal and vertical dwelling-unit separation barriers. The resulting FUS fire flow required is 70 l/s. As mentioned above, the front door of each dwelling will be within a 90m radius of either the existing or proposed hydrant.

The total max. day demand + fire flow requirement for the site is 71.52 l/s, and the peak hour demand requirement for the site is 2.29 l/s. See Appendix 'B' for detailed domestic water demand and fire flow calculations.

Fire hydrant testing will be required to confirm the head loss at the required max. day + fire flow rate as the detailed design progresses, although there are no present concerns with water supply for the proposed development.

5. Stormwater Management & Stormwater Servicing

The original design of the Canterbury Place Subdivision by Development Engineering (London) Ltd. also included the design and installation of a storm sewer system throughout the subdivision. This original storm design did not allocate any stormwater flow from the area of the proposed development. The original design of the Canterbury Place Subdivision indicated the existing 600mmø storm outlet near the intersection of Caesar Road (County Road 37) and Belmont Road (County Road 74) is operating at 99.4% capacity. This operating capacity does not allow for any additional flow from the proposed development or the neighboring lands to the east. As a result of this, a separate storm system and outlet for the proposed development (0.97ha) and approx. 0.1ha of the neighboring easterly lands was designed.

The stormwater management goals for the site are to provide quantity control by restricting post-development peak outflows to pre-development levels and an enhanced level of quality control (80% TSS removal) up to the 100-year design storm.

In order to provide stormwater quantity control and restrict post-development peak outflows to pre-development levels, a 'superpipe' strategy is proposed, which includes providing an oversized 1500mmø stormwater conveyance pipe along Street 'A' to store runoff underground. The proposed 1500mmø pipe will be approx. 80m in length and flow from the proposed CBMHST4 in front of Lot 7 to the proposed CBMHST3 just beyond the west limit of the site. An orifice will be installed at the northerly invert of CBMHST3 to restrict outflows from the superpipe during post-development conditions to pre-development levels. Under pre-development conditions, the site was allocated a runoff coefficient of C=0.30, which is increased to a runoff coefficient of C=0.42 under post-development conditions. The volume of stormwater storage required was calculated by restricting post-development peak outflows to pre-development levels for the 2 to 100-year design storms using the current 2010 MTO IDF Factors. In total, 120m^3 of stormwater storage is required to control the 100-year design storm to pre-development levels; the proposed 1500mmø pipe provides 137m^3 and is therefore of sufficient capacity. The storage capacity of the pipe takes into account the volume required for conveyance of the flows from within the site, and as a conservative design, does not account for any storage that will be provided by the rest of the proposed stormwater piping and conveyance system.

Quality control for the development is proposed to be provided by a Wilkinson Watergate Model WG100, which is capable of oil separation for flows up to 46.0 l/s and sediment removal up to flows of 105.0 l/s. The maximum outflow rate from the site for the 100-year storm is 57.5 l/s and 50.1 l/s for the 5-year storm. The proposed Watergate Model WG100 is capable of removing oil globules larger than 150 microns up to the 5-year design storm and 80% TSS removal up to the 100-year design storm, providing an enhanced level of quality control for the site. The Watergate chamber is proposed to be installed within the Canterbury Place ROW immediately west of the site, approx. 10m north of CBMHST3. The receiving watercourse proposed as the stormwater release point for the site was not identified as a sensitive watercourse nor a Provincially Significant Wetland within the Issues Scoping Report completed by Vroom + Leonard, or the Central Elgin Official Plan. The watercourse will be receiving outflows restricted to pre-development levels and runoff treated to an enhanved level of quality control up to the 100-year design storm.

A 250mmø storm conveyance pipe will be installed from the proposed MHST5 to CBMHST4. A cut-out will be left at MHST5 to allow for future connection for approx. 0.1ha of the neighboring easterly lands. A rear yard swale will collect flows from the back yards of Lots 10-18 which will outlet through the proposed CB3 and a side yard storm easement between lots 15 & 16, which outlets to the proposed superpipe along Street ‘A’. A rear yard swale will also collect flows from the back yards of Lots 1-9, which will flow to CB5 and CB4 that outlet to the proposed 300mmø storm outlet between the west limit of the site and the existing Canterbury Place roadway. Catchbasins will be provided every 90m in accordance with the Central Elgin Design Standards, which will be connected to the storm conveyance and storage system on-site. Street ‘A’ is proposed to have major flows split in opposite directions, with a maximum of 0.25m of ponding over CB2 and CBMHST4 before overtopping the east limit of Street ‘A’ and draining towards open grassed lands to the south. A maximum of 0.20m of ponding will occur over CB1 and CBMHST3 before overtopping the centerline of Canterbury Place and flowing to the north along Canterbury Place towards Caesar Road (County Road 37) and the northern ravine lands. All stormwater conveyance piping has been designed for the 2-year design storm using current 2010 MTO IDF Factors, with a runoff coefficient of C=0.42 and a 5-min inlet time in accordance with Section 3.0 of the Central Elgin Design Standards.

The proposed stormwater outlet location is at the existing ravine lands north of Caesar Road (County Road 37) into the existing watercourse within these ravine lands. From CBMHST3, within Street ‘A’, just outside the westerly limit of the site, a 300mmø storm pipe is proposed to flow 10m in length to the Wilkinson stormwater treatment chamber and then continue for 105.0m to the intersection of Canterbury Place and Caesar Road (County Road 37). The 300mmø storm pipe is currently shown 2.0m west of the western site limit (2.0m off the eastern limit of the Canterbury Place ROW) to avoid typical utility trench locations, but this running line is subject to change with detailed design and utility locates. At the south-eastern corner of the intersection of Canterbury Place and Caesar Road there is an existing catchbasin which is proposed to be relocated 3m further east. A storm manhole (MHST2) is proposed at the south-eastern corner of this intersection. At MHST2, a cut-out to the east will be left as an outlet point for the future connection of the eastern lands that neighbour the proposed development. A runoff coefficient of C=0.30 and a 30.9 min. time of concentration equating to a 100-year pre-development outflow of 119.4 l/s has been calculated for the entire 1.40ha of easterly neighboring lands as a conservative design for future development. From MHST2, a 375mmø storm pipe will continue across Caesar Road (County Road 37) for approx. 12.0m to proposed MHST1. From proposed MHST1, a 375mmø storm pipe will continue for approx. 39.0m to the existing watercourse within the ravine lands. This final outlet pipe will be set at a longitudinal slope of approx. 12.6%, which results in a flow velocity of 5.6m/s which is less than the maximum velocity of 6.0m/s in Section 3.0 of the Central Elgin Design Standards. Cable concrete matting at the outlet point to the watercourse will be provided to provide erosion control. A permit from the Kettle Creek Conservation Authority will be required for any work within the area of the existing watercourse on the north side of Caesar Road.

6. Erosion and Sedimentation Control/Construction Practices

The parking surfaces and roadways will be hot-mix asphalt with concrete curb and gutter to prevent erosion in the parking areas. Erosion prone areas adjacent to all in/outletting piping and structures will be protected with riprap underlain with geotextile and cable concrete matting as required.

Topsoil stripping and grading will be completed as the project develops. Silt fence will be placed at surface run-off locations and across drainage courses, where applicable. As servicing progresses, silt fence (with straw bales, if required) will be placed across all drainage swales at 100 m maximum intervals, including catchbasins and piped outlets and/or as directed on site.

Topsoil piles will be located for suitable access, but will be removed as far as practical from drainage courses.

Storm sewers and granular base will be installed by a General Contractor. In addition to the silt fence, the Contractor will place geotextile under all catchbasin and manhole castings to prevent the flow of construction silt into the storm sewers and to the receiving water courses.

All silt will be removed as accumulated and/or as directed by the Engineer on site. Catchbasins will be cleaned by the Contractor during construction to remove any silt which may accumulate.

All finished earth surfaces will be topsoiled and seeded. Areas susceptible to erosion will be protected by sod, staked sod and/or riprap as conditions warrant. The Contractor will be required to return within the guaranteed maintenance period to remedy any areas of erosion which develop.

Catchbasins will contain 600mm minimum deep sumps which will collect sediment.

7. OTHER RELATED STUDIES

Archaeological

An archaeological assessment entitled “The Stage 1 & 2 Archaeological Assessment of the Canterbury Place Development…” was completed in May of 2021 by Lincoln Environmental Consulting Corp. indicating no further assessment of the site was required. Clearance was provided by the Ministry of Heritage, Sport, Tourism and Culture Industries in June of 2021.

Geotechnical

A geotechnical study was completed by EXP (London) Inc. to assess the existing site conditions. The soil conditions on site were found to be clayey silt underlaying silt and topsoil. Glacial till was found below the clayey silt layer on-site. The groundwater level was found to be 2.8m – 3.4m below ground surface.

Issues Scoping Report (ISR)

An Issues Scoping Report was completed by Vroom + Leonard to assess the potential impact of the proposed development on the surrounding natural features and subwatershed, including the ravine lands at the stormwater outlet point. The proposed development was not found to have any major adverse affects on the surrounding natural area or subwatershed and an Environmental Impact Study (EIS) was not found to be warranted.

** ** **

If there are any questions, please do not hesitate to contact this office.

All of which is respectfully submitted,

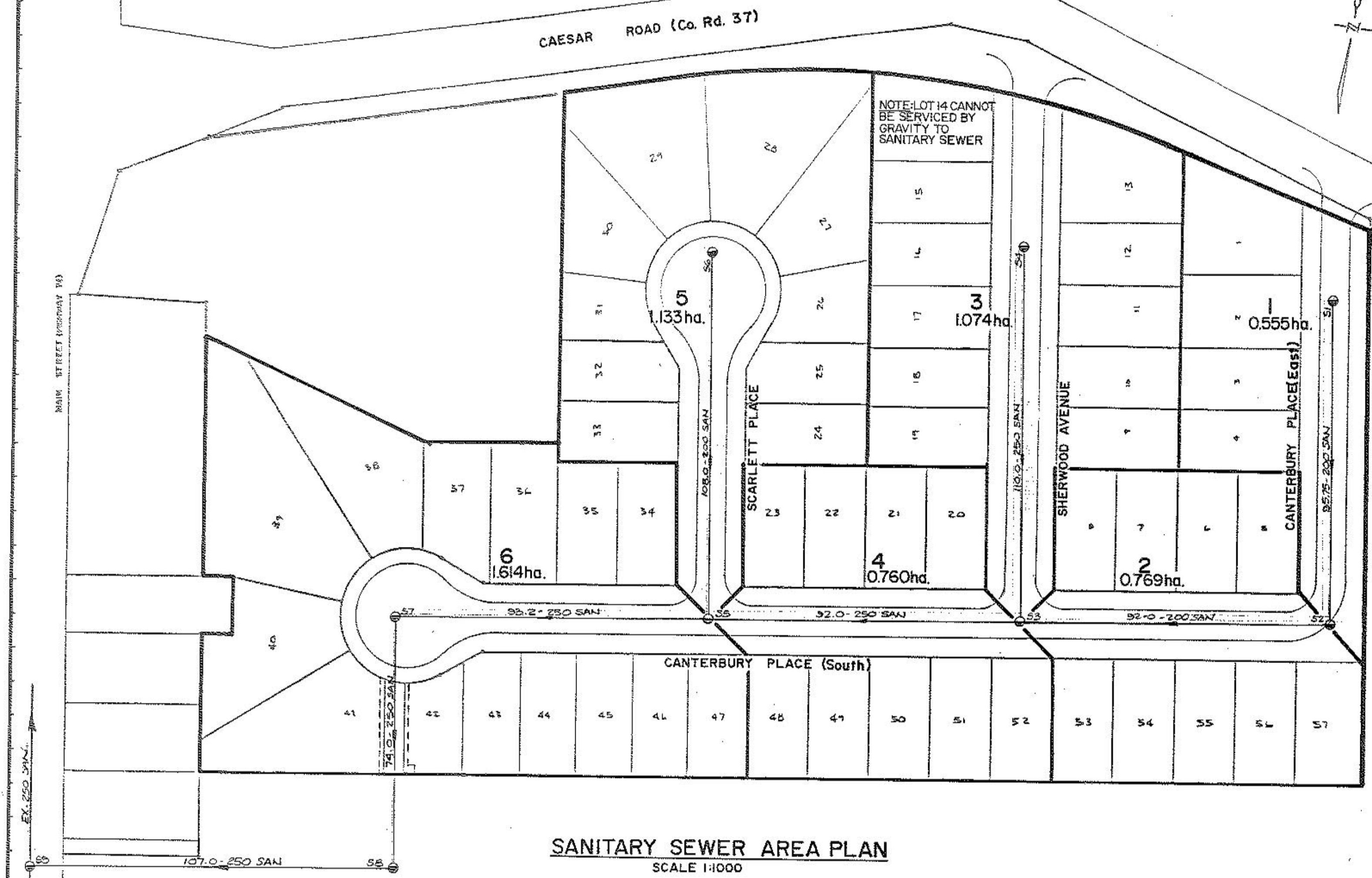
Deren Lyle, P.Eng.

DJL/avm

APPENDIX ‘A’

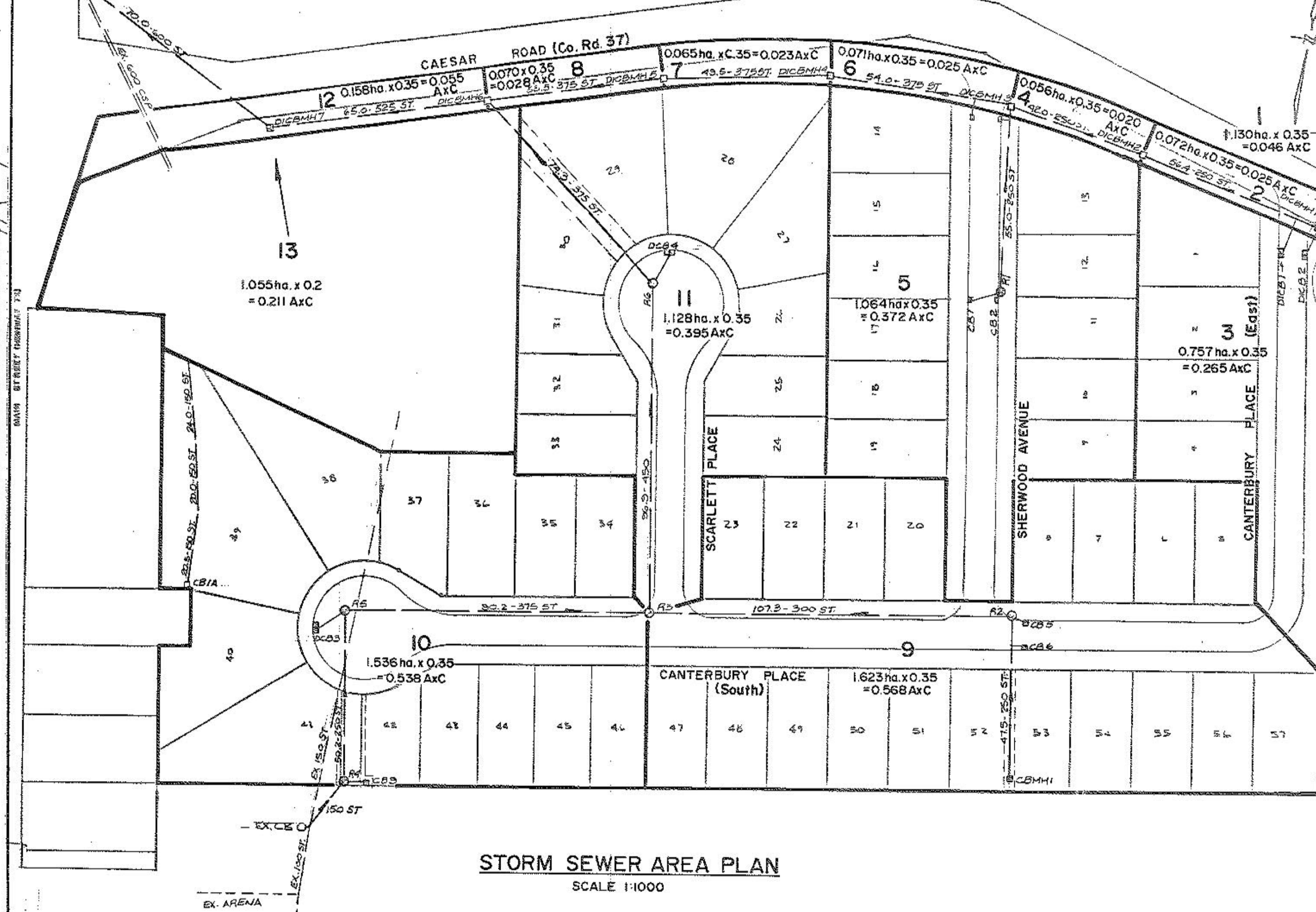
SANITARY DESIGN SHEETS

- ORIGINAL CANTERBURY PLACE SUBDIVISION SANITARY TRIBUTARY DRAWING AND DESIGN SHEET
- PROPOSED CANTERBURY PLACE DEVELOPMENT SANITARY DESIGN SHEET



SANITARY SEWER AREA PLAN

SCALE 1:1000



STORM SEWER AREA PLAN

SCALE 1:1000

RESIDENTIAL POPULATION DENSITIES

AREA BASIS
60 PEOPLE PER GROSS HECTARE
82 PEOPLE PER NET HECTARE

LOT & UNIT BASIS

SINGLE FAMILY	4	PEOPLE PER LOT
SEMI DETACHED	8	" " "
ROWHOUSING	4	" " UNIT
APARTMENTS - BACHELOR	1.5	" " "
- ONE BEDROOM	2.5	" " "
- TWO BEDROOM	3.5	" " "

SANITARY SEWER DESIGN SHEET

SEWER LOCATION				AREA				POPULATION					SEWAGE FLOW			SEWER DESIGN				
AREA No.	STREET	FROM	TO	NET OR GROSS	DIMENSIONS	Δ A ha	Σ A ha	PER ha	No. of Lots	PER LOT	Δ POP.	Σ POP.	INFILT. l/s	SEWAGE l/s	TOTAL l/s	SIZE mm	S %	n	CAP. l/s	VELOCITY M/s
1	Canterbury Place	S1	S2	G		0.555	0.555								0.5	200	0.70	0.013	27	0.89
2	Canterbury Place	S2	S3	G		0.769	1.324								1.5	200	0.50	0.013	23	0.74
3	Sherwood Avenue	S4	S3	G		1.074	1.074								1.2	250	0.40	0.013	36	0.77
4	Canterbury Place	S3	S5	G		0.760	3.158								5.7	250	0.34	0.013	34	0.71
5	Scarlett Place	S6	S5	G		1.133	1.133								1.3	250	0.34	0.013	34	0.71
6	Canterbury Place	S5	S7	G		1.614	5.905								10.0	250	0.34	0.013	34	0.71
	Outlet	S7	S8	G			5.905								10.	250	0.34	0.013	34	0.71
	Outlet	S8	S9	G			5.905								10	250	0.34	0.013	34	0.71

RUNOFF COEFFICIENT 'C'

PARKS & PLAYGROUNDS	0.20
RESIDENTIAL - SINGLE & SEMI	0.50 & 0.55
- ROWHOUSING	0.65
- APARTMENTS	0.65 - 0.70
COMMERCIAL & INDUSTRIAL	0.90 & 0.70
DENSELY BUILT, PAVED	0.90

STORM SEWER DESIGN SHEET

FLOW Q = 2.78 ACI
WHERE Q = PEAK FLOW IN LITRES PER SECOND (l/s)
A = AREA IN HECTARES (ha)
C = RUNOFF COEFFICIENT
I = RAINFALL INTENSITY IN MILLIMETRES PER HOUR (mm/hr)

RETURN PERIOD 2 YEARS

Project Vista Wood Estates
File No. 8601 Sheet ___ of ___
Drainage Area ___
Designed By EWH Checked By ___
Date December 1986

SEWER LOCATION			AREA		TOTAL AREA	A x C						RAINFALL INTENSITY			Q	SEWER DESIGN											PROFILE			
STREET	FROM	TO	AREA NUMBER	AREA (ha)	(ha)	RUNOFF COEFF. 'C'	INCR. A x C	TOTAL Section AxC	TOTAL Lat. AxC	TOTAL Sewer AxC	TOTAL 2.78AxC	Time Entry Sect.	MIN. ACCUM.	Intensity 'i' (mm/hr)	(l/s)	SIZE PIPE (mm)	SLOPE ST.	SLOPE	SLOPE	SLOPE	n	Actual Cap. l/s	VELOCITY M/s	LENGTH M	TIME OF FLOW (Min)	LOSSES IN MH. (M)	FALL IN SEWER (M)	INVERT U.S.	ELEV. D.S.	
Caesar Road	DICBMH 1	DICBMH 2	1	1.130																										
			2	0.072																										
			3	0.555	1.757	0.35	0.615			0.615	1.710	20		61	104.31	250	3.10			3.10	0.013	105	2.14	56.4	0.44		1.748			
Caesar Road	DICBMH 2	DICBMH 3	4	0.056	1.813	0.35	0.020	0.635		0.635	1.765	0.44	20.44	60	105.90	250	3.20			3.20	0.013	106	2.16	42.0	0.32		1.344			
Sherwood Avenue	MH R1	DICBMH 3	5	1.064	1.064	0.35	0.372			0.372	1.034	20	-	61	63.07	250	3.00			1.20	0.013	102	2.1	55.4	0.44		1.662			
Caesar Road	DICBMH 3	DICBMH 4	6	0.071	2.948	0.35	0.025	0.660	0.372	1.032	2.870	0.32	20.76	59	169.33	375	2.20			1.20	0.015	230	2.05	54.0	0.44		1.188			
Caesar Road	DICBMH 4	DICBMH 5	7	0.065	3.013	0.35	0.023	1.055		1.055	2.933	0.44	21.20	57	167.18	375	2.60			1.20	0.015	260	2.30	49.5	0.36		1.386			
Caesar Road	DICBMH 5	DICBMH 6	8	0.070	3.083	0.35	0.025	1.080		1.080	3.002	0.36	21.56	57.5	172.61	375	3.60			1.20	0.015	294	2.59	53.5	0.34		1.926			
Canterbury Place	MH R2	MH R3	9	1.623	1.623	0.35	0.568			0.568	1.579	20		61	96.32	300	1.90			1.30	0.015		1.64	107.3	1.09		2.039			
Canterbury Place	MH R5	MH R3	10	1.536	1.536	0.35	0.538			0.538	1.496	2.0		61	91.26	375	0.40			0.28	0.013	110	1.3	90.2	1.16		0.361			
Scarlett Place	MH R3	MH R6	11	1.128	4.287	0.35	0.395	0.963	0.538	1.501	4.173	1.09	21.09	58.5	244.12	450	1.00	0.15	0.144	0.94	0.015	252	1.55	96.5	1.04		0.969			
Easement	MH R6	DICBMH 6			4.287					1.501	4.173	1.04	22.13	56.5	235.77	375	6.90			2.30	0.015	410	DA = 2.13	75.0	0.59	0.144	5.127			
Caesar Road	DICBMH 6	DICBMH 7	12	0.158	7.528	0.35	0.055	1.135	1.501	2.636	7.328	0.59	22.72	55.5	406.70	525	0.88			0.88	0.013	410	1.88	65.0	0.58		0.572			
Outlet to River	DICBMH 7	OUTFALL	13	1.055	8.583	0.20	0.211	2.847		2.847	7.915	0.58	23.30	54	427.41	600	0.48			0.48	0.013	430	1.5	70.0	0.78		0.336			

AS CONSTRUCTED NOTES	AS CONSTRUCTED SERVICES	COMPLETION
1 SEE DRAWING No ___ FOR FURTHER DETAIL		
2 SEWER DESIGN: TRANSITION WIDTH OR AS NOTED		
3 REFERENCE B.M. No ___ ELEVATION ___ m		
4		

DESIGN EWH
DRAWN RVD
CHECKED WEF
APPROVED
DATE DEC 23 86
F.BK-337

No	REVISIONS	DATE	BY
	AS CONSTRUCTED	FEB 1990	

development engineering (London) Limited
Consulting Civil Engineers
Landscape Architects
361 Dufferin Avenue
London, Ontario N6B 1Z5

REGISTERED PROFESSIONAL ENGINEER W. E. FELLNER PROVINCE OF ONTARIO

The Corporation Of The Village Of Belmont

SCALE As Shown
Horizontal

TITLE Vista Wood Estates Limited
Sanitary and Storm Sewer Area Plans
Sanitary and Storm Sewer Design Sheets

PROJECT No 8601

SHEET No 2 of 11

CYRIL J. DEMEYERE LIMITED
CONSULTING ENGINEERS
BOX 460, TILLSONBURG, N4G 4H8
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PHONE: (519) 688-1000
FAX: (519)842-3235
website: www.cjdleng.com

SANITARY SEWER DESIGN SHEET - METRIC

PROJECT: Canterbury Place Development
MUNICIPALITY: Central Elgin (Belmont)
DATE: 2022-02-11
DESIGNED BY: AVM
CHECKED BY: DJL
JOB No.: 20048

CENTRAL ELGIN DESIGN CRITERIA

(1) POPULATION: 4 Persons/UNIT
(1) LOW DENSITY: 60 Persons/ha
HIGH DENSITY: 140 Persons/ha
INFILTRATION: 0.200 l/s/ha
SEWAGE: 400 l/Person/Day

$M=1+14(4+P^{0.5})^{-1}$ (l/s)
P=Population in thousands

$Cap=1000n^{-1}A*R^{0.667}s^{0.5}$ (l/s)
R=Hydraulic radius (=∅/4) (m)
A=Pipe cross-sectional area (m^2)
s=Slope of pipe

LOCATION				AREA			POPULATION								PROPOSED SEWER						
DWG #	STREET	FROM MH	TO MH	Net or Gross	Δ Area (ha)	Total Area (ha)	PER ha.	NO. LOTS	Δ Pop	Total Pop.	Peaking Factor, M	Sewage (l/s)	Infiltration (l/s)	Design Flow (l/s)	Length (m)	Pipe Size (mm)	Type of Pipe	n	Min Slope (%)	Capacity (l/s)	Full Flow Velocity (m/s)
	EASTERLY EXTERNAL LANDS	EXT	SAMH1	Gross	1.50	1.5	60	-	90	90	4.256	1.773	0.300	2.07	-	200	PVC	0.013	0.40	20.74	0.66
	STREET A	SAMH1	EX. SAMHS2	Gross	0.97	2.47	-	18	72	162	4.180	3.135	0.494	3.63	119.4	200	PVC	0.013	0.40	20.74	0.66
	CANTERBURY PLACE	EX. SAMHS1	EX. SAMHS2	Gross	0.56	0.56	60	-	33	33	4.347	0.670	0.111	0.78	96.0	200	PVC	0.013	0.70	27.44	0.87
		EX. SAMHS2	EX. SAMHS3	Gross	0.77	3.79	60	-	46	241	4.117	4.602	0.759	5.36	92.3	200	PVC	0.013	0.50	23.19	0.74
	SHERWOOD AVENUE	EX. SAMHS4	EX. SAMHS3	Gross	1.07	1.07	60	-	64	64	4.291	1.280	0.215	1.49	110.0	200	PVC	0.013	0.40	20.74	0.66
	CANTERBURY PLACE	EX. SAMHS3	EX. SAMHS5	Gross	0.76	5.63	60	-	46	351	4.048	6.587	1.126	7.71	92.0	250	PVC	0.013	0.34	34.68	0.71
	SCARLETT PLACE	EX. SAMHS6	EX. SAMHS5	Gross	1.13	1.13	60	-	68	68	4.286	1.349	0.227	1.58	108.0	200	PVC	0.013	0.34	19.12	0.61
	CANTERBURY PLACE	EX. SAMHS5	EX.SAMHS7	Gross	1.61	8.38	60	-	97	516	3.967	9.482	1.675	11.16	98.2	250	PVC	0.013	0.34	34.68	0.71
	OUTLET	EX. SAMHS7	EX. SAMHS8	Gross	0.00	8.38	60	-	0	516	3.967	9.482	1.675	11.16	74.0	250	PVC	0.013	0.34	34.68	0.71
		EX. SAMHS8	EX. SAMHS9	Gross	0.00	8.38	60	-	0	516	3.967	9.482	1.675	11.16	107.0	250	PVC	0.013	0.34	34.68	0.71

NO	REVISION		BY

Notes:
(1) Design Population and Density are based on original 1986 sanitary design for the Canterbury Place Subdivision by Development Engineering (London) Ltd.

APPENDIX ‘B’

WATER DEMAND CALCULATIONS

MUNICIPALITY OF CENTRAL ELGIN (BELMONT)
CANTERBURY PLACE DEVELOPMENT

CJDL Consulting Engineers

PROJECT No.	20048
DATE:	11-Feb-22
DESIGN BY:	AVM
CHECKED BY:	DJL

DOMESTIC WATER DEMAND CALCULATIONS

CANTERBURY PLACE DEVELOPMENT

No. Residential Units	18	units	(18 Single Detached Dwellings)
Pop. Per Residential Unit	4.00	ppl/unit	(Original Canterbury Place Subdivision Design, SAN Design = 4 ppl/unit)
Residential Design Population	72	cap.	18 units * 4 ppl/unit
Average Daily Demand	400	L/cap./d	(Central Elgin Design Standards Section 5.0, 2004)
Residential Base Demand	0.33	L/s	72 cap. * 400 L/cap/d
Residential Max. Day Factor	4.56	-	(MECP Drinking Water Design Guidelines Table 3-3, 2008)
Residential Peak Hour Factor	6.88	-	(MECP Drinking Water Design Guidelines Table 3-3, 2008)
Residential Max. Day Demand	1.52	L/s	0.33 L/s * 4.56
Residential Peak Hour Demand	2.29	L/s	0.33 L/s * 6.88

Total Average Base Demand	0.33	L/s
Total Max. Day Demand	1.52	L/s
Total Peak Hour Demand	2.29	L/s

No.	REVISION	DATE	BY

MUNICIPALITY OF CENTRAL ELGIN (BELMONT)
CANTERBURY PLACE DEVELOPMENT

PROJECT No.	20048
DATE:	11-Feb-22
DESIGN BY:	AVM
CHECKED BY:	DJL

FIRE UNDERWRITERS SURVEY FIRE DEMAND CALCULATIONS

CANTERBURY PLACE DEVELOPMENT - LOT 7

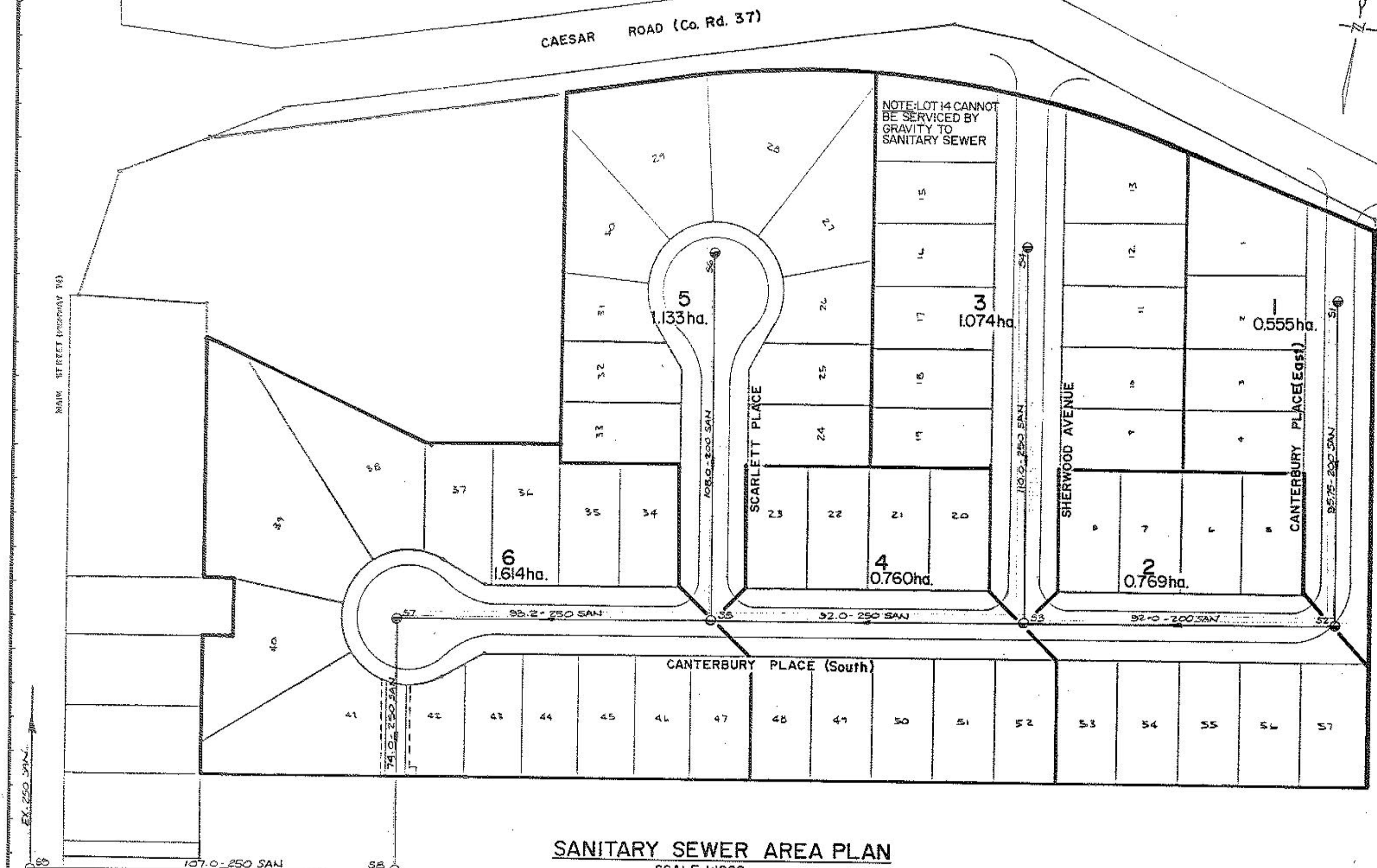
	Average Floor Area	170.0	m^2	
	No.Storeys	2		
	Gross Floor Area	213	m^2	(Largest Floor + 25% of Two immediately Adjoining Floors, Not Including Basement, Based on 1-Hr Fire Rating Between Floors)
	Building Height	7.50	m	(Height to Underside of Roof Deck, Not Including Crawl Space Below Ground) (OBC Section 3)
	Type of Sprinkler System	None		
	Fire Resistance/Separation	1.0	h	
	Building Class	C		
	Construction Type	Ordinary Construction (Brick or Other Masonry Walls, Combustible Floor and Interior)		
	Building Contents (Occupancy)	Limited Combustible		(Appendix FUS, 1999)
	C	1.0		(Construction Type Coefficient) (FUS, 1999)
1)	Base Fire Flow	3207.02	L/min	(F=220*C*vGross Floor Area)(FUS, 1999)
2)	Occupancy Safety Rating	-15%		(Occupancy Safety Rating FUS, 1999)
	Revised Fire Flow (F)	2725.97	L/min	(Fire Flow After Step 2)
3)	Sprinkler System Reduction (As)	0%		(Sprinkler System Reduction FUS, 1999)
	Fire Flow Reduction (R_F)	0.00	L/min	(Fire Flow Reduction From Step 3)(F*As)
4)	Exposed Structures Factor			
	S_{FRONT}	4.3%		(Distance = 32.00 m) (FUS, 1999)
	S_{LEFT}	21.0%		(Distance = 2.40 m) (FUS, 1999)
	S_{RIGHT}	21.0%		(Distance = 2.40 m) (FUS, 1999)
	S_{REAR}	7.5%		(Distance = 25.00 m) (FUS, 1999)
	Party Wall Building Separation	0.0%		No — Building Has Unpierced Party Wall/Firewall Boundary
	S_{SUM}	53.8%		
	Increase In Fire Flow (IF)	1467.5	L/min	(Fire Flow Increase After Step 4)(F*Ssum)(FUS, 1999)
5)	Final Fire Flow	4193.45	L/min	(Final Fire Flow = F - RF + IF) (FUS, 1999)
	REQUIRED FIRE FLOW	4194.00	L/min	
	REQUIRED FIRE FLOW	**70**	**L/s**	

No.	REVISION	BY	DATE

APPENDIX 'C'

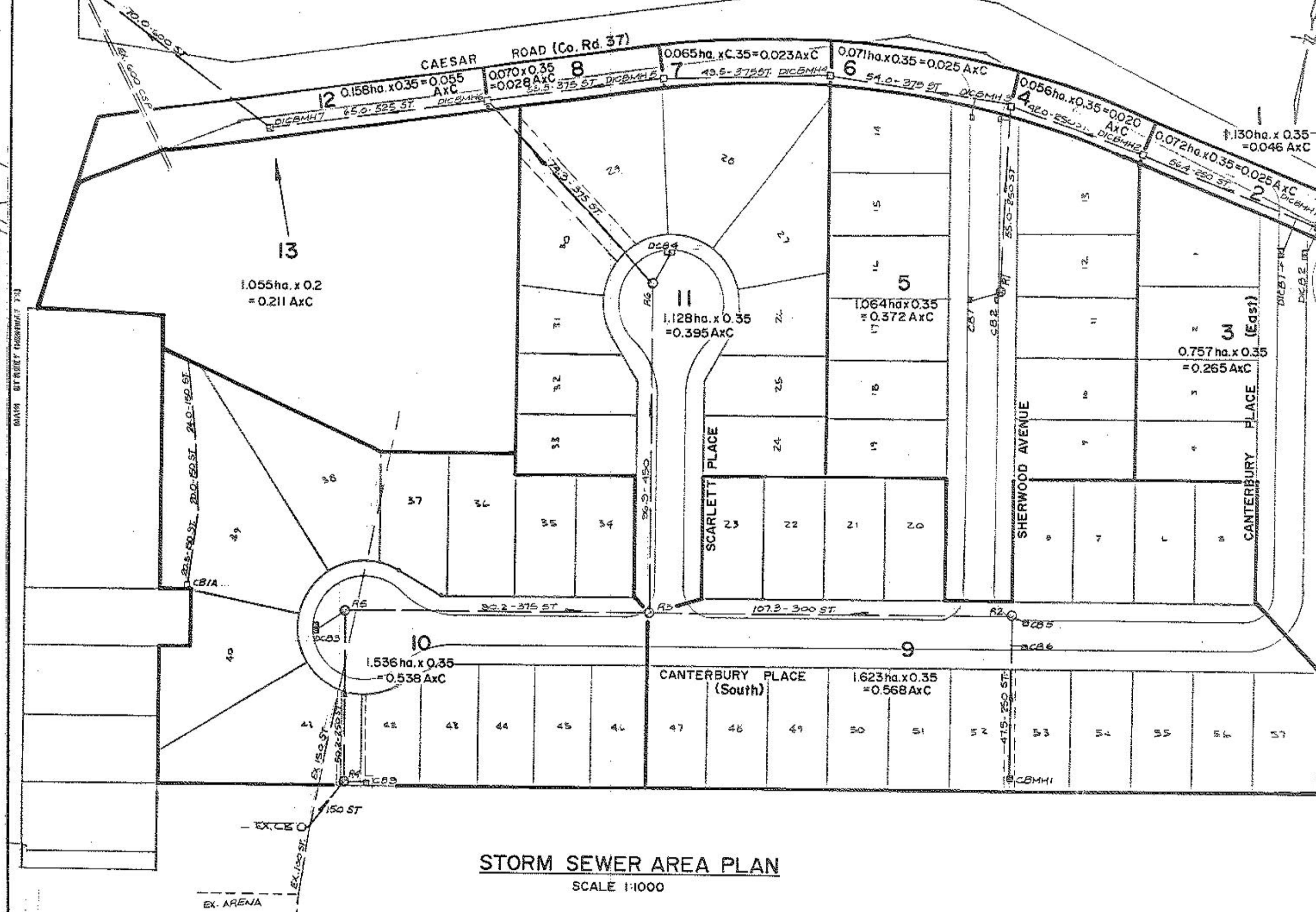
STORMWATER DESIGN SHEETS

- ORIGINAL CANTERBURY PLACE SUBDIVISION STORM TRIBUTARY DRAWING AND DESIGN SHEET
- PROPOSED CANTERBURY PLACE DEVELOPMENT STORM DESIGN SHEET
- CANTERBURY PLACE STORMWATER MANAGEMENT CALCULATIONS



SANITARY SEWER AREA PLAN

SCALE 1:1000



STORM SEWER AREA PLAN

SCALE 1:1000

RESIDENTIAL POPULATION DENSITIES

AREA BASIS
60 PEOPLE PER GROSS HECTARE
82 PEOPLE PER NET HECTARE

LOT & UNIT BASIS

SINGLE FAMILY	4	PEOPLE	PER LOT
SEMI DETACHED	8	"	"
ROWHOUSING	4	"	UNIT
APARTMENTS - BACHELOR	1.5	"	"
- ONE BEDROOM	2.5	"	"
- TWO BEDROOM	3.5	"	"

SANITARY SEWER DESIGN SHEET

SEWER LOCATION				AREA				POPULATION					SEWAGE FLOW			SEWER DESIGN				
AREA No.	STREET	FROM	TO	NET OR GROSS	DIMENSIONS	Δ A ha	Σ A ha	PER ha	No. of Lots	PER LOT	Δ POP.	Σ POP.	INFILT. l/s	SEWAGE l/s	TOTAL l/s	SIZE mm	S %	n	CAP. l/s	VELOCITY M/s
1	Canterbury Place	S1	S2	G		0.555	0.555								0.5	200	0.70	0.013	27	0.89
2	Canterbury Place	S2	S3	G		0.769	1.324								1.5	200	0.50	0.013	23	0.74
3	Sherwood Avenue	S4	S3	G		1.074	1.074								1.2	250	0.40	0.013	36	0.77
4	Canterbury Place	S3	S5	G		0.760	3.158								5.7	250	0.34	0.013	34	0.71
5	Scarlett Place	S6	S5	G		1.133	1.133								1.3	250	0.34	0.013	34	0.71
6	Canterbury Place	S5	S7	G		1.614	5.905								10.0	250	0.34	0.013	34	0.71
	Outlet	S7	S8	G			5.905								10.	250	0.34	0.013	34	0.71
	Outlet	S8	S9	G			5.905								10	250	0.34	0.013	34	0.71

RUNOFF COEFFICIENT 'C'

PARKS & PLAYGROUNDS	0.20
RESIDENTIAL - SINGLE & SEMI	0.50 & 0.55
- ROWHOUSING	0.65
- APARTMENTS	0.65 – 0.70
COMMERCIAL & INDUSTRIAL	0.90 & 0.70
DENSELY BUILT, PAVED	0.90

STORM SEWER DESIGN SHEET

FLOW Q = 2.78 ACI
WHERE Q = PEAK FLOW IN LITRES PER SECOND (l/s)
A = AREA IN HECTARES (ha)
C = RUNOFF COEFFICIENT
i = RAINFALL INTENSITY IN MILLIMETRES PER HOUR (mm/hr)

RETURN PERIOD 2 YEARS

Project: Vista Wood Estates
File No. 8601 Sheet ___ of ___
Drainage Area ___
Designed By EWH Checked By ___
Date December 1986

SEWER LOCATION			AREA		TOTAL AREA	A x C						RAINFALL INTENSITY			Q
STREET	FROM	TO	AREA NUMBER	AREA (ha)	(ha)	RUNOFF COEFF. 'C'	INCR. A x C	TOTAL Section AxC	TOTAL Lot AxC	TOTAL Sewer AxC	TOTAL 2.78AxC	Time Entry Sect.	MIN. ACCUM.	Intensity 'i' (mm/hr)	(l/s)
Caesar Road	DICBMH 1	DICBMH 2	1	1.130											
			2	0.072											
			3	0.555	1.757	0.35	0.615			0.615	1.710	20		61	104.31
Caesar Road	DICBMH 2	DICBMH 3	4	0.056	1.813	0.35	0.020	0.635		0.635	1.765	0.44	20.44	60	105.90
Sherwood Avenue	MH R1	DICBMH 3	5	1.064	1.064	0.35	0.372			0.372	1.034	20	-	61	63.07
Caesar Road	DICBMH 3	DICBMH 4	6	0.071	2.948	0.35	0.025	0.660	0.372	1.032	2.870	0.32	20.76	59	169.33
Caesar Road	DICBMH 4	DICBMH 5	7	0.065	3.013	0.35	0.023	1.055		1.055	2.933	0.44	21.20	57	167.18
Caesar Road	DICBMH 5	DICBMH 6	8	0.070	3.083	0.35	0.025	1.080		1.080	3.002	0.36	21.56	57.5	172.61
Canterbury Place	MH R2	MH R3	9	1.623	1.623	0.35	0.568			0.568	1.579	20		61	96.32
Canterbury Place	MH R5	MH R3	10	1.536	1.536	0.35	0.538			0.538	1.496	2.0		61	91.26
Scarlett Place	MH R3	MH R6	11	1.128	4.287	0.35	0.395	0.963	0.538	1.501	4.173	1.09	21.09	58.5	244.12
Easement	MH R6	DICBMH 6			4.287					1.501	4.173	1.04	22.13	56.5	235.77
Caesar Road	DICBMH 6	DICBMH 7	12	0.158	7.528	0.35	0.055	1.135	1.501	2.636	7.326	0.59	22.72	55.5	406.70
Outlet to River	DICBMH 7	OUTFALL	13	1.055	8.583	0.20	0.211	2.847		2.847	7.915	0.58	23.30	54	427.41

STREET	SIZE PIPE (mm)	SLOPE ST.	SLOPE %	SLOPE M	SLOPE %	SLOPE M	n	Actual Cap. l/s	VELOCITY M/s	LENGTH M	TIME OF FLOW Min	LOSSES IN MH. (M)	FALL IN SEWER (M)	INVERT ELEV. U.S.	INVERT ELEV. D.S.
Caesar Road (DICBMH 1 – DICBMH 2)	250	3.10			3.10		0.013	105	2.14	56.4	0.44		1.748		
Caesar Road (DICBMH 2 – DICBMH 3)	250	3.20			3.20		0.013	106	2.16	42.0	0.32		1.344		
Sherwood Avenue (MH R1 – DICBMH 3)	250	3.00			1.20		0.013	102	2.1	55.4	0.44		1.662		
Caesar Road (DICBMH 3 – DICBMH 4)	375	2.20			1.20		0.015	230	2.05	54.0	0.44		1.188		
Caesar Road (DICBMH 4 – DICBMH 5)	375	2.80			1.20		0.015	260	2.30	49.5	0.36		1.386		
Caesar Road (DICBMH 5 – DICBMH 6)	375	3.60			1.20		0.015	294	2.59	53.5	0.34		1.926		
Canterbury Place (MH R2 – MH R3)	300	1.90			1.30		0.015		1.64	107.3	1.09		2.039		
Canterbury Place (MH R5 – MH R3)	375	0.40			0.28		0.013	110	1.3	90.2	1.16		0.361		
Scarlett Place (MH R3 – MH R6)	450	1.00	0.15	0.144	0.94		0.015	252	1.55	96.9	1.04		0.969		
Easement (MH R6 – DICBMH 6)	375	6.90			2.30		0.015	410	Q/A = 2.13	75.0	0.59	0.144	5.127		
Caesar Road (DICBMH 6 – DICBMH 7)	525	0.88			0.88		0.013	410	1.88	65.0	0.58		0.572		
Outlet to River (DICBMH 7 – OUTFALL)	600	0.48			0.48		0.013	430	1.5	70.0	0.78		0.336		

AS CONSTRUCTED NOTES	AS CONSTRUCTED SERVICES	COMPLETION
1 SEE DRAWING No FOR FURTHER DETAIL		
2 SEWER DESIGN: TRANSITION WIDTH OR AS NOTED		
3 REFERENCE B. M. No ELEVATION m		
4		

DESIGN EWH
DRAWN RVD
CHECKED WEF
APPROVED
DATE DEC 23 86
F.BK-337

No	REVISIONS	DATE	BY
	AS CONSTRUCTED	FEB 1990	

development engineering (London) Limited
Consulting Civil Engineers
Landscape Architects
361 Dufferin Avenue
London, Ontario N6B 1Z5

REGISTERED PROFESSIONAL ENGINEER W. E. FELLNER PROVINCE OF ONTARIO

The Corporation Of The Village Of Belmont

SCALE: As Shown (Horizontal)

TITLE: Vista Wood Estates Limited

Sanitary and Storm Sewer Area Plans
Sanitary and Storm Sewer Design Sheets

PROJECT No 8601

SHEET No 2 of 11

CYRIL J. DEMEYERE LIMITED
CONSULTING ENGINEERS
BOX 460, TILLSONBURG, N4G 4H8
PHONE: (519) 688-1000
FAX: (519)842-3235
e-mail: cjdleng@cjdleng.com
website: www.cjdleng.com

STORM SEWER DESIGN SHEET - METRIC

PROJECT: Canterbury Place Subdivision
MUNICIPALITY: Central Elgin (Belmont)
Return Period (Yr.) 2
IDF Curve Based On 2010 MTO IDF

Peak flow = 2.778ACi l/s
Manning $Q = 1000n^{-1}AR^{0.667}s^{0.5}$ l/s
Intensity=at^{b} mm/hr

	2-YR	100-YR
	a= 23.6	a= 51.5
	b= -0.699	b= -0.699

DATE: 11-Feb-22
DESIGNED BY: AVM
CHECKED BY: DJL
JOB No.: 20048
SHEET: 1 of 1

LOCATION				Area - A		A X C				TIME OF CONC. (MIN)		RAINFALL INTENSITY (mm/hr)	PEAK FLOW (l/s)	SEWER DATA							UPSTREAM INVERT (m)	DOWN STREAM INVERT (m)	FALL (m)	DROP ACROSS LOWER MANHOLE (m)
DWG #	STREET	FROM MH	TO MH	Δ A (ha)	TOTAL (ha)	RUNOFF COEFF. 'C'	Δ A*C	TOTAL A*C	TOTAL 2.778 A*C	SECT.	ACCUM.			PIPE SIZE (mm)	n	SLOPE (%)	CAPACITY (l/s)	VELOCITY (m/s)	LENGTH (m)	TIME OF FLOW (min.)				
	STREET A	MHST5	CBMHST4	0.18	0.18	0.42	0.076	0.076	0.210	USE	5.00	134.0	28.2	250	0.013	1.50	72.8	1.48	30.0	0.34	259.10	258.65	0.45	0.50
	SOUTHERN REAR LOTS	CB3	CBMH4-CBMH3	0.20	0.20	0.42	0.084	0.084	0.233	USE	5.00	134.0	31.3	300	0.013	0.50	68.4	0.97	43.5	0.75	258.90	258.68	0.22	0.70
	STREET A	CBMH4	CBMH3	0.31	0.69	0.42	0.130	0.290	0.805	0.75	5.75	121.6	97.9	1500	0.013	0.50	4998.4	2.83	80.0	0.47	258.15	257.75	0.40	0.10
	NORTHERN REAR LOTS	CB5	CB4	0.14	0.14	0.42	0.059	0.059	0.163	USE	5.00	134.0	21.9	250	0.013	1.00	59.5	1.21	47.0	0.65	259.20	258.73	0.47	0.10
		CB4	CBMH3-MHST2	0.13	0.27	0.42	0.055	0.113	0.315	0.65	5.65	123.1	38.8	250	0.013	4.00	118.9	2.42	28.5	0.20	258.63	257.45	1.14	0.20
	STORM OUTLET	CBMHST3	MHST2	0.11	1.07	0.42	0.046	0.449	1.248	USE	22.70	[4] 101.6	[1] 57.5	300	0.013	1.00	96.7	1.37	119.0	1.45	257.65	256.46	1.19	0.10
	NEIGHBORING EASTERN LANDS	EXT	MHST2	1.40	1.40	0.30	0.525	0.525	1.458	USE	30.90	[4] 81.9	[2] 119.4	375	0.013	0.50	124.0	1.12		0.00		256.45	0.00	0.10
	STORM OUTLET	MHST2	MHST1	0.00	2.47	0.42	0.000	0.974	2.707	1.45	30.90	[4] 81.9	[3] 176.9	375	0.013	2.90	298.6	2.70	12.0	0.07	256.36	256.01	0.35	0.60
		MHST1	OUTLET	0.00	2.47	0.42	0.000	0.974	2.707	0.07	30.97	[4] 81.8	[3] 187.5	375	0.013	12.60	622.4	5.63	39.0	0.12	255.41	250.50	4.91	

NO	REVISION	DATE	BY

NOTES:
(1) Maximum Pre-Development Outflow Rate from Site is 57.5 l/s During 100-Year Design Storm. Using 95m Flow Length with 1.4% Slope and C = 0.30. Calculated Tc = 22.7 min.
(2) Maximum Pre-Development Outflow Rate from Easterly Lands is 113.6 l/s During 100-Year Design Storm. Using 140m Flow Length with 1.0% Slope and C = 0.30. Calculated Tc = 30.9 min.
(3) Maximum Pre-Development Outflow from Site (57.5 l/s) + Maximum Pre-Development Outflow from Easterly Lands (119.4 l/s) = 176.9 l/s
(4) Intensity Based on 100-Year Design Storm.

CANTERBURY PLACE DEVELOPMENT

20048
11-Feb-22

PRE-DEVELOPMENT FLOW CALCULATIONS

TRIBUTARY AREA =	2.64 [Acres]	1.07	Ha
AVERAGE OUTFLOW =	1.47 [cfs]		
	0.0415 [m^3/s]		
PREDEVELOPMENT RUNOFF COEF. =	0.30		

Q = 2.78*A*I*R

TC = (3.26 * (1.1-f*C)*(L)^1/2)/Sw^1/3

WATERSHED LENGTH 95

WATERSHED SLOPE (%) 1.4

Predevelopment Flows - 1 in 2 Year Storm Event

Rainfall Intensity **2010 MTO IDF**

Intensity=at^b mm/hr

a= 23.6

b= -0.699

Intensity Factors	2 year	5 year	10 year	25 year	50 year	100 year
a:	23.6	31.1	36	42.3	46.9	51.5
b:	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Intensity = 46.524

Time of Concentration TC = (3.26 * (1.1-1.0*C)*(140)^1/2)/0.4^1/3 = 22.723

Predevelopment Flow Qpre = 2.78* A * I * R = 41.517 l/s

Predevelopment Flows - 1 in 5 Year Storm Event

Rainfall Intensity **2010 MTO IDF**

Intensity=at^b mm/hr

a= 31.1

b= -0.699

Intensity Factors	2 year	5 year	10 year	25 year	50 year	100 year
a:	23.6	31.1	36	42.3	46.9	51.5
b:	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Intensity = 61.309

Time of Concentration TC = (3.26 * (1.1-1.0*C)*(L)^1/2)/S^1/3 = 22.723

Predevelopment Flow Qpre = 2.78* A * I * R = 54.711 l/s

Predevelopment Flows - 1 in 25 Year Storm Event

Rainfall Intensity **2010 MTO IDF**

Intensity=at^b mm/hr

a= 42.3

b= -0.699

Intensity Factors	2 year	5 year	10 year	25 year	50 year	100 year
a:	23.6	31.1	36	42.3	46.9	51.5
b:	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Intensity = 83.388

Time of Concentration TC = (3.26 * (1.1-1.0*C)*(L)^1/2)/S^1/3 = 22.723

Predevelopment Flow Qpre = 2.78* A * I * R = 74.414 l/s

Predevelopment Flows - 1 in 100 Year Storm Event

Rainfall Intensity **2010 MTO IDF**

Intensity=at^b mm/hr

a= 51.5

b= -0.699

Intensity Factors	2 year	5 year	10 year	25 year	50 year	100 year
a:	23.6	31.1	36	42.3	46.9	51.5
b:	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Intensity = 101.524

Time of Concentration TC = (3.26 * (1.1-1.0*C)*(L)^1/2)/S^1/3 = 22.723

Predevelopment Flow Qpre = 2.78* A * I * R = 113.248 l/s

CANTERBURY PLACE DEVELOPMENT

CJDL Consulting Engineers

20048
11-Feb-22

RAINFALL STORAGE CALCULATIONS - **2 YEAR**

Post Development 'C'

Item	Area (Ha)	C Value
Gravel	0.00	0.70
Building	0.25	0.90
Sod	0.75	0.20
Asph/Conc	0.10	0.90
Total	1.10	0.4227

TRIBUTARY AREA =	2.64 [Acres]	1.07	Ha
RUNOFF COEF. =	0.42		
PREDEVELOPMENT OUTFLOW =	1.47 [cfs]		
	0.0415 [m^3/s]		
POSTDEVELOPMENT OUTFLOW =	0.0405 [m^3/s]		

Rainfall Intensity

Intensity=at^b mm/hr

a= 23.6
b= -0.699

2010 MTO IDF

Intensity Factors	**2 year**	5 year	10 year	25 year	50 year	100 year
a:	23.6	31.1	36	42.3	46.9	51.5
b:	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

TIME [hrs]	RAINFALL INTENSITY [mm/hr]	TOTAL VOLUME [m^3]	INFLOW [m^3/s]	RATE OF RELEASE [m^3/s]	VOLUME RELEASED [m^3]	VOLUME STORED [m^3]	
0.083	134	50	0.169	0.0405	12	38	<---- MAX STORAGE
0.167	82	62	0.104	0.0405	24	38	
0.333	51	77	0.064	0.0405	49	28	
0.50	38	87	0.048	0.0405	73	14	
0.667	31	94	0.039	0.0405	94	0	
0.833	27	101	0.034	0.0405	101	0	
1	24	107	0.030	0.0405	107	0	
1.5	18	121	0.022	0.0405	121	0	
2	15	132	0.018	0.0405	132	0	
3	11	149	0.014	0.0405	149	0	
4	9	162	0.011	0.0405	162	0	
8	6	200	0.007	0.0405	200	0	
12	4	226	0.005	0.0405	226	0	
18	3	255	0.004	0.0405	255	0	
24	3	278	0.003	0.0405	278	0	

Manning $Q = 1000n^{-1}AR^{0.667}s^{0.5}$ l/s
7.9

CANTERBURY PLACE DEVELOPMENT

Consulting Engineers

20048
11-Feb-22

RAINFALL STORAGE CALCULATIONS - **5 YEAR**

SITE AREA =	2.64	[Acres]	1.07	Ha
TRIBUTARY AREA =	2.64	[Acres]	1.10	Ha
RUNOFF COEF. =	0.42			
PREDEVELOPMENT OUTFLOW =	1.93	[cfs]		
	0.0547	[m^3/s]		
POSTDEVELOPMENT OUTFLOW =	0.0453	[m^3/s]		

Post Development 'C'

Item	Area (Ha)	C Value
Gravel	0.00	0.70
Building	0.25	0.90
Sod	0.75	0.20
Asph/Conc	0.10	0.90
Total	1.10	0.42

Rainfall Intensity

Intensity=a(t+b) ˘ mm/hr

a= 31.1
b= -0.699

2010 MTO IDF

Intensity Factors	2 year	**5 year**	10 year	25 year	50 year	100 year
a:	23.6	31.1	36	42.3	46.9	51.5
b:	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

TIME [hrs]	RAINFALL INTENSITY [mm/hr]	TOTAL VOLUME [m^3]	INFLOW [m^3/s]	RATE OF RELEASE [m^3/s]	VOLUME RELEASED [m^3]	VOLUME STORED [m^3]	
0.083	177	68	0.229	0.0453	14	55	
0.167	109	84	0.140	0.0453	27	57	<---- MAX STORAGE
0.333	67	104	0.087	0.0453	54	50	
0.50	50	117	0.065	0.0453	82	36	
0.667	41	128	0.053	0.0453	109	19	
0.833	35	137	0.046	0.0453	136	1	
1	31	145	0.040	0.0453	145	0	
1.5	23	163	0.030	0.0453	163	0	
2	19	178	0.025	0.0453	178	0	
3	14	201	0.019	0.0453	201	0	
4	12	219	0.015	0.0453	219	0	
8	7	270	0.009	0.0453	270	0	
12	5	306	0.007	0.0453	306	0	
18	4	345	0.005	0.0453	345	0	
24	3	376	0.004	0.0453	376	0	

CANTERBURY PLACE DEVELOPMENT

20048
11-Feb-22

RAINFALL STORAGE CALCULATIONS - **25 YEAR**

SITE AREA =	2.64 [Acres]	1.07	Ha
TRIBUTARY AREA =	2.64 [Acres]	1.10	Ha
RUNOFF COEF. =	0.42		
PREDEVELOPMENT OUTFLOW =	2.63 [cfs]		
	0.074 [m^3/s]		
POSTDEVELOPMENT OUTFLOW =	0.050 [m^3/s]		

Post Development 'C'

Item	Area (Ha)	C Value
Gravel	0.00	0.70
Building	0.25	0.90
Sod	0.75	0.20
Asph/Conc	0.10	0.90
Total	1.10	0.42

Rainfall Intensity

Intensity=a(t+b)ˇ mm/hr

a= 42.3
b= -0.699

2010 MTO IDF

Intensity Factors	2 year	5 year	10 year	**25 year**	50 year	100 year
a:	23.6	31.1	36	42.3	46.9	51.5
b:	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

TIME [hrs]	RAINFALL INTENSITY [mm/hr]	TOTAL VOLUME [m^3]	INFLOW [m^3/s]	RATE OF RELEASE [m^3/s]	VOLUME RELEASED [m^3]	VOLUME STORED [m^3]	
0.083	241	93	0.311	0.050	15	78	
0.167	148	115	0.191	0.050	30	85	<---- MAX STORAGE
0.333	91	141	0.118	0.050	60	81	
0.50	69	160	0.089	0.050	90	70	
0.667	56	174	0.073	0.050	120	54	
0.833	48	186	0.062	0.050	150	36	
1	42	197	0.055	0.050	180	16	
1.5	32	222	0.041	0.050	222	0	
2	26	242	0.034	0.050	242	0	
3	20	274	0.025	0.050	274	0	
4	16	299	0.021	0.050	299	0	
8	10	368	0.013	0.050	368	0	
12	7	416	0.010	0.050	416	0	
18	6	469	0.007	0.050	469	0	
24	5	512	0.006	0.050	512	0	

CANTERBURY PLACE DEVELOPMENT

CJDL Consulting Engineers

20048
11-Feb-22

RAINFALL STORAGE CALCULATIONS - **100 YEAR**

TRIBUTARY AREA =	2.64 [Acres]	1.10 Ha	
RUNOFF COEF. =	0.47 C Value x 125%		
PREDEVELOPMENT OUTFLOW =	4.00 [cfs]		
	0.1132 [m^3/s]		
POSTDEVELOPMENT OUTFLOW =	0.0575 [m^3/s]		

Post Development 'C'

Item	Area (Ha)	C Value
Gravel	0.00	0.70
Building	0.25	0.90
Sod	0.75	0.20
Asph/Conc	0.10	0.90
Total	1.10	0.4227

Rainfall Intensity

Intensity=$a(t+b)$ mm/hr

a= 51.5
b= -0.699

2010 MTO IDF

Intensity Factors	2 year	5 year	10 year	25 year	50 year	**100 year**
a:	23.6	31.1	36	42.3	46.9	51.5
b:	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Manning Q = $1000n^{-1}AR^{0.667}s^{0.5}$ l/s
7.9

TIME [hrs]	RAINFALL INTENSITY [mm/hr]	TOTAL VOLUME [m^3]	INFLOW [m^3/s]	RATE OF RELEASE [m^3/s]	VOLUME RELEASED [m^3]	VOLUME STORED [m^3]	
0.083	293	125	0.417	0.0575	17	107	
0.167	180	154	0.256	0.0575	35	119	
0.333	111	189	0.158	0.0575	69	120	<---- MAX STORAGE
0.50	84	214	0.119	0.0575	103	110	
0.667	68	233	0.097	0.0575	138	95	
0.833	59	249	0.083	0.0575	172	77	
1	52	263	0.073	0.0575	207	56	
1.5	39	298	0.055	0.0575	298	0	
2	32	325	0.045	0.0575	325	0	
3	24	367	0.034	0.0575	367	0	
4	20	400	0.028	0.0575	400	0	
8	12	493	0.017	0.0575	493	0	
12	9	557	0.013	0.0575	557	0	
18	7	629	0.010	0.0575	629	0	
24	6	686	0.008	0.0575	686	0	

CANTERBURY PLACE DEVELOPMENT

20048
11-Feb-22

SUMMARY

1-2 YEAR STORAGE REQUIRED:	38	m^3
1-5 YEAR STORAGE REQUIRED:	57	m^3
1-25 YEAR STORAGE REQUIRED:	81	m^3
1-100 YEAR STORAGE REQUIRED:	120	m^3

OUTFLOW RESTRICTION	- 2 YEAR	41.52	l/s
OUTFLOW RESTRICTION	- 5 YEAR	54.71	l/s
OUTFLOW RESTRICTION	- 25 YEAR	74.41	l/s
OUTFLOW RESTRICTION	- 100 YEAR	113.25	l/s

Maximum Storage Provided in Superpipe = 137 m^3

1-2 YEAR PRIMARY CIRCULAR ORIFICE REQUIREMENTS

OUTFLOW RESTRICTION 0.0415 [m^3/s]

$Q=CA\sqrt{(2gh)}$ $d = \sqrt{(4Q/(3.14C(\sqrt{(2gh)})}$

h = E1-E2 A=	0.017671	AREA OF ORIFICE OPENING = $(\pi d^2)/4$
E1=	258.42	PONDING ELEVATION IN SUPERPIPE
E2 =	257.70	CENTERLINE OF ORIFICE OUTLET
h =	0.72	HYDRAULIC HEAD (m)
C =	0.61	DISCHARGE COEFFICIENT
g =	9.81	GRAVITATIONAL CONSTANT (m/s^2)
d=	0.152	MAX. DIAMETER OF ORIFICE REQUIRED (m)
d=	0.150	USE DIAMETER OF ORIFICE (m)

Q= 0.0405 Flow for Orfice Used (m^3/s)

1-5 YEAR PRIMARY CIRCULAR ORIFICE REQUIREMENTS

OUTFLOW RESTRICTION 0.0547 [m^3/s]

$Q=CA\sqrt{(2gh)}$ $d = \sqrt{(4Q/(3.14C(\sqrt{(2gh)}))}$

h = E1-E2 A=	0.017671	AREA OF ORIFICE OPENING = (πd^2)/4
E1=	258.60	PONDING ELEVATION IN SUPERPIPE
E2 =	257.70	CENTERLINE OF ORIFICE OUTLET
h =	0.9	HYDRAULIC HEAD (m)
C =	0.61	DISCHARGE COEFFICIENT
g =	9.81	GRAVITATIONAL CONSTANT (m/s^2)
d=	0.165	MAX. DIAMETER OF ORIFICE REQUIRED (m)
d=	0.150	USE DIAMETER OF ORIFICE (m)

Q= 0.0453 Flow for Orfice Used (m^3/s)

1-25 YEAR PRIMARY CIRCULAR ORIFICE REQUIREMENTS

OUTFLOW RESTRICTION 0.0744 [m^3/s]

$Q=CA\sqrt{(2gh)}$ $d = \sqrt{(4Q/(3.14C(\sqrt{(2gh)}))}$

h = E1-E2 A=	0.017671	AREA OF ORIFICE OPENING = (πd^2)/4
E1=	258.800	PONDING ELEVATION IN SUPERPIPE
E2 =	257.70	CENTERLINE OF ORIFICE OUTLET
h =	1.1	HYDRAULIC HEAD (m)
C =	0.61	DISCHARGE COEFFICIENT
g =	9.81	GRAVITATIONAL CONSTANT (m/s^2)
d=	0.226	MAX. DIAMETER OF ORIFICE REQUIRED (m)
d=	0.150	USE DIAMETER OF ORIFICE (m)

Q= 0.0501 Flow for Orfice Used (m^3/s)

1-100 YEAR PRIMARY CIRCULAR ORIFICE REQUIREMENTS

OUTFLOW RESTRICTION 0.113 [m^3/s]

$Q=CA\sqrt{(2gh)}$ $d = \sqrt{(4Q/(3.14C(\sqrt{(2gh)}))}$

h = E1-E2 A=	0.017671	AREA OF ORIFICE OPENING = (πd^2)/4
E1=	259.150	PONDING ELEVATION IN SUPERPIPE
E2 =	257.70	CENTERLINE OF ORIFICE OUTLET
h =	1.45	HYDRAULIC HEAD (m)
C =	0.61	DISCHARGE COEFFICIENT
g =	9.81	GRAVITATIONAL CONSTANT (m/s^2)
d=	0.211	MAX. DIAMETER OF ORIFICE REQUIRED (m)
d=	0.150	USE DIAMETER OF ORIFICE (m)

Q= 0.0575 Flow for Orfice Used (m^3/s)

CANTERBURY PLACE DEVELOPMENT

20048
11-Feb-22

SUMMARY

1-2 YEAR STORAGE REQUIRED:	38	m^3
1-5 YEAR STORAGE REQUIRED:	50	m^3
1-25 YEAR STORAGE REQUIRED:	85	m^3
1-100 YEAR STORAGE REQUIRED:	120	m^3
OUTFLOW RESTRICTION - 2 YEAR	41.52	l/s
OUTFLOW RESTRICTION - 5 YEAR	54.71	l/s
OUTFLOW RESTRICTION - 25 YEAR	74.41	l/s
OUTFLOW RESTRICTION - 100 YEAF	113.25	l/s
RELEASE RATE - 2 YEAR	40.52	l/s
RELEASE RATE - 5 YEAR	45.30	l/s
RELEASE RATE - 25 YEAR	50.08	l/s
RELEASE RATE - 100 YEAR	57.50	l/s

$A = \Pi D^2/4$ $D = (4A/\Pi)^{0.5}$

MANNING $Q = 1000n^{-1}AR^{0.667}s^{0.5}$ l/s

CONVEYANCE PIPE SLOPE	0.005	m/m
CONVEYANCE PIPE ROUGHNESS COEFFICIENT	0.013	
CONVEYANCE PIPE DIAMETER	300	mm
CONVEYANCE PIPE AREA	0.07	m^2
CONVEYANCE PIPE HYDRAULIC RADIUS	0.1	m
CONVEYANCE PIPE CAPACITY	68.38	l/s
100-YEAR FLOW RATE	57.50	l/s
100 YEAR CONVEYANCE PIPE % CAPACITY	84.09	%
SUPERPIPE DIAMETER	1500	mm
SUPERPIPE AREA	1.77	m^2
SUPERPIPE LENGTH	80	m
SUPERPIPE VOLUME	141.37	m^3
CONVEYANCE PIPE LENGTH	80	m
CONVEYANCE PIPE TOTAL VOLUME	5.65	m^3
CONVEYANCE PIPE UTILIZED VOLUME	4.75	m^3

Storage Volume = Superpipe Volume - Conveyance Pipe Utilized Volume

STORAGE VOLUME **137 m^3**

APPENDIX ‘D’

SITE DRAWINGS

- CANTERBURY PLACE DRAFT PLAN
- CANTERBURY PLACE PRELIMINARY SERVICING PLAN

KEYPLAN
SCALE: 1:10,000

DRAFT PLAN OF SUBDIVISION

PART OF LOT 32
REGISTERED PLAN 231
(FORMER VILLAGE OF BELMONT)
MUNCIPALITY OF CENTRAL ELGIN
COUNTY OF ELGIN

INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT RSO 1990
(A) ON PLAN
(B) ON PLAN
(C) ON PLAN
(D) LOTS 1–18 – SINGLE DETACHED RESIDENTIAL
BLOCK 19 – RESERVE
(E) NORTH – EXISTING RESIDENTIAL,
WEST – EXISTING RESIDENTIAL (CANTERBURY PLACE SUBDIVISION)
EAST – AGRICULTURAL (POSSIBLE FUTURE RESIDENTIAL)
SOUTH – OPEN SPACE
(F) ON PLAN
(G) ON PLAN
(H) MUN WATER AVAILABLE
(I) CLAYEY SILT AND GLACIAL TILL
(J) ON PLAN
(K) STORM SEWERS, SANITARY SEWERS, HYDRO, TELEPHONE, GAS, T.V. CABLE
(L) MUNICIPALITY OF CENTRAL ELGIN OFFICIAL PLAN AND ZONING BY–LAWS

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

OWNER'S CERTIFICATE

I HEREBY SUBMIT THIS DRAFT PLAN OF SUBDIVISION.

DATE

GREG HUSSEY
KARWOOD ONTARIO LTD.

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN ON THIS PLAN.

DATE

KIM HUSTED. ONTARIO LAND SURVEYOR

AREA SUMMARY

	DESCRIPTION	AREA (ha)
LOTS 1–18	SINGLE DETACHED RESIDENTIAL	0.75
DEDICATED STREETS	STREET 'A'	0.22
BLOCK 19	RESERVE	0.001
TOTAL		(0.97)

NORTH
SCALE 1:250
0 10 20 Meters

CJDL Consulting Engineers
Cyril J. Demeyere Limited
P.O. Box 460, 261 Broadway
Tillsonburg, Ontario. N4G 4H8
Tel: 519-688-1000
866-302-9886
Fax: 519-842-3235
cjdl@cjdleng.com

20048
08 FEB 2022

NOTE: ORIGINAL CONTOURS SHOWN FROM CJDL SURVEY

I:\ACAD Projects\2020\20048\01-Model\20048_Draft Plan\20048_Draft Plan.dwg, 2022-02-08 9:08:28 AM, CJDLPC38

LEGEND

PROPOSED SANITARY SEWER
PROPOSED STORM SEWER
PROPOSED STORM PDC
PROP. MANHOLE, EXISTING OR AS CONSTRUCTED
PROP. CATCHBASIN, EXISTING OR AS CONST.
PROPOSED WATERMAIN
EXISTING FLOW, PROPOSED
HYD PROPOSED HYDRANT, EX./FUT./AS-CONST.
WV PROPOSED WATERVALVE, EX./FUT./AS CONST.
PROP. CATCHBASIN MANHOLE, EX./FUT./AS-CONST.
EXISTING GASMAIN
(A), (R), (F) ADJUST, REMOVE, FUTURE
C U/H T EXISTING JOINT UTILITY TRENCH
EXISTING/PROPOSED TRANSFORMER, EXISTING PEDESTAL
PROPOSED DRIVEWAYS
SITE LIMITS
234 ORIGINAL CONTOURS PRIOR TO CONSTRUCTION FROM CJDL SURVEY (MAY NOT BE VALID NOW)
BOREHOLE (TROW 2005)
1.5m TO 1.2 HIGH BLACK VINYL CHAINLINK FENCE (BY OTHERS)
EX. DECIDUOUS TREE, TREE TO BE REMOVED
EX. CONIFEROUS TREE, TREE TO BE REMOVED
PROPOSED STREET LIGHT, TRANSFORMER, POLE
224.63 ELEVATIONS FROM CJDL SURVEY

LICENSED PROFESSIONAL ENGINEER
D.J. LYLE
100174772
PROVINCE OF ONTARIO

PRELIMINARY

METRIC SCALE 1:250

No.	REVISION	DATE	BY

MUNICIPALITY OF CENTRAL ELGIN

CJDL Consulting Engineers
Cyril J. Demeyere Limited
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cjdl@cjdleng.com

DESIGN BY: AM	DRAWN BY: ZDR	CHECKED BY: DJL
PROJECT NO. 20048	SURVEY BY: TPM	DATE: 11 FEB 2022

CANTERBURY PLACE
PART OF LOT 32
REGISTERED PLAN 231
MUNICIPALITY OF CENTRAL ELGIN

SERVICING PLAN

DRAWING No. 1